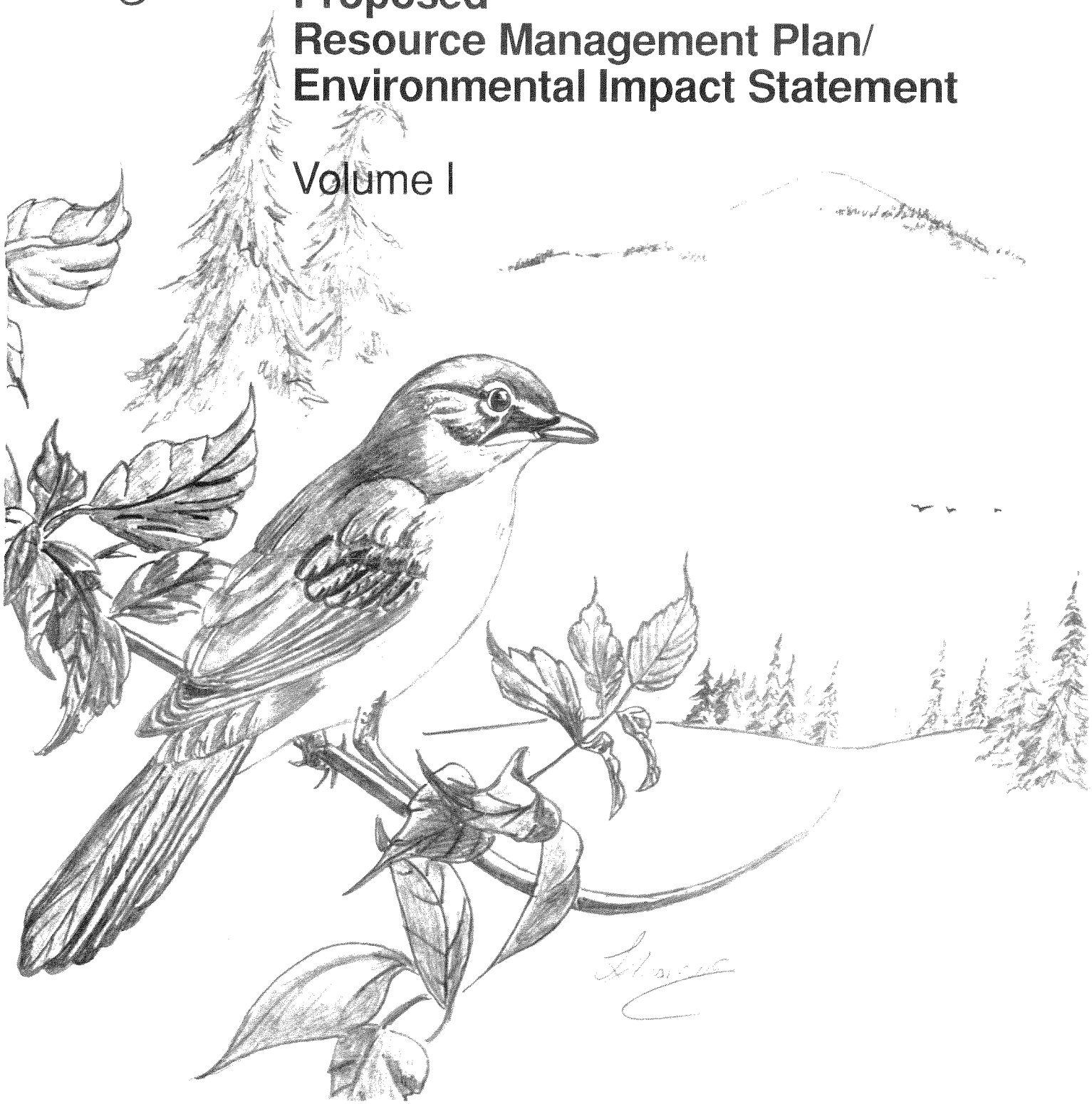
U.S. Department of the Interior
Bureau of Land Management

Roseburg District Office
777 N.W. Garden Valley Boulevard
Roseburg, Oregon 97470

October 1994

Roseburg District Proposed Resource Management Plan/ Environmental Impact Statement

Volume I



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/ES-94/34+1792

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Roseburg District Office
777 NW Garden Valley Boulevard
Roseburg, Oregon 97470

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

October 1994

Dear Public Land User:

Enclosed for your review and comment is the Roseburg District Proposed Resource Management Plan (RMP)/Final Environmental Impact Statement (EIS) for the Roseburg, Oregon District. The Bureau of Land Management has prepared this document in partial fulfillment of its responsibilities under the Federal Land Policy and Management Act of 1976 and the National Environmental Policy Act of 1969.

The Proposed RMP/Final EIS is designed to stand alone from the Draft RMP/EIS which was published in August 1992. However, you may find the Draft RMP/EIS to be a useful reference document.

The public devoted substantial effort to providing in-depth input on the Draft RMP/EIS. The Roseburg District received 1,348 individual comment letters containing over 9,000 specific comments. The Planning Team has assessed these comments and utilized the input in making substantive changes in the Proposed RMP and strengthening the EIS. We sincerely appreciate the efforts of those who took the time to provide us with their comments. We feel that your efforts have resulted in a stronger and clearer RMP.

This Proposed RMP/Final EIS contains a summary comparison of the alternatives analyzed in depth, an introduction, a description of the Proposed Plan and other alternatives analyzed, an affected environment description, the environmental consequences of the Proposed Plan and other alternatives, substantive (more than opinion) public comments received on the Draft RMP/EIS, and our response to those comments. The Preferred Alternative in the Draft RMP has been revised as a result of public comment, internal review, and the decisions made by the Secretaries of Interior and Agriculture following completion of the Supplemental Environmental Impact Statement on Management of Habitat for Species Within the Range of the Northern Spotted Owl. This revision has become the Proposed Plan which reflects these changes in the refinement of management objectives and in management actions.

If you desire assistance in understanding this document, you may contact RMP Team Leader Phil Hall at (503) 440-4930. Briefings or meetings to discuss and explain the proposed plan will be held. The time and place of these briefings will be announced.

If you would like me to further consider your interests/concerns as I make the final decisions which will guide the management of the public lands in the planning area for the next 10-15 years, please identify them in writing. The comment period will end 30 days after the Environmental Protection Agency publishes its notice of availability in the Federal Register. Comments should be sent to:

John Singlaub, District Manager
Bureau of Land Management
Roseburg District Office
777 NW Garden Valley Blvd.
Roseburg, Oregon 97470

The final decisions will be based on the analysis in the EIS, any additional data available, public input, management feasibility, policy, and legal constraints. Approval of the plan will be documented in a record of decision which will be made available to the public and mailed to all parties who were mailed this document. It is also important to note that RMP implementation usually involves further analysis and decision making, including public involvement and allows for protest of adverse decisions under 43 CFR Parts 4 and 5000.

The resource management planning process includes an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of a proposed RMP would be in error under 43 CFR 1610.5-2. Careful adherence to these guidelines will assist in preparing a protest that will assure the greatest consideration to your point of view.

Only those persons or organizations who participated in our planning process leading to this proposed RMP may protest. If our records do not indicate that you had any involvement in any stage in the preparation of the proposed Roseburg District RMP, your protest will be dismissed without further review. A protest must also be limited to a single proposed RMP, even if the issue or concern involves more than one proposed RMP. Protests that challenge proposed decisions in more than one proposed RMP will not be accepted by the Director. In effect, if you may be adversely affected by more than one RMP, you must file an individual protest for each RMP citing why and where that particular RMP is incorrect or not in compliance with existing laws, regulations, etc.

Protests of proposed plan elements that merely adopt decisions made in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl signed by the Secretary of the Interior will be dismissed, as the Director will not overturn a decision which the Secretary has already directed to be adopted in BLM's new resource management plans.

A protesting party may raise only those issues which he or she submitted for the record during the planning process. New issues identified during the protest period should be directed to the District Manager for consideration during plan implementation, as potential plan amendments, or as otherwise appropriate. If an issue is shared by several individuals or landowners or interest groups, a combined protest on the common neighborhood issue or concern may be mutually more efficient and effective. For example, several landowners in a portion of the planning area may wish to combine their concerns on a proposed land allocation or management issue that affects their common interests in a given watershed.

The period for filing a plan protest begins when the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of the final environmental impact statement concerning the proposed RMP or amendment. The protest period will end 30 days after the Environmental Protection Agency publishes its notice of availability in the Federal Register. There is no provision in BLM's regulations for any extension of time, and no extensions for filing protests will be granted. To be considered "timely," your protest must be postmarked no later than the last day of the protest period. Also, although not a requirement, we suggest that you send your protest by certified mail, return receipt requested.

Protests must be filed in writing to:

Director (760)
Chief, Planning and Environmental Coordination
Bureau of Land Management
406 "L" Street
Washington, D.C. 20240

To be considered complete, your protest must contain, at a minimum, the following information:

1. The name, mailing address, telephone number, and interest of the person filing the protest.

2. A statement of the issue or issues being protested.

3. A statement of the part or parts of the specific (named) proposed RMP being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the document.

4. A copy of all documents addressing the issue or issues that you submitted during the planning process or a reference to the date the issue or issues were discussed by you for the record.

5. A concise statement explaining why the BLM State Director's decision is believed to be incorrect. This is a critical part of your protest. Document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, and available planning records (e.g., meeting minutes or summaries, or correspondence). A protest which merely expresses disagreement with the Oregon/Washington State Director's proposed decision, without any data, will not provide us with the benefit of your information and insight. In this case, the Director's review will be based on the existing analysis and supporting data.

Thank you for your continued interest in the multiple use management of your public lands.

Sincerely,

John O. Singlaub
District Manager

U.S. Department of the Interior
Bureau of Land Management

PROPOSED ROSEBURG DISTRICT RESOURCE MANAGEMENT PLAN

FINAL ENVIRONMENTAL IMPACT STATEMENT

Prepared by
Roseburg District Office

Elaine Zielinski
State Director, Oregon/Washington

John Singlaub
District Manager, Roseburg District

ROSEBURG DISTRICT
PROPOSED RESOURCE MANAGEMENT PLAN and
FINAL ENVIRONMENTAL IMPACT STATEMENT

Draft ( ) Final (X)

Department of the Interior
Bureau of Land Management
Roseburg District

1. Type of Action: Administrative (X) Legislative ( )

2. Abstract: This Proposed Resource Management Plan and Final Environmental Impact Statement, in combination with the Draft, addresses resource management of 423,900 acres of public land surface and 1,717 acres of subsurface federal minerals administered by the Bureau of Land Management in the Roseburg District, Oregon. The Proposed Resource Management Plan responds to the need for a healthy forest ecosystem with habitat that will support populations of native species (particularly those associated with late-successional and old-growth forests) and includes protection for riparian areas and waters. It also responds to the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies, and contribute valuable resources to the national economy, on a predictable and long-term basis. Two new areas of critical environmental concern will be designated and seven existing areas of critical environmental concern will be retained, and no rivers are found suitable for designation under the Wild and Scenic Rivers Act.

3. The protest and comment period will end 30 days after the Environmental Protection Agency publishes its notice of availability in the Federal Register.

4. For further information contact:

Phil Hall
RMP/EIS Team Leader
Bureau of Land Management
777 NW Garden Valley Blvd.
Roseburg, Oregon 97470
(503) 440-4930

User's Guide

The Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP/FEIS) is divided into seven major sections: The Summary, Chapter 1 - Introduction, Chapter 2 - Alternatives, Chapter 3 - Affected Environment, Chapter 4 - Environmental Consequences, Chapter 5 - Consultation and Coordination, and supporting materials or appendices. Also included is a map packet which binds the one and two page maps. The larger foldout maps are included in a shrink wrap package. These major portions of the PRMP/FEIS are explained below.

The Summary presents a synopsis of the PRMP/FEIS. It follows the same outline as that in the Draft but has been updated to reflect changes made in the PRMP/FEIS. It summarizes all alternatives but presents more detail for the PRMP. Land use allocations are summarized for all issues in narrative and table form (see Table S-1). A summary of the environmental consequences (see Table S-2) and brief descriptions of monitoring, consistency with other government entities, and public involvement are included.

Chapter 1 (Introduction) contains introductory material to the PRMP/FEIS. This chapter remains essentially the same as that presented in the Draft and includes a description of the planning area and the purpose and need for preparing the RMP/EIS. Of major importance, it identifies the issues or concerns addressed in the RMP/EIS process. A discussion of the RMP's relationship to BLM policies, programs and other plans, a description of the planning process, and planning criteria are included.

Chapter 2 (Description of the Alternatives) has been revised extensively, both the organization and the description of the proposed decisions. The "PA" has been revised based on public comments, internal review, and the ROD on the SEIS; and the PA has been renamed the PRMP. Chapter 2 has been divided into three major sections:

- First, a "vision statement" that defines the overall goals and objectives of the PRMP.
- Second, the resource specific recourse conditions objectives, land use allocations, and management actions specific to the PRMP. This incorporates all management actions including those common to all the other alternatives.
- Third, management direction common to Alternatives NA-E, followed by those alternatives. This latter section has been modified very little.

As in the Draft, Chapter 2 describes seven different alternatives which respond to the 11 issues identified in Chapter 1. The alternatives provide a mix of uses and actions which could resolve the issues. Maps depicting the various proposed decisions for the PRMP have been updated and clarified. Maps displaying the major land use allocations for Alternatives A-E have not been reproduced.

Chapter 3 (Affected Environment) describes the environment that could be affected or changed by implementing any of the alternatives. Chapter 3 has been updated to reflect new data or to clarify information based upon comments. This chapter includes a description of the environmental factors (water resources, vegetation, wildlife habitat, visual resources, etc.) related to the issues.

Chapter 4 (Environmental Consequences) describes potential impacts and changes to the affected environment if any of the alternatives were implemented. This chapter has been updated primarily to reflect changes made to the PRMP. An overview of each alternative's relationship to plans and programs of other government agencies is also included.

Chapter 5 (Consultation and Coordination) identifies agencies and organizations BLM has worked with during the preparation of the PRMP/FEIS. This chapter has been significantly modified. It includes an updated summary of public involvement activities, a list of agencies and organizations to whom copies of the PRMP/FEIS have been sent, a summary of public comments, and a description of protest procedures.

The Appendices contain supplemental or backup information usually of a technical nature. The number of appendices included in the PRMP/FEIS has been substantially reduced from that included in the Draft. Also, some appendices have been altered to reflect new information or respond to changes to the PRMP. Appendix I is the response to Public Comment.

Other Specific Guidance

There are a number of other sections of the PRMP/FEIS that could enhance your understanding of this long, complex, and hard to read document.

The Table of Contents is located at the beginning of this document. It is very detailed and can be used to locate most sections. The Table of Contents not only contains a chapter by chapter list of topics but also includes lists of maps, figures, tables, and appendices.

The List of Acronyms is located at the beginning of this document. Acronyms are used throughout this document and their use had been reduced for the readers convenience.

The Glossary is located at the end of this volume and is essential to understanding many of the technical terminology and phrases used throughout the plan.

The Summary of Major Changes in each chapter documents those significant changes to the Draft EIS which have been incorporated into this PRMP/FEIS.

Maps. The shrink-wrapped maps depict allocations for the PRMP. The separately bound map packet contains all one and two-page maps. Maps illustrating allocations for the other alternatives were not reprinted; refer to the Draft RMP for this information.

Tables are located in the text as close to the first reference cited, except in Chapter 2 where most tables are located at the end of the text.

Acronyms

ACE	Allowable Cut Effect
ACEC	Area of Critical Environment Concern
ACMP	Area of Critical Mineral Potential
ADS	Automated Digitizing System
AI	Slope Index
AMS	Analysis of the Management System
APD	Application for Permit to Drill
AQMA	Air Quality Management Area
ARD	Automated Resource Data
ARPA	Archeological Resources Protection Act
ASQ	Allowable Sale Quantity
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practices
BRU	Basic Resource Unit
CBWR	Coos Bay Wagon Road
CCD	Coos, Curry, and Douglas County (Business Development Corporation)
CEQ	Council of Environmental Quality
Cf	Cubic Feet
CFI	Continuous Forest Inventory
CFL	Commercial Forest Land
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CMAI	Culmination of Mean Annual Increment
COPE	Coastal Oregon Productivity Enhancement
CSU	Controlled Surface Use
DBH	Diameter Breast Height
DDT	Dichloro-Diphenye-Tricholorethene
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DI	Density Index
DOT	United States Department of Transportation
EA	Environmental Assessment
EEA	Environmental Education Area
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQC	Environmental Quality Commission
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESC	Existing Stand Condition
FEIS	Final Environmental Impact Statement
FEMAT	Forest Ecosystem Management Team Report
FERC	Federal Energy Regulatory Commission
FHA	Federal Highway Administration
FI	Flow Index
FLPMA	Federal Land Policy and Management Act
FOI	Forest Operations Inventory
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act
FPHT	Forest Products Harvest Tax
FY	Fiscal Year
GFMA	General Forest Management Area
GIS	Geographic Information System
HCA	Habitat Conservation Area
HMP	Habitat Management Plan
IDT	Interdisciplinary Team
IPM	Integrated Pest Management
ISC	Interagency Scientific Committee
JTU	Jackson Turbidity Unit
KGRA	Known Geothermal Resource Area
LEIS	Legislative Environmental Impact Statement
LTSY	Long-Term Sustained Yield
LWD	Large Woody Debris
MBF	Thousand Board Feet
MFP	Management Framework Plan
Mg/l	Milligrams per Liter
MHA	Minimum Harvest Age
MI	Mining Index
MI	Management Intensity
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MOSS	Map Overlay and Statistical System
MOU	Memorandum of Understanding
MTP	Master Title Plat
MWS	Municipal Watershed
NA	No Action
NAAQS	National Ambient Air Quality Standards
EPA	National Environmental Policy Act
NOS	Notice of Staking
NPPC	Northwest Power Planning Council
NPS	Nonpoint Source
NSO	No Surface Occupancy
NTL	Notice to Lease
NTU	Nephelometric Turbidity Unit
NWSRS	National Wild and Scenic River System
O&C	Oregon and California Act of 1937 (Revested Oregon and California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands)
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OFPA	Oregon Forest Practices Act
OGEA	Old-Growth Emphasis Area
OI	Operations Inventory
ONA	Outstanding Natural Area
ONHP	Oregon Natural Heritage Plan
ORS	Oregon Revised Statutes
ORV	Off-Road Vehicle
ORV	Outstanding Remarkable Values
OSB	Oriented Strand Board
OSU	Oregon State University
PA	Preferred Alternative
PCT	Precommercial Thinning

PD	Public Domain
PI	Precipitation Index
PL	Public Law
PLS	Public Land Survey
PNW	Pacific Northwest Research Station
PM	Particulate Matter
PM 10	Particulate Matter 10 Microns or Smaller
PPB	Parts Per Billion
PPM	Parts Per Million
PRMP	Proposed Resource Management Plan
PSQ	Probable Sale Quantity
R&PP	Recreation and Public Purpose
R and R	Restoration and Retention Blocks
RI	Riparian Index
RIA	Rural Interface Area
RMA	Riparian Management Area
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
SCFL	Suitable Commercial Forest Land
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SDI	Soil Disturbance Index
SEIS	Supplemental Environmental Impact Statement
SEIS ROD	Supplemental Environmental Impact Statement, Record of Decision
SI	Silvicultural Index
SIP	State Implementation Plan
SMP	Smoke Management Plan
SRMA	Special Recreation Management Area
SWL	Suitable Woodland
SYU	Sustained Yield Unit
T&E	Threatened and Endangered (species)
TMDL	Total Maximum Daily Load
TMP	Timber Management Plan
TPCC	Timber Production Capability Classification
Ug/l	Micrograms per Liter
uS	Conductivity as Measured in Micro Siemens
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USDA	United States Department of Agriculture
USDI	United States Department of Interior
VI	Vegetation Index
VRM	Visual Resource Management
WCI	Watershed Condition Index
WODDB	Western Oregon Digital Data Base
WRRI	Water Resources Research Institute
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act

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PRMP/EIS Summary

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Introduction

The Roseburg Management Plan (RMP) will establish guidelines for the management of BLM-administered land in the Roseburg District for at least ten years. It will supersede and replace four management framework plans covering the same area, completed in 1983. The Proposed RMP/Final EIS has been prepared in accordance with the BLM planning regulations issued under authority of the Federal Land Policy and Management Act and written in accordance with Council on Environmental Quality regulations issued under authority of the National Environmental Policy Act.

BLM-administered lands in the planning area consist of 391,578 acres of Oregon and California Railroad (O&C) lands, 13,924 acres of Coos Bay Wagon Road lands, and 18,426 acres of Public Domain lands plus 1,717 acres of split estate (federal minerals).

Alternatives

Seven alternatives have been developed to provide a range of responses to major issues identified earlier in the planning process. These issues are: timber production practices; old-growth forests; habitat diversity; threatened and endangered species habitat; special areas; visual resources; stream, riparian, and water quality protection; recreation resources, including wild and scenic rivers; land tenure; and rural interface areas. Of particular interest is whether or not to harvest the remaining old-growth forests and the related effects on regional and local economies, biological diversity and the northern spotted owl, a federally listed threatened species.

Each alternative offers a possible broad course of action that, if selected, would provide guidelines for future, more specific decisions. Site specific management for various resources, annual timber sale plans, and issuance of rights-of-way leases, or permits will follow the guidelines identified in the RMP.

Selected land use or resource allocations of the alternatives are compared in Table S-1, found at the end of the summary. Analysis of effects of each alternative except No Action has been facilitated by development of ten year representative timber management scenarios. These reflect possible timber harvest units, roads, and timber management practices during the first ten years of the RMP. These scenarios include different levels of forest management practices (also shown in Table S-1). Anticipated environmental consequences of the alternatives are summarized in Table S-2, also located at the end of the summary.

A summary of the Proposed RMP (PRMP), the No Action Alternative, and Alternatives A, B, C, D, and E follows. A map of the District Planning Strategy is in the enclosed map packet.

No Action - This alternative would entail no change from the management direction established in BLM's current management framework plans (except where Congress has since enacted legislation prescribing different management direction for specific geographic areas or transferring specific lands to the administration or ownership of other parties).

This alternative would emphasize timber production and other economically important values to contribute to community stability, consistent with the variety of other land uses. A system of blocks of old-growth and mature forest would be retained to contribute to ecological functions important to forest productivity. Restrictions of disturbance of fragile sites and riparian zones would mitigate adverse impacts on soil productivity and water quality. Lands would be allocated for the specific purpose of protecting unique natural values and special status species, including endangered species. Mitigation measures would be used to moderate impacts on fisheries, wildlife, cultural resources, and other nontimber values.

Alternative A - This alternative would emphasize a high production of timber and other economically important values on all lands, and contribute to community stability. It would produce the highest sustained yield of timber on all suitable forest lands legally available for harvest. It would also manage threatened and endangered species habitat and habitats of species proposed for such status as legally required. In addition, it would protect habitats of other species with high potential for listing if known only to exist on BLM-administered lands. One of nine existing Special Areas would be retained. To meet legal requirements for protection of wetlands and water quality, as well as protecting anadromous fish habitat and other relevant values, riparian zones would be managed according to requirements of the Oregon Forest Practices Act and the Federal Water Pollution Control Act. Recreation management emphasis would be on existing recreation sites (including the North Umpqua Wild and Scenic Corridor) and trails of high use and dispersed motorized recreation uses. Land tenure adjustments

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which enhance BLM long-term sustained yield timber harvest opportunities would be emphasized. No special timber management actions or mitigating measures would be provided in rural interface areas.

Alternative B - This alternative would emphasize timber production and other economically important values to contribute to community stability, consistent with the variety of other land uses, on O&C lands and Coos Bay Wagon Road lands. Public Domain lands having greater importance for nontimber values and uses would be managed primarily for the maintenance of the nontimber values and uses. A system of blocks of old-growth and mature forest would be retained to contribute to ecological functions important to timber productivity. Habitat of threatened and endangered species and species proposed for such status would be protected. Other special status species would be protected to the extent they would not interfere with high timber production. Timber harvest would not be planned in riparian zones of important waters (third order and larger streams and wetlands). Seven of nine existing Special Areas would be retained, one existing Special Area would be expanded and one new one designated. No rivers (other than the already designated North Umpqua River) would be found suitable for designation as Wild and Scenic. Scenic resources would be managed in selected special status and high use areas. Recreation management would provide for a wide range of developed and dispersed recreation uses.

Land tenure adjustments of O&C and Coos Bay Wagon Road lands would be made primarily to acquire lands which would enhance timber management opportunities. Exchanges of public domain lands would be made to benefit one or more of the resources managed. Alternative forest management practices would be applied in rural interface areas which include lands zoned for occupancy of one to five acre lots within 1/4-mile of BLM-managed lands.

Alternative C - This alternative would provide timber production to contribute to community stability consistent with the variety of other land uses. It would emphasize retention and improvement of biological diversity, retaining a system that maintains some old-growth and mature forest, stressing connectivity and focusing on areas where special status plant and animal species cluster. Habitats of threatened and endangered species, species proposed for such status, and species with a high potential for federal listing as threatened or endangered would be protected. Other species of related concern would be protected primarily through the emphasis on biological diversity. Timber harvest would not be planned in or immediately adjacent to riparian zones of important waters. Eight of nine existing Special Areas would be retained, four existing Special Areas would be expanded and two new ones would be designated. No rivers in addition to the North Umpqua would be recommended suitable for designation as Wild and Scenic. Scenic resources would be managed in selected special status and high use areas. Recreation management would provide for a wide range of recreation opportunities, emphasizing dispersed use. Special forest management practices would be applied where appropriate in rural interface areas which include lands within 1/4-mile of areas zoned by Douglas County for one to five acre residential lots. Land tenure adjustments would be made to benefit a variety of uses and values.

Alternative D - This alternative would emphasize management and enhancement of values such as diversity of wildlife habitat, dispersed nonmotorized recreation opportunities, and scenic resources, consistent with a variety of other land uses including some timber production. Spotted owl habitat would be protected in accordance with the Conservation Strategy for the Northern Spotted Owl (Thomas et al. 1990). Species with a high potential for federal listing as threatened or endangered and other special status species would be protected. Timber harvest would not be planned in and adjacent to riparian zones of important waters or their immediate tributaries. Six of nine existing Special Areas would be retained, four existing Special Areas would be expanded, and three new ones designated. No additional rivers would be found suitable for designation as Wild and Scenic. All identified scenic resources would be managed as inventoried. Recreation management would emphasize dispersed nonmotorized opportunities. Special timber harvest and forest management practices would be applied in Rural Interface Areas which include lands within 1/4-mile of areas zoned for one to five acre residential lots. Land tenure adjustments would be made to benefit a variety of uses and values.

Alternative E - This alternative would emphasize protection of older forests and management and enhancement of values such as dispersed nonmotorized recreation opportunities and scenic resources. A sustained yield of timber would be produced consistent with the emphasis on these other values. All old-growth forest stands would be retained. Species with a high potential for Federal listing as threatened or endangered and other special status species would be protected. Timber harvest would not be planned in, or adjacent to, riparian

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zones. Six of nine existing Special Areas would be retained, four existing Special Areas would be expanded, and three new ones designated. Two additional rivers would be found suitable for designation as Wild and Scenic, with a recreation classification. All identified scenic resources would be managed and some visual resource protection would be provided for all lands. Recreation management would emphasize dispersed nonmotorized opportunities. Special timber harvest and forest management practices would be applied in rural interface areas. Land tenure adjustments would be made to emphasize enhancement of nontimber uses and values. Alternative forest management and timber harvest practices would be applied in rural interface areas which include lands zoned for occupancy of one to five acre lots within 1/2-mile of BLM-managed lands.

The Proposed Resource Management Plan (PRMP)

The PRMP was developed partially in response to public comments related to the Bureau of Land Management's August 1992 draft resource management plans for western Oregon. In addition the proposed plan incorporates the land use allocations and management direction from the 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its Attachment A (hereafter referred to simply as ROD).

Vision

The Bureau of Land Management will manage the natural resources under its jurisdiction in western Oregon to help enhance and maintain the ecological health of the environment and the social well being of human populations.

There are several basic principles supporting this vision:

- Natural resources can be managed to provide for human use and a healthy environment.
- Resource management must be focused on ecological principles to reduce the need for single resource or single species management.
- Stewardship, the involvement of people working with natural processes, is essential for successful implementation.
- The Bureau of Land Management cannot achieve this vision alone but can, by its management processes and through cooperation with others, be a significant contributor to its achievement.
- A carefully designed program of monitoring, research, and adaptation will be the change mechanism for achieving this vision.

Strategy

Lands administered by the Bureau of Land Management will be managed to maintain healthy, functioning ecosystems while providing a sustainable production of natural resources. This management strategy, titled ecosystem management, involves the use of ecological, economic, social, and managerial principles to ensure the sustained condition of the whole. Ecosystem management emphasizes the complete ecosystem instead of individual components and looks at sustainable systems and products that people want and need. It seeks a balance between maintenance and restoration of natural systems and sustainable yield of resources.

The building blocks for this strategy are comprised of several major land use allocations - Riparian Reserves, Late-Successional Reserves, Adaptive Management Areas, Matrix which includes General Forest Management Areas and Connectivity/Diversity Blocks, and a variety of special purpose management areas such as recreation sites, wild and scenic rivers, and visual resource management areas. These land use allocations are located and configured in the landscape to support overall ecosystem function and to meet the vision for management of federal lands in western Oregon. The major land use allocations are shown in Figure S-2.

Each land use allocation will be managed according to specific objectives and management actions/ direction. During initial implementation of the plan, the stated objectives and management actions/ direction will provide the rules and limits governing actions and the principles specifying the environmental conditions or levels to be achieved and maintained. As BLM gains experience in

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implementing the plan and applying the concepts of adaptive management, the stated objectives and management actions/direction will be refined for specific geographic areas.

There are two major management concepts underlying the plan - Ecological Principles for Management of Late-Successional Forests and the Aquatic Conservation Strategy.

Ecological Principles for Management of Late-Successional Forests

One goal of the proposed plan is to maintain late-successional and old-growth species habitat and ecosystems on federal lands. A second goal is to maintain biological diversity associated with native species and ecosystems in accordance with laws and regulations.

All land use allocations described in the proposed plan will contribute to these two goals. For instance, Late-Successional and Riparian Reserves and many special management areas (e.g., areas of critical environmental concern) will be managed to enhance and/or maintain late-successional forest conditions. The General Forest Management Area and Connectivity/Diversity Blocks will be managed to retain late-successional forest legacies (e.g., coarse woody debris, green trees, snags, and late-successional forest patches).

Aquatic Conservation Strategy

The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of the anadromous fish of the Pacific Ocean.

The Aquatic Conservation Strategy is designed to meet the following objectives:

- Maintain and restore the distribution, diversity, and complexity of watershed and landscape scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.
- Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, up slope areas, headwater tributaries, and intact refuge. These lineages must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian dependent species.
- Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
- Maintain and restore the sediment regime under which an aquatic ecosystem evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
- Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing (i.e., movement of woody debris through the aquatic system). The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.
- Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
- Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

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- Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian dependent species.

The components of the Aquatic Conservation Strategy are Riparian Reserves, Key Watersheds, watershed analysis, and watershed restoration.

Riparian Reserves

See Riparian Reserves in the following section.

Key Watersheds

A system of Key Watersheds that serve as refuge is crucial for maintaining and recovering habitat for at risk stocks of anadromous salmonids and resident fish species. These refuge include areas of high quality habitat and areas of degraded habitat. Key Watersheds with high quality conditions will serve as anchors for the potential recovery of depressed stocks. Those of lower quality habitat have high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program.

There are two types of Key Watersheds - Tier 1 and Tier 2. Tier 1 watersheds contribute directly to conservation of at risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. Tier 2 watersheds do not contain at risk fish stocks, but they are important sources of high quality water.
Key Watersheds in the district are as follows:

Key Watershed Name	Tier	Acres
Elk Creek	1	272
Middle Creek	1	10,617
Paradise Creek	1	294
South Umpqua River	1	47,492
Steamboat Creek	1	17,876
Upper Smith River	1	26,085
West Fork Cow Creek	1	702
Williams/Fairview Creeks	1	3
Total		103,340

Key Watersheds overlay portions of land use allocations in the district and place additional management requirements or emphasis on activities in those areas.

Watershed Analysis

Watershed analysis is one of the principle analyses that will be used to meet the ecosystem management objectives of this RMP. Watershed analyses will be the mechanism to support ecosystem management at approximately the 20 to 200 square mile watershed level.

Watershed analysis will focus on collecting and compiling information within a watershed that is essential for making sound management decisions. It will be an analytical process, not a decision making process with a proposed action requiring NEPA documentation. It will serve as a basis for developing project specific proposals, and determining monitoring and restoration needs for a watershed. Project specific NEPA planning will use information developed from watershed analysis. For example, if watershed analysis shows that restoring certain resources within a watershed could contribute to achieving Aquatic Conservation strategy objectives, then subsequent decisions will need to address that information.

Watershed Restoration

Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. The most important components of a watershed restoration program are control and prevention of road related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in stream habitat complexity. Other restoration opportunities include meadow and wetland restoration and mine reclamation.

Riparian Reserves

Riparian Reserves support Aquatic Conservation Strategy objectives and provide habitat for special status species and ROD special attention species.

There are approximately 113,500 acres of riparian reserves in the district, including approximately 8,200 acres modeled in the Little River Adaptive Management Area. Calculation of these acres is based on prescribed widths and estimated miles of stream in the various categories described in the Record of Decision. If Riparian Reserves were projected across the entire landscape, including all other reserves and administrative withdrawals, they

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would account for 217,000 gross acres. Gross acres for Riparian Management Areas or Riparian Reserves of all alternatives are shown in Table S-1. The gross acres of Riparian Reserves have little effect on management when they occur in areas already withdrawn. The widths are intended to provide a high level of fish, wildlife, and plant habitat and riparian protection until watershed and site analysis can be completed. Although Riparian Reserve boundaries on permanently flowing streams may be adjusted, they are considered to be the approximate widths necessary for attaining Aquatic Conservation Strategy objectives.

Riparian Reserves consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of riparian vegetation, or to a distance initially calculated as follows, whichever is greatest:

Fish bearing streams: equal to the height of two site potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel).

Permanently flowing non-fish bearing streams: equal to the height of one site potential tree, or 150 feet slope distance.

Seasonally flowing or intermittent streams, wetlands less than one acre, and unstable and potentially unstable areas: equal to the height of one site potential tree, or 100 feet slope distance.

In the last case and in the following ones, Riparian Reserves include the extent of unstable and potentially unstable areas, and the extent of the wetland or water body. In the following ones they also include the extent of seasonally saturated soil, and distances initially calculated as follows, whichever is greatest:

Constructed ponds and reservoirs, and wetlands greater than one acre: equal to the height of one site potential tree, or to 150 feet slope distance from the edge of a wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs.

Lakes and Natural Ponds: equal to the height of two site potential trees, or 300 feet slope distance.

As a general rule, management actions/direction for Riparian Reserves prohibit or regulate activities that retard or prevent attainment of Aquatic Conservation Strategy objectives. Watershed analysis and appropriate National Environmental Policy Act compliance will be required to change Riparian Reserves in all watersheds.

Timber harvest, including fuel wood cutting, will be precluded in Riparian Reserves, with exception of salvage if required to attain Aquatic Conservation Strategy objectives after catastrophic events, or when watershed analysis determines that present and future woody debris needs are met and other Aquatic Conservation Strategy Objectives are not adversely affected.

Silvicultural practices will be applied in Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives.

New roads in Riparian Reserves will be designed to meet Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Late Successional Reserves will be established to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest related species including the northern spotted owl and marbled murrelet; and to maintain a functional, interacting, late-successional and old-growth forest ecosystem.

There are 186,423 acres of Late-Successional Reserves in the district. The five components of this reserve system are:

1. Mapped Late-Successional Reserves: These reserves incorporate Key Watersheds to the extent practicable; some or parts of the most ecologically significant and ecologically significant late-successional forests identified by the Scientific Panel on Late-Successional Forest Ecosystems; and some or parts of the Designated Conservation Areas from the Final Draft Spotted Owl Recovery Plan.

2. Late-Successional/Old-Growth 1 and 2 areas within Marbled Murrelet Zone 1, as mapped by the Scientific Panel on Late-Successional Forest Ecosystems.

3. Occupied Marbled Murrelet Sites.

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4. Known Spotted Owl Activity Centers (as of January 1, 1994).

5. Protection Buffers for Special Status and ROD Special Attention Species.

See District Strategy map for locations of Late-Successional Reserves. Occupied marbled murrelet sites, known spotted owl activity centers, and protection buffers are unmapped.

Silvicultural treatments that are beneficial to the creation of late-successional habitat will be conducted inside Late-Successional Reserves.

If needed to create and maintain late-successional forest conditions, thinning operations will be conducted in forest stands up to 80 years of age. This will be accomplished by precommercial or commercial thinning of stands regardless of origin (e.g., planted after logging or naturally regenerated after fire or blowdown).

Salvage of dead trees in Late-Successional Reserves will be limited to areas where stand replacing events exceed ten acres in size and canopy closure has been reduced to less than 40 percent. All standing live trees, including those injured (e.g., scorched) but likely to survive, will be retained, as well as snags that are likely to persist until late-successional forest conditions have developed and a new stand is again producing large snags.

Adaptive Management Areas

Adaptive Management Areas were created as places to develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives. They also are intended to contribute substantially to the achievement of ROD objectives, including provision of well distributed late-successional habitat outside reserves; retention of key structural elements of late-successional forests on lands subjected to regeneration harvest; restoration and protection of riparian zones; and provision of a stable timber supply.

There are 19,260 acres of BLM-administered land in the Little River Adaptive Management Area. These Adaptive Management Area acres were modeled for analysis purposes as having similar land use allocations (Riparian Reserves, Connectivity/Diversity Blocks, etc.) as adjacent lands.

A plan will be developed for the Little River Adaptive Management Area and management activities will proceed while the plan is being developed.

Matrix (Connectivity/ Diversity Blocks and General Forest Management Area)

The lands in the Matrix are expected to:

- Produce a sustainable supply of timber and other forest commodities.
- Provide connectivity (along with other allocations such as Riparian Reserves) between Late-Successional Reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
- Provide early-successional habitat.

In the Matrix, there are approximately 54,900 acres of BLM-administered land in the General Forest Management Area and 26,900 acres in Connectivity/ Diversity Blocks. Connectivity/Diversity Blocks vary in size and are distributed throughout the Matrix.

Timber harvest and other silvicultural activities will be conducted in that portion of the Matrix with suitable forest lands. Management direction is summarized in the Timber Resources section later in this summary.

Timber harvest will be conducted so as to provide a renewable supply of large down logs well distributed across the Matrix landscape in a manner that meets the needs of species and provides for ecological functions. Down logs will reflect the species mix of the original stand.

Green trees and snags will be retained throughout the General Forest Management Area, including six

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to eight green conifer trees per acre in regeneration harvest units. Snags will be retained within a timber harvest unit at levels sufficient to support species of cavity nesting birds at 40 percent of potential population levels. In addition, green trees will be retained for snag recruitment in timber harvest units where there is an identified, near term (less than three decades) snag deficit. These trees do not count toward green tree retention requirements.

Connectivity/Diversity Blocks will be spaced throughout the BLM land base. They will be managed to maintain 25 to 30 percent of each block in late-successional forest at any point in time. Within these blocks, Riparian Reserves and other allocations with late-successional forest count toward this percentage.

In fifth field watersheds (20 to 200 square miles) in which federal forest lands are currently comprised of 15 percent or less late-successional forest, all remaining late-successional forest stands will be retained.

Air Quality

Efforts to meet National Ambient Air Quality Standards, Prevention of Significant Deterioration goals, and the visibility protection plan will continue. Activities will be conducted so as to maintain and enhance air quality and visibility in a manner consistent with the Clean Air Act and the Oregon State Implementation Plan.

Smoke emissions will be controlled by planning, conducting, monitoring, and, if necessary, adjusting prescribed fire activities in accordance with the State Implementation Plan and the Oregon Smoke Management Plan.

Methods for slash disposal, site preparation, etc., which reduce the need to burn will be developed and used. The selected methods will be compatible with ecosystem management objectives.

Water and Soils

The Aquatic Conservation Strategy and Riparian Reserve management previously discussed are the main elements of water and soils management.

In addition, management will contribute toward improvement or maintenance of water quality in municipal water systems, and will strive to improve and/or maintain soil productivity.

Soil and water conditions will be improved and/or maintained by closing selected areas to Off Highway Vehicle use and/or limiting such use to existing or designated roads and trails. See the Recreation section later in this summary, for additional details.

BLM will continue to implement a nonpoint source management program in cooperation with the U. S. Environmental Protection Agency and the Oregon Department of Environmental Quality. Coordination with the Oregon Department of Environmental Quality for implementation of Best Management Practices which protect beneficial uses of water will also continue.

Consistency of management activities with Oregon's Statewide Water Quality Management Plan for forest practices and with Oregon's water quality criteria and guidelines (Oregon Administrative Rule 340-41) will be ensured.

Flood plains and wetlands will be protected in accordance with Executive Orders 11988 and 11990 and BLM's Riparian-Wetlands Initiative for the 1990s.

Wildlife Habitat

Late-Successional Reserve, Riparian Reserve, and Matrix management all contribute to management of wildlife habitat. Management will be directed to enhance and maintain biological diversity and ecosystem health to contribute to healthy wildlife populations. Management for Special Status and ROD Special Attention Species Habitat (discussed later) also addresses many wildlife species.

Fish Habitat

The Aquatic Conservation Strategy drives fish habitat management. Riparian Reserve management is a key element of management intended to maintain or enhance the fisheries potential of streams and other waters consistent with BLM's Fish and Wildlife 2000 Plan, the Bring Back the Natives initiative, and other nationwide initiatives. This management is also intended to promote the rehabilitation and protection of fish stocks at risk and their habitat.

Priority for fish habitat enhancement projects will be given to watersheds supporting at risk fish species and stocks and those requiring extensive restoration.

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Actions will be taken to rehabilitate streams and other waters to enhance natural populations of anadromous and resident fish. Possible rehabilitation measures would include, but not be limited to, fish passage improvements, instream structures using boulders and log placement to create spawning and rearing habitat, placement of fine and coarse materials for over wintering habitat, and riparian rehabilitation to establish or release existing coniferous trees.

Special Status and ROD Special Attention Species Habitat

Management will be designed to protect, manage and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and bureau special status species policies. Management for the conservation of federal candidate and bureau sensitive species and their habitats will focus on not contributing to the need to list and to recover the species. Management for the conservation of state listed species and their habitats will be designed to assist the state in achieving management objectives.

Assessment species (which are of lesser concern) will be managed where possible so as to not elevate their status to any higher level of concern. ROD special attention species will also be managed so as not to elevate their status to any higher level of concern.

Community structure, species composition, and ecological processes of special status plant and animal habitat will be maintained or restored.

BLM will consult with or request technical assistance from the U.S. Fish and Wildlife Service or National Marine Fisheries Service for any proposed action which may affect federal listed or proposed species or their critical or essential habitat. Based on the results of consultation, the proposed action will be modified, relocated, or abandoned.

Table S-3 shows the numbers of special status plant and animal species that have been identified as inhabiting BLM-administered lands in the planning area.

The survey and manage provision of the ROD will be implemented within the ranges of its special attention species and the particular habitats that they are known to occupy.

Protection buffers will be provided for specific rare and locally endemic species and ROD special attention species in the upland forest matrix.

Establishment of Late Successional Reserves and other general allocations provide the framework for protection of the northern spotted owl. In addition 100 acres of the best northern spotted owl habitat as close as possible to a nest site or owl activity center in the Matrix will be retained for all known (as of January 1, 1994) spotted owl activity centers.

As noted previously, Late-Successional Reserves include Late-Successional/Old-Growth 1 and 2 areas in marbled murrelet Zone 1 and all occupied murrelet sites. In addition, contiguous existing and recruitment habitat for marbled murrelets (i.e., stands that are capable of becoming marbled murrelet habitat within 25 years), within a 0.5 mile radius of any site where the birds' behavior indicates occupation, will be protected.

To support the Pacific Bald Eagle Recovery Plan, six existing nest sites and 4660 acres of habitat would be protected.

All actions would be consistent with the Columbian White-tailed Deer Recovery Plan. Timber harvest or other vegetation altering activities on all BLM-administered lands (12,761 acres) within the general area of distribution will only occur if determined to be beneficial to Columbian White-tailed deer or until such time that definitive information is available describing the use level and value of these lands in the context of meeting recovery plan goals.

Special Areas

Seven existing special areas will be retained, four existing special areas would be expanded, and three new special areas would be designated. Total allocation would be 5,107 acres compared to a present allocation of 2,553 acres.

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Cultural Resources Including American Indian Values

Cultural resource localities will continue to be identified and managed for public, scientific, and cultural heritage purposes.

Responsibilities to appropriate American Indian groups regarding heritage and religious concerns will be fulfilled.

Visual Resources

Scenic quality will be managed through the Visual Resource Management System on Roseburg District public lands.

Sensitive areas will be designated and managed "as inventoried" in the Visual Resource Inventory. Landscape alterations will not dominate the view and scenic quality would meet objectives of Visual Resource Management Class I, II or III. They include:

- Land adjacent to developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the Wild and Scenic Rivers Act.
- Areas of Critical Environmental Concern and Research Natural Areas.
- Available forest land where Federal ownership consists of more than half of the viewshed.

Rural interface areas will be designated as Class III or higher. The majority of lands will be designated as Class IV which allows for major modification of the existing character of the landscape for management activities. However, every attempt will be made to minimize the impact of activities through careful location, minimal disturbance, and repeating the basic elements.

Timber harvest prescriptions are identified to meet Visual Resource Management Class II, III and IV objectives.

Wild and Scenic Rivers

No river segments will be recommended as suitable for designation by Congress under the Wild and Scenic Rivers Act. A 17.5 mile segment of Smith River and a 10.7 mile segment of Canton Creek which were found eligible for designation and studied by BLM will be found not suitable for such designation.

Rural Interface Areas

Visual Resource Management Class III management (and other special timber management practices) will be applied on 8,552 acres of BLM-administered lands within 1/4-mile of private lands where county zoning allows for development on one to five acre lots.

Socioeconomic Conditions

Management will contribute to local, state, national and international economies through sustainable use of BLM-managed lands and resources and use of innovative contracting and other implementation strategies. It will also provide amenities (e.g., recreation facilities, protected special areas and high quality fisheries) that enhance communities as places to live and work.

BLM management programs are expected to support 544 jobs and provide $9.333 million a year in personal income during the life of the plan. Those jobs are less than the average supported in the 1984-1988 period.

Recreation

Management will aim to provide a wide range of developed and dispersed recreation opportunities that contribute to meeting projected recreation demand within the planning area in a manner consistent with BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation initiative. Scenic, natural and cultural resources will be managed to enhance visitor recreation experience expectations and produce satisfied public land users. Locally sponsored tourism initiatives and community economic strategies will be supported by providing recreation projects and

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programs that benefit both short and long-term implementation.

All 17 existing recreation sites and trails would remain open. Twenty-nine additional sites or trails would be developed if funding is available. The emphasis of facility management and development would be to accommodate the increasing demand for recreation opportunities close to population centers and accessible by road.

Three road segments (both BLM roads and county roads on BLM-administered lands) totaling 89 miles would be designated Back Country Byways, components of the National Scenic Byway System.

Off Highway Vehicle designations will be made on all BLM-administered lands in the Roseburg District, either limiting or closing motorized use. Ninety-eight percent of public lands in the district will be limited to existing roads and trails.

Use for all recreation activities would be expected to increase during the life of the RMP. Expected demand would be met for all activities except for Off Highway Vehicle use.

Timber Resources

Management will provide a sustainable supply of timber and other forest products.

See Table S-4 for lands available for scheduled timber harvest.

The General Forest Management Areas and Connectivity/Diversity Blocks net land use allocations are interspersed with Riparian Reserves and other land use allocations which are not shown on the Roseburg District Strategy map. The gross mapped land use allocation acres as they appear on the Roseburg District Strategy map for the General Forest Management Areas and Connectivity/Diversity Blocks are shown on the above table. The net land use allocation acres are the actual allocated acres for the General Forest Management Areas and Connectivity/Diversity Blocks and are the acres modeled in TRIM-PLUS as available for harvest.

The allocation of lands for scheduled harvest is shown in Figure S-1.

The annual Probable Sale Quantity from these allocations and the management planned for the Matrix (with extrapolation of those management assumptions to the Adaptive Management Areas is 6.99 million cubic feet (45.3 million board feet).

The Probable Sale Quantity for the PRMP is an estimate of annual average timber sale volume likely to be achieved from lands allocated to planned, sustainable harvest. The use of Probable Sale Quantity, rather than Allowable Sale Quantity recognizes uncertainties in the estimate. Harvest of this approximate volume of timber is considered sustainable over the long term based on the assumptions that the available land base remains fixed, and that funding is sufficient to make planned investments in timely reforestation, plantation maintenance, thinning, genetic selection, forest fertilization, timber sale planning, related forest resource protection, and monitoring.

The Probable Sale Quantity represents neither a minimum level that must be met nor a maximum level that cannot be exceeded. It is an approximation because of the difficulty associated with predicting actual timber sale levels over the next decade, given the complex nature of many of the standards and guidelines. It represents BLM's best assessment of the average amount of timber likely to be awarded annually in the planning area over the life of the plan, following a start up period. The actual sustainable timber sale level attributable to the land use allocations and management direction of the PRMP may deviate by as much as 20 percent from the identified Probable Sale Quantity. The potential variables are discussed in the Timber Resources section of this chapter. There may be an additional ten percent non-chargeable ("other wood") volume beyond the level of the Probable Sale Quantity from lands that are not part of the timber base. This volume may be a result of activities for the enhancement of other resources, such as to meet the objectives of Late-Successional Reserves, Riparian Reserves, or other areas with no direct timber volume objective.

Logging systems will be selected based on the suitability and economic efficiency of each system for the successful implementation of the silvicultural prescription, for protection of soil and water quality, and for meeting other land use objectives.

Regeneration harvests will be scheduled to assure that, over time, harvest will occur in stands at or above the age of volume growth culmination (i.e., culmination of mean annual increment). This refers to the age range which produces maximum average annual growth over the lifetime of a timber stand. In the planning area, culmination occurs between 80 and 110 years of age. Regeneration harvests may be

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scheduled in stands as young as 60 years, in order to develop a desired age class distribution across the landscape. However, modeling shows that harvest in stands as young as 60 years is not necessary the first decade.

Silvicultural treatments and harvest designs will be based on the functional characteristics of the ecosystem and on the characteristics of each forest stand and site. Treatments will be designed, as much as possible, to prevent the development of undesirable species composition, species dominance, or other stand characteristics. The principles of integrated pest management and integrated vegetation management will be employed to avoid the need for direct treatments. Herbicides would be used only as a last resort.

Harvest of marketable hardwood stands will be planned in the same manner as conifer stands, if the land is not otherwise constrained from timber management. Volume from projected hardwood harvest is not included in the probable sale quantity estimate. Where hardwood trees became established following previous harvest of conifers, reestablishing a conifer stand on the site will be planned.

Unscheduled harvests will occur from thinning and salvage in Late-Successional Reserves and may occur from salvage in Riparian Reserves.

Special Forest Products

BLM will manage for the production and sale of Special Forest Products when demand is present and where actions taken are consistent with primary objectives for the land use allocation. The principles of ecosystem management will be used to guide the management will be used and harvest of special forest products.

Energy and Minerals

Management will maintain exploration and development opportunities for leasable and locatable energy and mineral resources.

Most BLM-administered lands would remain available for mineral leasing of oil and gas or geothermal resources and location of mining claims, but a variety of designations and allocations such as Areas of Critical Environmental Concern, Late-Successional Reserves, and Riparian Reserves restrict exploration and development.

Land Tenure Adjustments

Land tenure adjustments will benefit a variety of uses and values, emphasizing opportunities that conserve biological diversity or enhance timber management opportunities. As a matter of practice, O&C forest lands allocated to timber management would only be exchanged for lands to be managed for multiple use purposes.

Lands are categorized in three land tenure adjustment zones:

> Zone 1: 35,930 acres retained under BLM administration.
>
> Zone 2: 380,749 acres where land ownership may be "blocked up" in exchange for other lands in Zones 1 and 2 with significant resource values.
>
> Zone 3: 13,470 acres where only lands with unique resource values would be retained; other lands in this zone would be exchanged, sold, or transferred to another agency using appropriate disposal mechanisms.

Roads

Road management will correct problems associated with high road density by emphasizing the reduction of minor collector and local road densities where those problems exist. Roads will be managed to meet the needs identified under other resource programs (e.g., seasonal road closures for wildlife).

Monitoring the RMP

Monitoring and evaluation of the resource management plan will be carried out at appropriate intervals for the following purposes:

- To be sure activities are occurring in conformance with the RMP.
- To determine if activities are producing the expected results.
- To determine if activities are causing the effects identified in the environmental impact statement.

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Consistency with State, Local, Tribal, and Other Federal Plans

BLM planning regulations require that resource management plans be consistent with officially approved or adopted resource related plans, and the policies and procedures therein, of the Federal agencies, state and local governments and Indian tribes, so long as the RMPs are also consistent with applicable Federal laws and regulations. The BLM has compared the PRMP with a variety of such plans of other agencies. The PRMP appears to be consistent with all such plans, policies, and procedures, except perhaps the following:

- Possible cumulative effects of BLM and other landowners' activities in some watershed could lead to violation of the State of Oregon's antidegradation policy.
- Possible inconsistency with Oregon's Statutory Wildlife Policy, by maintaining some wildlife populations at less than optimum.
- Possible inconsistency with the clear cut size and proximity requirement of Section 4 of the Oregon Forest Practices Act.
- Possible delay in reforestation beyond the one year required by the Oregon Forest Practices Act, due to the requirement for smoke management clearance before burning slash.
- Inconsistency with the Natural Heritage Program administered by the Oregon Division of State Lands, due to proposed designation of only some of the potential research natural areas identified in that Program.
- Probable inconsistency with the Oregon Benchmarks for increasing standard of living, affordable housing, family stability, and stable home life.
- Partial inconsistency with Oregon statewide planning Goal 9 (Economy of the State), due to reduced levels of BLM resource dependent employment and payments to counties.

Public Involvement

Public involvement has been an integral part of BLM's resource management planning effort. Activities have included mailers or brochures, public meetings, open houses, field trips, distribution of planning documents and related comment periods, informal contacts, group meetings, written letters, and responses to comments.

Mailers requested comments on issue identification, development of planning criteria contained in state director guidance for the process, and BLM's analysis of the management situation which set the baseline for development of the Draft RMP/EIS. Suggestions for formulation of the Preferred Alternative were also requested.

The draft RMP/EIS was released for public review and comment in 1992. Comments were evaluated and some substantive recommendations led to changes in the Proposed RMP or the analysis of environmental consequences. Any protests to the director of BLM will be reviewed and addressed before a record of decision on the RMP is completed. Comments directly to the District Manager will also be considered in formulating the decision.

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Table S-1. Major Land Use or Resource Allocations and Action on BLM-Administered Lands, by Alternative

Allocations/Management Actions by Alternative	PRMP	PA
Water Quality and Riparian Zones		
Protection of Riparian Management Areas (Average width in feet each side of stream)		
Stream Order: 1	*	
2	*	
3	*	105
4	*	150
5	*	210
6+	*	240
Lakes, ponds, and other waters	NA	150
RMA (acres)	NA	34,576
Riparian Reserves (acres)	113,500	NA
Fragile Soils: Acres excluded from harvest or other ground disturbing activities (i.e., FGR acres in Alternative E)		0

*Riparian Reserve Widths: Fish bearing streams – 300 ft or 2 site potential trees
Permanent flow, non-fish bearing streams – 150 ft or 1 site potential tree
Intermittant streams – 100 ft or 1 site potential tree
(For complete description of Riparian Reserves, see Chapter 2, Riparian Reserves)

Allocations/Management Actions by Alternative	PRMP	PA
Timber		
Forest Management Allocations (acres):		
Intensive	61,200	144,300
Restricted	28,700	188,300
Enhancement of Other Uses or Not Available	305,500	63,000
Practices (assumed average annual acres for 1st decade):		
Regeneration		
Harvest	11,900	32,200
Commercial Thinning/Density Management	840/660	1300/5100
Brushfield/Hardwood Conversion	150	500
Site Preparation		
Prescribed Fire	8400	24,200
Other	500	1,600
Planting, regular stock	2,850	3,900
Planting, genetic stock	11,400	34,700
Stand Maintenance/Protection	8,300	21,600
Stand Release/Precommercial Thinning	39,000	52,800
Fertilization	14,400	58,200
New Road Construction (miles/acres)	65/350	215/1173
Harvest (MMCF)	7.0	16.3
Harvest (MMBF)	45	105
Harvest Volume for Enhancement of Other Resources (Otherwood)	0.7	1.6

No Action	A	B	C	D	E
					50
				60	60
100	75	75	105	140	200
100	75	100	150	200	200
100	75	140	210	280	280
100	75	160	240	320	320
	75	100	150	200	400
18,300	16,886	18,220	29,308	52,282	61,764
NA	NA	NA	NA	NA	NA
0	0	0	0	0	105,577
331,600	353,300	318,900	0	0	23,900
35,900	0	2,400	207,200	207,200	23,400
34,400	39,400	71,600	125,300	188,400	348,200
57,000	74,000	66,600	32,400	18,900	6,700
1400/0	1700/0	1600/0	1100/4300	1000	*
0	600	500	0	300	100
44,500	30,000	30,000	24,300	10,400	5,000
4,000	3,700	3,300	1,600	700	300
52,300	54,100	45,200	19,400	9,300	1,600
15,200	34,700	34,700	19,400	13,300	6,400
70,800	49,600	44,600	21,700	9,300	4,500
40,400	57,000	55,100	43,500	32,400	7,800
55,600	62,300	57,600	47,300	36,300	8,300
500/2727	500/2727	450/2455	190/1036	190/1036	35/1912
40.5	47.7	44.0	11.2	14.3	3.2
247	315	291	74	92	18
4.0	4.7	4.4	1.1	1.4	0.3

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Table S-1. Major Land Use or Resource Allocations and Action on BLM-Administered Lands, by Alternative (continued)

Allocations/Management Actions by Alternative	PRMP	PA
Special Status Species including threatened and Endangered Species Habitat		
Acres managed for all Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species plants and animals	419,007	419,007
Special Areas		
Existing ACEC/RNAs retained (#/acres)	4/613	4/613
Other Existing ACECs retained (#/acres)	2/7061	2/7061
New ACEC/RNAs designated (#/acres)	2/964	2/964
Other new ACECs designated (#/acres)	2/1685	1/727
Environmental Education Areas (#/acres)	0	0
Total ACED/RNAs (#/acres)	6/1577	6/1577
Total Other ACECs	4/8746	3/7788
Visual Resources		
Acres managed VRM Class I	28	28
Acres managed VRM Class II	18,045	38,348
Acres managed VRM Class III	4,385	6,224
Acres managed VRM Class IV	396,546	375,538
Recreation Resources		
Recreation sites		
Existing (# sites/acres)	12/1136	12/1136
New (# sites/acres)	17/173	17/173
Trails maintained		
Existing (# trails/acres)	6/14	6/14
New (# trails/acres)	13/35	13/35
Special Recreation Management Areas		
Existing (#/acres)	1/1620	1/1620
New (#/acres)	2/3950	2/3950
Back Country Byways (#/miles)		
Existing (#/miles)	3/34	3/34
Proposed (#/miles)	3/70	3/70
Acres open to OHV use	0	405,004
Acres limited to OHV use	423,422	414,659
Acres closed to OHV use	2,166	15,131

No Action	A	B	C	D	E
423,896	62,806	113,325	116,965	419,074	419,074
4/613	1/170	4/613	4/613	4/613	4/613
5/7076	0	4/7061	4/7061	2/7061	2/7061
0	0	1/793	3/1922	3/1922	3/1922
0	0	0	0	1/727	1/727
1/85	0	0	0	0	0
4/613	1/170	5/1406	7/2535	7/2535	7/2535
5/7076	1/170	4/7061	3/7788	3/7788	3/7788
28	28	28	28	28	6,311
9,300	15,176	30,194	43,514	86,779	141,887
13,600	2,005	6,681	7,189	22,855	271,937
401,070	402,929	383,235	369,403	310,501	0
12/1136	12/1136	12/1136	12/1136	12/1136	12/1136
7/85	0/0	3/65	7/107	17/173	17/173
6/14	6/14	6/14	6/14	6/14	6/14
3/5	0/0	0/0	5/7	13/35	13/35
1/1620	1/1620	1/1620	1/1620	1/1620	1/1620
1/1540	0/0	0/0	1/1540	2/3950	2/3950
3/34	3/34	3/34	3/34	3/34	3/34
3/70	3/70	3/70	3/70	3/70	3/70
414,245	409,712	408,527	407,703	285,661	11,681
0	0	0	0	121,838	395,818
9,655	9,656	10,841	11,665	11,869	11,869

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Table S-1. Major Land Use or Resource Allocations and Action on BLM-Administered Lands, by Alternative (continued)

Allocations/Management Actions by Alternative	PRMP	PA
Wild and Scenic Rivers		
River segments found suitable for designation:		
As Recreational (#/miles)	0	0
As Scenic (#/miles)	0	0
As Wild (#/miles)	0	0
Energy and Mineral Management		
Acres available for oil and gas and geothermal leasing.	421,062	421,062
Acres closed to oil, gas and geothermal lease.	28	28
Acres open to mining claim location and operation.	414,323	414,323
Acres closed to mining location.	5,050	5,050
Rural Interface Area Management		
Acres considered for alternative management practices	8,552	8,552
Acres where clearcutting, herbicide spraying and prescribed burning excluded	8,552	8,552

* Less than 100 acres.

No Action	A	B	C	D	E
0	0	0	0	0	185
0	0	0	0	0	0
0	0	0	0	0	0
421,062	421,062	421,062	421,062	421,062	421,062
28	28	28	28	28	28
416,162	416,960	415,674	414,500	414,323	412,951
3,211	2,413	3,699	4,873	5,050	6,422
0	0	8,552	8,552	8,552	24,052
0	0	0	8,552	8,552	24,052

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Table S-2 - Summary of Environmental Consequences, Comparison of Alternatives

Effects	PRMP	No Action	Alternatives A	B	C	D	E	Preferred
Air Quality								
Tons of fuel burned annually in prescribed fires, 10 years	29,600	60,100	60,100	60,100	80,100	30,300	10,800	80,100
Biological Diversity (after 10 years)								
Mature forest	79,100	79,600	85,700	83,700	79,800	84,000	85,300	66,700
Old-growth forest	126,500	42,400	34,700	44,600	106,90-0	102,600	115,600	91,700
After 100 years (acres)								
Mature forest	152,000	NA	16,000	26,800	167,900	78,600	151,200	127,200
Old-growth forest	156,300	38,900	22,500	46,037	147,086	116,000	179,900	99,500
Dominant Woodpecker Population (% of potential, 10 years)	54	38	35	38	58	54	57	52
Elk Habitat (10 years)[6]								
No. of habitat areas improving	9	0	0	2	1	6	7	6
No. of habitat areas unchanged	9	0	0	0	15	11	14	10
No. of habitat areas declining	3	21	21	19	5	4	0	5
Threatened and Endangered Species								
Bald eagle existing and potential nest sites protected	6	6	6	6	6	6	6	6
Columbian White-tailed Deer managed acres	12,761	12,761	12,761	12,761	12,761	12,761	12,761	12,761
Peregrine Falcon potential nesting cliffs protected	5	5	5	5	5	5	5	5
Northern Spotted Owl suitable habitat acres								
(10 years)	190,000	131,800	130,000	139,000	173,000	190,000	208,000	174,000
(100 years)	333,000	79,000	32,000	69,000	372,000	179,000	317,000	177,000

Table S-2 - Summary of Environmental Consequences, Comparison of Alternatives (continued)

Effects	PRMP	No Action	A	B	C	D	E	Preferred
				Alternatives				
Wild and Scenic Rivers(Canton Creek and Smith river study river segments, 10 years)								
Outstandingly remarkable value, Fish; +,-,0								
Visual Resources, 10 years; +, -, 0	0	0	0	0	0	0	0	0
Inventoried VRM Class I	0	0	0	0	0	0	+	0
Inventoried VRM Class II	0	–	–	–	0	+	+	0
Inventoried VRM Class III	+	–	–	–	+	+	+	+
Inventoried VRM Class IV	+	0	0	0	+	+	NA	+
Recreation Use (capability to meet 10-year demand)								
Off-road travel (ATV and 4x4)	No	Yes	Yes	Yes	Yes	No	No	No
Nonmotorized travel	Yes	No	No	No	No	Yes	Yes	Yes
Camping	Yes	No	No	No	No	Yes	Yes	Yes
Picnicking, studying nature, etc.	Yes	No	No	No	No	Yes	Yes	Yes
Boating	Yes	No	No	No	Yes	Yes	Yes	Yes
Swimming, general waterplay	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Areas closed to OHV use	2,166	10,465	10,465	12,901	14,200	15,131	15,131	15,131
Socioeconomic Conditions (10 years)								
Estimated dependent personal income millions (1989 dollars)	44,843	53,439	49,670	14,391	16,702	4,207		9,333
Estimated dependent employment	2,316	2,755	2,550	819	877	248		544
Projected O & C payments to counties attributable to timber harvest in Western Oregon	$129,958,000	$169,418,000	$154,190,000	$48,107,000	$54,145,000	$39,693,000	$25,771,000	

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Table S-3. Special Status Species Found on BLM-Administered Lands

	Number of Plant Species	Number of Animal Species
Federal Threatened	0	3
Federal Endangered	0	2
Federal Proposed	0	1
Federal Candidate	16	11
State Listed	2	4
Bureau Sensitive	1	1
Assessment Species	16	20

Table S-4. Lands Available for Scheduled Timber Harvest

Land Use Allocation	Net Land-Use Allocation	Gross mapped Land-Use Allocation
Matrix		
General Forest Management Areas (including visual resource management class II, rural interface, and TPCC restricted)	54,900	152,330
Connectivity/Diversity Blocks	26,900	70,950
Adaptive Management Areas	8,100	19,260

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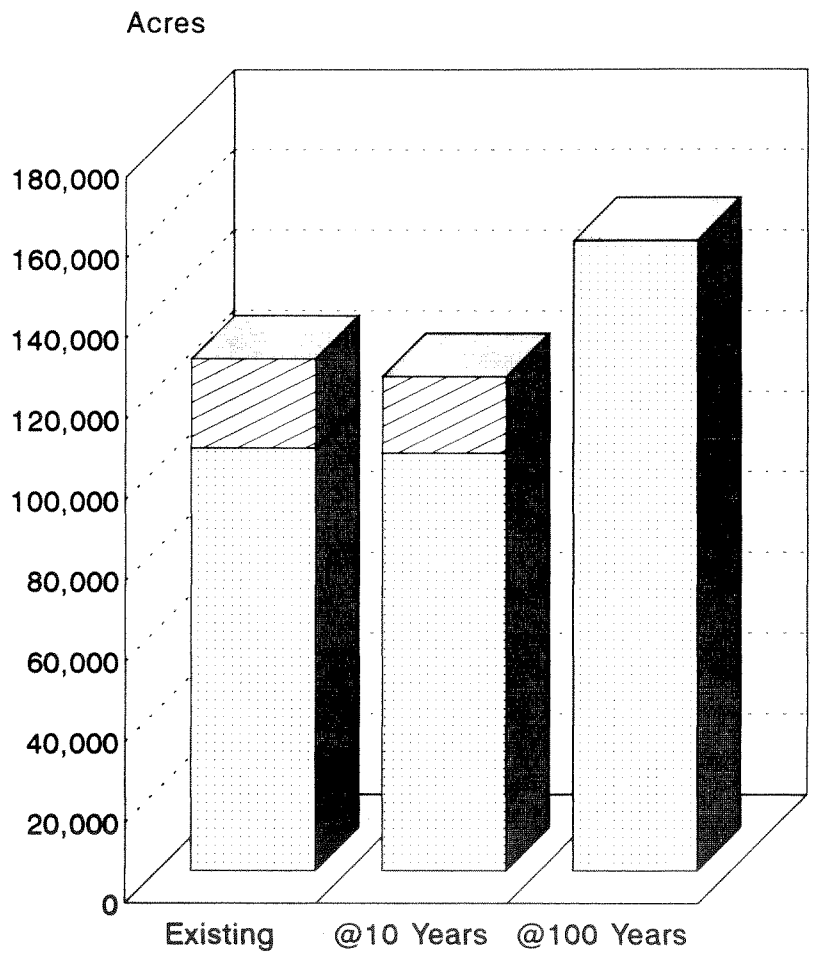
Figure S-1. Old Growth Forest Habitat Projections
Proposed RMP



	Existing	@10 Years	@100 Years
District Total	126,843	122,496	156,273
In-PSQ-Base	22,129	18,948	0
Out-of-PSQ-Base	104,714	103,548	156,273

Out-of-PSQ-Base acreage estimates adjusted for projected natural disturbances.
PSQ-Base ingrowth included for 10-Year projections.

Figure S-1. *Old Growth Forest Habitat Projections - Proposed RMP.*

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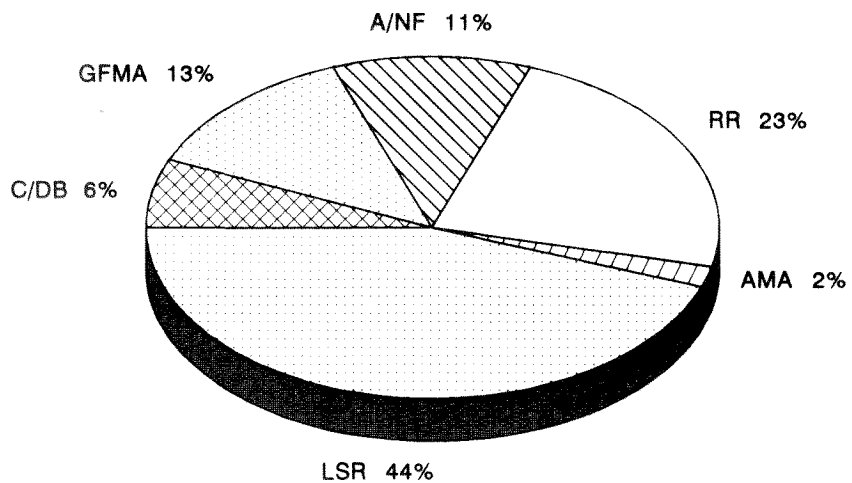
Figure S-2. Roseburg District Land Use Allocations
Proposed Resource Management Plan
Gross Acreage 419,007

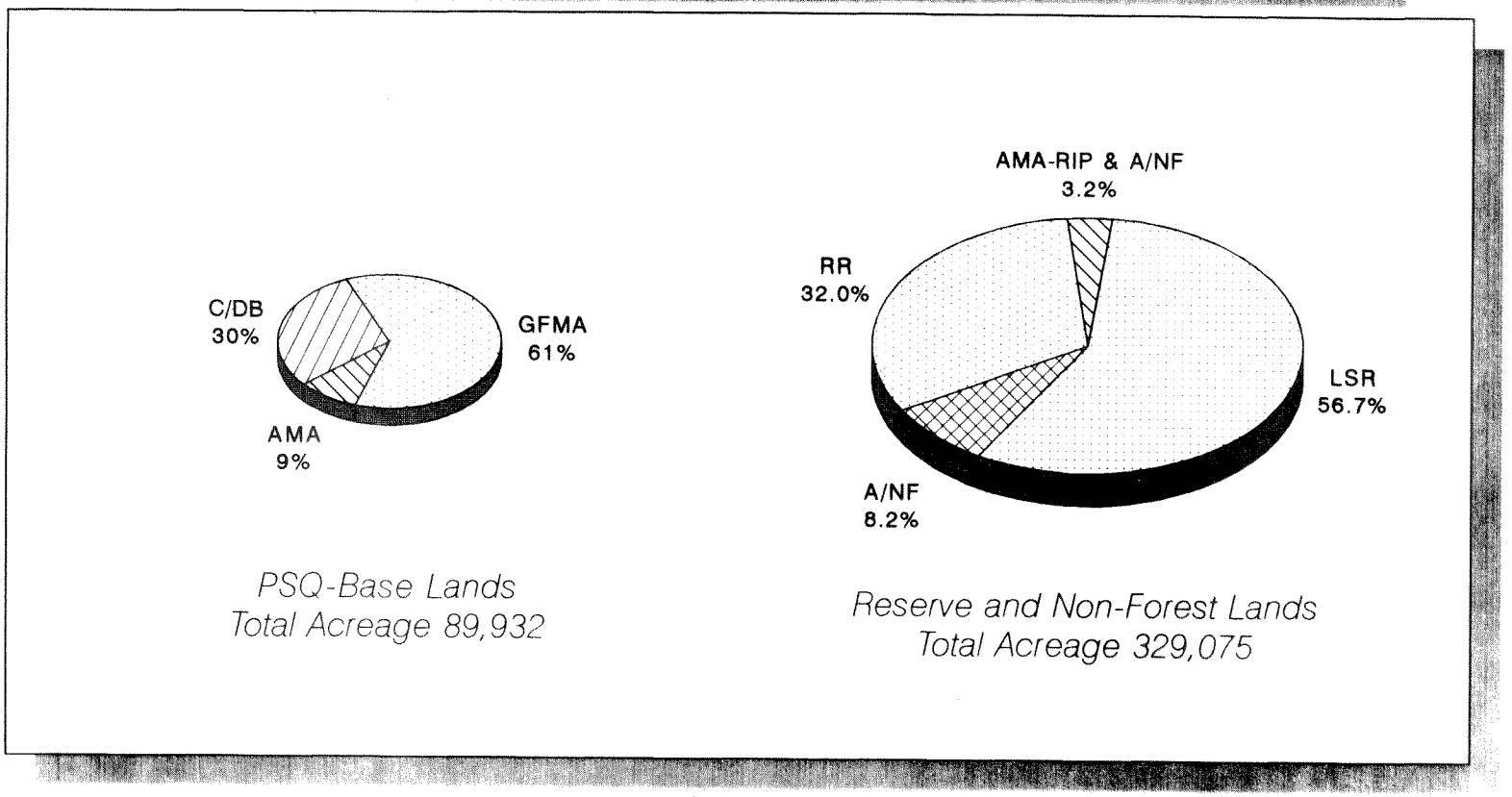


BLM PSQ-Modeling LUA's

GFMA: General Forest Management Areas
LSR: Late Successional Reserves
RR: Riparian Reserves
C/DB: Connectivity/Diversity Blocks
AMA: Adaptive Management Area
A/NF: Administrative & Non-Forest Withdrawals

Figure S-2. *Roseburg District Land Use Allocations - Proposed Resource Management Plan.*

Figure S-3. Roseburg District PRMP Land Use Allocations
PSQ-Base versus Reserves and Non-Forest Lands
Gross Acreage 419,007



PSQ-Base: Matrix (GFMA & Connectivity/Diversity Blocks) and Adaptive Management Area (AMA)
Reserves & Non-Forest: Late Successional Reserves (LSR), Riparian Reserves (RR) from the Matrix and AMA, Administrative Withdrawals, roads & non-forest (A/NF) lands.

Figure S-3. *Roseburg District PMRP Land Use Allocations - PSQ-Base versus Reserves and Non-Forest Lands.*

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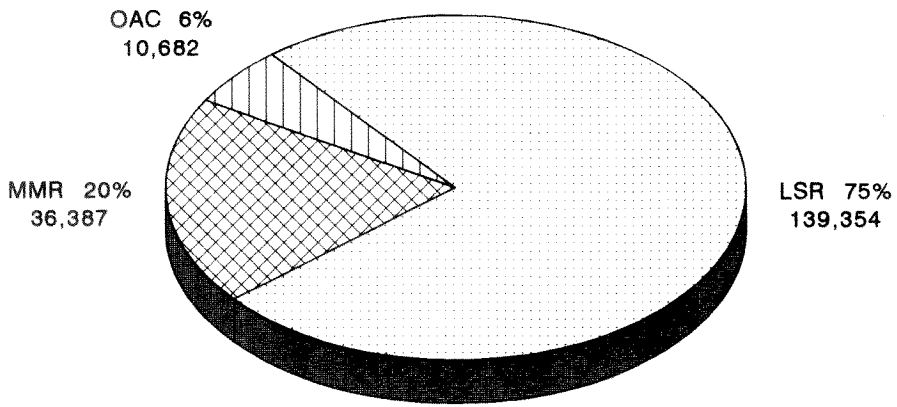
Figure S-4. Late Successional Reserve Elements
Roseburg District Proposed Resource Management Plan
Total Gross Acreage 419,007



LSR total Gross Acreage 186,423

LSR: Late Successional Reserves OAC: Owl Activity Centers MMR: Marbled Murrelet Reserves
Occupied marbled murrelet sites protected in existing LSRs and MMRs.
Protection Buffers for specific endemic species not yet identified.

Figure S-4. *Late Successional Reserve Elements - Roseburg District Proposed Resource Management Plan.*

Chapter 1
Introduction to the Proposed Resource Management Plan

Major Changes from Chapter 1 of the Draft Resource Management Plan

The Purpose and Need discussion has been changed to incorporate the needs addressed in the Supplemental Environmental Impact Statement, and discusses the requirements of various laws that govern the administration of Roseburg District BLM-administered lands.

The Planning Area

The Roseburg District Resource Management Plan/ Environmental Impact Statement analyzes impacts associated with managing 423,928 acres of land in Oregon administered by the U.S. Department of the Interior, Bureau of Land Management's (BLM) Roseburg District. Within the planning area there are also 1,717 acres of nonfederal land with federal subsurface mineral estate administered by BLM (see Table 3-1).

The land is located in western Oregon as shown on Map 1-1 and 1-2. The portions of the planning area where BLM-administered lands lie are in the western foothills of the Cascade Range, the Oregon Coast Range, and Klamath Mountains. They are predominately forested with stands of Douglas-fir mixed conifer, and drain into the Umpqua River or a number of different coastal rivers. Population is centered in and near Roseburg.

Purpose and Need

As discussed in the Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern spotted Owl (hereafter referred to as the SEIS), the Proposed Resource Management Plan responds to dual needs: the need for forest habitat and the need for forest products.

The need for forest habitat is the need for a healthy forest ecosystem with habitat that will support populations of native species and includes protection for riparian areas and waters. This need was reflected by President Clinton at the April 2, 1993, Forest Conference in Portland, Oregon.

The need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies and contribute valuable resources to the national economy, on a predictable and long-term basis. This need also was reflected by President Clinton at the Forest Conference.

The proposed Resource Management Plan (PRMP) identified in this document was developed after consideration of the following:

- Public comments at open house meetings and in correspondence.
- Comments from other government agencies.
- BLM staff analysis of the consequences of alternatives.
- Legal mandates of Federal laws and executive orders.
- Decisions made in the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* and its Attachment A (hereafter referred to as the SEIS ROD).
- Requirements of Bureau policy.

The RMP was developed under the requirements of the Federal Land Policy and Management Act through the use of an interdisciplinary planning process. This RMP/EIS document is written in compliance with the National Environmental Policy Act and related Council on Environmental Quality regulations.

A list of the major Federal laws and executive orders affecting BLM land management in western Oregon is provided in Appendix A.

The management of the Oregon and California Railroad (O&C) lands is governed by a variety of statutes, including the O&C Lands Act, Forest Land Policy and Management Act, the Endangered Species Act, and the Clean Water Act. The O&C Lands Act requires the Secretary of the Interior to manage O&C lands for permanent forest production; however, such management must also be in accord with sustained yield principles. Further, that Act requires that management of O&C lands protect watersheds, regulate streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries. The Act

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does not require the Secretary to harvest all old-growth timber or all commercial timber as rapidly as possible or according to any particular schedule. The Secretary has discretion to determine how to manage the forest on a sustained yield basis that provides for permanency of timber production over a long-term period. The Secretary must necessarily make judgments, informed by as much information as possible, about what kind of management will lead to permanent forest production that satisfies the principle of sustained yield.

O&C lands must also be managed in accordance with other environmental laws such as the Endangered Species Act and the Clean Water Act. Some provisions of these laws take precedence over the O&C Lands Act. For instance, the Endangered Species Act requires the Secretary to ensure that management of O&C lands will not likely result in jeopardy to listed species or destruction or adverse modification of critical habitat. The Endangered Species Act directs the Secretary and all federal agencies to utilize their authorities to carry out programs for the conservation and recovery of listed species. Section 5(a) of the Act also directs: "the Secretary, and the Secretary of Agriculture with respect to the National Forest System, shall establish and implement a program to conserve fish, wildlife, and plants, including those which are listed as endangered species or threatened species pursuant to Section 4 of this Act." 16 U.S.C. § 1534(a). Although several northern spotted owl recovery plans have been proposed, the Secretary has not yet adopted final recovery plans for either the northern spotted owl or the marbled murrelet. The SEIS ROD's late-successional and riparian reserve concepts are important building blocks in the development of recovery plans to achieve the conservation and recovery of those species.

One of the purposes of the Endangered Species Act is the preservation of ecosystems upon which endangered and threatened species depend. A forward looking land management policy would require that federal lands be managed in a way to minimize the need to list species under the Endangered Species Act. Additional species listings could have the effect of further limiting the O&C Lands Act's goal of achieving and maintaining permanent forest production. This would contribute to the economic instability of local communities and industries, in contravention of a primary objective of Congress in enacting the O&C Lands Act. That Act does not limit the Secretary's ability to take steps now that would avoid future listings and additional disruptions.

Protection of watersheds and regulating streamflow are explicit purposes of forest production under the O&C Lands Act. Riparian reserves, including those established on O&C lands under the PRMP, are designed to restore and maintain aquatic ecosystem functions. Together with other components of the aquatic conservation strategy, riparian reserves will provide substantial watershed protection benefits. Riparian reserves will also help attain and maintain water quality standards, a fundamental aspect of watershed protection. Both riparian reserves and late-successional reserves will help regulate streamflows, thus moderating peak streamflows and attendant adverse impacts to watersheds.

Relationship of the Resource Management Plan to BLM Policies, Programs and Other Plans

BLM in Oregon is developing five other Resource Management Plans (Medford, Klamath Falls, Coos Bay, Eugene, Salem) concurrently with development of the Roseburg District Resource Management Plan. The six Resource Management Plans together cover all BLM-administered lands in western Oregon. Some lands administered by the Eugene District to the north and the Medford District to the south and Coos Bay District to the west directly adjoin lands being addressed in the Roseburg plan. Cooperation is occurring in the planning for management of these lands.

The Draft RMP/EIS was supplemented by the SEIS. The SEIS ROD, signed jointly by the Secretary of the Interior and the Secretary of Agriculture, requires the Bureau to incorporate the land use allocations and standards and guidelines in that decision in the Bureau's RMPs for western Oregon. The Proposed RMP is intended to be consistent with the SEIS ROD; any apparent inconsistencies are oversights or misinterpretations of SEIS ROD language. The Final SEIS describes the environmental impacts which arise from those directions. This Final EIS for the RMP incorporates the analysis in that Final SEIS.

Any finding made in the record of decision for this RMP/EIS, that certain river segments studied herein are suitable for designation under the Wild and

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Scenic Rivers act, will be a preliminary administrative finding. It will receive further review and possible modification by the Director, BLM; Secretary of the Interior; or the President of the United States. To facilitate that review, after completion of this RMP and its record of decision, the BLM may elect or be required to prepare a study report to support recommendations to Congress for designation of specific rivers or river segments. Final decisions have been reserved by Congress unless the Governor nominates a river to the Secretary of the Interior, who may then decide to designate it.

The North Umpqua Wild and Scenic River Plan was completed in July 1992 to respond to a specific Congressional mandate which designated the North Umpqua River a recreational river under the National Wild & Scenic River System. The plan developed would not be changed by any of the Resource Management Plan alternatives.

Planning Process and Criteria

BLM's planning process involves nine steps which are described below.

Step 1: Issue Identification

This planning step is designed to identify major problems, concerns, or opportunities associated with the management of public land in the planning area. Issues are identified by the public, the BLM, and other governmental entities. The planning process is focused on resolving the identified planning issues.

Step 2: Planning Criteria

Planning criteria include policies, laws, regulations, and guidelines for resolving issues, developing alternatives, and choosing a proposed plan.

Step 3: Inventory and Data Collection

Certain kinds of biological, physical, social, or economic information needed to resolve the planning issues is collected and analyzed. Inventory information is used in determining how BLM-administered resources would also respond under each of the alternatives.

Step 4: Analysis of the Management Situation

The Analysis of the Management Situation identifies the ways lands are currently managed in the planning area and opportunities to manage these lands differently.

Step 5: Formulation of Alternatives

BLM formulates a range of alternatives for managing resources in the planning area. A range of alternatives are developed to resolve significant planning issues and address specific management concerns. Alternatives include a preferred plan, management direction common to all alternatives, alternative plans, and no action (current management).

Step 6: Estimation of Effects

This step involves estimating the environmental effects of implementing each of the alternatives. Impacts are estimated in order to provide a comparative evaluation of impacts in compliance with Council of Environmental Quality regulations for implementing National Environmental Policy Act (40 Code of Federal Regulations 1500).

Step 7: Selection of the Preferred Alternative

BLM identifies a Preferred Alternative. The draft Resource Management Plan/Environmental Impact Statement is then prepared and distributed for public review.

Step 8: Selection of Resource Management Plan

Following review and analysis of public comments of the Draft Resource Management Plan/Environmental Impact Statement, BLM selects a proposed resource management plan and then publishes the proposed Resource Management Plan and Final Environmental Impact Statement. Decisions become final after a 30 day appeal period following publication of the Final Environmental Impact Statement. BLM then publishes the Record of Decision and prepares the Approved Resource Management Plan.

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Step 9: Monitoring and Evaluation

This step involves the collection and analysis of resource condition and trend data to ensure the plan is accomplishing its objective of resolving the identified issues and achieving other desired results. Monitoring continues from the time the Resource Management Plan is adopted until changing conditions require revision of the entire plan or any portion of it.

Publication of this document constitutes completion of step seven. Public involvement has occurred at several steps in the process (see Chapter 5 for additional summary of public involvement). A summary of the Analysis of the Management Situation was published in February 1991. Where BLM manages the subsurface mineral estate and the surface is nonfederal or administered by another federal agency, the Resource Management Plan/ Environmental Impact Statement addresses only the management of the BLM-administered mineral resources.

Planning criteria sets out the legal parameters and management goals that guide and direct the preparation of the Resource Management Plan. Planning criteria were developed by BLM's Oregon State Director for the process of developing this Resource Management Plan and the other five western Oregon Resource Management Plans being developed concurrently. These planning criteria have been referred to as State Director Guidance and were reviewed by the public. The development of those planning criteria is discussed in Appendix B, Planning Criteria. The criteria for formulation of alternatives are also published in Appendix B.

Issues

The alternatives addressed in the SEIS but not selected in the SEIS ROD, were eliminated from district specific study because they were adequately considered in the SEIS.

A number of issues and concerns were identified through the early phases of public involvement in the process. Of particular relevance were public responses to a district scoping mailer of September 1986. Based on a review of those comments, the following planning issues and concerns emerged. They formed the foundation of planning criteria and alternatives.

1. Timber Production Practices: Which forestland should be available for intensive management of timber products and what practices should be used on those lands?

2 and 3. Old-Growth Forests and Habitat Diversity: To what extent and where should old-growth and/or mature forest habitats be retained, maintained, or reestablished to meet various resource objectives? To what extent and where should BLM manage habitat to support populations of native wildlife species?

4. Threatened and Endangered (and other Special Status) Species Habitat: What should BLM do to manage Federally listed threatened or endangered plants and animals and to prevent future Federal listing of plants and animals as threatened or endangered species?

5. Special Areas: What areas on BLM-administered lands need special management to prevent irreparable damage to important historic, cultural or scenic values; to protect botanical or fish and wildlife resources or other natural systems or processes; and to protect life and safety from natural hazards? Which of these areas should be formally designated as Areas of Critical Environmental Concern?

6. Visual Resources: Which, if any, areas of BLM-administered lands should be managed to reduce visual impacts or enhance visual (scenic) quality?

7 and 8. Stream/Riparian/Water Quality: Where and how should riparian zones be managed to protect and improve water quality, fisheries, and wildlife habitat? What actions should be undertaken to comply with state water quality standards? What should BLM do to manage for special needs such as municipal and domestic use?

9. Recreation Resources: What areas or sites should be designed and/or managed to protect or enhance a variety of recreational opportunities?

9A. Wild and Scenic Rivers: What, if any, rivers should be recommended for designation?

10. Land Tenure: In what areas would BLM-administered lands be sold, exchanged, or transferred out of federal ownership under other authorities to improve management efficiency and benefit resource program objectives? In what areas would BLM attempt to acquire lands to improve management efficiency and benefit resource program objectives?

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11. Rural Interface Area Management: Which BLM-administered lands should be allocated to receive special management practices due to the concerns of residents who live in close proximity? (Rural Interface Areas are areas where BLM-administered lands are adjacent to or intermingled with privately owned lands that have been zoned by the counties for occupancy of one to 20 acre size lots. In most Rural Interface Areas concerns of the residents are related to forest management practices, visual quality, and potential effects on domestic water sources and water supplies.)

Issues, Concerns, and Other Planning Considerations Eliminated from Detailed Study

The following issues were eliminated from consideration as primary factors in the formulation of alternatives, for the reasons cited:

- Grazing/range management - There are only a few seasonal grazing leases issued by BLM in the planning area. These few leases do not pose significant resource conflicts. (See Chapter 3, Vegetation.)

- Mineral resources - Mineral development activity on BLM-administered lands in the planning area has been insignificant in recent years, and is expected to continue to be minor and manageable.

The following topics were eliminated from study, for the reasons described:

- Use of herbicides - This topic was fully analyzed in BLM's 1989 Environmental Impact Statement, "Western Oregon Management of Competing Vegetation", and BLM's 1986 Environmental Impact Statement, "Northwest Area Noxious Weed Control", as supplemented in 1987.

- Effects on wilderness - There were no lands found suitable for wilderness study areas in the Roseburg District.

- Effects on agriculture - BLM activities in the planning area are not expected to have measurable effects on agriculture.

- Effects on wind and hydropower resources - There are no known wind power or hydropower proposals affecting BLM-administered lands in the planning area that are legally implementable.

The following effects, sometimes perceived as relevant planning topics, were eliminated from study for the reasons described:

- Effects on prime and unique farm lands and paleontological resources - No discernable effects are anticipated.

- Effects on off-reservation Indian tribal treaty rights or tribal treaty rights or trust resources. No such treaty rights or trust resources involve BLM-administered lands in the Roseburg District.

- Effects on energy use - Previous analyses (e.g., the Roseburg Timber Management Environmental Impact Statement) have shown that effects of BLM management activities in the planning area are not significant.

Western Oregon Digital Data Base

To support the Resource Management Plan process, BLM developed the Western Oregon Digital Data Base, a Geographic Information Systems digital (computer) data base.

Due to the checkerboard pattern of land ownership, base thematic data was mapped on a total of seven million acres to obtain coverage of BLM's 2.4 million acres in western Oregon. All base themes were derived from 1985/86 aerial photography and then digitized at 1:4800 scale. Base data themes include transportation, gross vegetation, hydrology, topography, and cultural features. Base theme mapping, except topography, is complete. This information was mapped using Automated Digitizing System software.

Resource data themes were mapped at a scale of 1:12,000 or more, depending on the theme. There are approximately 75 resource themes captured on the 2.4 million acres of BLM-administered lands. They include soils, forestry, big game, minerals, watersheds, spotted owls, and recreation. It is anticipated that additional themes will be added to meet future day-to-day resource management operational needs.

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Although the majority of BLM-administered lands in western Oregon is covered, within the Roseburg District, four townships with only minor acreage of BLM-administered land were excluded from the Western Oregon Digital Data Base project.

BLM ownership is based on the Public Land Survey theme in the Geographic Information System and from BLM's Master Title Plats. As the Geographical Information System ownership data is computer generated, it would differ from that displayed in other documents which were determined from BLM's Master Title Plats. The Master Title Plat acreages are computed from cadastral survey notes and represent official acres. The Master Title Plat acre figures would be used in realty actions while the Geographical Information System derived acreages would be used in other resource management programs in this document. Slight variations exist between the acreage figures based upon the Master Title Plats and those generated through the Geographical Information System.

BLM is using Geographical Information System technology based on the Map Overlay and Statistical System family of software on Prime computers in the six western Oregon districts and the State Office in Portland. Many base and resource themes have data base information associated with them. The data base information is stored in attribute files.

To build the Western Oregon Digital Data Base, standards for each of the themes were developed and agreed upon by BLM's western Oregon districts. The Western Oregon Digital Data Base Data Entry Handbook was developed with district input to provide a comprehensive and concise set of instructions, including quality control assurance, so that all of the data themes are standard from district to district.

There will actually be two Western Oregon Digital Data Bases: one for doing the Resource Management Plans, in which the data is "frozen" in time; and one for operational uses, in which the data will be updated regularly. Updating the operational Western Oregon Digital Data Base data will be important because of the high frequency of changes that need to be made for many of the resource themes, particularly roads and operations inventory.

The Western Oregon Digital Data Base has been used in three ways in the planning effort:

1. To compute and aggregate resource data for each planning area, and display maps of that data.

2. To help design alternatives in accordance with criteria established for alternative formulation and to display maps of those alternatives.

3. To facilitate analysis of some of the consequences of those alternatives.

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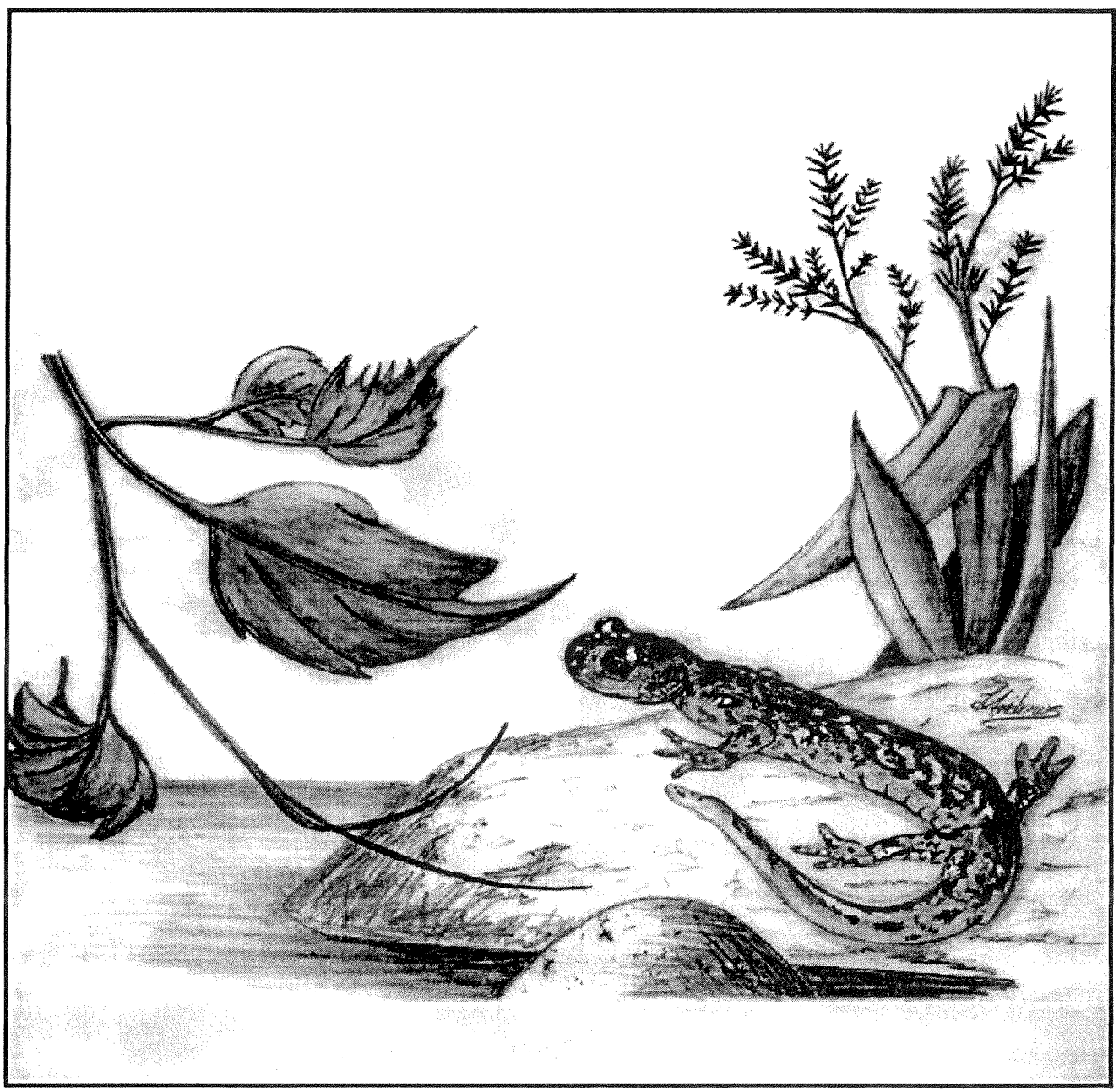
Chapter 2
The Proposed Resource Management Plan



Major Changes from Chapter 2 of the Draft Resource Management Plan

The Proposed Resource Management Plan, which is consistent with the SEIS Record of Decision, replaces the Preferred Alternative.

The description of the Proposed Resource Management Plan includes objectives, land use allocations, and management actions/direction in one location for reader convenience.

Management direction common to Alternatives NA, A, B, C, D, and E is located toward the end of this chapter.

Introduction

The purpose of this chapter is to describe the Roseburg District Proposed Resource Management Plan and the other land and resource management alternatives that were analyzed by BLM. The first section of the chapter is a description of the objectives, major land use allocations, and management actions/direction for the proposed resource management plan. The second section is a description of six other management alternatives.

Except for Table 2-1, the Preferred Alternative of the Draft Resource Management Plan has been dropped from the alternative comparison tables and discussion in the text.

The Proposed Resource Management Plan

The Proposed Resource Management Plan was developed partially in response to public comments related to the Bureau of Land Management's August 1992 draft resource management plans for western Oregon. In addition, the proposed plan incorporates the land use allocations and management direction from the SEIS ROD.

Two maps showing the land allocations of the Proposed Resource Management Plan are the Western Oregon Planning Strategy and the District Planning Strategy. All tables referenced in the proposed resource management plan section are located at the end of the section.

Vision

The Bureau of Land Management will manage the natural resources under its jurisdiction in western Oregon to help enhance and maintain the ecological health of the environment and the social well being of the human population.

There are several basic principles supporting this vision:

- Natural resources can be managed to provide for human use and a healthy environment.
- Resource management must be focused on ecological principles to reduce the need for single resource or single species management.
- Stewardship, the involvement of people working with natural processes, is essential for successful implementation.
- The Bureau of Land Management cannot achieve this vision alone but can, by its management processes and through cooperation with others, be a significant contributor to its achievement.
- A carefully designed program of monitoring, research, and adaptation will be the change mechanism for achieving this vision.

Strategy

Lands administered by the Bureau of Land Management will be managed to maintain or restore healthy, functioning ecosystems while providing a sustainable production of natural resources. This management strategy, titled ecosystem management, involves the use of ecological, economic, social, and managerial principles to ensure the sustained condition of the whole. Ecosystem management emphasizes the complete ecosystem instead of individual components and looks at sustainable systems and products that people want and need. It seeks a balance between maintenance and restoration of natural systems and sustainable yield of resources.

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The building blocks for this strategy are comprised of several major land use allocations - Riparian Reserves, Late-Successional Reserves, Adaptive Management Areas, Matrix which includes General Forest Management Areas and Connectivity/Diversity Blocks, and a variety of special purpose management areas such as recreation sites, wild and scenic rivers, and visual resource management areas. These land use allocations are located and configured in the landscape to support overall ecosystem function and to meet the vision for management of federal lands in western Oregon.

Each land use allocation will be managed according to specific objectives and management actions/ direction. During initial implementation of the plan, the stated objectives and management actions/ direction will provide the rules and limits governing actions and the principles specifying the environmental conditions or levels to be achieved and maintained. As BLM gains experience in implementing the plan and applying the concepts of adaptive management, the stated objectives and management actions/direction will be refined for specific geographic areas.

There are two major management concepts underlying the objectives and management actions/ direction - Ecological Principles for Management of Late-Successional Forests and the Aquatic Conservation Strategy. These concepts are summarized below.

Ecological Principles for Management of Late-Successional Forests

One goal of this plan is to maintain late-successional and old-growth species habitat and ecosystems on federal lands. A second goal is to maintain biological diversity associated with native species and ecosystems in accordance with laws and regulations.

All land use allocations described in this plan will contribute to these two goals. For instance, Late-Successional and Riparian Reserves and many special management areas (e.g., Areas of Critical Environmental Concern) will be managed to enhance and/or maintain late-successional forest conditions. The General Forest Management Area and Connectivity/Diversity Blocks will be managed to retain late-successional forest legacies (e.g., coarse woody debris, green trees, snags, and late-successional forest patches). These and other land use allocations and resource programs are described in detail below.

See the Attachment A of the SEIS ROD for additional information about ecological principles for management of late-successional forests.

Aquatic Conservation Strategy

The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmonid habitat on federal lands managed by the Forest Service and Bureau of Land Management within the range of the Pacific Ocean anadromy.

The Aquatic Conservation Strategy is designed to meet the following objectives:

- Maintain and restore the distribution, diversity, and complexity of watershed and landscape scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.

- Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, up slope areas, headwater tributaries, and intact refugia. These lineages must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian dependent species.

- Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

- Maintain and restore the sediment regime under which an aquatic ecosystem evolved. Elements of the sediment regime include the timing, volume,

rate, and character of sediment input, storage, and transport.

- Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing (i.e., movement of woody debris through the aquatic system). The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

- Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

- Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

- Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian dependent species.

The components of the Aquatic Conservation Strategy are Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration.

Riparian Reserves

See Riparian Reserves in the land use allocation section.

Key Watersheds

A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. These refugia include areas of high quality habitat and areas of degraded habitat. Key Watersheds with high quality conditions will serve as anchors for the potential recovery of depressed stocks. Those of lower quality habitat have high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program.

There are two types of Key Watersheds - Tier 1 and Tier 2. Tier 1 watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. Tier 2 watersheds do not contain at-risk fish stocks, but they are important sources of high quality water.

Key Watersheds in the district are as follows:

Key Watershed Name	Tier	Acres
Elk Creek	1	272
Middle Creek	1	10,617
Paradise Creek	1	294
South Umpqua River	1	47,492
Steamboat Creek	1	17,876
Upper Smith River	1	26,085
West Fork Cow Creek	1	702
Williams/Fairview Creeks	1	3
Total		103,340

See Roseburg District Strategy map for locations of Key Watersheds.

Key Watersheds overlay portions of land use allocations in the district and place additional management requirements or emphasis on activities in those areas.

Management Actions/Direction

1. Prior to further resource management activity, including timber harvest in Key Watersheds, prepare watershed analyses. Until watershed analyses can be completed, proceed with minor activities, such as those categorically excluded under the National Environmental Policy Act regulations (except timber harvest), if they are consistent with Aquatic Conservation Strategy objectives. Apply Riparian Reserve management actions/direction.

2. Reduce existing road mileage within Key Watersheds. If funding is insufficient to implement reductions, neither construct nor authorize through discretionary permits a net increase in road mileage in Key Watersheds.

3. Give highest priority to watershed restoration in Key Watersheds.

Watershed Analysis

See Watershed Analysis section (toward the end of this chapter), and Use of the Plan section.

Watershed Restoration

Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. The most important components of a watershed restoration program are control and prevention of road related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity. Other restoration opportunities include meadow and wetland restoration and mine reclamation.

Management Actions/Direction

1. Prepare watershed analyses and plans prior to restoration activities. See Use of the Plan (watershed analysis discussion) section.

2. Focus watershed restoration on removing some roads and, where needed, upgrading those that remain in the system.

3. Apply silvicultural treatments to restore large conifers in Riparian Reserves.

4. Restore stream channel complexity. In-stream structures will only be used in the short term and not as a mitigation measure.

Additional information about the Aquatic Conservation Strategy is found in Attachment A of the SEIS ROD.

Land Use Allocations and Resource Programs

This section provides a description of objectives, land use allocations, and management actions/direction for this proposed resource management plan. The term "land use allocations" is used in two ways. First, it pertains to the major land use allocation categories derived from the SEIS and its Record Of Decision (e.g., Riparian Reserves and Late-Successional Reserves) and the still relevant allocations of the Roseburg District Draft Resource Management Plan. The second use pertains to data and text describing specific allocations (e.g., acres, miles, and number of sites) under each land use allocation and resource program category.

The remainder of this Land Use Allocations and Resource Programs section has three major parts:

- Management actions/direction for all land use allocations and resource programs.

- Specific land use allocations - objectives, allocations, and management actions/direction for each category.

- Resource programs - objectives, allocations, and management actions/direction for each category.

Although described separately, each of these elements contributes collectively and cumulatively to meeting the overall management strategy and must be considered together to accurately reflect the concept of ecosystem management. There is some duplication of objectives and management actions/ direction for land use allocations and resource programs. A reader interested in either topic will find a basic package of related management guidance in one location.

Most resource programs have basic requirements for activities such as inventory, site specific analysis, planning, and environmental assessment prior to project implementation and monitoring after project implementation. Inherent in the proposed resource management plan is a BLM commitment to continue these activities in the future. For the sake of simplifying text, these activities are generally not repeated in the management actions/direction that follow.

A summary of the land use allocations and management actions/direction for the Proposed Resource Management Plan is found in Table 2-1. Most land use allocations are shown on the Chapter 2 maps in the accompanying packet.

Management Actions/ Direction for All Land Use Allocations and Resource Programs

The SEIS ROD provides guidance for six topics which apply to all land use allocations. Guidance for four of these topics is found under Recreation, Fire/ Fuels Management, and Range Resources and in the

Research section (toward the end of this chapter). Guidance for the other two topics is described below.

All management actions/direction in this proposed resource management plan are subject to refinement through planning based on watershed analysis and the adaptive management process. In some areas, land use allocations overlap. A hierarchy of allocations and related management actions/direction will be used to guide plan implementation (see Attachment A of the SEIS ROD, Hierarchy of Standards and Guidelines).

Survey and Manage for Amphibians, Mammals, Bryophytes, Mollusks, Vascular Plants, Fungi, Lichens, and Arthropods

Implement the survey and manage provision of the SEIS ROD within the range of SEIS special attention species and the particular habitats that they are known to occupy. Table T-1 of Appendix T shows which species are covered by this provision, and which of the following four categories and management actions/direction are to be applied to each:

1. Manage known sites (highest priority).

    a. Acquire and manage information on known sites, make it available to all project planners, and use it to design or modify activities.

    b. Protect known sites. For some species, apply specific management treatments such as prescribed fire.

    c. For rare and endemic fungus species, temporarily withdraw 160 acres around known sites from ground disturbing activities until the sites can be thoroughly surveyed and site specific measures prescribed.

    d. Establish management areas of all useable habitat up to 600 acres around two currently unprotected locations of Oxiporous nobilissimus. Protect these populations until the sites can be thoroughly surveyed and site specific measures prescribed. Protection will be undertaken immediately.

2. Survey prior to activities and manage sites.

    a. Continue existing efforts to survey and manage rare and sensitive species habitat.

    b. For species without survey protocols, start immediately to design protocols and implement surveys.

    c. Within the known or suspected ranges and within the habitat types of vegetation communities associated with the species, survey for Del Norte, Larch Mountain, Shasta, Siskiyou Mountains, and Van Dyke's salamanders, red tree voles, and Lynx.

    These surveys will precede the design of all ground disturbing activities that will be implemented in 1997 or later.

    d. For the other species listed in Appendix T, begin development of survey protocols in 1994 and proceed with surveys as soon as possible. These surveys will be completed prior to ground disturbing activities that will be implemented in Fiscal Year 1999 or later. Work to establish habitat requirements and survey protocols may be prioritized relative to the estimated threats to the species as reflected in the SEIS.

    e. Conduct surveys at a scale most appropriate to the species.

    f. Develop management actions/direction to manage habitat for the species on sites where they are located.

    g. Incorporate survey protocols and proposed site management in interagency conservation strategies developed as part of ongoing planning efforts coordinated by the Regional Ecosystem Office.

3. Conduct extensive surveys and manage sites.

    a. Conduct extensive surveys for the species to find high priority sites for species management. Specific surveys prior to ground disturbing activities are not a requirement.

    b. Conduct surveys according to a schedule that is most efficient and identify sites for protection at that time.

    c. Design these surveys for efficiency and develop standardized protocols.

d. Begin these surveys by 1996.

4. Conduct general regional surveys.

   a. Survey to acquire additional information and to determine necessary levels of protection for arthropods, fungi species that were not classed as rare and endemic, bryophytes, and lichens.

   b. Initiate these surveys no later than Fiscal Year 1996 and complete them within ten years.

Protection Buffers

Provide protection buffers for specific rare and locally endemic species and other species in the upland forest matrix. A list of these species and related management actions/direction are presented in Appendix T, Table T-2 and the section on Special Status and SEIS Special Attention Species. These species are likely to be assured viability if they occur within reserves. However, there might be occupied locations outside reserves that will be important to protect as well.

Apply the following management actions/direction:

1. Develop survey protocols that will ensure a high likelihood of locating sites occupied by these species.

2. Following development of survey protocols and prior to ground disturbing activities, conduct surveys within the known or suspected ranges of the species and within the habitat types or vegetation communities occupied by the species. See the previous Survey and Manage section for an implementation schedule.

3. When located, protect the occupied sites.

See Special Status and SEIS Special Attention Species section for additional details.

Specific Land Use Allocations

This section describes specific land use allocations developed for the SEIS ROD.

Two of the allocations in the SEIS ROD, Congressionally Reserved Areas and Administratively Withdrawn Areas, are simply recognition of valid resource management decisions in existing or proposed plans. These allocations are fully incorporated in the resource program elements of this proposed resource management plan. They are not described as separate land use allocations in this document.

Although there are no Congressionally Reserved allocations in the Roseburg District, the Myrtle Island area was set aside by Public Land Order.

Types of administratively withdrawn areas in the district include Special Areas, recreation sites, facility sites, stockpile sites, etc.

Riparian Reserves

Objectives

See Aquatic Conservation Strategy Objectives.

Provide habitat for special status and SEIS special attention (Survey and Manage, Protection Buffers, bat roosts) and other terrestrial species.

Land Use Allocations

There are approximately 113,500 acres of Riparian Reserves in the district, including approximately 8,200 acres modeled in Little River Adaptive Management Area. Calculation of these acres is based on prescribed widths and estimated miles of stream in the various categories described in the SEIS ROD. If Riparian Reserves were projected across the entire landscape, including all other reserves and administrative withdrawals, they would account for 217,000 gross acres. The gross acres of Riparian Reserves have little effect on management when they occur in areas already reserved or withdrawn. The widths are intended to provide a high level of fish, wildlife, and plant habitat and riparian protection until watershed and site analysis can be completed. Although Riparian Reserve boundaries on permanently flowing streams may be adjusted, they are considered to be the approximate widths necessary for attaining Aquatic Conservation Strategy objectives. Post watershed analysis Riparian Reserve boundaries for permanently flowing streams will approximate the boundaries described below. Following watershed analysis, Riparian Reserve boundaries for intermittent streams may be

different from the existing boundaries. Determination of final boundaries will be based on hydrologic, geomorphic, and ecologic processes in a watershed affecting intermittent streams. The widths of Riparian Reserves apply to all watersheds until watershed analysis is completed, a site specific analysis is conducted and described, and the rationale for final Riparian Reserve boundaries is presented through the appropriate National Environmental Policy Act decision making process.

The initial Riparian Reserve widths are as follows:

Fish bearing streams. Riparian Reserves consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Permanently flowing non-fish bearing streams. Riparian Reserves consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site potential tree, or 150 feet slope distance, whichever is greatest.

Seasonally flowing or intermittent streams, wetlands less than one acre, and unstable and potentially unstable areas. This category applies to features with high variability in size and site specific characteristics. At a minimum the Riparian Reserve will include:

- The extent of unstable and potentially unstable areas.
- The stream channel and the area extending to the top of the inner gorge.
- The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation.
- The area extending from the edges of the stream channel to a distance equal to the height of one site potential tree, or 100 feet slope distance, whichever is greatest.

Constructed ponds and reservoirs, and wetlands greater than one acre. Riparian Reserves consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site potential tree, or to 150 feet slope distance from the edge of a wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest. (Riparian vegetation and seasonally saturated soils will generally constitute a wetland and will be managed as prescribed for wetlands.)

Lakes and Natural Ponds. Riparian Reserves consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site potential trees, or 300 feet slope distance, whichever is greatest. (Riparian vegetation and seasonally saturated soils will generally constitute a wetland and will be managed as prescribed for wetlands.)

Management Actions/Direction

As a general rule, management actions/direction for Riparian Reserves prohibit or regulate activities that retard or prevent attainment of Aquatic Conservation Strategy objectives. Watershed analysis and appropriate National Environmental Policy Act compliance will be required to change Riparian Reserves in all watersheds.

Implement the following management actions/ direction in Riparian Reserves. (Management actions/direction in this section are supplemented by Best Management Practices in Appendix J.)

General

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Timber Management

Neither conduct nor allow timber harvest, including fuelwood cutting, in Riparian Reserves, with exception of the following:

- Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting if required to attain Aquatic Conservation Strategy objectives.

- Remove salvage trees only when watershed analysis determines that present and future woody debris needs are met and other Aquatic Conservation Strategy Objectives are not adversely affected.

- Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives.

Riparian Reserve acres are not included in calculations of the probable sale quantity.

Roads Management

Cooperate with federal, state, and county agencies and work with private parties with road use agreements to achieve consistency in road design, operation, and maintenance necessary to attain Aquatic Conservation Strategy objectives.

For each existing or planned road, meet Aquatic Conservation Strategy objectives by:

- Completing watershed analyses including appropriate geotechnical analyses (i.e., examining soil and rock conditions in riparian and stream crossings) prior to construction of new roads or landings in Riparian Reserves.

- Minimizing road and landing locations in Riparian Reserves.

- Preparing road design criteria, elements, and standards that govern construction and reconstruction.

- Preparing operation and maintenance criteria that govern road operation, maintenance, and management.

- Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.

- Restricting sidecasting as necessary to prevent the introduction of sediment to streams.

- Avoiding wetlands entirely when constructing new roads.

Determine the influence of each road on the Aquatic Conservation Strategy objectives through watershed analysis. Meet Aquatic Conservation Strategy objectives by:

- Reconstructing roads and associated drainage features that pose a substantial risk.

- Prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected.

- Closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy objectives and considering short-term and long-term transportation needs.

Design and construct new culverts, bridges and other stream crossings and improve existing culverts, bridges and other stream crossings determined to pose a substantial risk to riparian conditions. New structures and improvements will be designed to accommodate at least the 100 year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is not feasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.

Provide and maintain fish passage at all road crossings of existing and potential fish bearing streams (e.g., streams which can be made available to anadromous fish by removing obstacles to passage).

Develop and implement a Road Management Plan or a Transportation Management Plan that will meet the Aquatic Conservation Strategy objectives. As a minimum, this plan will include provisions for the following activities:

- Inspections and maintenance during storm events.

- Inspections and maintenance after storm events.

- Road operation and maintenance giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources.

- Traffic regulation during wet periods to prevent damage to riparian resources.

- Establishing the purpose of each road by developing the Road Management Objective.

Grazing Management

Through a planning and environmental analysis process appropriate to the action, adjust or eliminate grazing practices that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Locate new livestock handling and/or management facilities outside Riparian Reserves. For existing livestock handling facilities inside Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities.

Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will ensure Aquatic Conservation Strategy objectives are met.

Recreation Management

Design new recreational facilities within Riparian Reserves, including trails and dispersed sites, so as not to prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impacts to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.

Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

Address attainment of Aquatic Conservation Strategy objectives in Wild and Scenic River and Wilderness management plans.

Minerals Management

Note: The following management actions/direction differ from the standards and guidelines in the SEIS ROD, since the standards and guidelines are not all implementable under current laws and regulations. The stronger standards and guidelines in the SEIS ROD will be adopted at such time as changes in current laws and/or regulations authorize their implementation.

For any proposed locatable mining operation in Riparian Reserves, other than notice level or casual use, require the following actions by the operator consistent with 43 CFR 3809 regulations:

- Prepare a Plan of Operations, including a reclamation plan and reclamation bond for all mining operations in Riparian Reserves. Such plans and bonds will address the costs of removing facilities, equipment, and materials; recontouring of disturbed areas to an approved topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and revegetating to meet Aquatic Conservation Strategy objectives.

- Locate structures, support facilities, and roads outside Riparian Reserves. If no alternative to siting facilities in Riparian Reserves exists, locate in a way compatible with Aquatic Conservation Strategy objectives. Road construction will be kept to the minimum necessary for the approved mineral activity. Roads will be constructed and maintained to meet road management standards and to minimize damage to resources in Riparian Reserves. When a road is no longer required for mineral or land management activities, it will be reclaimed. In any case, access roads will be constructed consistent with 43 CFR 3809 and acceptable road construction standards and will minimize damage to resources in Riparian Reserves.

- Avoid locating solid and sanitary waste facilities in Riparian Reserves. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Reserves exists, if releases can be prevented, and if stability can be ensured, then:

  - Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.

- Locate and design the waste facilities using best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Reserves.

- Reclaim waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

- Monitor waste and waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

- Require reclamation bonds adequate to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

Where an existing operator is in noncompliance at the notice level (i.e., causing unnecessary or undue degradation), require actions similar to those stated above to meet the intent of 43 CFR 3809.

For leasable mineral activity in Riparian Reserves, prohibit surface occupancy for oil, gas, and geothermal exploration and development activities where leases do not exist. Where possible, adjust the stipulations in existing leases to eliminate impacts that retard or prevent the attainment of Aquatic Conservation Strategy objectives, consistent with existing lease terms and stipulations.

Allow development of saleable minerals, such as sand and gravel, within Riparian Reserves only if Aquatic Conservation Strategy objectives can be met.

Develop inspection and monitoring requirements and include such requirements in exploration and mining plans and in leases or permits consistent with existing laws and regulations. Evaluate the results of inspection and monitoring to determine if modification of plans, leases and permits is needed to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Fire/Fuels Management

Design fuel treatment and fire suppression strategies, practices, and activities to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies will recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management activities could be damaging to long-term ecosystem function.

Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Reserves. If the only suitable location for such activities is within the Riparian Reserve, an exemption may be granted following a review and recommendation by a resource advisor. The advisor will prescribe the location, use conditions, and rehabilitation requirements. Utilize an interdisciplinary team to predetermine suitable incident base and helibase locations.

Minimize delivery of chemical retardant, foam, or other additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor, when an escape would cause more long-term damage.

Design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

Immediately establish an emergency team to develop a rehabilitation treatment plan needed to attain Aquatic Conservation Strategy objectives whenever Riparian Reserves are significantly damaged by a wildfire or a prescribed fire burning outside prescribed parameters.

Limit the size of all wild fires. When watershed analysis and/or landscape analysis are completed and approved, some natural fires may be allowed to burn under prescribed conditions.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Locate and manage water drafting sites (e.g., sites where water is pumped to control or suppress fires) to minimize adverse effects on riparian habitat and water quality as consistent with Aquatic Conservation Strategy objectives.

Lands

Issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where legally possible, adjust existing leases, permits, rights-of-way, and easements to eliminate adverse affects that retard or prevent the

attainment of Aquatic Conservation Strategy objectives. If adjustments are not effective and where legally possible, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact and the ecological value of the riparian resources affected.

Use land acquisition, exchange, and conservation easements to meet Aquatic Conservation Strategy objectives and facilitate restoration of fish stocks and other species at risk of extinction.

For proposed hydroelectric projects under the jurisdiction of the Federal Energy Regulatory Commission (the Commission), provide timely, written comments regarding maintenance of instream flows and habitat conditions and maintenance/ restoration of riparian resources and stream channel integrity. Request the Commission to locate proposed support facilities outside of Riparian Reserves. For existing support facilities inside Riparian Reserves that are essential to proper management, provide recommendations to the Commission that ensure Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, provide recommendations to the Commission that such support facilities should be relocated. Existing support facilities that must be located in the Riparian Reserves should be located, operated, and maintained with an emphasis to eliminate adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives.

For other hydroelectric and surface water development proposals in Tier One Key Watersheds, require instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies. For other hydroelectric and surface water development proposals in all other watersheds, give priority emphasis to instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies.

General Riparian Area Management

Identify and attempt to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on site when needed to meet Aquatic Conservation Strategy and Riparian Reserve objectives.

Apply herbicides, insecticides, other toxicants, and other chemicals only in a manner that avoids impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and instream flows needed to maintain riparian resources, channel conditions, and fish habitat.

Watershed and Habitat Restoration

Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Aquatic Conservation Strategy objectives.

Cooperate with federal, state, local, and tribal agencies, and private landowners to develop watershed based coordinated resource management plans or other cooperative agreements to meet Aquatic Conservation Strategy objectives.

Prevent watershed and habitat degradation rather than relying on mitigation measures or planned restoration.

Fish and Wildlife Management

Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Aquatic Conservation Strategy objectives.

Design, construct, and operate fish and wildlife interpretive and other user enhancement facilities in a manner that does not retard or prevent attainment of Aquatic Conservation Strategy objectives. For existing fish and wildlife interpretative and other user enhancement facilities inside Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where Aquatic Conservation Strategy objectives cannot be met, relocate or close such facilities.

Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with

attainment of Aquatic Conservation Strategy objectives.

Cooperate with federal, tribal, and state fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest and poaching that threaten the continued existence and distribution of native fish stocks inhabiting streams with adjacent or nearby federal lands.

Late-Successional Reserves

Objectives

Protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth forest-related species including the northern spotted owl and marbled murrelet.

Maintain a functional, interacting, late-successional and old-growth forest ecosystem.

Land Use Allocations

There are 186,423 acres of Late-Successional Reserves which are mapped in the district. The five components of this reserve system are:

1. Mapped Late-Successional Reserves.

   These reserves incorporate Key Watersheds to the extent practicable; some or parts of the most ecologically significant and ecologically significant late-successional forests identified by the Scientific Panel on Late-Successional Forest Ecosystems; and some or parts of the Designated Conservation Areas from the Final Draft Spotted Owl Recovery Plan.

2. Late-Successional/Old-Growth 1 and 2 areas within Marbled Murrelet Zone 1, as mapped by the Scientific Panel on Late-Successional Forest Ecosystems.

3. Occupied Marbled Murrelet Sites.

   See Special Status and SEIS Special Attention Species section.

4. Known Spotted Owl Activity Centers (as of January 1, 1994).

   See Special Status and SEIS Special Attention Species section.

5. Protection Buffers.

   See Special Status and SEIS Special Attention Species section.

See Roseburg District strategy map for locations of Late-Successional Reserves. Occupied marbled murrelet sites, known spotted owl activity centers, and protection buffers are unmapped.

Management Actions/Direction

General

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Develop Late-Successional Reserve assessments prior to habitat manipulation. See Management Assessments and Plans toward the end of this chapter for additional information.

Plan and implement nonsilvicultural activities inside Late-Successional Reserves that are neutral or beneficial to the creation and maintenance of late-successional habitat.

Using interdisciplinary teams, evaluate other activities not described below and document appropriate guidelines.

Request review by the Regional Ecosystem Office of all activities deemed to have potential adverse effects on Late-Successional Reserve objectives. The Regional Ecosystem Office may develop additional criteria for exempting some additional activities from review.

Silviculture

Plan and implement silvicultural treatments inside Late-Successional Reserves that are beneficial to the creation of late-successional habitat.

If needed to create and maintain late-successional forest conditions, conduct thinning operations in forest stands up to 80 years of age. This will be accomplished by precommercial or commercial thinning of stands regardless of origin (e.g., planted after logging or naturally regenerated after fire or blowdown).

Salvage

Limit salvage of dead trees in Late-Successional Reserves to areas where stand replacing events exceed ten acres in size and canopy closure has been reduced to less than 40 percent.

Retain all standing live trees including those injured (e.g., scorched) but likely to survive.

Retain snags that are likely to persist until late-successional forest conditions have developed and a new stand is again producing large snags.

Retain adequate coarse woody debris quantities in a new stand so that in the future it will still contain amounts similar to naturally regenerated stands. Watershed level or province level plans will establish appropriate levels of coarse woody debris to be used. Levels will be typical and will not require retention of all material where it is highly concentrated or too small to contribute to coarse woody debris over the long term.

In the Oregon Klamath Province, if essential to reduce future risk of fire or insect damage, conduct salvage that does not meet the preceding management actions/direction. Focus on those areas where there is high risk of large scale disturbance.

Remove snags and logs to reduce hazards to humans along roads and trails and in or adjacent to recreation sites. Leave some material where coarse woody debris is inadequate.

After disturbance in younger stands, develop diameter and biomass retention direction consistent with the intention of achieving late-successional forest conditions. Where green trees, snags, and logs are present following disturbance, the green tree and snag direction will be applied first and completely satisfied where possible. The biomass left in snags can be credited toward the amount of coarse woody debris biomass needed to achieve management objectives.

Retain logs present on the forest floor before a disturbance event.

Retain coarse woody debris to approximate the species composition of the original stand to help replicate preexisting suitable habitat conditions.

Deviate from these management actions/direction only to provide reasonable access to salvage sites and feasible logging operations. Limit deviations to as small an area as possible.

Road Construction and Maintenance

Construct roads in Late-Successional Reserves if the potential benefits of silviculture, salvage, and other activities exceed the costs of habitat impairment. If new roads are necessary to implement a practice that is otherwise in accordance with these guidelines, they will be kept to a minimum, be routed through unsuitable habitat where possible, and be designed to minimize adverse impacts. Alternative access methods, such as aerial logging, will be considered to provide access for activities in reserves.

Remove trees along rights-of-way if they are a hazard to public safety. Consider leaving material on site if available coarse woody debris is inadequate. Consider topping of trees as an alternative to felling.

Fuelwood Gathering

Permit fuelwood gathering only in existing cull decks, in areas where green trees are marked by silviculturists for thinning, in areas where blowdown is blocking roads, and in recently harvested timber sale units where down material will impede scheduled post sale activities or pose an unacceptable risk of future large scale disturbance. In all cases these activities will comply with management actions/ direction for salvage and silvicultural activities.

Mining

Assess the impacts of ongoing and proposed mining activities in Late-Successional Reserves.

Include stipulations in mineral leases and, when legally possible, require operational constraints for locatable mineral activities to minimize detrimental effects to late-successional habitat.

Developments

Neither construct nor authorize new facilities that may adversely affect Late-Successional Reserves.

Review on a case-by-case basis new development proposals that address public needs or provide significant public benefits. They may be approved when adverse effects can be minimized and

mitigated. They will be planned to have the least possible adverse impacts on Late-Successional Reserves.

Locate new developments to avoid degradation of habitat and adverse effects on identified late-successional species.

Retain and maintain existing developments, such as campgrounds, utility corridors, and electronic sites, consistent with other management actions/direction for Late-Successional Reserves.

Remove hazard trees along utility rights-of-way and trails and in other developed areas.

Land Exchanges

Consider land exchanges in Late-Successional Reserves if they provide benefits equal to or better than current conditions.

Consider land exchanges especially to improve area, distribution, and quality (e.g., connectivity, shape, and contribution to biodiversity) of Late-Successional Reserves, especially where public and private lands are intermingled.

Habitat Improvement Projects

Design projects to improve conditions for fish, wildlife, and watersheds if they provide late-successional habitat benefits or if their effect on late-successional associated species is negligible.

Design projects for recovery of threatened or endangered species even if they result in some reduction of habitat quality for other late-successional species.

Design and implement watershed restoration projects consistent with Late-Successional Reserve objectives.

Fire Suppression and Prevention

As part of watershed analysis or a late-Successional Reserve Assessment, plan fire management for each Late-Successional Reserve.

Emphasize maintaining late-successional habitat in wildfire suppression plans.

Use minimum impact suppression methods for fuels management in accordance with guidelines for reducing risks of large scale disturbances.

During actual fire suppression activities, consult resource specialists to assure that habitat damage is minimized.

Until a fire management plan is completed for a Late-Successional Reserve or group of reserves, suppress wildfire to avoid loss of habitat and to maintain future management options.

Prepare a specific fire management plan prior to any habitat manipulation activities in Late-Successional Reserves. Specify how hazard reduction and other prescribed fire applications meet the objectives of the Late-Successional Reserve. Until the plan is approved, proposed activities will be subject to review by the Regional Ecosystem Office.

Apply prescribed fire in a manner which retains the amount of coarse woody debris determined through watershed analysis.

Limit the size of all wild fires. When watershed analysis or a Late-Successional Reserve Assessment is completed, some natural fires may be allowed to burn under prescribed conditions.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Special Forest Products

Evaluate whether special forest product harvest activities have adverse effects on Late-Successional Reserve objectives.

Prior to selling special forest products, ensure resource sustainability and protection of other resource values such as special status plant or animal species.

Where special forest product activities are extensive, evaluate whether they have significant effects on late-successional habitat. Restrictions may be appropriate in some cases.

Recreational Uses

Use adjustment measures, such as education, use limitations, traffic control devices, or increased maintenance, when dispersed and developed recreation practices retard or prevent attainment of Late-Successional Reserve objectives.

Rights-of-Way, Contracted Rights, Easements, and Temporary Use Permits

Access to nonfederal lands through Late-Successional reserves will be considered and existing right-of-way agreements, contracted rights, easements and temporary use permits in Late-Successional Reserves will be recognized as valid uses.

For all new rights-of-way proposals, design mitigation measures to reduce adverse affects on Late-Successional Reserves. Consider alternative routes that avoid Late-Successional Reserves. If rights-of-way must be routed through a reserve, design and locate them to have the least impact on late-successional habitat.

Review all temporary use permits. When objectives of Late-Successional Reserves are not being met, reduce impacts through education or modification of existing permits.

Nonnative Species

If introduction of a nonnative species is proposed, complete an assessment of impacts and avoid any introduction that would retard or prevent achievement of late-successional objectives.

Evaluate impacts of nonnative species (plant and animal) existing within reserves.

Develop plans and recommendations for eliminating or controlling nonnative species which are consistent with Late-Successional Reserve objectives. Include an analysis of effects of implementing such programs on other species or habitats within Late-Successional Reserves.

Protection Buffers

See the Special Status and SEIS Special Attention Species section.

Adaptive Management Areas

The following material summarizes Adaptive Management Area direction. Details regarding this direction are found in Attachment A of the SEIS ROD.

Objectives

Develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives.

Contribute substantially to the achievement of SEIS ROD objectives, including provision of well distributed late-successional habitat outside reserves; retention of key structural elements of late-successional forests on lands subjected to regeneration harvest; restoration and protection of riparian zones; and provision of a stable timber supply.

Land Use Allocations

There are 19,260 acres of BLM-administered land in the Little River Adaptive Management Area.

Management Actions/Direction

Develop a plan for the Little River Adaptive Management Area. See Management Assessments and Plans (toward the end of this chapter) for additional information.

Proceed with management activities in the Adaptive Management Area while the plan is being developed. Initiation of activities will not be delayed by requirements for comprehensive plans or consensus documents beyond those needed to meet existing legal requirements for activities.

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Manage mapped and unmapped Late-Successional Reserves in accordance with management actions/ direction stated previously. Management around these reserves will be designed to reduce the risk of natural disturbances.

Protect riparian areas in a manner comparable to that prescribed for other federal land areas. Desired conditions may be achieved in a manner different than that prescribed for other areas, and research projects may be conducted within riparian zones. During analysis of Riparian Reserve widths, consider the contribution of these reserves to aquatic and terrestrial species. Through watershed analysis, take into account all species that were intended to benefit by the prescribed Riparian Reserve widths (i.e., fish, mollusks, amphibians, lichens, fungi, bryophytes,

vascular plants, American marten, red tree voles, bats, marbled murrelets, and northern spotted owls.)

Manage coarse woody debris, green trees, and snags in a manner which meets the intent of the management actions/direction for the Matrix. There are no specific management actions/direction for these forest components in the Adaptive Management Area.

Modify site treatment practices, particularly the use of fire and pesticides, and modify harvest methods to minimize soil and litter disturbance.

1. Minimize intensive burning, unless appropriate for certain specific habitats, communities, or stand conditions. Prescribed fires should be planned to minimize the consumption of litter and coarse woody debris.

2. Minimize soil and litter disturbance that may occur as a result of yarding and operation of heavy equipment.

3. Reduce the intensity and frequency of site treatments.

Provide for old-growth fragments in watersheds where little remains. The Matrix management action/direction for retaining late-successional forest in fifth field watersheds (see Matrix section for details) will be considered as a threshold for analysis in Adaptive Management Area planning rather than a strict management action/direction. The role of remaining late-successional forest stands will be fully considered in watershed analysis before they can be modified.

During Adaptive Management Area planning, review relevant objectives, land use allocations, and management actions/direction for resource programs established in this proposed resource management plan. They may be modified in Adaptive Management Area plans based on site specific analyses. Otherwise, management actions/direction will be developed to meet the objectives of the Adaptive Management Area and the overall strategy. Development of management guidance will be coordinated with the Regional Ecosystem Office through the Regional Interagency Executive Committee.

Explore and support opportunities to research the role and effects of fire/fuels management on ecosystem functions.

Emphasize fire/fuels management cooperation across agency and ownership boundaries.

Follow the hazard reduction management actions/direction in this proposed resource management plan (see Fire section) until the Adaptive Management Area plan is completed.

Use accepted wildfire suppression strategies and tactics and conform to specific agency policy.

Matrix (Connectivity/Diversity Blocks and General Forest Management Area)

Objectives

Produce a sustainable supply of timber and other forest commodities.

Provide connectivity (along with other allocations such as Riparian Reserves) between Late-Successional Reserves.

Provide habitat for a variety of organisms associated with both late-successional and younger forests.

Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.

Provide early-successional habitat.

Land Use Allocation

In the Matrix, there are approximately 54,900 acres of BLM-administered land in the General Forest Management Area and 26,900 acres in Connectivity/Diversity Blocks. Connectivity/Diversity Blocks vary in size and are distributed throughout the Matrix.

Management Actions/Direction

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Conduct timber harvest and other silvicultural activities in that portion of the Matrix with suitable forest lands, according to management actions/ direction summarized below and in the Timber section.

Provide a renewable supply of large down logs well distributed across the Matrix landscape in a manner that meets the needs of species and provides for ecological functions. Down logs will reflect the species mix of the original stand.

1. Leave 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Decay class 1 and 2 logs will be credited toward the total. Down logs will reflect the species mix of the original stand. Where this management action/ direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit.

2. In areas of partial harvest (eg. Connectivity/ Diversity Blocks, density management), apply the same basic management actions/direction as in Number 1 above, but they can be modified to reflect the timing of stand development cycles where partial harvest is practiced.

3. Retain coarse woody debris already on the ground and protect it to the greatest extent possible from disturbance during treatment (e.g., slash burning and yarding) which might otherwise destroy the integrity of the substrate.

Retain green trees and snags throughout the General Forest Management Area.

1. Retain six to eight green conifer trees per acre in regeneration harvest units.

2. Retain snags within a timber harvest unit at levels sufficient to support species of cavity nesting birds at 40 percent of potential population levels. Meet the 40 percent minimum throughout the Matrix with per acre requirements met on average areas no larger than 40 acres.

3. In addition to the previous green tree retention management action/direction, retain green trees for snag recruitment in timber harvest units where there is an identified, near term (less than three decades) snag deficit. These trees do not count toward green tree retention requirements.

Provide Connectivity/Diversity Blocks spaced throughout the BLM Matrix. Manage the blocks as follows:

1. Maintain 25 to 30 percent of each block in late-successional forest at any point in time. Inclusions of Riparian Reserves and other allocations with late-successional forest within the gross mapped Connectivity/Diversity Blocks count toward this percentage. Blocks may be comprised of contiguous or noncontiguous BLM-administered land. The size and arrangement of habitat within a block will provide effective habitat to the extent possible.

2. Manage available forest land within each block on a 150 year area control rotation.

3. When an area is regeneration harvested, retain 12 to 18 green trees per acre within harvest units.

Modify site treatment practices, particularly the use of fire and pesticides, and modify harvest methods to minimize soil and litter disturbance. Plan and implement treatments to:

1. Minimize intensive burning, unless appropriate for certain specific habitats, communities, or stand conditions. Prescribed fires should be planned to minimize the consumption of litter and coarse woody debris.

2. Minimize soil and litter disturbance that may occur as a result of yarding and operation of heavy equipment.

3. Reduce the intensity and frequency of site treatments.

Retain late-successional forest patches in landscape areas where little late-successional forest persists. This management action/direction will be applied in fifth field watersheds (20 to 200 square miles) in which federal forest lands are currently comprised of 15 percent or less late-successional forest. (The assessment of 15 percent will include all federal land allocations in a watershed.) Within such an area, protect all remaining late-successional forest stands. Protection of these stands could be modified in the future when other portions of a watershed have recovered to the point where they could replace the ecological roles of these stands.

Retain 100 acres of the best northern spotted owl habitat as close as possible to a nest site or owl activity center for all known (as of January 1, 1994) spotted owl activity centers.

Resource Programs

The following section includes objectives, land use allocations, and management actions/direction for the resource uses and programs which BLM manages in the Roseburg District. Some of the management actions/direction in the previous land use allocation section are repeated in this section. The intent of this duplication is to give a reader a package of related management guidance in one location.

Air Quality

Objectives

Continue efforts to meet National Ambient Air Quality Standards, Prevention of Significant Deterioration goals, and the visibility protection plan.

Maintain and enhance air quality and visibility in a manner consistent with the Clean Air Act and the State Implementation Plan.

Reduce the potential for wildfire emissions through the use of prescribed fire and other fuels management techniques.

Land Use Allocations

None.

Management Actions/Direction

By the year 2000, reduce particulate matter emissions and impacts from prescribed burning by 50 percent from the baseline period (1976-1979). This will be accomplished by planning, conducting, monitoring, and, if necessary, adjusting prescribed fire activities in accordance with the Oregon State Implementation Plan and the Oregon Smoke Management Plan (see Fire section).

Reduce broadcast burning in favor of lower intensity under burning. Use emission reduction mitigation measures and smoke dispersal techniques to the greatest extent practical. Wildfire hazard reduction, site preparation, and the use of prescribed fire for species habitat mitigation will be implemented in a manner consistent with ecosystem management.

Where needed, use dust abatement measures on roads during BLM timber harvest operations or other BLM commodity hauling activity. Encourage dust abatement measures when haulers use BLM roads under permits and right-of-way agreements.

Determine the cumulative effects of proposed forest management activities on local and subregional air quality and minimize impacts. Coordinate cumulative impact analysis with other federal agencies.

As part of implementation planning, prepare conformity determinations required by the Clean Air Act.

Perform an emissions tradeoff analysis to determine and quantify the effects of prescribed burning and other types of fuel management on reduction of wildfire emissions. This analysis will be performed at the same geographic scale as conformity determinations.

Consider alternative emission reduction techniques whenever they are compatible with land allocation objectives and other management actions/direction. See the Air Quality Analysis section of the FSEIS for alternative treatments that may be considered during fuels management project design.

Water and Soils

Objectives

See Aquatic Conservation Strategy, Riparian Reserve, Watershed Restoration and Key Watershed objectives (Tier 1 on Roseburg District).

Improve and/or maintain soil productivity.

As directed by the Clean Water Act, comply with state water quality requirements to restore and maintain water quality to protect the recognized beneficial uses for the South Coast and Umpqua basins.

Land Use Allocations

None specifically for water quality or soils. However, Riparian Reserves, Key Watershed provisions, Timber Production Capability Classifications, Congressional Reserves, and Administratively Withdrawn Areas will assist in meeting water quality and soils management objectives. In addition, the district manages 8.4 miles of the total 33.8 river miles designated as the North Umpqua Wild and Scenic River corridor. Water quality and quantity were major

contributors to the outstandingly remarkable values of this river. There are an estimated 113,500 acres of Riparian Reserves that include the five categories of streams or waterbodies described in the Land Use Allocation, Riparian Reserve section of this chapter.

Management Actions/Direction

General

Improve and/or maintain soil and water conditions by closing selected areas to off highway vehicle use or limiting such use to existing roads and trails, and/or limiting the period of use. See Recreation, Off Highway Vehicles, for additional details.

Water

See Management Actions/Direction for Riparian Reserves and Key Watersheds (located in Aquatic Conservation Strategy section).

Conduct watershed analysis as described in Use of the Plan and in the SEIS ROD.

Continue to implement a nonpoint source management program in cooperation with the U.S. Environmental Protection Agency and in existing agreement with the Oregon Department of Environmental Quality.

Continue coordination with the Oregon Department of Environmental Quality for implementation of Best Management Practices which protect beneficial uses of water.

Ensure consistency of management activities with Oregon's Statewide Water Quality Management Plan for forest practices and with Oregon's water quality criteria and guidelines (Oregon Administrative Rule 340-41).

Protect flood plains and wetlands in accordance with Executive Orders 11988 and 11990 and BLM's Riparian-Wetlands Initiative for the 1990s (USDI, BLM 1991a).

Design and implement watershed restoration projects that promote long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and attain Aquatic Conservation Strategy objectives. See Aquatic Conservation Strategy for additional guidance.

Cooperate with federal, state, local, and tribal agencies and private landowners to develop watershed based coordinated resource management plans or other cooperative agreements to meet Aquatic Conservation Strategy objectives.

Prevent watershed degradation rather than using mitigation or planned restoration to correct foreseeable problems caused by management activities. See Best Management Practices, Appendix J, for additional guidance.

Identify and attempt to obtain instream flows needed to maintain riparian resources, channel conditions, aquatic habitat, and water quality.

Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.

Apply herbicides, insecticides, and other chemicals in a manner that avoids impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Use land acquisition, exchange, and conservation easements to meet Aquatic Conservation Strategy objectives.

Apply for water rights to support the needs for fire suppression, construction/maintenance (e.g., pump chances, water holes, and reservoirs), recreation, and other programs.

Land management practices of adjacent landowners will be considered during site specific timber management planning and other specific activity and project planning.

Provide for protection of both surface water and ground water in planning for chemical uses. Chemicals used will include herbicides, pesticides, fertilizers, and fire retardant chemicals. Application and monitoring of herbicides will be done in accordance with BLM's "Record of Decision, Western Oregon Program, Management of Competing Vegetation", 1991.

Management in municipal watersheds is subject to agreement with the cities of Drain, Riddle, and Canyonville through memorandums of understanding, and with the City of Myrtle Creek through a special use permit.

Soils

Apply Best Management Practices during all ground and vegetation disturbing activities. See Appendix J for a list of practices.

Minimize disturbance of identified fragile sites. Appendix J contains a summary of management guidance for fragile sites.

Use silvicultural systems that are capable of maintaining or improving long-term site productivity of soils.

Design logging systems to avoid or minimize adverse impacts to soils.

In forest management activities involving ground based systems, tractor skid trails, including existing skid trails, would be planned to have insignificant growth loss effect. Existing tractor trails will be used as much as possible and new trails will be limited to slopes less than 35 percent. Operation on these trails will minimize soil displacement and occur when soil moisture content provides the most resistance to compaction. Tractor trails, including those from previous entries, will be selectively tilled with a properly designed self-drafting winged subsoiler.

The use of prescribed fire on highly sensitive soils (those soils recognized as unusually erodible, nutrient deficient, or low organic matter) will be avoided. Any burning on such soils, if considered essential for resource management, will be accomplished under site specific prescriptions to accomplish the resource objectives and minimize adverse impacts on soil properties. On other soils, prescribed fire prescriptions will be designed to protect beneficial soil properties.

The following guidelines will be followed when using track type equipment with a brush blade for mechanical site preparation:

- Restrict use to areas with suitable soil types and slopes less than 35 percent.
- Avoid displacing duff layers and topsoil into piles or windrows.
- Minimize piling of large woody material.
- Limit machine use to one round trip over the same area.
- Operate at soil moistures that maximize resistance to compaction. A low ground pressure backhoe/ loader grapple or other special equipment or techniques that will achieve the same insignificant soil compaction may be used instead of the preceding techniques. All areas compacted during site preparation will be tilled with a properly designed self-drafting winged subsoiler.

Wildlife Habitat

Objectives

See Late-Successional Reserve, Riparian Reserve, and Matrix objectives.

Enhance and maintain biological diversity and ecosystem health to contribute to healthy wildlife populations.

Land Use Allocations

The land use allocations in this proposed resource management plan are designed to benefit wildlife species, in the aggregate, that use the various seral stages and other habitat areas of the forest.

Management Actions/Direction

All Land Use Allocations

Use the watershed analysis process to address wildlife habitat issues for individual watersheds. The analysis will help to resolve any concerns identified in applying management actions/direction in this section and those in the Special Status and SEIS Special Attention Species section. Where appropriate, wildlife habitat enhancement opportunities will be identified through this process. Coordinate with the Oregon Department of Fish and Wildlife during planning and implementation of wildlife habitat enhancement projects.

Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate impacts associated with habitat manipulation, poaching, and other activities that threaten the continued existence and distribution of native wildlife inhabiting federal lands.

Avoid road construction in areas with high wildlife values.

Riparian Reserves

Design and implement wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Aquatic Conservation Strategy objectives.

Design, construct, and operate wildlife interpretive and other user enhancement facilities in a manner that does not retard or prevent attainment of Aquatic Conservation Strategy objectives. For existing wildlife interpretative and other user enhancement facilities inside Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where Aquatic Conservation Strategy objectives cannot be met, relocate or close such facilities.

Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Design projects to improve conditions for wildlife if they provide late-successional habitat benefits or if their effect on late-successional associated species is negligible.

If introduction of a nonnative species is proposed, complete an assessment of impacts and avoid any introduction that would retard or prevent achievement of Late-Successional Reserve objectives.

Evaluate impacts of nonnative species existing within Late-Successional Reserves.

Develop plans and recommendations for eliminating or controlling nonnative species which are inconsistent with Late-Successional Reserve objectives. Include an analysis of effects of implementing such programs on other species within Late-Successional Reserves.

Matrix (General Forest Management Area and Connectivity/Diversity Blocks)

Retain snags within a timber harvest unit at levels sufficient to support species of cavity nesting birds at 40 percent of potential population levels. Meet the 40 percent minimum throughout the Matrix with per acre requirements met on average areas no larger than 40 acres.

General Forest Management Area

Retain late-successional forest patches in landscape areas where little late-successional forest persists. This management action/direction will be applied in fifth field watersheds (20 to 200 square miles) in which federal forest lands are currently comprised of 15 percent or less late-successional forest. (The assessment of 15 percent will include all federal land allocations in a watershed.) Within such an area, protect all remaining late-successional forest stands. Protection of these stands could be modified in the future when other portions of a watershed have recovered to the point where they could replace the ecological roles of these stands.

Retain six to eight green conifer trees per acre after regeneration harvest. Retained trees will be distributed in variable patterns (e.g., single trees, clumps, and stringers) to contribute to stand diversity.

In addition to the previous green tree retention management action/direction, retain green trees for snag recruitment in harvest units where there is an identified, near-term (less than three decades) snag deficit. These trees do not count toward green tree retention requirements.

Leave 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Existing decay class 1 and 2 logs count toward this requirement. Down logs will reflect the species mix of original stands. Where this management action/ direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit.

Connectivity/Diversity Blocks

Provide Connectivity/Diversity Blocks spaced throughout the BLM land base. Manage the blocks as follows:

1. Maintain 25 to 30 percent of each block in late-successional forest at any point in time. The percentage of habitat will include habitat in other allocations, such as Riparian Reserves. Blocks may be comprised of contiguous or noncontiguous BLM-administered land. The size and arrangement of habitat within a block should provide effective habitat to the extent possible.

2. Retain 12 to 18 green conifer trees per acre when an area is regeneration harvested. Distribute the retained trees in variable patterns (e.g., single trees, clumps, and stringers) to contribute to stand

diversity. The management goal for the retained trees and subsequent density management would be the recovery of old-growth conditions in approximately 100 to 120 years.

3. Leave 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Existing decay class 1 and 2 logs will be credited toward this total. Down logs will reflect the species mix of original stands. Where this management action/direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit.

Special Habitats

Using interdisciplinary teams, identify special habitat areas and determine relevance for values protection or management on a case by case basis. Of particular importance in these determinations will be the habitat of species for which the SEIS ROD provides protection buffers.

Use management practices, including fire, to obtain desired vegetation conditions in special habitats.

Special habitat areas will be buffered by 100 to 200 feet to protect their plant community structure, species composition, and ecological processes. The special habitat buffer will be an area designated and managed for the protection or enhancement of the special habitat. Activities such as timber harvest, timber salvage, and prescribed burning will be permitted within the buffers when they are considered necessary for special habitat restoration and will benefit resident special habitat species. Water courses flowing into and out of wetland habitats will be maintained.

Other Raptors Habitat

Known and future raptor nest sites not protected by other management recommendations would be protected by providing suitable habitat buffers and seasonal disturbance restrictions.

Roosevelt Elk

Elk habitat management will be emphasized in the Tyee, Deadman Mountain, and Canton Creek elk areas. Habitat Management Plans will be developed for these areas prior to implementing major management programs. The following road closures will be implemented to limit the amount of vehicle access and potential harassment to elk.

1. Approximately 20 miles of existing roads in the Tyee elk area.

2. Approximately 15 miles of year long road closure on existing roads in the Deadman Mountain elk management area to establish an area of approximately 6,000 acres (at the head of Days and Coffee Creeks) with limited disturbance.

In the Tyee and Canton Creek elk management areas and consistent with underlying land use allocations, the following guidelines will be adopted for timber harvest units:

1. Thirty percent of the harvest units will be small units (15 to 20 acres) with irregular boundaries.

2. Within harvest units the distance to cover will not exceed 500 feet.

3. Minimum width of cover adjacent to harvest units will be 200 feet.

Consistent with underlying land use allocations, preferred forage plots will be developed for the Tyee elk area utilizing a variety of practices. These practices may include seeding, fertilization of natural grass/forb types, creating small openings or wide spaced thinning in young stands, and enhancing the herbaceous vegetative layer within older forest stands. All forage developments will require practices designed not to adversely affect listed species or the development of suitable habitat.

In cooperation with Oregon Department of Fish and Wildlife, elk transplants will be conducted to supplement existing numbers or establish new local populations within the Rock Creek, Little River, Canton Creek, and Green Butte elk areas.

Wild Turkey Habitat

Consistent with underlying land use allocations, all oak stands will be maintained except on conifer sites within designated turkey habitat utilizing a variety of methods including prescribed fire. A minimum of one ten acre stand of roosting habitat will be provided in each section of designated turkey habitat. Roosting habitat will contain the following components:

- A scattering (eight to ten) of large (larger than 24" DBH) open limbed conifer trees on each acre.

- Ponderosa pine when available will be preferred roost trees.

Osprey Habitat

On BLM-administered lands within 1/4-mile of known osprey nest sites (2,500 total acres), nest trees and adjacent perch trees will be protected and disturbance will be restricted between March 20 and August 31. Consistent with other land use allocations, adequate nest and perch replacement trees for osprey will be retained within 1/4-mile of nest sites.

Fish Habitat

Objectives

See Aquatic Conservation Strategy objectives.

Maintain or enhance the fisheries potential of streams and other waters consistent with BLM's Fish and Wildlife 2000 Plan, the Bring Back the Natives initiative, and other nationwide initiatives.

Promote the rehabilitation and protection of fish stocks at risk and their habitat.

Land Use Allocations

There are no specific land use allocations for the fisheries resource. However, Riparian Reserves, Key Watershed provisions, and Timber Production Capability Classifications will assist in meeting fish habitat management objectives.

Management Actions/Direction

Riparian Reserves

Design and implement fish habitat restoration and enhancement activities in a manner that contributes to attainment of Aquatic Conservation Strategy objectives.

Design, construct, and operate fish interpretive and other user enhancement facilities in a manner that does not retard or prevent attainment of Aquatic Conservation Strategy objectives. For existing fish interpretative and other user enhancement facilities inside Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where Aquatic Conservation Strategy objectives cannot be met, relocate or close such facilities.

Cooperate with federal, tribal, and state fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands.

Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Design projects to improve conditions for fish if they provide late-successional habitat benefits or if their affect on late-successional associated species is negligible.

All Land Use Allocations

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Use the watershed analysis process to address at risk fish species and stocks and their habitat for individual watersheds. Where appropriate, fish habitat enhancement opportunities will be identified through this process.

Coordinate with the Oregon Department of Fish and Wildlife Wild Fish Policy during planning and implementation of fish habitat enhancement projects. Priority will be given to watersheds supporting at risk fish species and stocks and those requiring extensive restoration.

As identified through watershed analysis, rehabilitate streams and other waters to enhance natural populations of anadromous and resident fish. Possible rehabilitation measures would include, but not be limited to, fish passage improvements, instream structures using boulders and log placement to create spawning and rearing habitat, placement of fine and coarse materials for over-wintering habitat, and riparian rehabilitation to establish or release existing coniferous trees.

Use existing and new water impoundments to provide recreational fishing opportunities where sufficient water quality and quantity exist and where consistent with aquatic conservation strategy and other management action/direction.

See the Special Status and SEIS Special Attention Species section and Best Management Practices (Appendix J) for additional fish habitat management actions/direction and conservation practices.

Special Status and SEIS Special Attention Species Habitat

SEIS Special Attention Species include Survey and Manage, Protection Buffer, and bat roosts as discussed in Attachment A of the SEIS ROD.

Objectives

See Late-Successional Reserve, Riparian Reserve, Matrix, and Special Area objectives.

Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and bureau special status species policies.

Manage for the conservation of federal candidate and bureau sensitive species and their habitats so as not to contribute to the need to list, and to recover the species.

Manage for the conservation of state listed species and their habitats to assist the state in achieving management objectives.

Protect and manage assessment species where possible so as to not elevate their status to any higher level of concern.

Protect SEIS Special Attention Species so as not to elevate their status to any higher level of concern.

Maintain or restore community structure, species composition, and ecological processes of special status plant and animal habitat.

Land Use Allocations

The objectives for special status species will apply to all land use allocations. All of the major land allocations in this plan are designed in part to benefit special status species in the aggregate. Special status species habitat designated on the district may change as inventories are conducted and the status of species change.

Management Actions/Direction

Late-Successional Reserves

Design projects for recovery of threatened or endangered animal and plant species even if they result in some reduction of habitat quality for late-successional species. These projects will be designed for least impact to late-successional species.

All Land Use Allocations

Special Status Species

Review all proposed actions to determine whether or not special status species occupy or use the affected area or if the habitat for such species is affected.

Conduct field surveys according to protocols and established procedures. This includes surveying during the proper season unless surveys are deemed unnecessary through watershed analysis, project planning, and environmental assessment. Field surveys may not be conducted in all cases depending on the number and timing of previous surveys conducted, whether previous surveys looked for all species that would be included on a new survey, and the likelihood of potential habitat. The intensity of field surveys will also vary depending on the same factors.

Consult (formal, informal, conference, or technical assistance, as appropriate) with the U.S. Fish and Wildlife Service or National Marine Fisheries Service for any proposed action which may affect federal listed, proposed, or candidate species or critical or essential habitat. Based on the results of consultation, modify, relocate, or abandon the proposed action.

Coordinate with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and other appropriate agencies and organizations and jointly endeavor to recover federal listed and proposed species and their habitats.

Modify, relocate, or abandon a proposed action to avoid contributing to the need to list under the Endangered Species Act, all federal candidate, state listed species and bureau sensitive species or their habitats.

Coordinate and cooperate with the state of Oregon to conserve state listed species.

Protect assessment species where possible so as not to increase their status. Assessment species will be included in all field inventory and clearance work and all new locations will be documented. They will be considered in all environmental analyses where impacts will be clearly identified.

Where it is biologically appropriate and consistent with species recovery plans, buffer special status species by 100 to 300 feet from all surface disturbance and harvest of timber.

Retain under federal management, or other appropriate management organization, habitat essential for the survival or recovery of listed and proposed species. Retain habitat of candidate, bureau sensitive, and assessment species where disposal would contribute to the need to list the species.

Where appropriate opportunities exist, acquire land to contribute to recovery, reduce the need to list, or enhance special status species habitat.

Coordinate with other agencies and groups in management of species across landscapes. Coordination will be accomplished through conservation plans or similar agreements which identify actions to conserve single or multiple species and/or habitats.

Where plans exist for species no longer on the special status list, continue with the prescribed conservation actions if determined to be necessary to avoid relisting or future consideration for listing. In the case of interagency plans or agreements, this determination will be mutually decided. Such plans may be modified as needed based on adequacy of existing rangewide conditions and conservation management.

Pursue opportunities for public education about conservation of species.

Where appropriate, pursue opportunities to increase the number of populations of species under BLM management through land acquisition and/or species reintroduction in coordination with other responsible agencies.

SEIS Special Attention Species (includes Survey and Manage species, Protection Buffer species, and roosts for bats).

Survey and Manage

Implement the survey and manage provision of the SEIS ROD within the range of SEIS special attention species and the particular habitats that they are known to occupy. Appendix T shows which species are covered by this provision, and which of the following four categories and management actions/ direction are to be applied to each:

1. Manage known sites (highest priority).

    a. Acquire and manage information on known sites, make it available to all project planners, and use it to design or modify activities.

    b. Protect known sites. For some species, apply specific management treatments such as prescribed fire.

    c. For rare and endemic fungus species, temporarily withdraw 160 acres around known sites from ground disturbing activities until the sites can be thoroughly surveyed and site specific measures prescribed.

    d. Establish management areas of all useable habitat up to 600 acres around two currently unprotected locations of *Oxiporous nobilissimus*. Protect these populations until the sites can be thoroughly surveyed and site specific measures prescribed. Protection will be undertaken immediately.

2. Survey prior to activities and manage sites.

    a. Continue existing efforts to survey and manage rare and sensitive species habitat.

    b. For species without survey protocols, start immediately to design protocols and implement surveys.

    c. Within the known or suspected ranges and within the habitat types of vegetation communities associated with the species, survey for Del Norte, Larch Mountain, Shasta, Siskiyou Mountains, and Van Dyke's salamanders, red tree voles, and Lynx.

    These surveys will precede the design of all ground disturbing activities that will be implemented in 1997 or later.

    d. For the other species listed in Appendix T, begin development of survey protocols in

1994 and proceed with surveys as soon as possible. These surveys will be completed prior to ground disturbing activities that will be implemented in Fiscal Year 1999 or later. Work to establish habitat requirements and survey protocols may be prioritized relative to the estimated threats to the species as reflected in the SEIS.

e. Conduct surveys at a scale most appropriate to the species.

f. Develop management actions/direction to manage habitat for the species on sites where they are located.

g. Incorporate survey protocols and proposed site management in interagency conservation strategies developed as part of ongoing planning efforts coordinated by the Regional Ecosystem Office.

3. Conduct extensive surveys and manage sites.

a. Conduct extensive surveys for the species to find high priority sites for species management. Specific surveys prior to ground disturbing activities are not a requirement.

b. Conduct surveys according to a schedule that is most efficient and identify sites for protection at that time.

c. Design these surveys for efficiency and develop standardized protocols.

d. Begin these surveys by 1996.

4. Conduct general regional surveys.

a. Survey to acquire additional information and to determine necessary levels of protection for arthropods, bryophytes, lichens, and fungi species that were not classed as rare.

b. Initiate these surveys no later than Fiscal Year 1996 and complete them within ten years.

Protection Buffers

Provide protection buffers for specific rare and locally endemic species and SEIS Special Attention Species in the upland forest matrix. A list of these species and related management actions/direction are presented below. These species are likely to be assured viability if they occur within reserves. However, there might be occupied locations outside reserves that will be important to protect as well.

Apply the following management actions/direction:

1. Develop survey protocols that will ensure a high likelihood of locating sites occupied by these species.

2. Following development of survey protocols and prior to ground disturbing activities, conduct surveys within the known or suspected ranges of the species and within the habitat types or vegetation communities occupied by the species. See the previous Survey and Manage section for an implementation schedule.

3. When located, protect the occupied sites as follows:

The SEIS ROD establishes Late-Successional Reserves for the Protection Buffers for the following species:

Nonvascular Plants

Ptilidium californicum (Liverwort) - This species is rare and has a very limited distribution in old white fir forests with fallen trees. It occurs on trunks of trees at about 5000 feet elevation. Mitigation options include finding locations and maintaining stands of overmature white fir at about 5000 feet elevation for inoculum and dispersal along corridors and studying specific distribution patterns. Protect known occupied locations if distribution patterns are disjunct and highly localized by deferring timber harvest and avoiding removal of fallen trees and logs.

Ulota meglospora (Moss) - This species occurs in northern California and southwest Oregon. It is best developed (locally abundant) in very old stands of tanoak, Douglas-fir, and other conifer species further north, but is generally scarce throughout its range. The species is poorly known ecologically. Mitigation activities include conducting basic ecological studies, and surveying for presence, particularly in Oregon. Protect known occupied sites if distribution patterns are disjunct and highly localized. Defer timber harvest or other activities which would not maintain desired habitat characteristics and population levels.

Aleuria rhenana (Fungus) - This mushroom is widely distributed but rare and little known throughout its range. Known from one collection from Mt. Rainier

National Park it is a conifer litter decomposer. Mitigation activities include conducting ecological studies and surveys to determine localities. Protect known populations if surveys continue to indicate that the population is rare. Defer ground disturbing activities.

Otidea leporina, O. onotica, and *O. smithii* (Fungi) - These mushrooms occur in conifer duff, and are widespread in distribution but uncommon. They are dependent on older-age forests. Specific mitigation options include protecting older forests from ground disturbance where the species are located.

For the plants listed above, it is recommended that Regional or state office level ecologists or botanists should: (1) maintain a spatially explicit data base of all known sites in BLM Districts, and (2) develop species or area management plans, to be implemented under the guidance of the regional botany programs.

Amphibians

Shasta Salamander - This species is very narrowly distributed, occurring only in localized populations on the Shasta-Trinity National Forest. Only a small part of its range is included within Habitat Conservation Areas identified by the Interagency Scientific Committee (1990) (status within Late-Successional Reserves has not been determined). It occurs in association with limestone outcrops, protected by an overstory canopy. All known and future localities must be delineated and protected from timber harvest, mining, quarry activity, and road building within the delineated site, and a buffer of at least the height of one site potential tree or 100 feet horizontal distance, whichever is greater, should surround the outcrop. Additional surveys conducted using a standardized protocol must be undertaken to identify and delineate all occupied sites within the species' potential range.

Birds

Great Gray Owl - Within the range of the northern spotted owl, the great gray owl is most common in lodgepole pine forests adjacent to meadows. However, it is also found in other coniferous forest types. In some locations, such as on the Willamette National Forest west of the crest of the Cascade Range, at least some shelterwood harvesting seems to be beneficial for the species by opening up otherwise closed canopy cover for foraging. In doing so, consequences to species such as northern goshawk and American marten must be evaluated. Specific mitigation measures for the great gray owl, within the range of the northern spotted owl, include the following: provide a no harvest buffer of 300 feet around meadows and natural openings and establish 1/4-mile protection zones around known nest sites.

Within one year of the signing of the Record of Decision for the SEIS develop and implement a standardized protocol for surveys; survey for nest locations using the protocol. Protect all future discovered nest sites as previously described.

In the SEIS ROD, Managed Late-Successional Areas are designated for the Protection Buffers for the following rare and locally endemic species. The following rare and locally endemic species are likely to be assured viability if they occur within designated areas. However, there might be occupied locations outside these areas that will be important to protect as well. Protocols for surveys will be developed that will ensure a high likelihood of locating these occupied sites, and such surveys will be conducted prior to ground disturbing activities within the known or suspected ranges and within the habitat types or vegetation communities occupied by these species, according to the implementation schedule for Survey and Manage components 1, 2, 3, and/or 4 set forth in the SEIS ROD. When located, the occupied sites need to be protected as follows:

Nonvascular Plants

Buxbaumia piperi, B. viridis, Rhizomnium nudum, and *Tetraphis geniculata* (Mosses) - Most of these species are fairly rare (the exception is *B. piperi*). They occur on rotten logs and some organic soil, and are shade dependent, occurring in old-growth forests. Mitigation activities include surveying to determine presence and distribution; and, where located, maintaining decay class 3, 4, and 5 logs and greater than 70 percent closed canopy forest habitats for shade. Shelterwood and thinning prescriptions for timber harvest will cause their demise, as logs dry out. The implementation schedule for this species is the same as for survey and manage components 1 and 3.

Polyozellus multiplex (Fungus) - Ecologically, this mushroom was considered in the same species group as *Albatrellus caeryliopus* and others, listed earlier in the SAT Report under species aided by marbled murrelet mitigation measures. However, *P. multiplex* occurs in higher elevations of the Cascades in silver fir and mixed conifer (and is thus outside the range of marbled murrelet mitigations). It can be locally abundant and is a mycorrhizal species important to forest health. Like its group associates, it

is a good indicator of old-growth forests. Mitigation activities for this species include conducting surveys to define its distribution, and studies to assess its habitat requirements. The implementation schedule for this species is the same as for survey and manage components 1 and 3.

Sarcosoma mexicana (Fungus) - This mushroom occurs in deep conifer litter layers in older forests. It is uncommon to rare and is found in the Oregon and Washington Coast Range into British Columbia. Mitigation activities include surveying for locations and protecting deep litter layers of older forests where found. Defer prescribed burning of understory or other activities which would not retain a deep litter layer. The implementation schedule for this species is the same as for survey and manage component 3.

For the plants listed above, it is recommended that regional and state ecologists or botanists should: (1) maintain a spatially explicit data base of all known sites in BLM Districts, and (2) develop species or area management plans, to be implemented under the guidance of the regional botany programs.

Amphibians

Larch Mountain Salamander - Because of the narrow distribution of this species, mostly within the Columbia River Gorge, primary emphasis should be to survey and protect all known sites. Sites must be identified based on fall surveys conducted using a standardized protocol. Known sites are included within boundaries of conservation areas and under these guidelines, are not to be disturbed. Surveys are needed at additional sites in the forest matrix along the Columbia River Gorge. Key habitat is mossy talus protected by overstory canopy. Avoiding any ground disturbing activity that would disrupt the talus layer where this species occurs is the primary means of protection. Once sites are identified, maintain 40 percent canopy closure of trees within the site and within a buffer of at least the height of one site-potential tree or 100 feet horizontal distance, whichever is greater, surrounding the site. Larger buffer widths are appropriate upslope from protected sites on steep slopes. Partial harvest may be possible if canopy closure can be retained; in such cases logging must be conducted using helicopters or high-lead cable systems to avoid disturbance of the talus layer. The implementation schedule for this species is the same as for survey and manage components 1 and 2.

Siskiyou Mountain Salamander - This species occurs within an extremely narrow range on the Rogue River, Siskiyou, and Klamath National Forests. Its range does not fall within any of the Habitat Conservation Areas identified by the Interagency Scientific Committee in Oregon. Additional surveys conducted using a standardized protocol must be undertaken to delineate range and identify subpopulations. All populations must be protected by delineating an occupied site and avoiding disturbance of talus throughout the site. Because this species seems to require cool, moist conditions, a buffer of at least the height of one site potential tree or 100 feet horizontal distance, whichever is greater, surrounding the site, must be retained around the outer periphery of all known sites. Overstory trees must not be removed within the boundary of this buffer. The implementation schedule for this species is the same as for survey and manage components 1 and 2.

Del Norte Salamander - This species occurs in talus slopes protected by overstory canopy that maintains cool, moist conditions on the ground. The species is a slope-valley inhabitant, and sometimes occurs in high numbers near riparian areas. Riparian Reserves, in combination with Late-Successional Reserves and other reserves, will offer some protection to the species but significant numbers also occur in upland areas. Additional mitigation options in this upland matrix include identifying locations (talus areas inhabited by the species) by using a standardized survey protocol, then protecting the location from ground disturbing activities. Designate a buffer of at least the height of one site potential tree or 100 feet horizontal distance, whichever is greater, surrounding the location. Within the site and its surrounding buffer, maintain 40 percent canopy closure and avoid any activities that would directly disrupt the surface talus layer. Partial harvest within the buffer may be possible if 40 percent canopy closure can be maintained; in such cases, tree harvest must be conducted using helicopters or high-lead cable systems to avoid compaction or other disturbance of talus. The implementation schedule for this species is the same as for survey and manage components 1 and 2.

Where the following species occur in the matrix, apply the protection measures specified:

Birds

White-headed Woodpecker, Black-backed Woodpecker, Pygmy Nuthatch, and Flammulated Owl - These species will not be sufficiently aided by application of mitigation measures for riparian habitat protection or for marbled murrelets alone. They all occur on the periphery of the range of the northern

spotted owl on the east slope of the Cascade Range in Washington or Oregon. Additionally, the white-headed woodpecker and flammulated owl occur in the Klamath Province in northwestern California and southwestern Oregon. The viability of all four species within the range of the northern spotted owl was rated as a medium risk on National Forests, although they each are much more widely distributed elsewhere.

Apply the following mitigation standards and guidelines to ensure that the distribution and numbers of all four species do not severely decline on BLM Districts within the range of the northern spotted owl. These guidelines apply to the forest matrix outside designated habitat for the northern spotted owl and Riparian Reserves. Maintain adequate numbers of large snags and green-tree replacements for future snags within the four species' ranges in appropriate forest types. Where feasible, green-tree replacements for future snags can be left in groups to reduce blowdown. Specifically, the Scientific Analysis Team recommends that no snags over 20 inches dbh be marked for cutting. The Scientific Analysis Team recognizes, however, that safety considerations may prevent always retaining all snags. Use of standardized definitions of hazard trees is required. For the longer term, provide for sufficient numbers of green trees to provide for the full (100 percent) population potential of each species.

As depicted by Neitro in Management of Wildlife and Fish Habitats in Forest of Western Oregon and Washington (1985), the 100 percent population potential for white-headed woodpeckers is 0.60 conifer snags (ponderosa pine of Douglas-fir) per acre in forest habitats; these snags must be at least 15 inches dbh (or largest available if 15 inch dbh snags are not available) and in soft decay stages, and must be provided in stands of ponderosa pine and mixed pine/Douglas-fir. The 100 percent population potential or black-backed woodpeckers is 0.12 conifer snags per acre in forest habitats; these snags must be at least 17 inches dbh (or largest available if 17 inch dbh snags are not available) and in hard decay stages, and must be provided in stands of mixed conifer and lodgepole pine in higher elevations of the Cascade Range. Provision of snags for other cavity nesting species, including primary cavity nesters, must be added to the requirements for these two woodpecker species. Site specific analysis, and application of a snag recruitment model (specifically, the Forest Service's Snag Recruitment Simulator) taking into account tree species, diameters, falling rates, and decay rates, will be required to determine appropriate tree and snag species mixes and densities. If snag requirements cannot be met, then harvest must not take place.

As identified by the expert panel, black-backed woodpeckers also require beetle infested trees for foraging; some such trees should be provided in appropriate habitat, and sanitation harvest of all such trees would be detrimental to the species. More information is needed on habitat use, seasonal occurrence, and use of forest age classes and burns, for the black-backed woodpecker.

Pygmy nuthatches use habitat very similar to those of white-headed woodpeckers. Pygmy nuthatches require large trees, typically ponderosa pine within the range of the northern spotted owl, for roosting. Provision of snags for white-headed woodpeckers is assumed to provide for the needs of pygmy nuthatch, as no species specific guidelines for the species have been developed. Additional information on ecology of pygmy nuthatch within the range of the northern spotted owl is needed to develop more precise standards and guidelines.

Flammulated owls are secondary cavity nesters and use cavities in snags and live trees, created by woodpeckers or, less often, that occur naturally. It is assumed that standards and guidelines for snags and green-tree replacements for woodpeckers and other primary cavity nesting species, as provided by BLM District Land and Resource Management Plans and for the woodpeckers in this species group, would provide for flammulated owls.

Note: The snag recommendations above are based on the model presented by Neitro and others (1985). In that model, snag requirements for individual species were treated as additive in developing snag requirements for the overall community of cavity excavators. As noted above, "provision of snags for other cavity nesting species, including primary cavity nesters, must be added to the requirements for these two woodpecker species" (black-backed and white-headed woodpeckers).

Snag requirements are developed by the BLM Districts for specific forest cover types, and these may be further broken down by geographic location. The intent is to tailor the requirements to those species that are actually expected to occur in an area. To determine if the protection buffer requirements should be added to existing BLM District Plan requirements, the basis for those existing requirements should be analyzed to determine if they include the species identified by SAT at the specified level of percent population potential. If they do not, then the SAT requirements

must be added to the existing Forest and BLM District Plan requirements.

Mammals

Lynx - Lynx are rare within the range of the northern spotted owl, occurring primarily in the Okanogan area of Washington. The lynx is currently listed by the Fish and Wildlife Service as a Category 2 candidate (a species for which additional information is needed to propose listing as threatened or endangered). A petition was filed to list the lynx as endangered within the northern Cascades of Washington, based on small population size, population isolation, and lack of adequate prey base (snowshoe hare). However, the Fish and Wildlife Service ruled that available information does not warrant listing the lynx in Washington.

Three primary habitat components for lynx are (1) foraging habitat (15 to 35 year old lodgepole pine) to support snowshoe hare and provide hunting cover, (2) denning sites (patches of greater than 200 year old spruce and fir, generally less than 5 acres), and (3) dispersal/travel cover (variable in vegetation composition and structure). The major limiting factor is abundance of snowshoe hare, which in turn is limited by availability of winter habitat (primarily early-successional lodgepole pine with trees at least 6 feet tall). Past excessive trapping of lynx and incidental mortality of lynx from hunting of other species have depressed populations and may have been detrimental to local lynx populations in Washington. Roads provide access to hunters and trappers and thus road density may be related to lynx mortality.

The reserves and other designated areas in these standards and guidelines will provide denning habitat within protected forest stands in juxtaposition with early-successional vegetation in the forest matrix. Connectivity between many of the denning patches will be provided by the network of buffers along streams under the Riparian Reserves.

In addition, the Scientific Analysis Team proposed development of site specific timber harvest, roading, and fire management plans in known lynx range. These plans should be developed in consultation with state wildlife agencies and should address:

1. Minimizing road construction, closing unused roads, and maintaining roads to the minimum standard possible.
2. Using prescribed fire to maintain forage for snowshoe hare in juxtaposition with hunting cover.
3. Designing areas as closed to kill trapping of any furbearer to avoid incidental lynx mortality to maintain population refugia for lynx in key areas.
4. Planning for kill trapping closure on a wider basis if data indicate a declining lynx population as a result of incidental trapping mortality.
5. Developing and implementing a credible survey and monitoring strategy to determine the distribution of lynx throughout its potential range.

Roosting Bats - Conduct surveys of crevices in caves, mines, and abandoned wooden bridges and buildings for the presence of roosting bats, including fringed myotis, silver-haired bats, long-eared myotis, long-legged myotis, and pallid bats. Surveys will be conducted according to protocol as outlined below and defined in the SEIS ROD and in any subsequent revisions to the protocol.

As an interim measure, allow no timber harvest within 250 feet of sites containing bats. Develop mitigation measures in project or activity plans involving these sites. The intent of these measures is to protect sites from destruction, vandalism, disturbance from road construction or blasting, or any other activity that could change cave or mine temperatures or drainage patterns.

When Townsend's big-eared bats are found on federal land, notify the Oregon Department of Fish and Wildlife. Develop management prescriptions for these sites that include special consideration for potential impacts on this species.

This provision is intended to apply in matrix forests and Adaptive Management Areas, and elements such as protection of known occupied caves should be considered for other land allocations. Conduct surveys of crevices in caves, mines, and abandoned wooden bridges and buildings for the presence of roosting bats, including fringed myotis, silver-haired bats, long-eared myotis, long-legged myotis, and pallid bats. For the purposes of this management action/direction, caves are defined as in the Federal Cave Resources Protection Act of 1988 as "any naturally occurring void, cavity, recess, or system of interconnected passages which occur beneath the surface of the earth or within a cliff or ledge (. . . but not including any . . . man-made excavation) and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or man-made." Searches should be conducted during

the day in the summer (to locate day roosts and maternity colonies), at night during the late summer and fall (to locate night roosts, which are important for reproduction), and during the day in the winter (to locate hibernacula). If bats are found, identify the species using the site and determine for what purpose it is being used by bats. As an interim measure, timber harvest is prohibited within 250 feet of sites containing bats. Management action/direction that may be included as mitigation measures in project or activity plans will be developed for the site. This management action/direction will be developed following an inventory and mapping of resources. The purpose of the management action/direction will be developed following an inventory and mapping of resources and will provide for protection of the site from destruction, vandalism, disturbance from road construction or blasting, or any other activity that could change cave or mine temperatures or drainage patterns. The size of the buffer, and types of activities allowed within the buffer, may be modified through the direction developed for the specific site. Retention of abandoned bridges or buildings will be made contingent on safety concerns.

Listed and Proposed Threatened and Endangered Species

General

Implement the land use allocations and management actions/direction of this proposed resource management plan which are designed to enhance and maintain habitat for all endangered and threatened species.

Northern Spotted Owl

Retain 100 acres of the best northern spotted owl habitat as close to the nest site or owl activity center as possible for all known (as of January 1, 1994) spotted owl activity centers. Human activity within 1/4-mile of nest sites which could disturb owl nesting activities will be restricted, especially the use of large power equipment and falling of trees. Restrictions will apply from March 1 to September 30 or until non-nesting status is confirmed using protocol procedures. The retention of adequate habitat conditions for dispersal of the northern spotted owl will be taken into account during watershed analysis that addresses the issue of adjusting Riparian Reserve widths.

Columbian White-tailed Deer

Timber harvest or other vegetation altering activities on all BLM-managed lands (12,761 acres) within the general area of distribution will only occur if determined beneficial to Columbian White-tailed deer or until such time that definitive information is available describing the use level and value of these lands in the context of meeting recovery plan goals. Of the above acres, 8830 acres occurring within the core habitat area for the species have been removed from the timber base. Acquisition of lands within the core area (primarily T. 26 S., and T. 27 S., R. 5 W.) for the Columbian white-tailed deer in Douglas County through exchange or purchase will be actively pursued. To provide long term recovery for the Columbian white-tailed deer, the recovery plan identifies a need for 5,500 acres of secure suitable habitat and a population of 1,000 animals supported on secure habitat for down listing to occur. An Habitat Management Plan will be prepared for existing BLM-managed lands determined to be of significant value to Columbia white-tailed deer or any lands acquired specifically for this species. The Roseburg District has recently acquired approximately 6,600 acres (included in above totals) of prime habitat for this species. A management plan for the area is currently under development. When adequate habitat is secured to meet recovery plan goals and the species is no longer listed, lands outside the core area and not acquired primarily for Columbian white-tailed deer management will no longer be restricted as described above.

Townsend's Big-eared Bat

Townsend's big-eared bat roosts and hibernacula will be protected and buffered by 600 feet to maintain the integrity of sites. Disturbance will be limited near roosts and hibernacula to prevent detrimental impact to colonies. The use of pesticides which are detrimental to prey species or their habitat within the normal hunting range of known bat nursery colonies and hibernacula will be restricted. The restriction will apply to an area within the normal hunting range of known nursery colonies, and hibernacula. BLM will pursue acquisition of the Scott Mountain hibernaculum consisting of approximately ten acres. To maintain habitat integrity on BLM-administered lands adjacent to the Scott Mountain hibernaculum, 36 acres will remain withdrawn from the timber base.

Marbled Murrelet

Conduct two years of survey prior to any physical disturbance of marbled murrelet habitat within zone II (approximately 50 miles from coast).

Protect contiguous existing and recruitment habitat for marbled murrelets (i.e., stands that are capable of becoming marbled murrelet habitat within 25 years) within a 0.5 mile radius of any site where the birds' behavior indicates occupation (e.g., active nest, fecal ring, or eggshell fragments, and birds flying below, through, into, or out of the forest canopy within or adjacent to a stand).

Neither conduct nor allow harvest of timber within occupied marbled murrelet habitat at least until completion of the Marbled Murrelet Recovery Plan.

Human activity will be minimized or curtailed within occupied or nesting stands between March 1 and July 15.

During silvicultural treatments of nonhabitat within the 0.5-mile circle, protect or enhance suitable or replacement habitat.

Amend or revise management direction as appropriate when the recovery plan is completed.

Bald Eagle

Comply with the Pacific Bald Eagle Recovery and Implementation Plans and existing, site specific habitat management plans.

Manage 4,658 acres along the major river corridors to develop or maintain forest structure needed to support nesting and foraging activities. These acres are withdrawn from the timber base.

To meet recovery plan goals, the currently existing six bald eagle nest territories and habitat (4,658 acres) would be protected as well as any future occupied territories under the following management guidelines:

1. Maintain or attain the following stand characteristics on all lands managed for bald eagles:

    a. Large conifer trees that are greater than 50 inches dbh and occur at a density of five to seven trees per acre.

    b. Multi-storied canopy with at least 60 percent crown closure.

    c. Remainder of the stand with conifer trees with an average dbh of 24 inches and an average density of 50 to 70 trees per acre.

2. Avoid disturbance including logging, mining, and mineral leasing (except existing recreational use) within 1/2-mile of active nest sites which may adversely affect, between the dates of February 15 and August 31 contingent on consultation under Sec. 7 of the Endangered Species Act.

3. Provide an appropriate level of fire protection on lands managed for bald eagles and restrict the use of insecticides within 1/2-mile of bald eagle sites.

Retain ownership of all BLM designated bald eagle habitat and pursue conservation easements or acquisition of other lands occurring within known active or future nesting territories. Priority is placed on acquiring 261 acres within Cougar Creek and Woodruff Mountain nesting territories.

Implementation of the Umpqua Corridor Habitat Management Plan will continue. Habitat management plans will be developed for all active nesting territories.

Vehicle use on 1.5 miles of road at the head of Huntley Creek will be restricted from February 15 to August 31 to limit nest site disturbance.

Peregrine Falcon

Comply with the Peregrine Falcon Recovery Plan and existing, site specific habitat management plans. Known and potential (sites rated 7 or above) nesting cliffs will be managed to maintain site integrity.

Although there are no known Peregrine falcon nesting sites on BLM-administered lands, sites occupied in the future will have seasonal disturbance restrictions of 1/4-mile or greater around them. Actual areas restricted will depend on the activity and likely disturbance at the nest cliff. Pesticides that have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat management plans will be written for all active Peregrine falcon nest sites on BLM-administered lands. High potential sites will periodically be surveyed for occupancy and all future occupied sites will be monitored annually to determine occupancy, nesting, and production. Acquisition will be pursued for occupied nest sites occurring on adjacent private lands. Currently there is one active nest site suitable for BLM acquisition.

Northern Goshawk

Retain 30 acre buffers of undisturbed habitat around active and alternative nest sites. Restrict human activity and disturbance within 1/4-mile of active sites between March and August or until such time as young have dispersed.

Plants

Umpqua Mariposa Lily (*Calochortus umpquaensis*)

Manage Umpqua mariposa lily habitat to increase numbers of plants in each of the populations known throughout the species range. A conservation strategy will be prepared in cooperation with the Medford District BLM, Umpqua National Forest, and the U.S. Fish and Wildlife Service which will prescribe the following management actions at locations throughout the species range:

- Acquisition of private land to increase habitat in federal ownership.
- Securing voluntary protection by private landowners through cooperative agreements.
- Designation of habitat as Areas of Critical Environmental Concern.
- Installation of gates and fences.
- Management of livestock grazing and Off Highway Vehicle use.
- Collection of seed for long term storage.
- Prescribed burning of habitat.
- Girdling trees, precommercial thinning, and commercial thinning forest stands to produce gaps in forest habitat.
- Monitoring habitat to determine population trends and the effects of management treatments.
- Conducting demographic studies.

Special Areas

Objectives

Retain and modify existing Special Areas to maintain or protect the resource values for which they were originally designated. Designate new Special Areas where resource values have been identified that need special management attention. Remove Special Area designation from any area that does not meet relevance and importance criteria. Provide interim management to candidate Special Areas nominated since publication of the Draft RMP to protect resource values and preserve future management options.

Manage Areas of Critical Environmental Concern for the maintenance, protection, or restoration of relevant and important resource values.

Manage Research Natural Areas for the purpose of scientific study, research, and education and to provide a baseline against which human impacts on natural systems can be measured.

Manage Outstanding Natural Areas for recreation in a way which will not damage the natural features that make the area outstanding.

Land Use Allocations

Seven existing Special Areas will be retained, four of which will be expanded. Three new Special Areas will be designated. Total allocation will be 11,323 acres (Table 2-5). The Brad's Creek and Golden Bar Areas of Critical Environmental Concern will be combined and expanded to form the new Umpqua Wildlife Area of Critical Environmental Concern. Seven areas have been nominated for Special Area designation since publication of the draft RMP. These areas which include Ace Williams Mountain, Bilger Ridge, Canton Creek, Langell Ridge, North Myrtle Creek Headwaters, Lee Creek, and Odd Lots. Ace Williams Mountain, Bilger Ridge, Canton Creek, Langell Ridge, North Myrtle Creek Headwaters will be evaluated for future designation as Areas of Critical Environmental Concern, Lee Creek as an Area of Critical Environmental Concern/Research Natural Area, and Odd Lots as an Area of Critical Environmental Concern/Outstanding Natural Area (Table 3-27).

See Map 3-7 for locations and Table 2-5 for site specific acres.

Management Actions/Direction

Management activities will be implemented in such a manner so as to be compatible with specific management objectives identified in site specific activity management plans. Management plans with specific management objectives have already been prepared for all existing Areas of Critical Environmental Concerns and Research Natural Areas. New plans will be prepared for new and expanded Special Areas. These new plans will define specific management objectives and address a wide spectrum of management activities such as land acquisition, the role of fire, and public outreach. Interim management will be provided areas without activity management plans to protect the natural features for which the areas were designated and preserve future management options.

Land acquisition will be pursued for the Beatty Creek Area of Critical Environmental Concern/Research Natural Area to block up ownership and improve management opportunities. Land acquisition for other Special Areas will be addressed in site specific management plans or activity level environmental assessments.

Management restrictions for Special Areas are summarized below. Additional restrictions may be identified in site specific management plans or activity level environmental assessments.

- Mineral withdrawal of all Areas of Critical Environmental Concern/Research Natural Areas. Mining will be permitted in other Special Areas with a plan of operations to avoid undue and unnecessary degradation.
- No salable mineral development and no surface occupancy for leasable minerals in Special Areas.
- Closure of Areas of Critical Environmental Concern/Research Natural Areas to Off Highway Vehicle use and the restriction of Off Highway Vehicle use to existing roads and trails in all other Special Areas.
- No timber harvest, road construction, or the operation of ground based fire suppression equipment off existing roads or other surface disturbing activity in Areas of Critical Environmental Concern/Research Natural Areas.

Cultural Resources Including American Indian Values

Objectives

Identify cultural resource localities and manage them for public, scientific, and cultural heritage purposes.

Conserve and protect designated cultural paleontological resources for future generations.

Support ecosystem management by providing information on long-term environmental change and the interactions between humans and the environment in the past.

Fulfill responsibilities to appropriate American Indian groups regarding heritage and religious concerns.

Identify paleontological resources, manage them for their scientific, educational, and recreational values, and protect significant sites and specimens.

Land Use Allocations

Cultural resources are allocated to specific use categories based on scientific, heritage, and interpretive values.

Sites with significant values will be protected from management actions and from vandalism to the extent possible. Cultural resource sites are not mapped in this plan or described in detail due to the sensitivity of resource values.

Management Action/Direction

Conduct systematic inventories of areas likely to contain cultural resources.

Evaluate cultural resource sites to determine their potential for contributing to public, cultural heritage, and/or scientific purposes.

Develop cultural resource management plans for areas with fragile resources or intensive prehistoric or historic use. These areas will include Golden Bar, the North Umpqua River corridor, the Little River/Wolf Creek area, the Middle Creek drainage, Camas Valley, the White Rock/Deadman Mountain/Deadman

Creek area, and the mining areas in the southern portion of the district.

Develop educational and interpretive programs to increase public awareness and appreciation of cultural resources, as part of the "Adventures in the Past" initiative.

Develop partnerships with local Native American groups and other interested parties to accomplish cultural resource objectives.

Monitor cultural resources being impacted by unauthorized use, such as 35DO100, 35DO147, 35DO153, and 35DO435, and take appropriate law enforcement actions.

Implement physical protection measures, such as riprapping and barrier installations, to reduce deterioration.

Develop memoranda of understanding with federally recognized Indian tribes and other Indian groups so that their heritage and religious concerns may be appropriately considered. These groups may include the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of the Siletz Indians, the Confederated Tribes of Grand Ronde, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, and the Coquille Indian Tribe.

Acquire significant cultural resource properties for public, cultural heritage, and scientific purposes. These properties include 35DO17, 35DO19, 35DO291, 35DO431, and the portion of 35DO383 located on nonfederal land.

Develop province level inventory plans.

Investigate landscape features such as bogs, ponds, and packrat middens, as well as cultural sites, that contain information regarding long-term environmental change.

Develop mechanisms for describing past landscapes and the role of humans in shaping those landscapes.

Maintain an updated record of paleontological sites in the Roseburg District and manage the sites as appropriate.

Visual Resources

Objectives

Manage all BLM-administered land to meet the following visual quality objectives:

Class

VRM I: Preserve the existing character of landscapes.
VRM II: Retain the existing character of landscapes.
VRM III: Partially retain the existing character of landscapes.
VRM IV: Allow major modifications of existing character of landscapes.

Land Use Allocations

Class	Acres
VRM I	28
VRM II	18,045
VRM III	4,385
VRM IV	396,546

See Map 3-8. Acres managed for Visual Resource Management Classes for each alternative are shown in Table 2-1.

Roseburg District Visual Resource Management Classes will be determined by the following:

1. Designate Visual Resource Management Classes "as inventoried" in the Visual Resource Inventory, including:

   a. Land adjacent to (within 1/4-mile of) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the federal Wild and Scenic Rivers Act.

   b. Available forest land where Federal ownership consists of more than half of the viewshed.

   c. Areas of Critical Environmental Concern and Research Natural Areas.

2. Designate rural interface areas under Visual Resource Management Class III objectives unless these lands fall under a more restrictive Visual Resource Management Class.

3. Designate all other forest lands Visual Resource Management Class IV.

Management Actions/Direction

Address visual resource management issues when conducting landscape/watershed analysis, environmental assessments, or environmental impact statements.

Use the visual resource contrast rating system during project level planning to determine whether or not proposed activities will meet Visual Resource Management objectives. Use mitigation measures to reduce visual contrasts.

Provide for natural ecological changes in Visual Resource Management Class I areas. Some very limited management activities may occur in these areas. The level of change to the characteristic landscape would be very low and must not attract attention. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

Manage Visual Resource Management Class II lands for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

Manage Visual Resource Management Class III lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

Manage Visual Resource Management Class IV lands for moderate levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the effect of the activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture.

Adhere to the following timber harvest scenarios to meet Visual Resource Management Class II, III, and IV objectives. Based on the visual resources rating system and site specific conditions, these scenarios or others may be used.

VRM II: Timber management approaches to meet Visual Resource Management Class II objectives will employ single tree selection, uneven-aged harvest, retention of shelterwood overstory trees or group selection management in seen areas. Larger regeneration harvests will be in unseen areas. Fire suppression and fuels management standards will be established to meet Visual Resource Management Class II objectives.

To permit screening of regeneration harvests and permit time for regrowth between sequential entries, regeneration harvests will not remove more than 6.6 percent of any seen Visual Resource Management Class II area in a given decade.

VRM III: Timber management approaches to meet Visual Resource Management Class III objectives will employ either short-term retention of shelterwood overstory trees, or use of regeneration harvests which have less than ten acres of seen area and which do not disturb more than ten percent of the seen Visual Resource Management Class III area in any decade. Where possible, regeneration harvests will be screened from key viewing points along major travel routes by uncut areas or by shelterwood units or young stands.

VRM IV: No specific visual management constraints will apply to lands managed for Visual Resource Management Class IV objectives, but mitigation of visual impacts will be incorporated where consistent with efficient timber harvest or other management activities.

Employ guidelines of the revised Oregon Forest Practices Act, Section 17, in visually sensitive corridors along Interstate 5 and State Highways 38, 42 and 138.

Monitor Visual Resource Management according to District Visual Resource Management monitoring procedures.

Conduct Visual Resource Management inventories on newly acquired public lands.

Wild and Scenic Rivers

Objective

Manage designated components of the National Wild and Scenic Rivers System by protecting their Outstandingly Remarkable Values and maintain and enhance the natural integrity of river related values.

Land Use Allocations

The only designated National Wild and Scenic River is an 8.4 mile segment of the North Umpqua River located on BLM-managed lands classified as recreational.

Appendix References

P Management Guidelines and Standards for National Wild and Scenic Rivers.
Q Wild and Scenic River Eligibility and Classification Determinations.
R Wild and Scenic Rivers Suitability Assessments for the Roseburg District.

Eligible Segments

Of the five river segments found eligible for inclusion into the National Wild and Scenic Rivers System, three were not assessed for suitability because they did not meet minimum suitability requirements (Cow Creek, South Umpqua River, Umpqua River). The two which were assessed for suitability (Canton Creek, Smith River) were determined to be unsuitable for designation in the National Wild and Scenic River system. See Appendix R.

The corridor width for rivers found eligible or studied for suitability is defined as 1/4-mile on either side of the river.

Under interim protective management, all authorized actions on BLM-administered land within a 1/2-mile wide corridor must have either a positive or neutral effect on identified Outstandingly Remarkable Values that resulted in rivers being found eligible/suitable (see Appendix P). A synopsis of interim management for the Roseburg District follows:

> Eligible Recreational Rivers: Exclude timber harvest in the riparian reserves, moderately restrict development of leasable and salable minerals, and protect a segment's free flowing values and identified Outstandingly Remarkable Values.

Implementation monitoring will be conducted according to procedures identified for monitoring Wild and Scenic Rivers.

Management Actions/Direction

Undesignated Segments

Determine future manageable river segments which may be suitable for designation to the National Wild and Scenic River System.

Protect Outstandingly Remarkable Values identified on BLM-administered lands within the study corridors of eligible river segments studied and found suitable for inclusion as components of the National Wild and Scenic Rivers System.

Provide interim protective management for Outstandingly Remarkable Values identified on BLM-administered lands along river segments determined eligible but not studied for inclusion as components of the National Wild and Scenic Rivers System.

Manage the natural integrity of river related values to maintain or enhance the highest tentative classification determined for rivers found eligible or studied for suitability.

Designated Segments

Revise the North Umpqua Wild and Scenic River Management Plan, dated 1992, to address attainment of Aquatic Conservation Strategy Objectives.

Manage the Congressionally designated North Umpqua River segment as a Wild and Scenic River under the North Umpqua Wild and Scenic River Management Plan.

See Appendix P for general wild and scenic river management guidelines.

Wilderness Study Areas

There are no lands in the Roseburg District which are eligible as Wilderness Study Areas.

Rural Interface Areas

Objectives

Consider the interests of adjacent and nearby rural land owners, including residents, during analysis, planning, and monitoring related to managed rural interface areas. These interests include personal health and safety, improvements to property and quality of life. Determine how land owners might be or are affected by activities on BLM-administered lands.

Land Use Allocations

Managed rural interface areas encompass approximately 8,522 acres of BLM-administered land within 1/4-mile of private lands zoned for 1-5 acre lots located throughout the district (see Map 2-7 for locations).

Management Actions/Direction

Work with local governments to:

- Improve the BLM data base regarding private land planning/zoning designations and residential development near BLM-administered land.
- Provide information to local planners regarding BLM land allocations in Rural Interface Areas and the management objectives and guidelines for these lands.
- Develop design features and mitigation measures that will minimize the possibility of conflicts between private and federal land management.
- Monitor the effectiveness of design features and mitigation measures in Rural Interface Areas.

As a part of watershed analysis and project planning, work with local individuals and groups, including fire protection districts, to identify and address concerns related to possible impacts of proposed management activities on rural interface areas.

Use design features and mitigation measures to avoid/minimize impacts to health, life and property, and quality of life. The following timber management practices will not be applied on those lands: herbicide spraying, clearcutting, and broadcast burning.

Manage rural interface areas using Visual Resource Management class III standards (unless an area is classified as Visual Resource Management class I or II).

Socioeconomic Conditions

Objectives

Contribute to local, state, national and international economies through sustainable use of BLM-managed lands and resources and use of innovative contracting and other implementation strategies.

Provide amenities (e.g., recreation facilities, protected special areas, and high quality fisheries) that enhance communities as places to live and work.

Land Use Allocations

There are no specific land use allocations related to socioeconomic conditions. However, allocations such as the general forest management area and adaptive management area can assist in meeting socioeconomic objectives.

Management Actions/Direction

Support and assist the state of Oregon Economic Development Department's efforts to help rural, resource based communities develop and implement alternative economic strategies as a partial substitute for declining timber based economies. Aid and support could include:

1. Increased coordination with state and local governments and citizens to prioritize BLM management and development activities.
2. Increased emphasis on management of special forest products.
3. Recreation development and other activities identified by BLM and the involved communities as benefiting identified economic strategies.

Improve wildlife and fish habitat to enhance hunting and fishing opportunities and to increase the economic returns generated by these activities.

Improve viewing opportunities for watchable wildlife.

Plan and design forest management activities to produce a sustained yield of products to support local and regional economic activity. A diversity of forest products (timber and nontimber) will be offered to support large and small commercial operations and provide for personal use.

Recreation

Objectives

Ensure the continued availability of Public Land for a diversity of resources dependent outdoor recreation while maintaining the commitment to manage Public Land consistent with the applicable laws, regulations, and principles of ecosystem management.

Provide a wide range of developed and dispersed recreation opportunities that contribute to meeting projected recreation demand within the planning area.

Manage recreation use on BLM-administered land to protect natural resources, provide visitor safety, and minimize conflicts among various uses.

Provide a variety of public recreation opportunities and experiences through visitor awareness information, interpretation, and protection, with emphasis on-the-ground presence.

Expand and strengthen cooperative partnerships with Federal, State and local agencies and the private sector to enhance the outdoor recreation opportunities offered on and adjacent to the Public Land.

Enhance recreation opportunities provided by existing and proposed watchable wildlife areas and national back country byways.

Provide motorized and nonmotorized recreation opportunities and create additional opportunities where consistent with other management objectives.

Manage special and extensive recreation management areas in a manner consistent with the policy, goals, and objectives identified in BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation initiative.

Develop and maintain cooperative relationships with national, state and local tourism entities and assist them in promoting local tourism.

Land Use Allocations

Recreation Sites
Existing - 12.
Proposed - 17.

Recreation Trails
Existing - seven.
Proposed - 13.

Special Recreation Management Areas
Existing - one; containing 1,620 acres.
Proposed - two; containing 3,950 acres.

Extensive Recreation Management Areas
Existing - three; containing 420,018 acres.
Proposed - zero acres.

Off Highway Vehicle Use Areas
Open - zero acres.
Limited - 423,422 acres.
Closed - 2,166 acres.

Back Country Byways
Existing - two; encompassing 34 miles.
Proposed - three; encompassing 70 miles.

See Map 2-2 for locations and Table 2-3 for site or areas specific details.

Management Actions/Direction

Riparian Reserves

New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impacts to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.

Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on site when needed to met coarse woody debris objectives.

Late-Successional Reserves

Retain and maintain existing recreation development in Late-Successional Reserves. Dispersed recreational uses, including hunting and fishing, generally are consistent with the objectives of Late-Successional Reserves. Use adjustment measures such as education, use limitations, traffic control devices, or increased maintenance when dispersed and developed recreation practices retard or prevent attainment of Late-Successional Reserve objectives.

Review new recreation development proposals on a case-by-case basis. Approve new recreation projects when adverse affects can be minimized and mitigated. Locate new recreation developments to avoid degradation of habitat and adverse affects on identified late-successional species. Permit no new recreation developments that may adversely affect Late-Successional Reserves.

Removal of snags and logs in Riparian Areas may be necessary to reduce hazards to humans along roads and trails, and in or adjacent to recreation sites. Where materials must be removed, a salvage sale is appropriate.

All Land Use Allocations

In addition to the guidelines for late-successional and riparian reserves, manage recreation resources in accordance with the following guidelines:

Recreation Sites and Trails

Continue to operate and maintain 12 existing recreation sites and 6 existing trails. (See Table 2-3) Maintain potential for recreation development in 16 sites and 13 trail locations listed in Table 2-3 and any future sites or trails consistent with management allocations and practices. Develop potential sites and trails as funding becomes available.

Designate developed recreation sites as fire suppression areas (intensive) and fire fuels management areas. These designations will reduce fire hazards and protect investments. Restrictions on fire suppression equipment and activities at all developed recreation sites will be in accordance with Special Fire Management Measures C-5-6 of the BLM/Oregon Department of Forestry Fire Protection Contract.

Manage timber within developed recreation sites for purposes of 1) removing hazard trees, 2) providing space for additional facilities and activity areas, and 3) providing desired regeneration of the forest canopy.

Consistent with management of existing roads and developed recreation sites in riparian areas, fell trees when necessary to maintain open flyways to ponds (dispersed recreation sites) where helicopters dip water for fire suppression. Restrict the sale of timber in any existing or potential recreation site to the salvage of trees cut for any of the above stated purposes.

Pursue mineral withdrawals or expansions for existing developed recreation sites and for proposed recreation sites when development is approved.

Propose for withdrawal from locatable mineral entry the following existing or potential recreation sites:

Site	*Acres*
Cow Creek Bluffs Trail	10.00
Cow Creek Recreational Gold Panning Area	93.76
Eagleview Recreation Site	42.40
Iron Mountain Gold Panning Area	40.00
Island Creek Recreation Site	162.22
Miner-Wolf Watchable Wildlife Site	10.00
North Umpqua Trail Primitive Campsite	43.17
Olalla-Thompson Creek	10.00
Osprey Boat Ramp	10.00
Pickett Bridge Recreation Site	15.00
Susan Creek Recreation Site	200.82

A total of 637.37 acres will be proposed for withdrawal from public land laws and the mining laws.

Acquisition of private lands or access easement to cross nonfederal lands will be needed before trail systems are built to Cow Creek Bluffs, Alexander Butte, Upper Susan Creek Falls, Salt Creek, Deadman Mountain, or around Ben Irving Reservoir.

Improve and develop camping, hiking, and other dispersed recreational opportunities within the Cow Creek Special Recreation Management Area in the vicinity of Cow Creek Bluffs through land acquisition of approximately 840 acres, Sections 33 and 34, T. 30 S., R. 07 W., W.M., and in Sections 4 and 5, T. 31 S., R. 07 W., W.M. Pursue acquisition of approximately 540 acres for hiking opportunities on the Salt Creek Trail, Section 18, T. 30 S., R. 06 W., W.M., and Sections 25, 26 and 35, T. 30 S., R. 07 W., W.M.

Pursue land acquisition to develop the Hardscrabble and Island Creek potential recreation sites. Land acquisitions will involve acquiring approximately 40 acres in two different ownerships located in Section 12, T. 22 S., R. 6 W., W.M., for the Hardscrabble site, and approximately 60 acres in Section 1, T. 31 S., R. 7 W., W.M. and Section 36, T. 30 S., R. 7 W., W.M. for the Island Creek Recreation Site.

Consider additional land acquisitions for recreation purposes which meet management objectives and recreation program goals in Extensive or Special Recreation Management Areas.

Special Recreation Management Areas

Manage three Special Recreation Management Areas for intensive recreation management. Develop and maintain a Recreation Area Management Plan for each Special Recreation Management Area. Update and revise the Management Plan for the North Umpqua Special Recreation Management Area and Area of Critical Environmental Concern, to be consistent with the North Umpqua Wild and Scenic River Management Plan and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl.

See Table 2-10 for a description of the three Special Recreation Management Areas.

Manage Special Recreation Management Areas under the following objectives:

1. Identify, plan, and implement high priorities for recreational and interpretive opportunities for the public, emphasizing camping, picnicking, hiking, nature study, interpretation, watchable wildlife, driving for pleasure, horseback riding, mountain biking, white water sports, fishing, swimming, recreational gold panning, and other compatible activities.

2. Identify the need for, and secure funding to develop priority areas. Utilize outside funding programs and initiatives including volunteer labor.

3. Develop partnerships with public agencies, private landowners, and recreation user groups or individuals to promote recreation opportunities.

Extensive Recreation Management Areas

Designate all lands not classified as a Special Recreation Management Areas as Extensive Recreation Management Areas, one per respective Resource Area. Recreation management is one of several management objectives where limited commitment of resources provides extensive and unstructured types of recreation activities. Extensive Recreation Management Areas may contain recreation sites.

Maintain recreation site information and visitor use data based on Special and Extensive Recreation Management Areas in each Resource Area. Calculate visitor statistics and other information in the annual Recreation Management Information System report.

Back Country Byways

Continue to manage the North Umpqua River National Scenic Byway (8.4 miles) and the Cow Creek Back Country Byway (26 miles in the Roseburg District and 17.5 miles in the Medford District).

Dedicate the following as Back Country Byways: Tyee-Loon Lake Road (25 miles in Roseburg District), Coos Bay Wagon Road (18 miles in Roseburg District), and Smith River Road (27 miles in Roseburg District). Additional mileage will be designated on all three proposed Back Country Byways on lands managed by the Coos Bay District BLM.

Coordinate dedication and management of Back Country Byways with adjoining BLM Districts, local county governments, the Chamber of Commerce and regional visitor bureau. Incorporate public participation where issues are sensitive on any route listed with potential for a back country byway.

Manage Back Country Byways according to policy and objectives contained in BLM Manual 8357.

Off Highway Vehicle Designations

Designate all public lands within the District as "limited" or "closed" to Off Highway Vehicle (motorized) use. No lands will be designated in the open category. Off Highway Vehicle designations apply only to BLM-administered lands, including:

Limited to OHV use	423,422 acres
Closed to OHV use	2,166 acres
Total acres	425,588 acres

Descriptions of Limited and Closed Off Highway Vehicle Areas

A. Limited Areas to Motorized Use - Limited use will occur on 423,422 acres of public land, including:

1. Limited to Existing Roads and Trails - 415,446 acres.

Motorized use will be "limited to existing roads and trails" to meet objectives of resource protection, safety of users and minimization of conflicts among various uses of the public lands, in accordance with criteria listed in 43 CFR 8342.1 (a-d). New proposed motorized routes will be established through the NEPA process.

As part of the area limited to existing roads and trails, 11,681 acres of the Hubbard Creek area will be managed as an Off Highway Vehicle recreation use area under the limited category. In this area, registered vehicles such as All Terrain Vehicles and motorcycles will be allowed to travel on BLM maintained (graveled) roads as well as other natural surfaced roads and trails on public lands. Cooperation and partnerships will be sought with adjoining private landowners, other government agencies (State) and organized clubs for program development.

2. Limited to Official Use - 7,976 acres

a. Motorized use will be "limited to official use" on 1,395 acres of BLM roads totaling 230 miles of roads (517 spur roads within a 50 foot wide corridor). Official motorized use may occur as determined by the Authorized Officer on any of these spur roads.

Of these 517 roads, 234 will be limited to official use year-round and 283 will be limited to official use seasonally in the South Douglas Resource Area as follows:

- Ten roads will be closed seasonally to public use between December 1 and August 15. The ten roads comprise a total of 87 acres and a combined length of 14 miles. The purpose of the limitation is to meet wildlife management program objectives. The roads are open to motorized use between August 16 and November 30 each year.

- Between October 15 and August 15, 273 roads will be closed seasonally to public use . The 273 spur roads comprise a total of 620 acres and a combined length of 102 miles. The purpose of the limitation is to meet water quality and soil protection objectives. The roads are open to motorized use between May 16 and October 14 each year.

Roads listed above vary in length, however, average less than one mile long.

A list of BLM roads in this category is maintained in the District Office. The roads will be managed according to the District Off Highway Vehicle Implementation Plan. This plan will determine which roads will be rehabilitated, which will be gated, signed, or restricted by other means, and when actions will be implemented. In addition, the District Transportation Management Objectives Plan will identify how roads will be managed in the future.

Limitations on motorized use will help meet objectives of the wildlife program, including upgrading hunting opportunities. Limitations may also reclaim spur roads not needed over a ten year or longer period.

b. Motorized use will be limited to official use year-round on 6,581 acres of public land within the North Bank Habitat Management Area. Motorized use will be closed to the general public and official use will be allowed as determined by the Authorized Officer.

In both cases above, the limitation is on the "type of user", closing motorized use to the

general public, but allowing authorized access for official or administrative use.

Nonmaintained dirt roads will be inventoried and may be closed to motorized use at a future date.

Where problems occur in any limited area, roads trails or areas may be closed on an emergency basis through procedures identified in 43 CFR 8341 and 8364.

B. Closed Areas to Motorized Use - Three closures will occur on 2,166 acres:

1. Areas of Critical Environmental Concern/ Research Natural Areas - 1,419 acres, including:

   - Bear Gulch - 330 acres
     T. 31 S., R. 4 W., Sec. 7;
     T. 31 S, R. 5 W., Sec. 1 & 12.

   - Beatty Creek - 173 acres
     T. 30 S., R. 6 W., Sec. 31;
     T. 30 S., R 7 W., Sec. 25.

   - North Myrtle Creek - 472 acres.
     T. 28 S., R. 4 W., Sec. 33.

   - Red Ponds - 134 acres (does not include two spur roads into unit, approx .1 mile long)
     T. 27 S., R. 3 W., Sec. 35.

   - Tater Hill - 280 acres
     T. 29 S., R. 2 W., Sec. 6, 7; T. 29 S., R. 3 W., Sec. 1;
     T. 28 S, R. 3 W., Sec. 36.

   - Myrtle Island - 30 acres
     T. 24 S., R. 7 W. Secs. 20, 21.

2. Trails closed to Off Highway Vehicle use - 92 acres

   All BLM trail systems intended for nonmotorized activities such as hiking, mountain biking, or horseback riding will be closed to motorized use, including:

   North Umpqua Trail
   Wolf Creek Falls Trail
   Susan Creek Falls Trail
   Susan Creek Complex Trails
   Deadline Falls Watchable Wildlife Trail
   Miner-Wolf Creek Watchable Wildlife Trail

   Additional hiking trails, progeny test sites, or Areas of Critical Environmental Concern developed in the future will also be closed to Off Highway Vehicle use.

3. Progeny Test Sites - 655 Acres

   Fifty-three sites are closed to motorized use. These genetic evaluation areas are a test ground for the progeny of selected Douglas-Fir trees. Most of the District's progeny test sites are fenced and have no motorized access into or through the site. The site list is available at District Office.

General Off Highway Vehicle

An implementation plan for Off Highway vehicle management will be completed as outlined in BLM Manual 8342.

See Table 2-1 for comparison of Off Highway Vehicle designations by alternative.

General Recreation Management

Implement initiatives, goals and objectives in BLM's Recreation 2000 Strategic Plan to the capabilities of the District.

Maintain District recreation sites to a standard that protects the resource, the public, and the public investment, and fosters pride of public ownership.

Place increased emphasis on interpretive and informational signs, maps and brochures.

Support state and local recreation management strategies to encourage tourism and provide quality visitor services.

Plan new developments to meet standards set forth in the Americans with Disabilities Act of 1990, as appropriate and feasibly possible.

Timber Resources

Objectives

Provide a sustainable supply of timber and other forest products.

Manage developing stands on available lands to promote tree survival and growth and to achieve a balance between wood volume production, quality of wood, and timber value at harvest.

Manage timber stands to reduce the risk of stand loss from fires, animals, insects, and diseases.

Provide for salvage harvest of timber killed or damaged by events such as wildfire, windstorms, insects, or disease, consistent with management objectives for other resources.

Land Use Allocations

The General Forest Management Areas and Connectivity/Diversity Blocks net land use allocations are interspersed with Riparian Reserves and other land use allocations which are not shown on the Roseburg District Strategy map. The gross mapped land use allocation acres as they appear on the Roseburg District Strategy map for the General Forest Management Areas and Connectivity/Diversity Blocks are shown in Table 2-11. The net land use allocation acres are the actual allocated acres for the General Forest Management Areas and Connectivity/Diversity Blocks and are the acres modeled in TRIM-PLUS as available for harvest.

Management Actions/Direction

All Land Use Allocations

Conform all management activities within the range of Port-Orford cedar to the guidelines described in the BLM Port-Orford cedar Management Policies to mitigate damage caused by *Phytophthora lateralis*. Site specific analyses for projects within the range of Port-Orford cedar will consider possible effects on the species.

Matrix (General Forest Management Areas and Connectivity/Diversity Blocks)

Determine the probable level of harvest based on the productivity of lands available for timber production and on the silvicultural treatments planned for these lands.

Apply silvicultural systems that are planned to produce, over time, forests which have desired species composition, structural characteristics, and distribution of seral or age classes (see Appendix L).

Develop plans for the locations and specific designs of timber harvests and other silvicultural treatments within the framework of watershed analyses.

Select logging systems based on the suitability and economic efficiency of each system for the successful implementation of the silvicultural prescription, for protection of soil and water quality, and for meeting other land use objectives.

Schedule regeneration harvests to assure that, over time, harvest would occur in stands at or above the age of volume growth culmination (i.e., culmination of mean annual increment). This refers to the age range which produces maximum average annual growth over the lifetime of a timber stand. In the planning area, culmination occurs between 80 and 110 years of age. Regeneration harvests may be scheduled in stands as young as 60 years, in order to develop a desired age class distribution across the landscape.

Base silvicultural treatments and harvest designs on the functional characteristics of the ecosystem and on the characteristics of each forest stand and site. Treatments would be designed, as much as possible, to prevent the development of undesirable species composition, species dominance, or other stand characteristics. The principles of integrated pest management and integrated vegetation management would be employed to avoid the need for direct treatments. Herbicides would be used only as a last resort.

Plan harvest of marketable hardwood stands in the same manner as conifer stands, if the land is not otherwise constrained from timber management. Where hardwood trees became established following previous harvest of conifers, plan to reestablish a conifer stand on the site.

Unscheduled Harvests - see Riparian Reserves and Late-Successional Reserves sections.

Timber sale contracts, usually awarded on a competitive basis, are the means of accomplishing all timber harvest and many forest development practices. The standard and special provisions (which include mitigating measures) in a contract set forth the performance standards to be followed by the contractor in carrying out the action in accordance with applicable laws, regulations, and policies. In contract preparation, selection of special provisions is governed by the scope of the action to be undertaken and the physical characteristics of the specific site.

Standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales. Bureau manuals and manual supplements provide a variety of approved special provisions for use, as appropriate, in individual contracts. The combination of selected special provisions constitutes Section 41 of the timber sale contract. Maintaining or enhancing water quality and long-term soil/site productivity will be inherent in all timber harvest and production practices.

The Probable Sale Quantity has been calculated using a computer program called TRIM-PLUS. The capabilities of TRIM-PLUS and the rationale for selection of the model are discussed in Appendix K. The sustainable Probable Sale Quantity has been calculated in cubic feet. Timber sales under the plan will be sold according to cubic foot measure.

Accomplish timber harvest by the appropriate application of aerial, cable, or ground-yarding systems. The logging systems and the degree of log suspension are design features that will be employed for yarding efficiency, watershed protection, to minimize soil damage and to minimize damage to residual trees in partial cut operations. BLM Oregon Manual Supplement H-5420-1 will guide selection of harvesting techniques for timber sale contracts.

Plan timber sales involving ground yarding systems with skid trails (including trails from previous harvest entries) to have insignificant (less than one percent) growth loss effect. Skid trails will affect less than ten percent of the land. Existing skid trails will be used as much as possible and new skid trails will be limited to slopes of less than 35 percent. Operation on these trails will minimize soil displacement and occur when soil moisture content provides the most resistance to compaction. Upon final harvest, all compacted trails, including skid trails from previous entries, will be tilled with a properly designed self-drafting subsoiler. For entries other than final harvest, skid trails will be selectively tilled.

Harvest unit size will be determined at the appropriate level given the site specific management objectives, such as watershed wildlife habitat enhancement or salvage of timber damaged by fire, disease, insects, or wind. In addition, economic, logistical, and safety considerations may influence size.

Accomplish regeneration harvests in such a way that the land can be adequately restocked within five years.

Apply commercial thinning in the matrix where practical and where research indicates increased gains in timber production are likely. The interval of treatment will range from 10 to 30 years, varying by site class, with poor sites having longer intervals.

Harvest trees from lands withdrawn from timber production under certain circumstances, only when their harvest will be consistent with other plan guidelines. Examples of circumstances under which trees may be harvested from these lands are:

- To harvest inclusions of trees within a harvest unit on lands mostly classified as suitable for timber production, to allow design of more logical management units and/or reduced road construction, thereby lessening net adverse environmental impacts.
- To salvage trees or stands killed or substantially damaged by fire, windthrow, or other natural disturbance.
- To control the spread of insect or disease outbreaks.
- To conduct experiments.
- To provide for the safety of forest users (this includes hazard tree removal in camp and picnic grounds, in administrative sites, and along trails and roads open to the public).
- To maintain or enhance fish and wildlife habitats.
- To improve the visual resource by opening scenic vistas.
- To provide guy line or tailhold trees where needed to facilitate logging on adjacent lands.
- To facilitate construction and maintenance of facilities such as roads, trails, power lines, communication facilities, administrative facilities, recreation facilities, etc.
- To eliminate interference with the operation of communication sites.

Design, to the extent consistent with other management direction, forest products sales to encourage complete utilization of harvestable timber including noncommercial species.

Use site preparation procedures to prepare newly harvested and inadequately stocked areas for planting new trees. Four types of site preparation

treatments (prescribed burning, herbicide application, and mechanical and manual techniques) will be utilized. BLM's "Record of Decision Western Oregon Program - Management of Competing Vegetation", 1992, and BLM Oregon Manual Supplement H-5420-1 will be followed in selecting site preparation treatments, using an integrated vegetation management approach.

Use prevention as the preferred strategy in controlling competitive and unwanted vegetation. The goal is to prevent or reduce the need for future vegetation control by considering known ecological relationships on individual sites. Harvest activity will be designed to eliminate or reduce post harvest treatment. Prevention seeks to detect and ameliorate conditions that cause or favor the presence of competing or unwanted vegetation in the harvest units before it interferes with management objectives. Prevention is in contrast to treatment.

Use herbicides where considered the most appropriate treatment to control grasses, forbs, brush and noncommercial tree species, to increase seedling survival. Application and monitoring of herbicides will be done in accordance with BLM's "Record of Decision, Western Oregon Program, Management of Competing Vegetation", 1992.

Apply herbicides aerially and by several ground methods, as site specifically appropriate. The method selected will depend on costs, topography, equipment limitations, target plant species and their distribution, potential environmental impacts, and biological conditions. Most aerial herbicide applications will be accomplished by helicopters equipped with systems designed to limit herbicide application to the target areas.

Control stringently the timing of herbicide treatment in relation to specified weather conditions such as temperature, humidity, and wind. Continuous project inspection of spraying operations is required. There is full authority for ordering cessation of operations based on adverse field conditions. Both equipment and operators will be checked frequently by field project inspectors. Only registered chemicals will be used in accordance with label instructions on the container. Handling, storage, and application of chemicals will also be in accordance with the Oregon Forest Practices Rules (See the BLM Planning and Resource Interrelationships section, State and Local Government, in Chapter 5).

Use manual site preparation consisting of brush pulling or cutting or hand piling of slash for burning.

Use mechanical site preparation consisting of piling or windrowing of slash, brush, and unmerchantable stems. Track-type equipment with a brush blade will be restricted to areas with suitable soil types and slopes less than 35 percent. Track-type tractor site preparation operations will meet the following minimum conditions:

1. Minimize piling of large woody material.

2. Avoid displacing duff layers and topsoil into piles or windrows.

3. Make only two machine passes (one round trip) over the same area.

4. Operate at soil moistures that maximize resistance to compaction. Special equipment or techniques that will achieve the same insignificant (less than one percent) growth loss result may be used instead of the preceding techniques, especially on soils considered unsuitable for tractor type operations. All compacted areas will be tilled with a properly designed self drafting subsoiler equipment.

Convert lands identified as available for timber production but currently growing primarily brush or hardwoods to appropriate conifer species unless the hardwoods will produce a higher net monetary return than conifers. Such actions will meet relevant tests of economic feasibility or justification and will be consistent with other resource and land use allocation objectives of an alternative. Conversion could include harvest of existing merchantable trees, slashing of nonmerchantable trees, and other site preparation techniques as appropriate.

Achieve adequate reforestation as promptly as practical following timber harvest. Harvested areas will be planted with indigenous commercial coniferous species (e.g., Douglas-fir, western hemlock, and western redcedar, etc.) generally within one year of the completion of harvesting and site preparation. Hardwoods will be encouraged on harvested sites where they will produce a higher net monetary return than conifers. Identified root disease centers will be planted with indigenous resistant tree species.

Use planting stock from nursery grown from seed collected on sites and at elevations similar to the specific project area. Genetically selected stock will also be nursery grown and used to the extent available in accordance with BLM's Western Oregon Tree Improvement Plan. Broad selection of parent trees for such stock is used to maintain genetic

diversity. See Appendix M for a description of the tree improvement program.

Conduct post-treatment reforestation surveys to determine the rate of survival and if replanting or interplanting will be required to meet stocking standards.

Protect plantations by using treatments including protection of seedlings from the sun by shading and protection from damage by deer, elk, mountain beaver, or other animals by placing plastic tubing or netting over the seedlings or by bud capping. Large populations of mountain beaver or pocket gophers will be reduced by several different methods when they cause significant damage to a plantation. The number of acres requiring each of these treatments will be determined annually in conjunction with normal reforestation surveys. Control within progeny test sites and other intensive study plots will also include porcupine or other animals causing significant damage. The appropriate treatments will be analyzed and determined through an interdisciplinary effort that will consider all resource objectives.

Promote the survival and establishment of coniferous seedlings through maintenance treatments. Release treatments reduce competition for light, moisture, and nutrients between surrounding vegetation and existing coniferous seedlings, and promote dominance and growth of established coniferous trees. Faster growing hardwoods, such as red alder, bigleaf maple or vine maple, overtop and suppress slower starting conifer seedlings. The degree and type of competition varies with the individual site. On dry sites, grasses, forbs and shrubs are strong competitors for water, while elsewhere shrubs and/or hardwoods grow rapidly enough to shut out essential light and compete for water during the dry summer. With reduced competition, the conifers rapidly grow beyond the point where they can be overtopped and further suppressed by surrounding vegetation. When this growth situation is achieved (approximately three to ten years after planting), there will be no further effort to control competing vegetation.

Use an integrated vegetation management approach in selection of maintenance and release treatments, in conformance with BLM's "Record of Decision, Western Oregon Program - Management of Competing Vegetation", 1992. Herbicides will be used to control competing vegetation when analysis shows their use to be the most appropriate treatment. See the previous discussion on site preparation for further discussion of herbicide use. Manual vegetation control methods (clearing around selected commercial trees using hand tools) will also be used when considered most appropriate to assure commercial tree growth.

Apply precommercial thinning to timber stands in the intensive timber production base that are overstocked. Thinning will generally be done between ten and 20 years of age. Average number of trees left will vary between 150 to 250 trees per acre depending on the alternative and individual stand prescription. Contract specifications will define desired density, spatial arrangement and selection criteria for trees to be retained.

Fertilize areas precommercially or commercially thinned and portions of areas where stocking control is achieved through plantation spacing where increased wood yields will result. The average application is expected to be 200 pounds of nitrogen per acre beginning when the stand is precommercially thinned and at 15 year intervals thereafter until 20-25 years before final harvest. In addition to acceleration of growth for up to 15 years following treatment, fertilization tends to reduce shock associated with thinning.

Manage top ranking plus trees intensively in the field to optimize cone production (thinning, fertilization, girdling, and systemic insecticide treatment). The seed orchards for Douglas-fir and sugar pine will be managed to produce increasing yields of genetically selected seed. Minor species seed production plantations will also be planted in the seed orchards to ensure a dependable supply of seed for trees native to the Roseburg District.

Apply pruning to selected young forest stands. This treatment can significantly increase the value of harvested timber. It reduces the proportion of juvenile wood in the tree and the number of knots caused by branches. The lower branches of the identified crop trees will usually be pruned to a height of approximately 18 feet.

General Forest Management Area

Retain late-successional forest patches in landscape areas where little late-successional forest persists. This management action/direction will be applied in fifth field watersheds (20 to 200 square miles) in which federal forest lands are currently comprised of 15 percent or less late-successional forest. (The assessment of 15 percent will include all federal land allocations in a watershed.) Within such an area, protect all remaining late-successional forest stands.

Protection of these stands could be modified in the future when other portions of a watershed have recovered to the point where they could replace the ecological roles of these stands.

Retain snags within a timber harvest unit at levels sufficient to support species of cavity nesting birds at 40 percent of potential population levels. Meet the 40 percent minimum throughout the Matrix with per acre requirements met on average areas no larger than 40 acres.

Retain six to eight green conifer trees per acre after regeneration harvest to provide a source of snag recruitment and a legacy bridging past and future forests. Retained trees will be distributed in variable patterns (e.g., single trees, clumps, and stringers) to contribute to stand diversity.

In addition to the previous green tree retention management action/direction, retain green trees for snag recruitment in harvest units where there is an identified, near-term (less than three decades) snag deficit. These trees do not count toward green tree retention requirements.

Leave 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Existing decay class 1 and 2 logs count toward this requirement. Down logs will reflect the species mix of original stands. Where this management action/ direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit.

Plan initial spacing of seedlings, thinning and control of competing vegetation in the General Forest Management Area to maximize wood production by concentrating site resources on individual tree growth.

Connectivity/Diversity Blocks

Maintain 25 to 30 percent of each block in late-successional forest at any point in time. The percentage of habitat will include habitat in other allocations, such as Riparian Reserves. Blocks may be comprised of contiguous or noncontiguous BLM-administered land. The size and arrangement of habitat within a block should provide effective habitat to the extent possible.

Retain 12-18 green conifer trees per acre when an area is regeneration harvested. Distribute the retained trees in variable patterns (e.g., single trees, clumps and stringers) to contribute to stand diversity. The management goal for the retained trees and subsequent density management would be the recovery of old-growth conditions in approximately 100 to 120 years.

Provide 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long. Existing decay class 1 and 2 logs will be credited toward this total. Down logs will reflect the species mix of original stands. Where this management action/direction cannot be met with existing coarse woody debris, merchantable material will be used to make up the deficit.

Special Forest Products

Objectives

Manage for the production and sale of special forest products when demand is present and where actions taken are consistent with primary objectives for the land use allocation.

Use the principles of ecosystem management to guide the management and harvest of special forest products.

Land Use Allocations

No land use allocations are made specifically for special forest products.

Management Actions/Direction

Riparian Reserves

Where catastrophic events result in degraded riparian conditions, allow fuelwood cutting if required to attain Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Permit fuelwood gathering only in existing cull decks, in areas where green trees are marked by silviculturists for thinning, in areas where blowdown is blocking roads, and in recently harvested timber sale units where down material will impede scheduled post-sale activities or pose an unacceptable risk of future large scale disturbance. In all cases, these

activities will comply with management actions/ direction for Late-Successional Reserves.

Evaluate whether special forest product harvest activities have adverse effects on Late-Successional Reserve objectives.

Prior to selling special forest products, ensure resource sustainability and protection of other resource values such as special status plants or animal species.

Where special forest product activities are extensive, evaluate whether they have significant effects on late-successional habitat. Restrictions may be appropriate in some cases.

All Land Use Allocations

Establish specific guidelines for the management of individual Special Forest Products using interdisciplinary review as needed. Management guidelines would be based on the ecological characteristics of the Special Forest Products species and the requirements of associated plant, animal, and fungal species. Guidelines will include provisions that minimize changes in site productivity. Monitoring of harvest activities and the effects of harvest would be part of Special Forest Products management. Feasibility to harvest newly identified Special Forest Products species would receive interdisciplinary review.

Energy and Minerals

Objectives

Maintain exploration and development opportunities for leasable and locatable energy and mineral resources.

Provide opportunities for extraction of salable minerals by other government entities, private industry, individuals, and nonprofit organizations.

Continue to make available mineral resources on the reserved federal mineral estate.

Land Use Allocations

See Table 2-1, Proposed Resource Management Plan, for energy and mineral allocations.

Management Actions/Direction

See Tables 2-7, 2-8, and 2-9 for restrictions on energy and mineral activities and Appendix O for leasing stipulations and operating standards pertinent to locatable and salable minerals.

Riparian Reserves

Note: The following management actions/direction differ from the standards and guidelines in the SEIS ROD, since the standards and guidelines are not all implementable under current laws and regulations. The stronger standards and guidelines in the SEIS ROD will be adopted at such time as changes in current laws and/or regulations authorize their implementation.

For any proposed locatable mining operation in Riparian Reserves, other than notice level or casual use, require the following actions consistent with 43 CFR 3809:

- Prepare a Plan of Operations, including a reclamation plan and reclamation bond for all mining operations in Riparian Reserves. Such plans and bonds will address the costs of removing facilities, equipment, and materials; recontouring of disturbed areas to an approved topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and revegetating to meet Aquatic Conservation Strategy objectives.

- Locate structures, support facilities, and roads outside Riparian Reserves. If no alternative to siting facilities in Riparian Reserves exists, locate in a way compatible with Aquatic Conservation Strategy objectives. Road construction will be kept to the minimum necessary for the approved mineral activity. Roads will be constructed and maintained to meet road management standards and to minimize damage to resources in Riparian Reserves. When a road is no longer required for mineral or land management activities, it will be reclaimed. In any case, access roads will be constructed consistent with 43 CFR 3809 and acceptable road construction standards and will minimize damage to resources in Riparian Reserves.

- Avoid locating solid and sanitary waste facilities in Riparian Reserves. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Reserves exists, releases can be prevented, and stability can be ensured, then:

- Analyze the waste material using the best conventional sampling methods and analytic techniques to determine it's chemical and physical stability characteristics.

- Locate and design the waste facilities using best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Reserves.

- Reclaim waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

- Monitor waste and waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

- Require reclamation bonds adequate to ensure chemical and physical stability and to meet Aquatic Conservation Strategy objectives.

- Where an existing operator is in noncompliance at the notice level (i.e., causing unnecessary or undue degradation), require actions similar to those stated above to meet the intent of 43 CFR 3809.

For leasable minerals, prohibit surface occupancy for oil, gas, and geothermal exploration and development activities where leases do not exist. Where possible, adjust the stipulations in existing leases to eliminate impacts that retard or prevent the attainment of Aquatic Conservation Strategy objectives consistent with existing lease terms and stipulations.

Develop inspection and monitoring requirements and include such requirements in exploration and mining plans and in leases or permits consistent with existing laws and regulations. Evaluate the results of inspection and monitoring to determine if modification of plans, leases, and permits is needed to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Assess the impacts of ongoing and proposed mining activities in Late-Successional Reserves.

Include stipulations in mineral leases and, when legally possible, require operational constraints for locatable mineral activities to minimize detrimental effects on late-successional habitat.

All Land Use Allocations

Leasable Minerals

Use special stipulations for oil, gas and geothermal leases to protect fragile areas or critical resource values (see Appendix O for a list of mineral restrictions by resource value). Special stipulations may include seasonal restrictions to protect resources such as critical wildlife habitat, prevent excessive erosion, etc.; controlled surface use stipulations to protect valuable resources in small areas; and no surface occupancy stipulations to protect valuable resources scattered over a large area while still providing an opportunity for exploration and development. Special stipulations may be waived by authorized BLM officials if the objective of a stipulation could be met in another way.

Locatable Minerals

Use general requirements in 43 CFR 3809 and site specific guidelines to avoid unnecessary or undue degradation of resources on mining claims.

Require reclamation at the earliest feasible time for all surface disturbing operations, whether conducted under a notice or approved plan of operations.

Saleable Minerals

Address quarry development, management, and reclamation needs through implementation planning.

Emphasize long-term regional quarry use.

Develop new quarry sites in locations consistent with overall management objectives and guidelines of the proposed resource management plan. New quarry sites will not be developed unless no other reasonable alternative can be found.

Continue to use rock from existing quarries for construction and maintenance of timber sale access roads and other purposes.

Land Tenure Adjustments

Objectives

Make land tenure adjustments to benefit a variety of uses and values. Emphasize opportunities that conserve biological diversity or enhance timber management opportunities. As a matter of practice, O&C forest lands allocated to timber management would only be exchanged for lands to be managed for multiple use purposes.

Meet the following objectives for the three land tenure adjustment zones:

Zone 1: Generally, retain these lands under BLM administration.

Zone 2: "Block up" areas in Zone 2 with significant resource values and exchange other lands in Zone 2 to "block up" areas in Zones 1 and 2 with significant resource values.

Zone 3: Retain lands with unique resource values; dispose of other lands in this zone using appropriate disposal mechanisms.

Make BLM-administered lands in Zones 1, 2, and 3 available for a variety of uses as authorized by section 302 of the Federal Land Policy and Management Act, and special recreation permits. Leases and conveyances under the Recreation and Public Purpose Act would be made in Zones 2 and 3.

Manage newly acquired lands for the purpose for which they are acquired or consistent with the management objectives for adjacent BLM-administered lands. If lands with unique or fragile resource values are acquired, protect those values until the next plan revision.

Eliminate unauthorized use of BLM-administered land.

Land Use Allocations

Zone Acres

Zone 1	35,930
Zone 2	380,749
Zone 3	13,470

See Map 2-10 for location of land tenure zones.
See Appendix D for legal descriptions of Zone 3 lands.

Management Actions/Direction

Riparian Reserves

Use land acquisition, exchange, and conservation easements to meet Aquatic Conservation Strategy objectives and facilitate restoration of fish stocks and others species at risk of extinction.

Late-Successional Reserves

Consider land exchanges when they will provide benefits equal to or better than current conditions.

Consider land exchanges especially to improve area, distribution, and quality (e.g., connectivity, shape, and contribution to biodiversity) of Late-Successional Reserves and where public and private lands are intermingled.

All Land Use Allocations

Use the land tenure adjustment criteria shown in Appendix C when conducting environmental analyses for site specific proposals. Application of these criteria may result in retention of some zone 3 lands.

Maintain or increase public land holdings in Zone 1 by retaining public lands and acquiring nonfederal lands with high public resource values. The primary mode of acquisition will be through exchange of BLM-administered lands in Zones 2 and 3. Utilize purchases and donations if exchange is not feasible. All fee acquisitions will be with willing sellers.

Consult with county governments prior to any exchange involving O&C land.

Consider the effect of land tenure adjustments on the mineral estate. If the lands are not known to have mineral potential, or in an exchange if the mineral potential is deemed equal, the mineral estate will normally be transferred simultaneously with the surface estate.

Minimize impact on local tax base by emphasizing exchanges rather than fee purchase.

Make exchanges to enhance public resource values and/or improve land patterns and management capabilities of both private and BLM-administered land within the planning area by consolidating ownership and reducing the potential for land use conflict.

Consider transfer of Roseburg District BLM-administered land to other BLM districts or Federal agencies, or acquisition of other federal lands where consistent with public land management policy and where improved management efficiency would result.

Consider conveying the subsurface mineral interest owned by the United States to the existing or proposed owner of the surface estate consistent with FLPMA Section 209(b).

For all land Tenure Zones, sales of lands other than available commercial forest lands will be made to dispose of lands that meet criteria (1) or (2) of the Federal Land Policy and Management Act Sec. 203(a), but sales of land that meet only criterion (3) will not be made.

Generally prohibit disposal of Zones 1 and 2 lands through sales under Section 203(a) of the Federal Land Policy and Management Act. Some sales may occur on a case-by-case basis. Zone 2 lands may be transferred to other public agencies or managed under some form of cooperative agreement. Zones 1 and 2 lands would generally remain under BLM administration.

Dispose of Zone 3 lands through sale under Section 203(a) of Federal Land Policy Management Act if no viable exchange proposals can be identified. Zone 3 lands could also be transferred to another Federal agency or state or local government as needed, to accommodate community expansion or other public purposes.

Where survey hiatuses and unintentional encroachments on public lands are discovered in the future which meet the disposal criteria, the lands may be automatically assigned Zone 3 for disposal.

Land Use Authorizations

Lease serial numbers ORe 05564, ORe 010734, OR 16775, OR 37065 and OR 37070, would be continued in accordance with the terms of each lease. A life estate residential lease (ORe 05564) would not be assigned at the end of its terms. Douglas County maintains Richard Baker County Park as a day use area. This 7.5 acre Recreation and Public Purpose lease, located within the Wild and Scenic River Corridor of the North Umpqua River, would be continued.

Temporary use permits, as identified under the Federal Land Policy and Management Act section 302, would be issued for a variety of uses such as, but not limited to apiary, stockpile and storage sites, and as a tool to authorize unintentional trespass situations pending final resolution.

No leases or permits would be issued for landfills or other waste disposal facilities and no leases would be issued for new residential construction. Leases or permits for other uses of public land or amendments to existing authorizations would be authorized if the use does not conflict with higher resource values.

Rights-of-Way

Objectives

Continue to make BLM-administered lands available for needed rights-of-way where consistent with local comprehensive plans, Oregon statewide planning goals and rules, and the exclusion and avoidance areas identified in this PRMP.

Ensure that all rights-of-way for hydroelectric development are consistent with the Northwest Power Planning Council guidance, which recommends prohibiting future hydroelectric development on certain rivers and streams with significant fisheries and wildlife values.

Land Use Allocations

Allocation of lands to existing rights-of-way would continue.

The occupied utility transportation routes identified in the Western Regional Corridor Study, 1992, containing electrical transmission facilities of 115 to 500 kV and pipelines ten inches in diameter or larger, will be designated as corridors under this plan. These corridors will be available for uses compatible with existing facilities. The corridors described above and all existing communication sites are shown on Map 3-1.

Corridor widths vary depending on the number of parallel facilities, but are a minimum of 2,000 feet (1,000 feet either side of existing centerlines) unless constrained by exclusion and avoidance areas described below. Applicants will be encouraged to locate new facilities (including communication sites) adjacent to existing facilities to the extent technically and economically feasible.

Communication facilities will be allowed on existing communication sites. Existing communication sites will be fully developed with compatible uses prior to developing new sites. New communication sites will be considered available for development when the use is consistent with the objective of the alternative.

Douglas County is considering the construction of the Milltown Hill Reservoir. Some rights-of-way across BLM-administered lands would be required for access and water impoundment.

Prior to BLM approval of a right-of-way, the applicant must submit plans, maps, and other information related to the use of the proposal, for evaluation. Each right-of-way will be limited to the area necessary for operation and maintenance. Approvals will consider the protection of public safety, be consistent with the Resource Management Plan, and minimize damage to the environment.

All Research Natural Areas and Visual Resource Management Class I areas will be considered right-of-way exclusion areas where future rights-of-way may be granted only on a case-by-case basis or when mandated by law.

All existing and proposed recreation sites, Areas of Critical Environmental Concern other than Research Natural Areas, (rivers suitable for scenic status), and areas identified as having threatened or endangered, proposed, candidate (Category 1 or 2), state listed, or Bureau sensitive plant or animal species will be avoidance areas (where future rights-of-way may be granted only when no feasible alternative route or designated right-of-way corridor is available). Areas identified for Visual Resource Management Class II management will be avoided or appropriate mitigation measures taken. On August 10, 1988, the Northwest Power Planning Council amended its Northwest Conservation and Electric Power Plan to prohibit future hydroelectric development on rivers and streams with significant fisheries and wildlife resource values. In accordance with the plan, rights-of-way authorizing new hydroelectric development will not be approved on the streams designated in the plan. For lands acquired in the future, hydroelectric development will not be allowed on any rivers or streams designated as protected in the Northwest Conservation and Electric Power Plan. Lands within the Canton Creek drainage are avoidance areas for new hydroelectric development, power transmission or distribution lines.

Future rights-of-way may be granted in avoidance areas when no feasible alternative route or designated right-of-way corridor is available.

Management Actions/Direction

Riparian Reserves

Issue rights-of-way to avoid adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where legally possible, adjust existing rights-of-way to eliminate adverse effects that retard or prevent the attainment of Aquatic Conservation Strategy objectives. If adjustments are not effective and where legally possible, eliminate the activity. Priority for modifying existing rights-of-way will be based on the actual or potential impact and the ecological value of the riparian resources affected.

For proposed hydroelectric projects under the jurisdiction of the Federal Energy Regulatory Commission (the Commission), provide timely, written comments regarding maintenance of instream flows and habitat conditions and maintenance/ restoration of riparian resources and stream channel integrity. Request the Commission to locate proposed support facilities outside of Riparian Reserves. For existing support facilities inside Riparian Reserves that are essential to proper management, provide recommendations to the Commission that ensure Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, provide recommendations to the Commission that such support facilities should be relocated. Existing support facilities that must be located in the Riparian Reserves should be located, operated, and maintained with an emphasis to eliminate adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives.

For other hydroelectric and surface water development proposals in Tier One Key Watersheds, require instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies. For other hydroelectric and surface water development proposals in all other watersheds, give priority emphasis to instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies.

Late-Successional Reserves

Retain and maintain existing developments, such as utility corridors and electronic sites, consistent with other management actions/direction for Late-Successional Reserves.

Neither construct nor authorize new facilities that may adversely affect Late-Successional Reserves.

Review on a case-by-case basis new development proposals. They may be approved when adverse effects can be minimized and mitigated.

Locate new developments to avoid degradation of habitat and adverse affects on identified late-successional species.

Remove hazard trees along utility right-of-way and in other developed areas.

Other Land Use Allocations

Encourage location of major new rights-of-way projects in existing utility/transportation routes and other previously designated corridors.

Encourage applicants to consult the Western Regional Corridor Study in planning route locations.

Consider new locations for rights-of-way projects on a case-by-case basis. Applications may be approved where the applicant can demonstrate that use of an existing route or corridor would not be technically or economically feasible; and the proposed project would otherwise be consistent with this proposed resource management plan and would minimize damage to the environment.

Allow expansion of communications facilities on existing communication sites.

Consider new communication sites on a case-by-case basis. Applications may be approved where the applicant can demonstrate that use of an existing, developed communication site would not be technically feasible; and the proposed facility would otherwise be consistent with this proposed resource management plan and would minimize damage to the environment.

Access

Objectives

Acquire access to public lands to assist various programs to meet management objectives.

Land Use Allocations

None

Management Actions/Direction

Acquire access by obtaining easements, entering into new reciprocal right-of-way agreements, or amending existing reciprocal right-of-way agreements. Condemnation for access will be pursued when necessary.

Acquire perpetual exclusive easements whenever possible to provide for public access and BLM control. Acquire nonexclusive easements, which do not provide for public access, consistent with management objectives and where no public access is needed. Acquire temporary easements only when other options are not available.

Continue to obtain access across lands of private companies or individuals who are a party (permittee) to existing reciprocal rights-of-way agreements through appropriate agreements. Whenever a willing permittee is identified and it is determined there is a need for public access, negotiations could be started to provide for the acquisition of public access rights.

Emphasize acquisition for public access on major travel routes.

Acquisition of easements will be required for access to all parcels in the planning area for resource management.

Continue to provide all prospective purchasers of BLM timber with an equal opportunity of access when timber is offered for sale. This will most often be accomplished by reciprocal right-of-way agreements with private landowners or through federal ownership and control of roads. Reciprocal right-of-way agreements will continue to be used to identify conditions of use that are equitable and nondiscriminatory and facilitate management of the road network. Most of the lands where logging road right-of-way agreements are appropriate are now covered by reciprocal agreements. The 140 individual agreements and permits will continue to be subject to the regulations in effect when they were executed or assigned. The provisions of these agreements allow BLM only limited discretion to control the location of roads constructed by private parties across BLM-administered lands (and vice versa). This limited discretion allows BLM to object for only one environmental reason - excessive erosion damage. However, future reciprocal right-of-way agreements

could have different provisions depending on the regulations in effect at the time of their execution.

Withdrawals

Objectives

Protect lands with important resource values and/or significant levels of investment by withdrawing them from the operation of public land and mineral laws. Withdrawal is necessary to avoid irreparable damage that may be caused by nondiscretionary activities.

Land Use Allocations

All withdrawals identified in Appendix V are recommended for continuation pending formal withdrawal review recommendations.

Two new public land and mineral law withdrawals are being considered in the Recreation section of this chapter (refer to Table 2-3). They will not be withdrawn from the mineral leasing laws, but will have a no surface occupancy stipulation applied to any leases that may include those areas.

It is expected that new proposals for acquisition and/ or development of special concern areas (e.g. recreation sites, Area of Critical Environmental Concern/Riparian Management Area) will arise over the next decade. Whenever existing regulations are not adequate to guarantee protection of improvements or resources, or whenever additional lands are acquired to enlarge the size of existing special concern areas, a withdrawal that will be consistent with the management objectives will be considered.

Classifications will generally withdraw land from the operation of general land laws and mining laws, but not mineral leasing laws. Classifications recommended for termination are listed in Table 2-4. These include three Small Tract Act and one Recreation and Public Purpose Act classifications. Once revoked, the lands will be restored to the operation of general land and mining laws. Since the lands involved are being managed for purposes established through the classification process, but under different authorities, no change in land use is anticipated. New classifications for Recreation and Public Purpose Act leases will be considered in land tenure Zone 2 and 3 for all new proposals that surface during the life of this plan. A ten acre tract located in Lot 1, Section 28, T. 24 S., R. 7 W. will be classified for Recreation and Public Purpose Act lease purposes for a boat ramp facility on the Umpqua River.

Management Actions/Direction

See Management of Newly Acquired Lands (toward the end of this chapter).

Complete the review of existing withdrawals to determine whether continuation of the withdrawal is consistent with the statutory objectives of the programs for which the lands were dedicated and with other important programs.

Terminate unnecessary or duplicate withdrawals and continue those which still meet the intent of the withdrawal.

Implement the BLM-proposed withdrawals listed under land use allocations. This will involve recommendations to and approval by the Secretary of the Interior.

Evaluate future withdrawal proposals for compliance with program objectives and federal law and recommend appropriate action to the Secretary of the Interior.

Limit withdrawals to the minimum area needed and restrict only those activities that would be detrimental to the purposes of the withdrawal.

Withdrawals generally segregate the lands from operations under the nondiscretionary general land laws, mining laws, and sometimes mineral leasing laws. All withdrawals remaining to be reviewed are identified in Appendix V. These withdrawals will be reviewed during the 1990s and may be continued, modified, or terminated. The BLM currently manages lands withdrawn as Power Site Reserves, Power Site Classifications, and Water Power Designations. These lands will be managed in accordance with the objectives of the plan whether the withdrawals are continued, modified, or terminated.

Roads

Objectives

Develop and maintain a transportation system that serves the needs of users in an environmentally sound manner. Arterial and major collector roads will

form the backbone of the transportation system in the planning area.

Correct problems associated with high road density by emphasizing the reduction of minor collector and local road densities where those problems exist.

Manage roads to meet the needs identified under other resource programs (e.g., seasonal road closures for wildlife). Road management is mentioned or implied primarily under Aquatic Conservation Strategy Objectives, Riparian Reserves, Late-Successional Reserves, Water Quality and Soils, Wildlife, Fish Habitat, Special Status and SEIS Special Attention Species Habitat, Timber Resources, and Recreation.

Land Use Allocations

Existing roads occupy approximately 15,900 acres on BLM-administered land in the district.

Management Actions/Direction

Riparian Reserves

Cooperate with federal, state, and county agencies and work with parties with road use agreements to achieve consistency in road design, operation, and maintenance necessary to attain Aquatic Conservation Strategy objectives.

For each existing or planned road, meet Aquatic Conservation Strategy objectives by:

- Completing watershed analyses, including appropriate geotechnical analyses (i.e., examining soil and rock conditions in riparian and stream crossings) prior to construction of new roads or landings in Riparian Reserves.
- Minimizing road and landing locations in Riparian Reserves.
- Preparing road design criteria, elements, and standards that govern construction and reconstruction.
- Preparing operation and maintenance criteria that govern road operation, maintenance, and management.
- Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- Restricting sidecasting as necessary to prevent the introduction of sediment to streams.
- Avoiding wetlands entirely when constructing new roads.

Determine the influence of each road on the Aquatic Conservation Strategy objectives through watershed analysis. Meet Aquatic Conservation Strategy objectives by:

- Reconstructing roads and associated drainage features that pose a substantial risk.
- Prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected.
- Closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential affects to Aquatic Conservation Strategy objectives and considering short-term and long-term transportation needs.

Design and construct new culverts, bridges and other stream crossings and improve existing culverts, bridges and other stream crossings determined to pose a substantial risk to riparian conditions. New structures and improvements will be designed to accommodate at least the 100 year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.

Provide and maintain fish passage at all road crossings of existing and potential fish bearing streams (e.g., streams which can be made available to anadromous fish by removing obstacles to passage).

Develop and implement a Road Management Plan or a Transportation Management Plan that meets the Aquatic Conservation Strategy objectives. As a minimum, this plan will include provisions for the following activities:

- Inspections and maintenance during storm events.

- Inspections and maintenance after storm events.
- Road operation and maintenance giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources.
- Traffic regulation during wet periods to prevent damage to riparian resources.
- Establishing the purpose of each road by developing the road management objective.

Late Successional Reserves

Construct roads in Late Successional Reserves if the potential benefits of silviculture, salvage, and other activities exceed the costs of habitat impairment. If new roads are necessary to implement a practice that is otherwise in accordance with these guidelines, they will be kept to a minimum, routed through unsuitable habitat where possible, and designed to minimize adverse impacts. Alternative access, such as aerial logging, should be considered to provide access for activities in reserves.

Remove trees along rights-of-way if they are a hazard to public safety. Consider leaving material on site if available coarse woody debris is inadequate. Consider topping of trees as an alternative to felling.

Key Watersheds

Reduce existing road mileage within key watersheds. If funding is insufficient to implement reductions, neither construct nor authorize through discretionary permits a net increase in road mileage in Key Watersheds.

All Land Use Allocations

Prepare a district wide road management plan after approval of the resource management plan. The management plan will specifically address recreation use, road densities, road closures, wildlife protection, water quality, Port-Orford-cedar management, timber management, construction and maintenance standards, fire suppression, and coordination with adjacent landowners. Address road management planning on a watershed basis consistent with Late-Successional Reserves, Riparian Reserves, and other major allocations. Specific road closures would be determined using standard analysis, public involvement, and notification procedures.

Determine standards for new road construction during the project planning process. Standards will be the minimum necessary to meet resource and allocation objectives (e.g., recreation site, timber sale, key watershed, etc.) while having minimal impacts on the environment.

Minimize new road construction in areas with fragile soils (granitic, schist, and pyroclastic soils) to reduce impacts to soils, water quality, and fisheries. Stabilize existing roads where they contribute to significant adverse affects on these resources.

Locate, design, construct, and maintain roads to standards that meet management objectives in accordance with the district road management plan.

Follow Best Management Practices (see Appendix J) for water quality and soil productivity to mitigate adverse affects on soils, water quality, fish, and riparian habitat during road construction and maintenance.

Permanent roads will be paved or rocked to minimize sedimentation. Cuts and fills of new roads capable of supporting vegetation will be seeded to stabilize them prior to winter rains to provide the maximum stability. Roads built for temporary use will be stabilized prior to winter rains and rehabilitated when use is completed. Roads will be closed, if required, to prevent or alleviate significant resource damage.

Reduce road density by closing minor collector and local roads in areas or watersheds where water quality degradation, big game harassment, or other road related resource problems have been identified.

Acquire water rights for road management purposes.

Avoid road construction in special areas and special habitats.

Keep roads to the minimum needed for management, and locate, design, and construct to standards appropriate to the expected road use and the resource values affected. Use BLM Oregon Manual Supplement H-5420-1 in preparing road construction requirements for timber sale contracts. (Copies of Supplement H-5420-1 are available from the district office on request.)

Noxious Weeds

Objectives

Contain and/or reduce noxious weed infestations on BLM-administered land using an integrated pest management approach.

Avoid introducing or spreading noxious weed infestations in any areas.

Land Use Allocations

No allocations are made for noxious weeds in the planning process.

Management Actions/Direction

Late-Successional Reserves

Evaluate impacts of nonnative plants (weeds) growing in Late-Successional Reserves.

Develop plans and recommendations for eliminating or controlling nonnative plants (weeds) which adversely affect Late-Successional Reserve objectives. Include an analysis of effects of implementing such programs on other species or habitats within reserves.

All Land Use Allocations

Continue to survey BLM-administered land for noxious weed infestations, report infestations to the Oregon Department of Agriculture, and work with the department to control infestations.

Use control methods which do not retard or prevent attainment of Aquatic Conservation Strategy Objectives.

Apply integrated pest management methods (e.g., chemical, mechanical, manual, and biological) in accordance with BLM's 1985 Northwest Area Noxious Weed Control Program Environmental Impact Statement, 1987 Supplement and respective Records of Decision.

Hazardous Materials

Objectives

Minimize use of hazardous materials on BLM-administered lands.
Eliminate known hazardous wastes on BLM-administered lands.

Land Use Allocations

No allocations are made for hazardous wastes sites in the planning process.

Management Actions/Direction

Identify, investigate, and arrange for removal of hazardous substances on BLM-administered land in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (the Act). Emergency response will be as specified in the District Hazardous Materials Contingency Plan. The response will include cleanup, proper notifications, criminal investigations, risk assessment, and other actions consistent with the Act and the nature of the emergency.

Store, treat, and dispose of hazardous materials in accordance with the Resource Conservation and Recovery Act and other appropriate regulations.

Use the Emergency Planning and Community Right-To-Know Act to coordinate emergency planning with state and local jurisdictions concerning hazardous materials, emergency notifications and routine reporting of hazardous materials inventories.

Until hazardous wastes on BLM-administered land are removed, protect employees and the public from exposure to these materials.

Provide information to the public regarding the need to properly dispose of hazardous materials and the danger of becoming exposed to hazardous materials.

Fire/Fuels Management

Objectives

Provide appropriate fire suppression responses to wildfires that will help meet resource management objectives and minimize the risk of large scale, high intensity wildfires.

Use prescribed fire to meet resource management objectives. This will include but not be limited to fuels management for wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat, management of fire dependent/adapted species, and silvicultural treatments.

Adhere to smoke management/air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning.

Land Use Allocations

None specifically for fire/fuels management.

Management Actions/Direction

General

Apply the management actions/direction in the Special Status and SEIS Special Attention Species section.

Address fire/fuels management for all land use allocations as part of watershed analysis and project planning. This will include determinations of the role of fire and the risk of large-scale, high intensity wildfires at the landscape level.

Describe the need to use prescribed fire or other fuel management treatments to reduce fuel hazards and the risk of large scale, high intensity fire, while maintaining coarse woody debris, down logs, green tree retention, and snags, consistent with the natural role of fire and protection standards for each land allocation unit.

Coordinate fire management activities in rural interface areas with local governments, agencies, and landowners. During watershed analysis, identify additional factors which may affect hazard reduction goals. Minimize the impacts of wildfire suppression actions.

Riparian Reserves

Design fuel treatment and fire suppression strategies, practices, and activities to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies will recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management activities could be damaging to long-term ecosystem function.

Locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of Riparian Reserves. If the only suitable location for such activities is within the Riparian Reserve, an exemption may be granted following a review and recommendation by a resource advisor. The advisor will prescribe the location, use conditions, and rehabilitation requirements. Utilize an interdisciplinary team to predetermine suitable incident base and helibase locations.

Minimize delivery of chemical retardant, foam, or other additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor, when an escape would cause more long-term damage.

Design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

Immediately establish an emergency team to develop a rehabilitation treatment plan needed to attain Aquatic Conservation Strategy objectives whenever Riparian Reserves are significantly damaged by a wildfire or a prescribed fire burning outside prescribed parameters.

Limit the size of all wildfires.

Allow some natural fires to burn under prescribed conditions. This decision will be based on additional analysis and planning.

Rapidly extinguishing smoldering coarse woody debris and duff should be considered to preserve these ecosystem elements.

Locate and manage water drafting sites (e.g., sites where water is pumped to control or suppress fires) to minimize adverse affects on riparian habitat and water quality as consistent with Aquatic Conservation Strategy objectives.

Late-Successional Reserves

Emphasize maintaining late-successional habitat in wildfire suppression plans.

Use minimum impact suppression methods for fuels management in accordance with guidelines for reducing risks of large scale disturbances.

During fire suppression activities, consult with an interdisciplinary team to assure that habitat damage is minimized.

Until a fire management plan is completed for a Late-Successional Reserve or group of reserves, suppress wildfire to avoid loss of habitat and to maintain future management options. Then some natural fires may be allowed to burn under prescribed conditions.

Prepare a specific fire management plan prior to any habitat manipulation activities in Late-Successional Reserves. Specify how hazard reduction and other prescribed fire applications meet the objectives of the Late-Successional Reserve. Until the plan is approved, proposed activities will be subject to review by the Regional Ecosystem Office.

Apply prescribed fire in a manner which retains the amount of coarse woody debris determined through watershed analysis.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Adaptive Management Areas

Explore and support opportunities to research the role and effects of fire management on ecosystem functions.

Emphasize fire/fuels management cooperation across agency and ownership boundaries.

Follow fire/fuels management actions/direction in this proposed resource management plan until Adaptive Management Area plans are completed and approved.

Use accepted wildfire suppression strategies and tactics and conform with specific agency policy.

Matrix

Plan and implement prescribed fire treatments to minimize:

- Intensive burning, unless appropriate for certain specific habitats, communities, or stand conditions.
- Consumption of litter and coarse woody debris.
- Disturbance of soil and litter that may occur as a result of heavy equipment operation.
- The frequency of treatments.

All Land Use Allocations

Wildfire Suppression

Minimize the direct negative impacts of wildfire suppression on ecosystem management objectives.

Respond to all wildfires by taking appropriate suppression responses. In most cases, responses will consist of aggressive initial attack to extinguish fires at the smallest size possible.

For wildfires that escape initial attack, perform a Wildfire Situation Analysis to develop a suppression strategy to evaluate the damage induced by suppression activities compared to expected wildfire damage. Suppression tactics will consider:

- Public and firefighting personnel safety.
- Protection of specific attributes of each land use allocation.
- Coordination of wildfire suppression activities to avoid causing adverse impacts on federal and nonfederal lands.
- Appropriate use of suppression tools such as aircraft, dozers, pumps and other mechanized equipment, and clear definitions of any restrictions relating to their use.
- The potential adverse affects on meeting ecosystem management objectives.
- Protection of structural components such as snags, duff, and coarse woody debris to the extent possible.

Fuels Management (including Hazard Reduction) Using Prescribed Fire

Modify fuel profiles in order to lower the potential of fire ignition and rate of spread; protect and support land use allocation objectives by lowering the risk of high intensity, stand replacing wildfires; and, adhere to smoke management and air quality standards.

Reduce hazards through methods such as prescribed burning, mechanical or manual manipulation of forest vegetation and debris, removal of forest vegetation and debris, and combinations of these methods.

Hazard reduction plans will be developed through an interdisciplinary team approach and will consider the following:

- Safety of fire fighting personnel.
- Identification of levels of coarse woody debris and snags of adequate size and in sufficient quantities to meet habitat requirements of species of concern.
- Developing a fuel profile that supports land allocation objectives.
- Reducing the risk of wildfire in a cost efficiency manner.
- Interagency cooperation to assure cost effective fuel hazard reduction across the landscape.
- Adherence to smoke management and air quality standards.
- Consistency with objectives for land use allocations.
- Maintenance or restoration of ecosystem processes or structure.
- The natural role of fire in specific landscapes, current ecosystem needs, and wildfire hazard analysis included in the fire management plan.

Prescribed Fire Use for Ecosystem Maintenance and Restoration

The use of prescribed fire will be based on the risk of high intensity wildfire and the associated cost and environmental impacts of using prescribed underburning to meet protection, restoration, and maintenance of critical stands that are currently susceptible to large scale catastrophic wildfire.

Underburning will be reintroduced across large areas over a period of time to create a mosaic of stand conditions. Treatments should be site specific treatments because some species with limited distributions are fire intolerant. The use of prescribed burning will be based on an interdisciplinary evaluation. Funding authority, therefore, must reflect the range of objectives identified for using fire under ecosystem management.

Use prescribed fire to manage seral stage diversity through the development of fire resistant stand mosaics by timing the application of fire (e.g. every five to ten years).

Fuels Management for Hazard Reduction

Modify fuel profiles in order to lower the potential of fire ignition and rate of spread; protect and support land allocation objectives by lowering the risk of high intensity, stand replacing wildfires; and, adhere to smoke management and air quality standards.

Reduce hazards through methods such as prescribed burning, mechanical or manual manipulation of forest vegetation and debris, removal of forest vegetation and debris, and combinations of these methods. Hazard reduction plans will be developed through an interdisciplinary team approach and will consider the following:

- Providing for the safety of firefighting personnel.
- Identification of levels of coarse woody debris and snags of adequate size and in sufficient quantities to meet habitat requirements of species of concern.
- Developing a fuel profile that supports land allocation objectives; and seeking a balance between reducing the risk of wildfire and the cost efficiency consistent with meeting land allocation objectives.

Management Direction Common to Alternatives NA, A, B, C, D, and E

The following management direction will apply fully to alternatives NA through E but not necessarily to the No Action alternative and Alternative C. Significant exceptions to this direction are noted in the descriptions of those two alternatives.

General

Land management practices of adjacent landowners will be considered during site specific timber

management planning and other specific activity and project planning.

Special management will be provided for the tree species Pacific yew, the bark of which is the only currently approved (by the Food and Drug Administration) source of taxol, a promising agent for treatment of a variety of cancers. Due to the progress in synthesizing taxol, there is currently no demand for yew material from federal lands. Pacific yew management and collection on federal lands is provided for by a separate environmental impact statement which was prepared by the U.S. Forest Service, with BLM as a cooperating agency. However, the record of decision for this environmental impact statement is implemented only when there is a demand for Pacific yew from federal lands for taxol. In addition, the Pacific Yew Act expired in accordance with its terms and letters to the Congress from the Secretaries of health and Human Services, Agriculture, and Interior, in January 1994.

Inherent in all management practices is a goal of maintaining long-term site productivity of soils. Achievement of this goal will be accomplished by using Best Management Practices and minimizing disturbance of fragile areas (see Appendix J for a list of Best Management Practices and a description of management guidance for fragile sites).

All BLM prescribed fire activities which could affect air quality will be conducted in accordance with the Oregon State Implementation Plan as administered by the Department of Environmental Quality, and the Oregon Smoke Management Plan as administered by the Department of Forestry.

The BLM will aid and support the Oregon Economic Development Department's efforts to help communities develop and implement alternative economic strategies as a partial substitute for faltering timber based economies. Aid and support will consist mostly of coordination and prioritization of BLM recreation and fisheries development activities. These activities are mutually perceived as benefiting the identified economic strategies.

Water Quality and Riparian Areas

To assure protection of water and water dependent resources, BLM will continue to implement a Nonpoint Source Management Program in cooperation with the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality.

Section 319 of the Clean Water Act directs the states to prepare a statewide management plan which outlines a Nonpoint Source pollution control program. Oregon's Nonpoint Source management program includes two goals for Nonpoint Source prevention and control efforts: (1) the protection, in every waterbody, of water quality necessary for full support of the various designated beneficial uses of water, and (2) the maintenance of "high quality" waters wherever they are found. The Clean Water Act as amended directs federal agencies to comply with state water quality requirements to restore, maintain, and enhance water quality necessary to protect existing beneficial uses. Oregon's Nonpoint Source management plan requires the BLM to continue coordination with Department of Environmental Quality for implementation of Best Management Practices which protect the beneficial uses of water. Best Management Practices are those land and resource management techniques designed to maximize beneficial results and minimize detrimental results. Best Management Practices are listed in Appendix J.

Management activities will be consistent with Oregon's adopted Statewide Water Quality Management Plan for forest practices, and comply with Oregon's Water Quality Standards and Guidelines for the Umpqua Basin (Oregon Administrative Rule 340-41-282, Oregon Administrative Rule 340-41-285) and the South Coast Basin (Oregon Administrative Rule 340-41-322, Oregon Administrative Rule 340-41-325). Best Management Practices will be selected based on site specific conditions, feasibility, and the water quality standards for waters potentially affected. Mining, recreation, Off Highway Vehicle use, fire management, and other activities will be regulated to protect water quality.

Watershed management practices will be designed to comply with Oregon's Antidegradation Policy which describes the conditions under which water quality may be lowered and when it must be maintained or enhanced. The current Antidegradation Policy states that degradation of water quality will not be permitted should it interfere with or become injurious to the established beneficial uses of water within designated reaches of National Wild and Scenic Rivers (Oregon Administrative Rule 340-41-026).

Floodplains and wetlands will be protected in accordance with Executive Orders 11988 and 11990. The executive orders require that: 1) Floodplains and wetlands be identified; 2) activities which affect

floodplains or wetlands must be investigated to assess potential changes in their values; 3) actions in floodplains or wetlands are required to minimize impacts to those areas; and 4) actions and their impacts must be formally declared and the public notified.

New roads and associated structures will be located, designed, and constructed to minimize stream crossings and the risk of soil or other material entering streams or other waters. Excavation will be limited to the practical amount needed to meet appropriate road standards. Exposed soil will be seeded or protected where necessary to keep surface erosion within accepted standards. Logging, road building, road maintenance, and slash disposal methods will be designed to minimize the number and/or size of mass soil movements.

Riparian management areas will be established on each side of streams, lakes, ponds, and other waters.

The exclusion of fragile nonsuitable sites from the timber production base through the Timber Production Capability Classification process, and the commitment in the Resource Management Plan to design features to minimize soil erosion and otherwise protect streams are the foundation for the effort to minimize the effects of land management activities on surface water. Analysis of cumulative effects by analytical watersheds or their subdrainages in the Environmental Impact Statement for this Resource Management Plan may guide overall timber sale scheduling during the life of the plan. See the discussions of Requirement for Further Environmental Analysis and Use of the Completed Plan, later in this chapter.

Planning for chemical uses will provide for protection of both surface water and ground water. Chemicals used will include herbicides, pesticides, fertilizers, and fire retardant chemicals. Application and monitoring of herbicides will be done in accordance with BLM's "Record of Decision, Western Oregon Program, Management of Competing Vegetation", 1991.

The management goal in watersheds that provide surface water to municipalities (domestic uses) will be to maintain existing water quality. Management in municipal watersheds is subject to agreement with the cities of Drain, Riddle, and Canyonville through memorandums of understanding, and with the City of Myrtle Creek through a special use permit.

The following constraints will apply to management in and adjacent to riparian zones:

- No timber harvest will be planned as part of the sustained yield timber management program within a Riparian Management Area extending a minimum of 50 feet horizontal distance and an average distance that is wider, which will vary by alternative (see Table 2-1) on each side of perennial (generally 3rd order and larger) streams. Some tree cutting or timber harvest activities could occur there, however, to achieve resource management objectives. These activities may include road construction, enhancement of fish and wildlife habitat, safety along roads or within harvest areas, and yarding corridors to facilitate timber harvest outside the riparian management area.

- Brush, hardwoods, and nonmerchantable vegetation will not be cut or slashed in a strip 25 feet wide, measured horizontally on each side of all intermittent (generally first and second order) streams, whenever timber harvest activities occur other than those associated with road construction.

The following standards will be followed in Riparian Management Areas:

- Yarding corridors through Riparian Management Areas will be restricted to the minimum number feasible, with the maximum width of any corridor being 50 feet.

- Removal of logs through the corridors will require either full log or one end suspension.

- All trees to be felled adjacent to Riparian Management Areas will be directionally felled to protect the Riparian Management Area.

- Conifers and woody riparian species will be planted in riparian areas adjacent to streams where previous management activities have removed them. Placement of woody debris, creation of snags, or planting of conifers or riparian species will be used where appropriate to enhance riparian conditions.

Agreements will be pursued with private land owners and other land management agencies for certain riparian areas within the district to help minimize impacts from timber management, grazing, or other activities.

Timber

Timber sale contracts, usually awarded on a competitive basis, are the means of accomplishing all timber harvest and many forest development practices. The standard and special provisions (which include mitigating measures) in a contract set forth the performance standards to be followed by the contractor in carrying out the action in accordance with applicable laws, regulations and policies. In contract preparation, selection of special provisions is governed by the scope of the action to be undertaken and the physical characteristics of the specific site. Standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales. Bureau manuals and manual supplements provide a variety of approved special provisions for use, as appropriate, in individual contracts. The combination of selected special provisions constitutes Section 41 of the timber sale contract. Maintaining or enhancing water quality and long-term soil/site productivity will be inherent in all timber harvest and production practices.

Transportation System

New roads will be kept to the minimum needed for management, and will be located, designed, and constructed to standards appropriate to the expected road use and the resource values affected. BLM Oregon Manual Supplement H-5420-1 will be used in preparing road construction requirements for timber sale contracts. (Copies of Supplement H-5420-1 are available from the district office on request.) Construction standards (i.e., stream crossing requirements, subgrade width, ditch, cut-and-fill slope requirements, and type of surfacing) will be determined during the annual timber sale planning process.

Timber Harvest

The Probable Sale Quantity for each alternative has been calculated using a computer program called TRIM-PLUS. The capabilities of TRIM-PLUS and the rationale for selection of the model are discussed in Appendix K . The sustainable Probable Sale Quantity has been calculated in cubic feet. Timber sales under the plan will be sold according to cubic foot measure.

On lands allocated primarily for timber production, clearcut harvesting will be used where it is silviculturally appropriate to accomplish forest management objectives, including cost effective management and assurance of timely reforestation. Under those criteria, the timber harvest method to be commonly employed will be clearcut harvesting, except in Alternative C. Appendix L discusses timber harvest methods, silvicultural systems, and the rationale for use of clearcutting.

Timber harvest will be accomplished by a mix of aerial, cable, or ground yarding systems. The logging systems and the degree of log suspension are design features that will be employed for watershed protection, to minimize soil damage and to minimize damage to residual trees in partial cut operations. BLM Oregon Manual Supplement H-5420-1 will guide selection of harvesting techniques for timber sale contracts.

In timber sales involving ground yarding systems, skid trails (including trails from previous harvest entries) will be planned to have insignificant (less than one percent) growth loss effect. Skid trails will affect less than ten percent of the land. Existing skid trails will be used as much as possible and new skid trails will be limited to slopes of less than 35 percent. Operation on these trails will minimize soil displacement and occur when soil moisture content provides the most resistance to compaction. Upon final harvest, all compacted trails, including skid trails from previous entries, will be tilled with a properly designed self-drafting subsoiler. For entries other than final harvest, skid trails will be selectively tilled.

Harvest unit size will be determined at the appropriate level given the site specific management objectives, such as wildlife habitat enhancement or salvage of timber damaged by fire, disease, insects, or wind. In addition, economic, logistical, and safety considerations may influence size.

Uneven aged (selection) harvest methods will generally be employed where they are above cost sales and either silviculturally preferred or favored to meet other resource or social objectives of the alternatives. In all cases, harvesting (either clearcut or selection) will be done in such a way that the land can be adequately restocked within five years.

Single tree selection will be employed for harvest of dead and dying timber (mortality salvage). Mortality salvage will take place on lands in the intensive timber production base to the extent consistent with wildlife and other resource objectives, and on other lands in the event of a major catastrophic event or when beneficial to wildlife, fish, or public safety.

Commercial thinning will be applied to intensively managed timber stands where practical and where research indicates increased gains in timber production are likely. The interval of treatment will range from ten to 30 years, varying by site class, with poor sites having longer intervals.

Trees could be cut or removed from lands withdrawn from timber production under certain circumstances, unless their harvest will be inconsistent with other plan guidelines. Examples of circumstances under which trees may be harvested from these lands are:

- To harvest inclusions of trees within a harvest unit on lands mostly classified as suitable for timber production, to allow design of more logical management units and/or reduced road construction, thereby lessening net adverse environmental impacts.
- To salvage trees or stands killed or substantially damaged by fire, windthrow, or other natural disturbance.
- To control the spread of insect or disease outbreaks.
- To conduct experiments.
- To provide for the safety of forest users (this includes hazard tree removal in camp and picnic grounds, in administrative sites, and along trails and roads open to the public).
- To maintain or enhance fish and wildlife habitats.
- To improve the visual resource by opening scenic vistas.
- To provide guy line or tailhold trees where needed to facilitate logging on adjacent lands.
- To facilitate construction and maintenance of facilities such as roads, trails, power lines, communication facilities, administrative facilities, recreation facilities, etc.
- To eliminate interference with the operation of communication sites.

To the extent consistent with management direction of the various alternatives, forest products sales will be designed to encourage complete utilization of harvested timber including noncommercial species.

Site Preparation

Site preparation procedures will be used to prepare newly harvested and inadequately stocked areas for planting new trees. Four types of site preparation treatments (prescribed burning, herbicide application, and mechanical and manual techniques) will be utilized. BLM's "Record of Decision Western Oregon Program - Management of Competing Vegetation", 1992, and BLM Oregon Manual Supplement H-5420-1 will be followed in selecting site preparation treatments, using an integrated vegetation management approach.

Prevention is the preferred strategy in controlling competitive and unwanted vegetation. The goal is to prevent or reduce the need for future vegetation control by considering known ecological relationships on individual sites. Harvest activity will be designed to eliminate or reduce post-harvest treatment. Prevention seeks to detect and ameliorate conditions that cause or favor the presence of competing or unwanted vegetation in the harvest units before it interferes with management objectives. Prevention is in contrast to treatment.

Prescribed fire, the primary method of site preparation, will be conducted in accordance with Oregon Smoke Management Plan Rules and Directives administered by the Oregon Department of Forestry. Other considerations in the design and timing of prescribed fire will be expected effects on soils and biological processes and effectiveness in fire hazard reduction and site preparation. Prescribed fire will be avoided on highly sensitive soils (those soils recognized as unusually erodible, nutrient deficient or having low organic matter - Category I soils) in most instances. Any burning on such soils, if considered essential to obtain adequate reforestation, will be accomplished under carefully prepared prescriptions designed to minimize detrimental impacts on both the physical and chemical properties of the soil. On other soils, prescriptions will be designed to protect beneficial soil properties and result in moderate and low intensity prescribed fires. Standard operating procedures to be used for prescribed fire are further delineated in BLM's "Record of Decision, Western Oregon Program, Management of Competing Vegetation", 1992 and in BLM Manual 9214.

Vegetation control techniques reduce competition for light, moisture and soil nutrients during the tree seedling establishment period. Where considered the most appropriate treatment, herbicides will be used to control grasses, forbs, brush and noncommercial tree species, to increase seedling survival. Application

and monitoring of herbicides will be done in accordance with BLM's "Record of Decision, Western Oregon Program, Management of Competing Vegetation", 1992.

Herbicides will be applied aerially and by several ground methods, as site specifically appropriate. The method selected will depend on costs, topography, equipment limitations, target plant species and their distribution, potential environmental impacts, and biological conditions. Most aerial herbicide applications will be accomplished by helicopters equipped with systems designed to limit herbicide application to the target areas.

Timing of herbicide treatment will be stringently controlled in relation to specified weather conditions such as temperature, humidity, and wind. Continuous project inspection of spraying operations is required. There is full authority for ordering cessation of operations based on adverse field conditions. Both equipment and operators are checked frequently by field project inspectors. Only registered chemicals will be used in accordance with label instructions on the container. Handling, storage, and application of chemicals will also be in accordance with the Oregon Forest Practices Rules (See the BLM Planning and Resource Interrelationships section, State and Local Government, in Chapter 5).

Manual site preparation will consist of brush pulling or cutting or hand piling of slash for burning.

Mechanical site preparation will consist of piling or windrowing of slash, brush, and unmerchantable stems. Track-type equipment with a brush blade will be restricted to areas with suitable soil types and slopes less than 35 percent. Track-type tractor site preparation operations will meet the following minimum conditions:

1. Minimize piling of large woody material.

2. Avoid displacing duff layers and topsoil into piles or windrows.

3. Make only two machine passes (one round trip) over the same area.

4. Operate at soil moistures that maximize resistance to compaction. Special equipment or techniques that will achieve the same insignificant (less than one percent) growth loss result may be used instead of the preceding techniques, especially on soils considered unsuitable for tractor-type operations. All compacted areas will be tilled with properly designed equipment.

Brush and Hardwood Conversion

Lands identified as available for timber production but currently growing primarily brush or hardwoods will be converted to appropriate conifer species unless the hardwoods will produce a higher net monetary return than conifers. Such actions will meet relevant tests of economic feasibility or justification and will be consistent with the objectives of an alternative. Conversion could include harvest of existing merchantable trees, slashing of nonmerchantable trees, and other site preparation techniques as appropriate.

Planting

To achieve adequate reforestation as promptly as practical following timber harvest, harvested areas will be planted with indigenous commercial coniferous species (e.g., Douglas-fir, western hemlock, and western redcedar, etc.) generally within one year of the completion of harvesting and site preparation. Hardwoods will be encouraged on harvested sites where they will produce a higher net monetary return than conifers. Identified root disease centers will be planted with indigenous resistant tree species.

Planting stock will be nursery grown from seed collected on sites and at elevations similar to the specific project area. Genetically selected stock will also be nursery grown and used to the extent available (up to 50 percent in Alternative C, in accordance with BLM's Western Oregon Tree Improvement Plan. Broad selection of parent trees for such stock is used to maintain genetic diversity. See Appendix M for a description of the tree improvement program.

Initial spacing of seedlings, thinning and control of competing vegetation will be planned to maximize wood production by concentrating site resources on individual tree growth except in Alternative C.

Target stocking levels cannot always be achieved by the initial planting. Post-treatment reforestation surveys will be conducted to determine the rate of survival and if replanting or interplanting will be required to meet stocking standards.

Plantation Protection

Treatments will include protection of seedlings from the sun by shading and protection from damage by deer, elk, mountain beaver or other animals by placing plastic tubing or netting over the seedlings or by bud capping. Large populations of mountain beaver or pocket gophers will be reduced by several different methods when they cause significant damage to a plantation. The number of acres requiring each of these treatments will be determined annually in conjunction with normal reforestation surveys. Control within progeny test sites and other intensive study plots will also include porcupine or other animals causing significant damage.

Plantation Maintenance and Release

Maintenance treatments promote the survival and establishment of coniferous seedlings. Release treatments reduce competition for light, moisture and nutrients between surrounding vegetation and existing coniferous seedlings, and promote dominance and growth of established coniferous trees.

Faster growing hardwoods, such as red alder, bigleaf maple or vine maple, overtop and suppress slower starting conifer seedlings. The degree and type of competition varies with the individual site. On dry sites, grasses, forbs and shrubs are strong competitors for water, while elsewhere shrubs and/or hardwoods grow rapidly enough to shut out essential light and compete for water during the dry summer. With reduced competition, the conifers rapidly grow beyond the point where they can be overtopped and further suppressed by surrounding vegetation. When this growth situation is achieved (approximately three to ten years after planting), there will be no further effort to control competing vegetation.

An integrated vegetation management approach will be used in selection of maintenance and release treatments, in conformance with BLM's "Record of Decision, Western Oregon Program - Management of Competing Vegetation", 1992. Herbicides will be used to control competing vegetation when analysis shows their use to be the most appropriate treatment. See the previous discussion on site preparation for further discussion of herbicide use. Manual vegetation control methods (clearing around selected commercial trees using hand tools) will also be used when considered most appropriate to assure commercial tree growth.

Precommercial Thinning

Precommercial thinning will be applied to timber stands in the intensive timber production base that are overstocked. Thinning will generally be done between ten and 20 years of age. Average number of trees left will vary between 150 to 250 trees per acre depending on the alternative and individual stand prescription. Higher densities will be left under Alternative A, lowest under Alternative C and the Proposed Alternative. Contract specifications will define desired density, spatial arrangement and selection criteria for trees to be retained.

Fertilization

Areas precommercially or commercially thinned and portions of areas where stocking control is achieved through plantation spacing will be fertilized where increased wood yields will result except under Alternative C. The average application is expected to be 200 pounds of nitrogen per acre beginning when the stand is precommercially thinned and at 15 year intervals thereafter until 20-25 years before final harvest. In addition to acceleration of growth for up to 15 years following treatment, fertilization tends to reduce shock associated with thinning.

Forest Tree Improvement

Top ranking plus trees will be managed intensively in the field to optimize cone production (thinning, fertilization, girdling, and systemic insecticide treatment). The seed orchards for Douglas-fir and sugar pine will be managed to produce increasing yields of genetically selected seed. Minor species seed production plantations are also being planted in the seed orchards to ensure a dependable supply of seed for trees native to the Roseburg District.

Minor Forest Products

Extraction of minor forest products (firewood, shake bolts, ferns, floral greens, etc.) will be accommodated on lands available for such harvest, to the extent of product availability, funding to administer transactions, and consistency with plan objectives. Sales are normally made on a negotiated basis, with the permit or contract containing applicable stipulations for the protection of other resource values.

Access for Timber Management

Roseburg District BLM-administered lands and private lands generally are intermingled in the planning area, therefore, each party must cross the lands of the other in order to reach their timber. BLM policy will continue to provide all prospective purchasers of BLM timber with an equal opportunity of access when timber is offered for sale. This will most often be accomplished by reciprocal right-of-way agreements with private landowners or through federal ownership and control of roads. Reciprocal right-of-way agreements will continue to be used to identify conditions of use that are equitable and nondiscriminatory and facilitate management of the road network. Most of the lands where logging road right-of-way agreements are appropriate are now covered by reciprocal agreements. The 140 individual agreements and permits will continue to be subject to the regulations in effect when they were executed or assigned. The provisions of these agreements allow BLM only limited discretion to control the location of roads constructed by private parties across BLM-administered lands (and vice versa). This limited discretion allows BLM to object for only one environmental reason - excessive erosion damage. However, future reciprocal right-of-way agreements could have different provisions depending on the regulations in effect at the time of their execution.

When the landowner does not need rights to cross BLM-administered lands, BLM gains access through the purchase of either a nonexclusive or an exclusive road easement. Nonexclusive road easements are obtained for administrative and timber harvest purposes only.

Special Status Species Habitat (Including Threatened and Endangered Species)

Habitats of federally listed or proposed threatened or endangered species will be managed as required by law and consistent with approved recovery plans. Field or office reviews will be conducted on all proposed actions prior to any ground manipulation or any disposal of BLM-administered land. Effort will be made to modify, relocate, or abandon a proposed action to avoid a "may affect" determination if a federally listed or proposed species was located during project review. Consultation or conferencing with the U.S. Fish and Wildlife Service will be initiated on all "may affect" determinations. No actions will be undertaken or permitted that will jeopardize populations of federally listed or proposed species.

Systematic inventories and monitoring will be conducted for special status species where baseline information is lacking. Habitat Management Plans will be developed for special status species whenever significant long term management guidelines and programs are needed.

All actions will be consistent with the Pacific Bald Eagle Recovery Plan. To meet recovery plan goals, the currently existing six bald eagle nest territories and habitat (4,660 acres) will be protected as well as any future occupied territories under the following management guidelines:

1. Maintain or attain the following stand characteristics on all lands managed for bald eagles:

    a. Large conifer trees that are greater than 50 inches dbh and occur at a density of five to seven trees per acre.

    b. Multi-storied canopy with at least 60 percent crown closure.

    c. Remainder of the stand with conifer trees with an average dbh of 24 inches and an average density of 50 to 70 trees per acre.

2. Avoid disturbance including logging, mining and mineral leasing (except existing recreational use) within 1/2-mile of active nest sites which may adversely affect, between the dates of February 15 and August 31 contingent on consultation under Sec. 7 of the Endangered Species Act.

3. Provide an appropriate level of fire protection on lands managed for bald eagles and restrict the use of insecticides within 1/2-mile of bald eagle sites.

All actions will be consistent with the Pacific Peregrine Falcon Recovery Plan.

The integrity of potential Peregrine falcon nesting cliffs (Chimney Rock, Taylor Creek, Buck Butte, Callahan Ridge, and Hill Creek - 560 acres) on BLM-managed lands will be maintained.

Seasonal restrictions will be placed on all logging activities, road building, mining, and operating large equipment which may adversely affect within 1/4-mile of active northern spotted owl nest sites during the nesting and fledgling season to avoid disturbance and harm to adult and young owls.

All actions will be consistent with the Columbian White-tailed Deer Recovery Plan.

Wildlife and Fish Habitat

Nonmerchantable down and dead wood will be retained on areas allocated for timber production, to the extent compatible with reforestation objectives, fire hazard reduction standards, and watershed protection objectives. Gross yarding will be planned only where needed for one of these purposes. At a minimum, Forest Practices Act (Oregon Administrative Rule 629-24) standards for snags and down logs will be met. Salvage of down and dead wood on lands not allocated for timber production (lands outside the timber base) will be conducted only after adequate amounts of such material have been retained to provide habitat for maintenance of small animal populations and biological diversity.

Except where public safety is a concern, snags will be retained where they occur on lands not allocated to timber production and left as nonmerchantable material in timber harvest units. Where relevant to meeting cavity nester objectives, and to the extent that funding permits, some green trees on lands not allocated to timber production will be girdled or topped to create snags. Timber sale contracts will require retention of all snags and nonmerchantable trees that can be left safely in timber harvest areas. In alternatives providing for retention of wildlife trees that may be merchantable in timber harvest units, the following guidelines will be used:

- Leave all soft snags except where unacceptable for safety, logging systems, or control of prescribed burns or wildfire suppression purposes.

- Leave scattered hard snags and green trees, including culls, both to provide the current needs of hard snag dependent species, and to serve as a source of future snags. As a minimum, one conifer wildlife tree per acre on intensive forest management land base or three conifer wildlife trees per acre on lands withdrawn from the commercial timber base will be retained. The distribution of wildlife trees could be in a scattered or in a clumped pattern depending on the occurrence of suitable trees and harvest practices.

Wherever practical, new roads will avoid areas with high wildlife values. Temporary roads not needed for continued management will be closed upon completion of logging and replanting.

Special habitat areas such as lakes, talus slopes, meadows, serpentine barrens, and wetlands will be managed to protect their habitat values. Impacts from road construction will be permitted under all alternatives when construction outside a special habitat will result in greater impacts to other resources.

Forage seeding will be done, where compatible with continued timber production, following regeneration cuts in any Oregon Department of Fish and Wildlife designated wildlife unit where less than 30 percent of the land base is in the early seral stage.

Mineral materials will not be sold from riparian zones.

Demonstration/experimental watersheds will be designated in the three physiographic zones used by anadromous fish: Wolf Creek (T. 24 S., R. 7/8 W.), Stouts Creek (T. 30/31 S., R. 3 W.), and Pass Creek (T. 24 S., R. 1 W.). These watersheds will be used to collect baseline data, follow trends, monitor riparian, stream and fish parameters, and to apply new techniques or studies that will benefit from the availability of background data.

When practical, timber sale contracts will require removal of debris which obstructs fish passage or has the potential to degrade a stream channel. All other large woody debris and snags in and adjacent to fishery streams will be retained. Stream crossing structures will be installed so that fish passage is not impeded.

Stream enhancement projects will be implemented consistent with BLM's nationwide "Fish and Wildlife 2000 - A Vision for the Future" (USDI BLM 1989). All uncompleted fish habitat improvement projects identified in BLM's "A Five-Year Comprehensive Anadromous Fish Habitat Enhancement Plan for Oregon Coastal River", 1985, will be completed. In addition, a number of other potential projects have been identified where significant, correctable limiting factors exist. These projects may include full and partial stream spawning structures, rootwad and brush bundle placement, blast pools, bank stabilization, off-channel development, culvert access or replacement, riparian conversion to conifers, structure maintenance, and barrier removal. Table

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2-2 shows both remaining projects in the Five-Year Plan and other proposed projects.

Existing and new water impoundments will be used to provide recreational fishing opportunities where sufficient water quality and quantity exist. All wildlife habitat management practices (i.e., plantings, seedings, nest boxes and structures, water developments, pond construction, stream structures, inventories) could be implemented under any of the alternatives, as long as compatible with other management objectives.

See the previous Water Quality and Riparian Areas discussion for riparian management direction which relates to wildlife and fish habitat.

Special Areas

Existing Special Areas which are selected for continued management will be managed in accordance with existing management guidelines. Management plans will be developed for new or modified Special Areas or for any existing Special Area where management objectives have been changed. Prescribed fire could be used to achieve management objectives. All Research Natural Areas will be designated as closed to Off Highway Vehicle use.

All Special Areas designated in any alternative except No Action will be designated Areas of Critical Environmental Concern. Some Special Areas will also be designated Research Natural Areas in order to clarify management emphasis for research and education.

Recreation

Most BLM-administered lands in the planning area will be designated as Extensive Recreation Management Areas. Consistent with BLM's nationwide Recreation 2000 plan, lands will be managed for a diversity of resources. The lands will be available for dispersed recreation activities, including hunting, fishing, sightseeing, riding, hiking, and rafting, etc., consistent with managed forest settings. Provision of opportunities accessible by car and close to population centers will be emphasized. In general, BLM-administered lands will be open to recreational mineral collection (casual use) unless subject to prior rights, such as mining claims. The following developed recreation facilities will be maintained and managed by BLM and associated volunteers and partnerships:

- Recreation Sites - 12 existing recreation sites with a total of 93 campsites; 31 picnic units; two pavilions within 6 developed recreation sites.
- Nonmotorized trails - 15.1 miles, for hiking, horseback, and mountain bike use.

Three Special Recreation Management Areas will continue or be newly designated:

- North Umpqua Special Recreation Management Area. Existing 1620 acre Special Recreation Management Area consistent with the Area of Critical Environmental Concern boundary. Includes Congressionally designated Wild and Scenic River, North Umpqua National Recreation Trail, North Umpqua Scenic Byway, developed recreation sites that support camping, picnicking, hiking, fishing, mountain bike riding, wildlife observation, white water sports, nature observation, and driving for pleasure.
- Cow Creek Special Recreation Management Area. New 1540 acre Special Recreation Management Area. Includes Cow Creek Back Country Byway and developed/proposed recreation sites to support day use activities, historical interpretation, driving for pleasure, wildlife observation, camping, hiking, historical interpretation, mountain bike riding, recreational gold panning, and waterfront activities.
- Umpqua River Special Recreation Management Area. New 2240 acre Special Recreation Management Area. Consists of existing and proposed recreation attractions including: Camping, picnicking, hiking, interpretation, wildlife observation, river activities, fishing, and driving for pleasure along a Back Country Byway.

These Special Recreation Management Areas require more intensive recreation planning and management to properly manage the intensive use. Objectives are to promote recreation opportunities on public lands, promote safety, reduce impacts to natural resources and provide opportunities for public partnerships.

Susan Creek recreation site (200 acres) and Cow Creek Recreational Gold Panning Area (94 acres) will be withdrawn from locatable entry and will have no surface occupancy for mineral leasing.

Eighty-nine miles of roads will be dedicated as Back Country Byways, a component of the National Scenic Byway System.

The use of Off Highway Vehicles on BLM-administered lands will be regulated in accordance with the authority and requirements of Executive Orders 11644 and 11989 and regulations contained in 43 CFR 8340. They require that Off Highway Vehicle use not cause significant adverse impacts to resource values, that conflicts between visitors be minimized, that public hazards are identified, and that public safety is promoted. All public lands in the Roseburg District will be designated as open, limited, or closed to Off Highway Vehicles.

Increasing emphasis will be placed on interpretive and informational signing and maps, to support state and local strategies for encouraging tourism. Increased emphasis will also be placed on accomplishing the goals and objectives of BLM's Recreation 2000 Implementation Plan and the Oregon-Washington Special Recreation Management Area and Extensive Recreation Management Area Initiatives.

Opportunities for new recreation activity and site development will be pursued where such development does not conflict with other allocated uses.

Wild and Scenic Rivers

BLM-administered land adjacent to and within approximately 1/4-mile of the designated 8.4 mile (recreation) section of the North Umpqua Wild and Scenic River will be managed to protect, and to the extent possible, enhance the outstandingly remarkable values which resulted in the river's designation by Congress. No timber harvest will be planned as part of the sustained yield timber management program within the designated Wild and Scenic River corridor boundary. However, salvage of trees killed by a natural catastrophic event and those posing safety hazards will be allowed. The North Umpqua River Management Plan has been developed to implement the requirements of the Wild and Scenic Rivers Act of 1968, as amended. This Management Plan will be adopted as the land management document for those lands within the designated boundaries of the Wild and Scenic River Corridor. Management guidelines and standards for national Wild and Scenic rivers are described in Appendix P.

For rivers determined to be suitable through the planning process for designation under the Wild and Scenic Rivers Act, and all eligible rivers where suitability is not determined (generally, those segments where BLM administers less than 40 percent of the land within 1/4-mile), BLM's interim wild and scenic river management policy will remain in effect pending Congressional resolution of the designation issue. Under this interim management, no actions will be authorized on BLM-administered lands within 1/4-mile of the river that will adversely impact the outstandingly remarkable value(s) which resulted in the river being found eligible for designation for Wild and Scenic status.

For rivers suitable or found eligible (but not studied) for recreational status, interim management will exclude timber harvest on BLM-administered land in the Riparian Management Area and protect the identified outstandingly remarkable values of the segment. No rivers have been found eligible for scenic or wild status classification.

Wilderness Study Areas

There are no lands in the planning area which are eligible as Wilderness Study Areas.

Visual Resources

Visual Resource Management classes and objectives are set forth below:

Class I. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the

characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV. The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

The visual resource contrast rating system will be used during activity level planning to determine what and how proposed activities will meet Visual Resource Management objectives. The following timber harvest scenarios could be used to meet Visual Resource Management Class II, III, and IV objectives. Based on the visual resources rating system and site specific conditions, these scenarios or others may be used.

Timber management approaches to meet Visual Resource Management Class II objectives will employ single tree selection, uneven aged harvest, retention of shelterwood overstory trees or group selection management in seen areas. Larger clearcuts will be in unseen areas. Fire suppression and fuels management standards will be established to meet Visual Resource Management Class II objectives.

To permit screening of regeneration harvests and permit time for regrowth between sequential entries, regeneration harvests will not remove more than 6.6 percent of any seen Visual Resource Management Class II area in a given decade.

Timber management approaches to meet Visual Resource Management Class III objectives will employ either short-term retention of shelterwood overstory trees, or use of regeneration harvests which have less than ten acres of seen area and which do not disturb more than ten percent of the seen Visual Resource Management Class III area in any decade. Where possible, regeneration harvests will be screened from key viewing points along major travel routes by uncut areas or by shelterwood units or young stands.

No specific visual management constraints will apply to lands managed for Visual Resource Management Class IV objectives, but mitigation of visual impacts will be incorporated where consistent with efficient timber harvest or other management activities.

In the visually sensitive corridors along Interstate 5 and State Highways 38, 42, and 138, guidelines of the revised Oregon Forest Practices Act as spelled out in Section 17 will be followed as a minimum requirement.

Cultural and Paleontological Resources

BLM will continue to identify localities with cultural resource values and manage them for their public and scientific uses. This objective will largely be accomplished through implementation of 36 CFR 800, which ensures that authorized land use actions do not inadvertently harm or destroy federal or nonfederal cultural resources, but will also include affirmative measures taken to protect and enhance cultural resources. The affirmative measures will be largely a result of the 1988 Archeological Resources Protection Act amendments and the Bureau initiative, Adventures in the Past. The Archeological Resources Protection Act amendments direct Federal agencies to identify and evaluate their cultural resources and to develop public awareness programs to explain the significance of those resources. Adventures in the Past helps attain those goals by enhancing public enjoyment and awareness of cultural resources. Implementation of these measures will depend upon adequate funding and will be susceptible to change based on the accumulation of new data. These measures will include:

- Systematic inventory of areas likely to contain cultural resources.
- Systematic testing and evaluation of archaeological sites to assess their potential for contributing to public and scientific uses.
- Development of cultural resource management plans for areas with fragile resources or a record of intensive prehistoric or historic use. These areas will include Golden Bar, the North Umpqua River corridor and Little River/Wolf Creek area, the Middle Creek drainage and Camas Valley, the White Rock/ Deadman Mountain/Deadman Creek area, and the mining areas in the southern portion of the District.

- Development of inventory plans based on geomorphic provinces of the Coast Range, western Cascades, and Klamath Mountains.

- Acquisition of significant cultural resource properties for conservation and scientific purposes. These properties will include five sites located throughout the planning area: 35DO17, 35DO191, 35DO291, 35DO431, and 35DO383.

- Development of Memoranda of Understanding with Federally recognized Indian tribes and other Indian groups so that their heritage and religious concerns may be appropriately considered. These groups will include the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of Siletz Indians, the Confederated Tribes of Grand Ronde, the Coquille Indian Tribe, and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians.

- Systematic monitoring by law enforcement personnel of cultural resources being impacted by unauthorized use such as 35DO147, 35DO153, and 35DO435.

- Interpretation of cultural resources to increase public awareness and appreciation of the resource values.

- Implementation of physical protection measures, such as riprapping and barrier installations, to reduce deterioration.

All vertebrate fossils and scientifically significant invertebrate and plant specimens will be collectible only under a permit issued by an authorized officer. Common fossils will be collectible without a permit as long as mechanized equipment or explosives are not used. Paleontological clearances will be performed as a standard part of project clearance. Affected sites will be analyzed for their significance and mitigation measures will be applied if appropriate. Efforts to increase our knowledge of sites and specimens will continue, using volunteers or contractors as appropriate. The locality of the Days Creek mammoth discovery will be monitored for additional exposures.

Land Tenure

Exchanges and acquisitions will be made to enhance public resource values and/or improve land patterns and management capabilities of both private and BLM-administered lands within the planning area by consolidating ownership and reducing the potential for land use conflict. These will occur when opportunities arise that enable the BLM to meet the goals for an alternative. For this reason, exchanges and acquisitions are not quantified in this document.

All land tenure adjustments will consider the effect on the mineral estate. If the lands are not known to have mineral potential, the mineral interest will normally be transferred simultaneously with the surface.

The land ownership adjustment criteria identified in Appendix C will be considered in environmental assessments prepared for specific adjustment proposals.

Transfer of lands to other public agencies will be considered where consistent with public land management policy and where improved management efficiency will result. Minor adjustments involving sales or exchanges may be made based on site specific application of the land ownership adjustment criteria.

Land to be acquired by the BLM through exchanges or any other method, generally must:

- Facilitate access to public land and resources, or

- maintain or enhance important public values and uses, or

- maintain or enhance local social and economic values in public ownership, or

- facilitate implementation of other aspects of the approved Resource Management Plan.

Land tenure adjustment will be guided by a three zone concept utilizing the following standards:

- Zone 1 includes areas currently identified as having high public resource values, and other efficiently managed lands. The natural resource values may require protection by Federal law, Executive Order or policy. These lands may have other values or natural systems which merit long-term public ownership. They do not meet the criteria for sale under the Federal Land Policy Management Act of 1976, Section 203(a) and will generally be retained in public ownership.

- Zone 2 includes lands that meet criteria for exchange because they form discontinuous ownership patterns, are relatively inefficient to manage, and may not be accessible to the general public. These BLM-administered lands may be

blocked up in exchange for other lands in Zones 1 or 2, transferred to other public agencies, or given some form of cooperative management. These lands will not be sold under the Federal Land Policy and Management Act, Section 203(a).

- Zone 3 includes lands that are scattered and isolated with no known unique natural resource values. Zone 3 lands will be available for use in exchanges for private in holdings in Zone 1 (high priority) or Zone 2 (moderate priority). They are also potentially suitable for disposal through sale under the Federal Land Policy and Management Act Section 203(a) if important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values are not identified during disposal clearance reviews and no viable exchange proposals for them can be identified. Zone 3 lands will also be available for transfer to another agency or to local governments, as needed to accommodate community expansion and other public purposes.

Land exchanges conducted under the zone concept will be made to benefit one or more of the resources. Exchanges will be consummated when it is determined that the public interest will be served by making the exchange. Exchanges will be conducted under the authority of the Federal Land Policy and Management Act Section 205 and 206 (Public Law 94-579).

Lands in the zones will be the same in all alternatives as shown on Map 2-1. Zone 3 lands are listed in Appendix D.

Sales of BLM-administered lands are conducted under the authority of the Federal Land Policy and Management Act Section 203(a) which requires that one of the following criteria exist before land is offered for sale:

1. Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the BLM-administered lands and is not suitable for management by another Federal department or agency; or

2. Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or

3. Disposal of such tract will serve important BLM-administered objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than BLM-administered land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which will be served by maintaining such tract in Federal ownership.

In addition to the sale criteria listed above, where O&C or Coos Bay Wagon Road lands are involved there must also be a determination as to whether the lands are more suitable for management and administration for permanent forest production and other purposes as provided in the Acts. When the lands are suitable for administration under the Acts they cannot be sold. State and local governments will be consulted prior to any land disposal.

Where survey hiatuses and unintentional encroachments on public lands are discovered in the future which meet the disposal criteria the lands may be automatically assigned to Zone 3 for disposal.

Nonfederal lands that BLM is specifically considering for acquisition are located throughout the district. Land acquisitions are discussed in this chapter under the sections for Land Tenure Management, Cultural and Paleontological Resources, Wild and Scenic Rivers, and Access. The lands or interest in lands may be acquired through exchange, donation, or purchase. Specific acquisitions common to all alternatives include:

1. The Cultural and Paleontological Resources section identifies sites that total 140 acres.

2. A total of 169 easements have been identified to access all parcels in the planning area for resource management. All 169 easements will not be acquired during the life of this plan. Easements will be acquired through the negotiation or condemnation process.

3. The North Umpqua Wild and Scenic River Management Plan identifies specific tracts of private land which will be desirable to acquire.

Land Use Authorizations

Lease serial numbers ORe 05564, ORe 010734, OR 16775, OR 37065 and OR 37070, will be continued in accordance with the terms of each lease. A life estate residential lease (ORe 05564) will not be assigned at the end of its terms. Douglas County maintains Richard Baker County Park as a day use area. This 7.5 acre Recreation and Public Purpose lease,

located within the Wild and Scenic River Corridor of the North Umpqua River, will be continued.

Temporary use permits, as identified under the Federal Land Policy and Management Act section 302, will be issued for a variety of uses such as, but not limited to apiary, stockpile and storage sites, and as a tool to authorize unintentional trespass situations pending final resolution.

No leases or permits will be issued for landfills or other waste disposal facilities and no leases will be issued for new residential construction. Leases or permits for other uses of public land or amendments to existing authorizations will be authorized if the use does not conflict with higher resource values.

Rights-of-Way

BLM-administered lands will continue to be available for needed rights-of-way where consistent with local comprehensive plans and Oregon's statewide planning goals and rules.

The occupied utility transportation routes identified in the Western Regional Corridor Study, 1986, containing electrical transmission facilities of 115 to 500 kV and pipelines ten inches in diameter or larger, will be designated as corridors under this plan. These corridors will be available for uses compatible with existing facilities. The corridors described above and all existing communication sites are shown on Map 3-1.

Corridor widths vary depending on the number of parallel facilities, but are a minimum of 2,000 feet (1,000 feet either side of existing centerlines) unless constrained by exclusion and avoidance areas described below. Applicants will be encouraged to locate new facilities (including communication sites) adjacent to existing facilities to the extent technically and economically feasible.

No Federal or State highways, major county roads, railroads, or interstate communication lines will be designated as corridors because topographic constraints have limited most development to nonfederal lands. No public lands have been identified as short critical segments or corridor windows for these land uses, or for microwave communication sites. There are no significant canals, ditches, or conduits located within the planning area.

Communication facilities will be allowed on existing communication sites. Existing communication sites will be fully developed with compatible uses prior to developing new sites. New communication sites will be considered available for development when the use is consistent with the objective of the alternative.

Douglas County is planning construction of the Milltown Hill Reservoir.

Prior to BLM approval of a right-of-way, the applicant must submit plans, maps, and other information related to the use of the proposal, for evaluation. Each right-of-way will be limited to the area necessary for operation and maintenance. Approvals will consider the protection of public safety, be consistent with the Resource Management Plan, and minimize damage to the environment.

All Research Natural Areas and Visual Resource Management Class I Areas will be considered right-of-way exclusion areas where future rights-of-way may be granted only when mandated by law.

All existing and proposed recreation sites, Areas of Critical Environmental Concern other than Research Natural Areas, (rivers suitable for scenic status), and areas identified as having threatened or endangered, proposed, candidate (Category 1 or 2), state listed, or Bureau sensitive plant or animal species will be avoidance areas (where future rights-of-way may be granted only when no feasible alternative route or designated right-of-way corridor is available). Areas identified for Visual Resource Management Class II management will be avoided or appropriate mitigation measures taken. On August 10, 1988, the Northwest Power Planning Council amended its Northwest Conservation and Electric Power plan to prohibit future hydroelectric development on rivers and streams with significant fisheries and wildlife resource values. In accordance with the plan, rights-of-way authorizing new hydroelectric development will not be approved on the streams designated in the plan. For lands acquired in the future, hydroelectric development will not be allowed on any rivers or streams designated as protected in the Northwest Conservation and Electric Power Plan.

Access

The BLM acquires access to its lands by the purchase of road easements and by entering into reciprocal right-of-way agreements. Road easements for administrative and timber harvest purposes will be acquired where needed to support timber management or other programs. When acquiring

easements, an attempt will be made to also negotiate public access rights. Condemnation for access may be pursued where negotiations fail. Where opportunities arise to negotiate such rights, in conjunction with existing reciprocal right-of-way agreements, that also will be attempted. Acquisition of an additional 169 easements will be required for access to all parcels in the planning area for resource management.

Withdrawals and Land Classifications

Withdrawals generally segregate the lands from operations under the nondiscretionary general land laws, mining laws and sometimes the mineral leasing laws. All withdrawals remaining to be reviewed are identified in Appendix V. These withdrawals will be reviewed during the 1990s and may be continued, modified, or terminated. The BLM currently manages lands withdrawn as Power Site Reserves, Power Site Classifications, and Water Power Designations. These lands will be managed in accordance with the objectives of the plan whether the withdrawals are continued, modified, or terminated.

Two new public land and mineral law withdrawals are being considered in the Recreation section of this chapter (refer to Table 2-3). They will not be withdrawn from the mineral leasing laws, but will have a no surface occupancy stipulation applied to any leases that may include those areas.

It is expected that new proposals for acquisition and/ or development of special concern areas (e.g. recreation sites, Area of Critical Environmental Concern/Riparian Management Area) will arise over the next decade. Whenever existing regulations are not adequate to guarantee protection of improvements or resources, or whenever additional lands are acquired to enlarge the size of existing special concern areas, a withdrawal that will be consistent with the management objectives will be considered.

Classifications will generally withdraw land from the operation of general land laws and mining laws, but not mineral leasing laws. Classifications recommended for termination are listed in Table 2-4. These include three Small Tract Act and one Recreation and Public Purpose Act classification. Once revoked, the lands will be restored to the operation of general land and mining laws. Since the lands involved are being managed for purposes established through the classification process, but under different authorities, no change in land use is anticipated. New classifications for Recreation and Public Purpose Act leases will be considered in land tenure Zone 2 for all new proposals that surface during the life of this plan. A ten acre tract located in Lot 1, Section 28, T. 24 S., R. 7 W. will be classified for Recreation and Public Purpose Act lease purposes for a boat ramp facility on the Umpqua River.

Energy and Minerals

Leasable Minerals

Standard oil and gas lease stipulations are listed in Section 6 of "Offer to Lease and Lease for Oil and Gas" Form 3100-11. They are displayed in Appendix O.

Special stipulations (See Appendix O) will be attached to oil and gas leases to provide additional protection for fragile areas or critical resource values. The special stipulations are seasonal restrictions for critical wildlife habitat, and a ban on surface occupancy, to protect special values or fragile areas. The stipulation prohibiting surface occupancy can be waived by authorized BLM officials; exceptions will be considered on a case by case basis.

Any proposed drilling pad or road construction will be located to avoid steep slopes and areas of highly erosive soils. Surface disturbance will have to be restored to original contours when operations were completed. Activities could not dominate the landscape or leave long-term visual impacts. The evidence of exploration or development activities should be substantially unnoticeable after reclamation has been completed.

Locatable Minerals

Areas not specifically withdrawn from mineral entry will continue to be open under the mining laws. Mineral exploration and development will be regulated under the Surface Management Regulations 43 CFR 3809 to prevent "unnecessary or undue degradation". All surface disturbance from operations, whether conducted under casual use, a notice, or an approved plan of operations, shall be reclaimed. The standards that govern activities conducted under a notice affecting five acres or less and those that govern activities conducted under a plan of operations are also shown in Appendix O. Minimum reclamation standards shall be in

accordance with BLM Manual and Supplemental Guidance.

Salable Minerals

Salable minerals, including common varieties of sand, gravel, rock and stone, will be made available for local governments, if demand exists, consistent with management direction for protection of other resources, and consistent with the requirement that undue degradation be prevented. These needs and any private demand will be met from existing designated community pits where they provide practical sources of material. New pit or quarry sites will be opened where appropriate. Specific sites may be closed or reclaimed.

Rock quarries will also continue to be used to provide rock for use in construction and maintenance of BLM timber access roads. New quarry sites will be developed as needed, if they are consistent with the management direction for protection of other resources, with provision for reclamation following use.

Reserved Federal Mineral Estate

The reserved federal mineral estate will continue to be open for mineral development. Conveyances of mineral interest owned by the United States, where the surface is, or will be, in nonfederal ownership, may be made to the existing or proposed owner of the surface estate after a determination is made under Section 209(b) of the Federal Land Policy and Management Act, finding:

- That there are no known mineral values in the land, or
- That the reservation of mineral rights in the United States will interfere with or preclude nonmineral development of the land and that such development is a more beneficial use of the land than mineral development.

Roads

Roads will be constructed and maintained to standards sufficient to serve their anticipated use. Road construction will be sited and scheduled so as to avoid mass movement of soil. Permanent roads will be paved or rocked to minimize sedimentation. Cuts and fills of new roads capable of supporting vegetation will be seeded to stabilize them prior to winter rains to provide the maximum possible stability. Roads built for temporary use will be stabilized prior to winter rains and rehabilitated when use is completed. Roads will be closed, if required, to prevent or alleviate significant resource damage. Road closures will be implemented using standard analysis, public involvement, and notification procedures.

Noxious Weeds

Treatment of noxious weeds to control infestations on BLM-administered lands will be accomplished using an integrated pest management approach. Chemical, mechanical, and biological methods will be considered. Application and monitoring of the effects of herbicides will be done in accordance with BLM's multi-state "Environmental Impact Statement, Northwest Area Noxious Weed Control Program", 1986, as supplemented in 1987, and the related Record of Decision.

Hazardous Materials

The transportation, storage, and handling of hazardous materials (anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed), will be in accordance with manufacturers' specifications and applicable laws such as the Resource Conservation and Recovery Act, Emergency Planning and Community Right-to-Know Act and other environmental laws.

Any release, unauthorized dumping, or abandoned or inactive waste disposal site suspected of involving hazardous wastes will be reported, assessed, and treated in accord with the district's Hazardous Materials Contingency Plan, the Federal Water Pollution Control Act, the Clean Air Act, the Comprehensive Environmental Response, Compensation and Liability Act, and other applicable state and federal environmental laws.

Fire

All BLM prescribed fire activities which affect air quality will be conducted in accordance with the Oregon State Implementation Plan (Oregon Department of Environmental Quality 1981),

administered by the Department of Environmental Quality, and the Oregon Smoke Management Plan (Oregon Department of Forestry 1972), administered by the Department of Forestry. The protection of public land from the impacts of wildfires and the planned application of prescribed fire to meet various resource management objectives will be implemented as part of all alternatives on BLM-administered land within the planning area.

Wildfire

Fire protection and the use of fire will be implemented on BLM-administered lands under all alternatives. BLM resources will be aggressively protected from damage due to wild fire in accordance with the least suppression cost plus the most beneficial net change in resource value (total cost = suppression cost + net value change). This includes the cost of emergency rehabilitation after wildfire.

The management of wildfires on BLM-administered lands in the planning area is accomplished through contract with the Oregon Department of Forestry. Oregon Department of Forestry has assigned the responsibility for protection of the Roseburg District BLM-administered lands to the Douglas Forest Protective Association. The primary objective of the contract is prompt detection, attack and suppression of all wildfires in accordance with the Roseburg District's resource management objectives. The district provides suppression resources to the Oregon Department of Forestry on a cost reimbursable basis for any fires which threaten or occur on BLM-administered land in the planning area. The district also maintains qualified resources and personnel for regional and national wildfire suppression by other agencies.

The suppression of wildfires under all alternatives will involve either an Intensive or Conditional response, depending upon the resource values at risk. Regardless of which of these two response levels is followed, a BLM Environmental Specialist with specific knowledge of resource values, locations and constraints will be assigned to all wildfires that escape initial attack.

Intensive fire suppression will be required where unacceptable resources damage will occur from a wildfire of any intensity. Conditional suppression will be required where the intensity of the suppression action can vary based on the environmental and operational conditions.

The identification of special suppression levels (i.e., intensive and conditional) by the resource management area will determine the intensity of the suppression action required. Suppression levels will meet the resource management objectives for the management area emphasis (i.e., wildlife, recreation, range, and timber). Therefore, depending on values at risk (soil, air quality, timber, fisheries, Special Habitat Areas, etc.), various suppression tactics will be used to minimize resource damage. Conditional tactics may exclude the use of bulldozers on fragile soils, ponding of important streams, soil disturbance near archaeological sites, backfiring near habitats of special status plants, etc. Conversely, certain areas such as developed recreation areas, new plantations, or advanced regeneration sites have very high resource value which may dictate the use of air tankers and other expensive intensive suppression tactics for maximum protection.

Emergency fire rehabilitation is frequently necessary following large, severe wildfires to prevent further site degradation and to restore the burned area to full productivity. Rehabilitation will be used to remedy adverse conditions caused by both the wildfire and the suppression activities. Rehabilitation may include restoration and seeding of bulldozer lines, prompt revegetation of bare areas on erodible soils, clearing ponded streams, etc.

Fire suppression tactics that reflect either intensive or conditional strategies for Visual Resource Management, Special Areas, Research Natural Areas, Areas of Critical Environmental Concerns, Wild and Scenic Rivers, and Rural Interface will be identified in site specific fire management plans.

Fuels Management

Fire hazard created by human activity or natural disturbances will be managed consistent with resource values through the use of the appropriate fuels management techniques (i.e., prescribed fire, mechanical treatments, and fuel breaks.)

Prescribed fire and other fuels management practices and techniques will be used, when biologically appropriate, to enhance, maintain, and protect resources. Such resources include riparian zones, wildlife habitat, plant communities, Special Areas, unique ecosystems, etc.

Management Direction for Alternatives NA, A, B, C, D, and E

Goals and objectives for each alternative are defined in Appendix B. Table 2-1 summarizes the management actions for each alternative. Key allocations for Alternatives NA through E was displayed on fold-out maps enclosed with the Draft RMP/EIS. These maps were digital (from computerized data). The data was compiled from BLM's most recent inventories. The No Action alternative, based on earlier inventories that were not computerized, could not be digitally mapped.

The specific direction for each alternative follows.

No Action Alternative

This alternative projects all land allocations and management actions in the existing plans for the next ten years. Some allocations have changed as a result of land tenure adjustments.

Water Quality and Riparian Areas

Soil and water resources will be conserved by meeting or exceeding Oregon Forest Practices rules during intensive timber management and by land allocations for riparian zones (18,300 acres of Commercial Forest Land withdrawn) and Timber Production Capability Classification withdrawals (10,900 acres of Commercial Forest Land withdrawn). Riparian zones will be protected on third order and larger streams. Road and yarding corridors will be allowed in these zones.

Old-Growth and Mature Forest

Harvest will be limited in the first decade on 35,900 acres to temporarily protect older forests (in addition to that already withdrawn for other purposes). This system will provide for some harvest while protecting resources in mid-age and old-growth timber managed under a 250 year minimum harvest age. Included are functioning old-growth systems distributed by seed zone and elevation in order to safeguard long term timber production.

Timber

There will be 331,600 acres available for intensive timber production, and 35,900 acres for constrained timber production The allowable annual timber sale quantity for the expected ten year life of the plan will be 39.5 mmcf (240.4 MMBF Scribner short log). An additional average annual 1.0 mmcf (6.3 MMBF) will be harvested from the constrained base.

Special Status Species Habitat

Threatened or endangered species will receive special attention under the terms of the Endangered Species Act of 1973. Because of their habitat requirements and locations, no impacts are expected to occur to the Columbian white-tailed deer and the bald eagle. To protect known bald eagle nesting sites, 350 acres of commercial forest land will be withdrawn and designated an Area of Critical Environmental Concern. Projects which may affect determination to any federally listed or proposed threatened or endangered species or its critical habitat, the project will be modified or abandoned in order to obtain a no effect determination. Consultation with the U.S. Fish and Wildlife Service will be initiated for projects that could not be altered or abandoned. Other special status species will be protected to varying degrees on all BLM-administered lands. (See Table 2-1).

Other Wildlife Habitat

Nonhazardous snags will be retained on harvest units. Clearcuts will be spatially distributed.

Special Areas

Nine existing Special Areas will be retained, including three Areas of Critical Environmental Concern, two Area of Critical Environmental Concern/Research Natural Areas, two Research Natural Areas, one Outstanding Natural Area and one Environmental Education Area. Total allocation will be 2553 acres. (See Table 2-5)

Recreation

All existing recreation sites and trails, including those identified in Management Common to All Alternatives, will be maintained and managed. See Table 2-3 for comparison of maintained sites and trails. A total of

414,245 acres will be open to Off Highway Vehicle use and the 9,655 acres currently closed to Off Highway Vehicle (1983 MFP) use will continue to be closed. Six recreation sites totaling 549 acres have been identified for withdrawal from public land and mineral law.

Wild and Scenic Rivers

The North Umpqua Wild and Scenic River plan has been implemented (1992). No additional rivers will be recommended for federal designation as Wild and Scenic.

Visual Resources

Along major travel routes that have been designated by the State of Oregon as scenic areas, approximately 9,300 acres will be managed to meet Visual Resource Management II standards. See Table 2-1 for acres of each class by alternative.

Land Tenure

Lands identified as available for disposal by exchange or sale include approximately 286 acres of Public Domain and 569 acres of O&C lands. Another 137 acres of Public Domain lands has been identified for disposal by sale only.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws and open to sale of salable minerals. Withdrawals totaling 1,262 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3. See Tables 2-7, 2-8 and 2-9 for comparison of mineral restrictions by alternative.

Alternative A

Water Quality and Riparian Areas

Riparian Management Areas will be established averaging 75 feet horizontal distance (50 ft. minimum) in width on each side of perennial (generally 3rd order and larger) streams and other waters (e.g., lakes). Actual riparian management area widths will be determined by on-the-ground riparian vegetation, terrain and stream characteristics. See Table 2-1.

Old-Growth and Mature Forest

Forest lands in the Timber Production Capability Classification category of Nonsuitable Woodland will not be available for planned harvest. Other forest lands allocated for riparian management areas, existing recreation sites, the North Umpqua Wild and Scenic River Corridor, and the bald eagle recovery plan will also not be available for planned harvest. These forest lands total 37,700 acres, of which 13,400 acres currently are old-growth and 9,600 acres are mature forest.

Timber

Of 393,500 acres of commercial forest lands, 371,200 (94.3 percent) were identified as suitable for timber production. These lands are considered capable of being reforested within five years after harvest and of being managed without irreversible resource damage. In this alternative, 353,300 acres will be available for intensive timber production. See Table 2-1 and Figure 2-2 for comparisons of acres available for timber production.

Projected ten year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual timber sale quantity for the expected ten year life of the plan will be 47.7 mmcf (315 MMBF Scribner short log). Of the planned sale quantity, 46.1 mmcf is attributable to the base program which includes site preparation and planting, including genetically improved stock, protecting seedlings, and plantation release. The balance of 1.2 mmcf is attributable to intensive management practices (fertilization, precommercial thinning, commercial thinning, and brush and hardwood conversion). This 47.7 mmcf level is not the full biological potential of all the BLM-administered forest lands in the planning area. If all such forest lands were made available for timber harvest, and funds for environmentally sensitive timber harvest and reforestation were unlimited, the sustainable harvest could be as much as 50.6 mmcf.

Special Status Species Habitat

Management will be designed to protect habitat of federal candidate, state listed, and Bureau Sensitive species where such actions will not diminish commercial use. A field or office review will be conducted on all proposed actions. Mitigating measures that will not reduce commercial use will be

implemented to protect special status species and their habitats. Current acres protected for plants are shown on Table 2-6.

Peregrine Falcon Habitat

At present there are no known Peregrine falcon nesting sites on district BLM-administered lands. Peregrine falcon nesting cliffs occupied in the future will have seasonal disturbance restrictions within 1/2-mile placed around them including mining and mineral leases. Occupied sites will be protected to maintain features important to peregrines. Pesticides which have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat Management Plans will be written for all active Peregrine falcon sites.

Other Wildlife Habitat

Special habitat areas will be managed to protect their plant and animal community structure, species composition, and ecological processes. Water courses flowing into and out of wetland habitats will be maintained. Emphasis for animals will be placed on identifying and protecting habitat values for bats, reptiles, and amphibians which are often associated with unique habitats such as caves, talus, and wetland/bog areas.

Special Areas

One existing Special Area will be designated an Area of Critical Environmental Concern/Research Natural Area with a 170 acre allocation which will be included in a Timber Production Capability Classification withdrawal.

Recreation

No existing recreation sites or trails will be closed. See Table 2-3 for comparison of maintained sites and trails. Areas currently closed to Off Highway Vehicle use (9,655 acres from the 1983 Management Framework Plan) use will continue to be closed. One additional acre of the Tater Hill Area of Critical Environmental Concern/Research Natural Area will be closed to Off Highway Vehicle use. The remaining 409,712 acres of public land will be open to Off Highway Vehicle use.

Two recreation sites (Susan Creek, which includes North Umpqua Trail Primitive Campsite and Susan Creek Campground Trail and Cow Creek Recreational Gold Panning Area) totaling 294 acres have been identified for withdrawal from public land laws and the mining law. See Table 2-3.

Wild and Scenic Rivers

No rivers will be recommended suitable for federal designation as part of the National Wild and Scenic rivers system.

Visual Resources

Forest lands allocated for timber production will be managed as Visual Resource Management Class IV, and the remaining lands will be managed as inventoried. See Management Direction Common to All Alternatives, Visual Resource Management for Visual Resource Management objectives and standards by class. See Table 2-1 for acres of each class by alternative.

Land Tenure

Exchanges or acquisitions will be made to acquire lands which will enhance the nondeclining harvest level of the commercial forest land managed by BLM. Factors to be considered include site quality, access to BLM-administered public forest land, logical logging units, and management of BLM-administered public forest land to facilitate timber harvest. No exchanges will be made to acquire lands for nontimber uses except those identified in the North Umpqua Wild and Scenic River Plan. No commercial timberland will be sold or leased. Leases or conveyances of land in Zones 2 and 3 other than commercial timberland will be made under the Recreation and Public Purposes Act to provide appropriate facilities or services.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws and open to sale of salable minerals. Withdrawals totaling 464 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3. See Tables 2-7, 2-8, and 2-9 for comparison of mineral restrictions by alternative.

Rural Interface Areas

No special timber management actions or mitigating measures will be provided in Rural Interface Areas.

Potential mineral development will be minimally constrained.

Alternative B

Water Quality and Riparian Areas

Riparian Management Areas will be established with the following expected average widths (horizontal distance) on each side of perennial streams and other waters with a 50 foot minimum: 3rd order streams 75 feet, 4th order 100 feet, 5th order 140 feet, 6th order and larger 160 feet, other waters (e.g., lakes) 100 feet. Riparian Management Areas will also be established on perennial 2nd order streams to protect important beneficial uses. Actual riparian management area widths will be determined by on the ground riparian vegetation and stream characteristics (Table 2-1).

Attempts will be made to obtain long term (e.g. 50 years) Natural Resource Easements on third order and larger streams in the experimental/demonstration watersheds.

Old-Growth and Mature Forest

Forest lands in the Timber Production Capability Classification categories of nonsuitable woodland and suitable woodland-low site will not be available for planned harvest. Other forest lands allocated for riparian management areas, recreation sites, threatened and endangered species recovery areas where timber harvest is prohibited, and Areas of Critical Environmental Concerns will also not be available for planned harvest. These forest lands total 46,800 acres, of which 15,900 acres currently are old-growth and 11,200 acres are mature.

An additional 24,700 acres of forest land will be excluded from planned harvest of which 15,000 acres are currently old-growth and 5,300 acres are mature. These lands are aggregated in blocks of approximately 640 and 80 acres distributed in a corridor system by seed zone and elevation. Some of the blocks incorporate lands excluded from harvest for other purposes as noted in the preceding paragraph. Public domain lands received priority for placement in the corridor system. These blocks are labeled "seral stage blocks" on the Alternative B map.

Timber

There will be 318,900 acres available for intensive timber production, and 2,400 acres for restricted timber production. See Tables 2-1. Projected ten year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual timber sale quantity for the expected ten year life of the plan will be 44.0 mmcf (291 MMBF Scribner short log).

Special Status Species Habitat

Management will be designed on O&C and Coos Bay Wagon Road lands to protect federal candidate, state listed, and Bureau sensitive species and their habitats when such actions will not diminish commercial use.

All special status species except for assessment species will be protected on public domain land. When it is considered biologically appropriate, protected special status species habitat on public domain lands will be buffered by 300 feet from all surface disturbance and harvest of timber. Federal candidate species known only to occur on BLM-administered lands will be protected to the extent necessary to prevent their federal listing. A field or office review will be conducted on all proposed actions. Other special status species will be protected to varying degrees on all BLM-administered lands. See Table 2-1.

Peregrine Falcon Habitat

At present there are no known Peregrine falcon nesting sites on district BLM-administered lands. Peregrine falcon nesting cliffs occupied in the future will have seasonal disturbance restrictions within 1/2-mile placed around them including mining and mineral leases. Occupied sites will be protected to maintain features important to peregrines. Pesticides which have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat Management Plans will be written for all active Peregrine falcon sites.

Bald Eagle

The Umpqua River Corridor Habitat Management Plan for bald eagles will continue to be in effect and implemented on 3,350 acres.

Other Wildlife Habitat

Wildlife Tree and Down Log

An average of two unmerchantable conifer wildlife trees per acre will be retained on the intensive forest managed land base, and three conifer wildlife trees per acre on all other lands.

Wildlife trees will not necessarily be evenly distributed across harvest units. Wildlife trees will have a minimum diameter of 20 inches dbh and a minimum height of 50 feet whenever available. An average of two down logs with a diameter of at least 20 inches and 16 feet long per acre will be retained, where available, on all lands.

Special Habitat Areas

Special habitat areas will be managed to protect their plant and animal community structure, species composition, and ecological processes. Water courses flowing into and out of wetland habitats will be maintained. Emphasis for animals will be placed on identifying and protecting habitat values for bats, reptiles, and amphibians which are and often associated with unique habitats such as caves, talus, and wetland/bog areas.

Roosevelt Elk Habitat

Precommercial thinning projects will provide for maintenance of existing game trails free of slash accumulation that impede big game movement.

Management of elk habitat will be emphasized in the Tyee and Camp Creek elk management areas. The following guidelines will be adopted for timber harvest units:

1. Thirty percent of the harvest units will be small units (15 to 20 acres) with irregular boundaries.

2. Within harvest units the distance to cover will not exceed 500 feet.

3. Minimum width of cover adjacent to harvest units will be 200 feet.

Road management within the Tyee and Camp Creek elk management areas will be guided by a goal to limit the amount of habitat available to vehicle access and the increased disturbance and poaching which can occur with such access. Disturbance from vehicle access will be limited by:

1. Implementing year long road closures on approximately 20 miles of existing roads.

2. Newly constructed roads will be managed to limit open road densities to 1.5 to 2.5 miles of road per square mile on BLM-administered lands wherever practical.

Special Areas

Seven existing Special Areas will be retained, one of these existing Special Area will be expanded. One new Special Area will be designated. Three of these will be Areas of Critical Environmental Concerns. The remaining five will be Area of Critical Environmental Concern/Research Natural Areas. Total allocation will be 3,246 acres. (See Table 2-5.)

Recreation

All existing (including currently closed) recreation sites and trails, in addition to those identified in Management Common to All Alternatives, will be maintained and managed. See Table 2-3 for comparison of maintained sites and trails. To retain options for future development of high value potential recreation sites, no timber sales other than salvage sales of dead and dying timber will be made on 65 acres encompassing the following potential sites on public domain lands:

1. Osprey Boat Ramp

2. Woolley Pond Recreation Site

3. Iron Mountain Gold Panning Area

To develop the Woolley Pond recreation site, land acquisition will be pursued. This will involve acquiring approximately 40 acres in two different ownerships located in Section 12, T. 22 S., R. 6 W., WM. Three recreation sites totaling 344 acres will be proposed for withdrawal from public land laws and the mining law. Areas currently closed to Off Highway Vehicle use (9655 acres) will continue to be closed. In addition, 1,186 acres in five Areas of Critical Environmental Concern/Research Natural Areas will also be closed to Off Highway Vehicle use. (see Table 2-5). The remaining 408,527 acres of public land will be open to Off Highway Vehicle use.

Wild and Scenic Rivers

No additional rivers will be recommended suitable for federal designation as part of the National Wild and Scenic system.

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Visual Resource

Forest land available for timber management which is adjacent to (within 1/4-mile) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the federal Wild and Scenic Rivers Act will be managed as inventoried. All other available forest land will be managed as Visual Resource Management Class IV, except as noted under Rural Interface Area management. The remaining lands (nonforest, nonsuitable woodland, suitable woodland - low site, and lands allocated for uses other than timber production) will be managed as inventoried. See Table 2-1 for acres of each class by alternative.

Land Tenure

Exchanges of O&C and Coos Bay Wagon Road lands will be made primarily to acquire lands which will enhance timber management opportunities. Exchanges of public domain lands will be made to benefit one or more of the resources managed, including nontimber values. Sale of O&C and Coos Bay Wagon Road lands other than available commercial forest lands, and of Public Domain lands, will be made to dispose of lands that meet any of the criteria of the Federal Land Policy and Management Act Section 203(a). Leases of such lands will be made to accommodate other uses. Leases or conveyances under the Recreation and Public Purposes Act will be made in Zones 2 and 3 to provide appropriate facilities or services. Areas proposed for acquisition or withdrawal from the general land law and mining laws are identified in the Recreation section of this alternative. See Recreation Table 2-3. Easement acquisitions are discussed in the Water Quality and Riparian Areas section of this alternative.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws, and open to sale of salable minerals. Withdrawals totaling 1,750 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3. See Tables 2-7, 2-8, and 2-9 for comparison of mineral restrictions by alternative.

Rural Interface Area

There are 8,552 acres of BLM-administered lands within 1/4-mile of private land in identified Rural Interface Areas zoned for occupancy of one to five acre lots which will be managed for Visual Resource Management Class III objectives. Alternative timber management practices will be applied, where appropriate, on those lands where it is feasible and consistent with sustained yield timber management to mitigate the adjacent neighbors concerns and for safety reasons. Examples of management options include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, inclusion of additional buffers for domestic water sources, and hand piling slash for burning as opposed to broadcast burning. Future oil and gas development with 1/4-mile of these areas will be allowed, but with no surface occupancy. See Table 2-1 for BLM-managed acres located within identified Rural Interface Areas by alternative.

Alternative C

Water Quality and Riparian Areas

Riparian Management Areas will be established with the following expected average widths (horizontal distance) on each side of perennial streams and other waters: 3rd order streams, 105 feet; 4th order, 150 feet; 5th order, 210 feet; 6th order and larger, 240 feet; other waters (such as lakes), 150 feet. Actual riparian management area widths will be determined by on the ground riparian vegetation and stream characteristics. The integrity of the 25 foot hardwood and brush vegetative strip left along each side of first and second order intermittent streams will be maintained during harvest, site preparation, and reforestation.

Attempts will be made to obtain land from private land owners to bring BLM ownership within the experimental/demonstration watersheds to 75 percent.

Old-Growth and Mature Forest

Forest lands in the Timber Production Capability Classification categories of nonsuitable woodland, suitable woodland low site, and suitable woodland nonsuitable commercial forest land will not be available for planned harvest. Other forest lands allocated for riparian management areas, recreation sites, threatened and endangered species recovery areas where timber harvest is prohibited, and Areas of Critical Environmental Concerns will also not be subject to planned harvest. These forest lands total

57,900 acres, of which 19,700 acres currently are old-growth and 13,500 acres are mature forest.

An additional 67,400 acres of forest land will be included in a system of old-growth restoration and retention areas maintained to retain and improve biological diversity. Of this land, 25,615 acres are currently old-growth and 13,459 acres are mature forest. All but 200 miles of road within these areas will be closed to public use.

The remaining 270,200 acres of forest land will be managed under partial stand retention prescriptions (See Timber Section below). The lands to be managed for a high level of partial retention will be considered potential replacements for old-growth restoration and retention areas lost to natural events.

The stands to be managed for a high level of partial retention and most of the old-growth restoration and retention areas are located within biological connectivity corridors designed to provide linkage between the lands of the Umpqua, Siuslaw, and Siskiyou National Forests and Eugene, Coos Bay, and Medford BLM Districts.

Agreements will be pursued with private landowners and other land management agencies to optimize the extent and distribution of old-growth restoration and retention areas while minimizing undue impact on multiple resource use.

Timber

There will be 270,200 acres available for constrained timber production. See Table 2-1. Projected ten year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual timber sale quantity for the expected ten year life of the plan will be 11.2 mmcf (74 MMBF Scribner short log). In addition, an average annual unregulated volume of approximately 1.4 mmcf (7.3 MMBF) is expected to be available for sale from density management thinnings on lands not allocated to timber production. Since this alternative includes many elements recognized to be substantially untested, modeling its sustainable timber yield is more difficult than with the other alternatives. The level of confidence in the preceding numbers is therefore lower.

Regeneration harvests will be used to regenerate all indigenous tree species. This will be achieved through partial cutting, group selection, or a combination of these. Regeneration harvest of predominantly conifer stands will be conducted under one of two broad prescription concepts, except where uneven age management is most appropriate for the stand (either for silvicultural reasons and/or to address another planning issue).

On 161,055 acres, the regeneration harvest prescription will be designed to retain an average of 35 percent of the normal live conifer basal area for the site (based on Technical Bulletin 201; Yield of Douglas-fir in the Pacific Northwest, McCardle, Meyer, Bruce, 1961), using an individual tree selection or a group selection harvest system.

Size of selected groups will be only as large as needed to assure regeneration, normally not exceeding one acre. These lands are situated in biological connectivity corridors identified through an interdisciplinary process, in analytical watersheds where federal lands are less than 25 percent of the forest land, and on lands within one to two miles of old-growth restoration and retention areas (See previous direction for Retention, Maintenance and/or Reestablishment of Old-Growth and Mature Forest).

On 110,960 acres the regeneration harvest prescription will retain an average of 20 percent of the normal live conifer basal area for the site (based on Technical Bulletin 201; Yield of Douglas-fir in the Pacific Northwest, McCardle, Meyer, Bruce, 1961), in a well distributed pattern, with a range of sizes of dominant and codominant trees, including some of the larger trees in the stand. These lands are situated outside the areas defined in the preceding paragraph.

The reestablishment of old-growth conditions of the stands is expected to occur at an average of 100 years after regeneration harvest. Old-growth conditions in stands will be maintained for approximately 30 years before regeneration harvest. Regeneration harvests will occur at approximately 150 years.

Harvest techniques, such as designated skid trails, that minimize impacts to soil and residual vegetation will be used. Where new roads are needed, road density will not exceed that needed if clearcut harvesting were planned. New roads will be constructed to the lowest practical standard and density consistent with resource protection and multiple use values. Road management, including closure, could be applied to meet biodiversity and multiple use needs.

Prescribed fire will be used as a favored tool for site preparation, fuel reduction, and to restore natural ecological processes. Herbicides will be used only as part of spot suppression of specific species to provide planting spaces or to release individual trees.

Natural regeneration following timber harvest will be encouraged through silvicultural prescriptions, sale design and reforestation planning. Artificial regeneration will supplement natural reforestation to minimize regeneration lag, but with wide spacing, to allow for a natural regeneration in the new stand and to delay crown closure. Planting stock of commercial species will be used. Up to half of this stock will come from superior tree seed collected from wild trees or from seed orchards developed from wild trees. Mixed species will be used to assure diversity of regeneration.

Conversion of natural vegetation (e.g., hardwood) sites will not occur. Hardwood stands on hardwood sites will be managed for sustained yield timber production. Hardwood stands on conifer sites (except designated wild turkey areas) will be converted to conifer production, but will retain hardwoods in the reestablished stand.

In conifer stand management, native hardwoods will be retained or restored as part of the forest mix, to enhance biodiversity, provide natural fertilization and aid in forest protection from wildfire. Hardwoods will be artificially regenerated where natural propagation is not likely. The goal will be to retain or attain a hardwood component resembling that which occurred naturally or to exceed that level to emphasize retention of species that play significant ecological roles.

Fertilization will be used only where relevant to supplement natural nitrogen fixation, enhance growth, and hasten development of structure and large trees.

Wherever feasible on both lands available for timber production and lands in old-growth restoration and retention areas which do not possess old-growth characteristics, intermediate harvests will be part of density management along with precommercial thinnings. The objective will be to maintain open canopy conditions and promote retention of mixed species, as well as accelerate development of old-growth structure conditions. To the extent that stand conditions permit, intermediate harvests will leave enough snags and dead and down material to meet Old-Growth Definition Task Group standards (Pacific Northwest Research Station Note PNW-447, July 1986).

Special Status Species Habitat

Management will be designed on O&C and Coos Bay Wagon Road lands to protect federal candidate, state listed, and Bureau sensitive species and their habitats when such actions will not diminish commercial use. Mitigating measures that will not reduce commercial use will be implemented on O&C and Coos Bay Wagon Road lands. All special status species except assessment species will be protected on Public Domain land and areas maintained to conserve biological diversity. When it is considered biologically appropriate, protected special status species habitat will be protected by a 300 foot special habitat buffer from all surface disturbance and harvest of timber on public domain lands, in old-growth restoration and retention areas, and in biological corridors. Federal candidate species known only to occur on BLM-administered lands will be protected to the extent necessary to prevent their federal listing. A field or office review will be conducted on all proposed actions.

Bald Eagle Habitat

The Umpqua River Corridor Habitat Management Plan for bald eagles on 3,350 acres will continue to be implemented. Delineated bald eagle habitat will not be considered for disposal. Acquisition of conservation easements or ownership of lands within active or future occupied bald eagle territories will be pursued. Priority will be placed on acquiring lands adjacent to the Cougar Creek and Woodruff Mountain sites (200 acres). Site specific Habitat Management Plans will be developed for all occupied nesting territories. Implement a seasonal road closure from February 15th to August 31 on 1.5 miles of road at the head of Huntley Creek to limit disturbance in an active nesting territory.

Peregrine Falcon Habitat

At present there are no known Peregrine falcon nesting sites on district BLM-administered lands. Peregrine falcon nesting cliffs occupied in the future will have seasonal disturbance restrictions within 1/2-mile placed around them including mining and mineral leases. Occupied sites will be protected to maintain features important to peregrines.

Pesticides which have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat Management Plans will be written for all active Peregrine falcon sites. A proposal will be developed and implemented to operate one hack site (a site where captive birds are released into the wild) on the district.

Columbian White-tailed Deer

In order to achieve the recovery plan goal of assuring 5,500 acres of secure habitat for the Columbian

White-tailed deer, acquisition of suitable habitat will be pursued within the core area (primarily T. 26 S., and T. 27 S., R. 5 W.). Habitat Management Plans will be prepared for lands acquired for the recovery of this species or for existing lands determined to be of significant value to the species.

Townsend's Big-eared Bat

Townsend's big-eared bat nurseries, roosts, and hibernacula will be protected and buffered by 600 feet to maintain the integrity of sites. Access and human disturbance will be limited near roosts and hibernacula to prevent detrimental impacts to colonies.

Other Wildlife Habitat

Wildlife Tree and Down Log

Timber harvest will be designed to retain (where available) adequate snags and down wood to meet Old-Growth Definition Task Group standards, which vary according to plant community. For Douglas-fir on mixed conifer sites the minimum standards will be 1-1/2 snags per acre, 20 inches in diameter, and 15 feet tall; and the down log material which includes at least two pieces 24 inches in diameter and 50 feet long. A total of 350 linear feet of down and dead logs of all diameter size classes will be retained, if available.

Roosevelt Elk Habitat

Precommercial thinning projects will provide for maintenance of existing game trails free of slash accumulation that impede big game movement.

Management of elk habitat will be emphasized in the Tyee and Camp Creek elk management areas. The following guidelines will be adopted for timber harvest units:

1. Thirty percent of the harvest units will be small units (15 to 20 acres) with irregular boundaries.

2. Within harvest units the distance to cover will not exceed 500 feet.

3. Minimum width of cover adjacent to harvest units will be 200 feet.

Road management within the Tyee, Camp Creek, and Deadman Mountain elk management areas will be guided by a goal to limit the amount of habitat available to vehicle access and the increased disturbance and poaching which can occur with such access. Disturbance from vehicle access will be limited by:

1. Implementing year long road closures on approximately 20 miles of existing roads.

2. Implementing approximately 15 miles of year long road closure on existing roads in the Deadman Mountain elk management area to establish approximately 6000 acres (at the head of Days and Coffee Creeks) with restricted disturbance.

3. Use and management of newly constructed roads will be guided by BLM's effectiveness in limiting open road densities to 1.5 to 2.5 miles per square mile on BLM-administered lands.

Wild Turkey Habitat

All oak stands will be maintained within designated turkey habitat utilizing a variety of methods including prescribed fire. A minimum of one ten acre stand of roosting habitat will be provided in each section of designated turkey habitat. Roosting habitat will contain the following components:

- A scattering (eight to ten) of large (larger than 24 inches dbh) open limbed conifer trees on each acre.

- Ponderosa pine, when available, will be preferred roost trees.

Other Raptor Habitat

An allocation will be made of 500 acres of forest land to be used for protecting known and future located raptor nest sites not protected by other management recommendations.

Special Habitat Areas

Special habitat areas will be buffered by 100-200 feet from all surface disturbance and harvest of timber to protect their plant community structure, species composition, and ecological processes. Water courses flowing into and out of wetland habitats will be maintained.

Special Areas

Eight existing Special Areas will be retained, four of these existing Special Areas will be expanded. Two

new Special Areas will be designated. Three of these will be Areas of Critical Environmental Concern. The remaining seven will be Areas of Critical Environmental Concern/Research Natural Areas. Total allocation will be 4375 acres. See Table 2-5. All Areas of Critical Environmental Concern/Research Natural Areas will be withdrawn from locatable mineral entry and will have a no surface occupancy stipulation for leasable minerals.

Recreation

Cow Creek (1,540 acres), Umpqua River (2,240 acres), and North Umpqua River (1,670 acres) will be managed as Special Recreation Management Areas.

All existing recreation sites and trails will be maintained and managed. See Table 2-3 for recreation sites to be acquired or withdrawn from mineral entry or appropriation under the general land laws.

In order to retain options for future development of high value potential recreation sites, trails and siteseeing opportunities, no timber sales other than salvage sales of dead and dying timber will be made on the following areas:

Cow Creek Special Recreation Management Area
Deadman Mountain Trail
Iron Mountain Gold Panning Area
Miner-Wolf Watchable Wildlife Trail
North Umpqua Trail Primitive Campsite
Osprey Boat Ramp
Pickett Bridge Recreation Site
Susan Creek Falls Barrier Free Trail
Swiftwater Day Use
Tyee Mountain Trail
Umpqua River Special Recreation Management Area
Wolf Creek Falls Trail Extension
Woolley Pond Recreation Site

An exception to timber salvage or harvest will be made in the event a natural disturbance (e.g., fire, windstorm) destroyed the high value recreation potential of the area.

To develop the Woolley Pond potential recreation site, land acquisition will be pursued, involving approximately 40 acres in Section 12, T. 22 S., R. 6 W., W.M.

The following existing or potential recreation sites will be withdrawn from locatable mineral entry or have their existing withdrawals expanded:

Cow Creek Recreational Gold Panning Area
Iron Mountain Gold Panning Area
North Umpqua Trail Primitive Campsite
Osprey Boat Ramp
Pickett Bridge Recreation Site
Susan Creek Recreation Site

A total of 273 acres will be proposed for withdrawal from public land laws and the mining law.

Areas currently closed to Off Highway Vehicle use will continue to be closed (9,655 acres) and 407,703 acres would be open to Off Highway Vehicle Use. In addition, 1,840 acres of lands designated as Area of Critical Environmental Concern/Research Natural Areas and 170 acres of lands occupied by Special Status plants will also be closed to Off Highway Vehicle use. See Table 2-1 for comparisons of Off Highway Vehicle designations.

Wild and Scenic Rivers

No additional rivers will be recommended suitable for federal designation as part of the National Wild and Scenic system.

Visual Resources

Available forest land where federal ownership consists of more than half of a viewshed and available forest land adjacent to (within 1/4-mile) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the federal Wild and Scenic Rivers Act will be managed as inventoried. All other available forest land will be managed as Visual Resource Management Class IV, except as noted under Rural Interface Area management. The remaining lands will be managed as inventoried. Acres that will be managed for each Visual Resource Management Class are shown in Table 2-1.

Land Tenure

Exchanges of public domain lands will be made to benefit any of the resources managed, including nontimber values. Exchanges of O&C and Coos Bay Wagon Road lands will emphasize opportunities that will contribute to conservation of biological diversity or will enhance timber management opportunities. Sale of O&C and Coos Bay Wagon Road lands other than available commercial forest lands and of public domain lands will be made to dispose of lands that meet any of the criteria of the Federal Land Policy and Management Act Section 203(a). Leases of such

lands will be made to accommodate other appropriate uses. Leases or conveyances under the Recreation and Public Purposes Act will be made in Zones 2 and 3 to provide appropriate facilities or services. Areas identified for acquisition and/or land withdrawal are identified in the Special Areas, Special Status Species habitat, Recreation, and Water Quality, and Riparian Areas sections of this chapter.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws and open to sale of salable minerals. Withdrawals totaling 2,924 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3. See Tables 2-7, 2-8, and 2-9 for comparison of mineral restrictions by alternative.

Rural Interface Areas

There are 8,552 acres of BLM-administered lands within 1/4-mile of private land in the identified Rural Interface Areas (zoned for one to five acre lots) that will be managed for Visual Resource Management Class III objectives. Alternative timber management practices will be applied on these lands to mitigate the adjacent neighbors concern. Examples of management options include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, inclusion of additional buffers for domestic water sources, and hand piling slash for burning as opposed to broadcast burning. Future oil and gas development within 1/4-mile of these areas will be allowed, but with no surface occupancy. See Table 2-1 for BLM-administered acres located within identified Rural Interface Areas by alternative.

Alternative D

Water Quality and Riparian Areas

Riparian Management Areas will be established with the average widths on each side of the following streams and other waters: 2nd order, 60 feet; 3rd order, 140 feet; 4th order, 200 feet; 5th order, 280 feet; 6th order and larger, 320 feet; other waters (e.g., lakes), 200 feet. Actual riparian management area widths will be determined by on the ground vegetation and stream characteristics.

Land acquisition will be pursued to maximize public ownership within the experimental/demonstration watersheds.

Old-Growth and Mature Forest

Forest lands in the Timber Production Capability Classification categories of nonsuitable woodland and suitable woodland will not be available for planned harvest. Other forest lands allocated for riparian management areas, recreation sites, undisturbed protection of special status species, and Area of Critical Environmental Concerns will also not be subject to planned harvest. These forest lands total 112,200 acres, of which 25,900 acres currently are old-growth and 17,600 acres are mature forest.

An additional 108,100 acres of forest land will be set aside from timber harvest and new road construction, and managed according to recommendations of the Interagency Scientific Committee's Conservation Strategy for the Northern Spotted Owl. Of this land 37,300 acres are currently old-growth and 24,800 acres are mature forest.

Timber

There will be 159,300 acres available for unrestricted timber practices and managed under the 50-11-40 rule. There will be 47,900 acres managed for restricted timber practices in Visual Resource Management II and Rural Interface Areas. See Table 2-1. Projected ten year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual timber sale quantity for the expected ten year life of the plan will be 17.3 mmcf (92 MMBF Scribner short log).

Special Status Species Habitat

All BLM-administered land will be managed for the conservation and protection of special status species and their habitats. When it is considered biologically appropriate, special status species habitat will be protected by a 300 foot special habitat buffer. Field or office reviews will be conducted on all proposed actions.

Northern Spotted Owl Habitat

Management for the northern spotted owl will incorporate those strategies and guidelines identified in the Interagency Scientific Committee Report (Thomas et al. 1990). Spotted owl Habitat Conservation Areas will be established as shown on

the Alternative D map. Timber harvest will not be planned in these areas, and logging and other silvicultural activities (except stand regeneration) will not be conducted. Road construction in Habitat Conservation Areas will take place only where no feasible alternative exists. When roads are constructed in Habitat Conservation Areas, they will be located and engineered to minimize loss and alteration of spotted owl habitat, and will not be located within 1/4-mile of the activity center of any spotted owl pair. Reforestation activities on cutover lands in Habitat Conservation Areas will encourage a mix of species. In each quarter township, lands will be managed so that 50 percent of the forest on Federal-administered lands outside Habitat Conservation Areas will have stands averaging 11 inches or more dbh with at least 40 percent canopy closure.

Bald Eagle Habitat

The Umpqua River Corridor Habitat Management Plan for bald eagles will continue to be implemented. Delineated bald eagle habitat will not be considered for disposal. Acquisition of conservation easements or ownership of lands will be pursued within active or future occupied bald eagle territories. Priority will be placed on acquiring land adjacent to the Cougar Creek and Woodruff Mountain sites (approximately 200 acres). Site specific Habitat Management Plans will be developed for all occupied nesting territories.

Peregrine Falcon Habitat

At present there are no known Peregrine falcon nesting sites on district BLM-administered lands. Peregrine falcon nesting cliffs occupied in the future will have seasonal disturbance restrictions within 1/2-mile placed around them including mining and mineral leases. Occupied sites will be protected to maintain features important to peregrines. Pesticides which have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat Management Plans will be written for all active Peregrine falcon sites.

Columbian White-tailed Deer

In order to achieve the recovery plan goal of assuring 5,500 acres of secure habitat for the Columbian White-tailed deer, acquisition of suitable habitat will be pursued within the core area (primarily T. 26 S., and T. 27 S., R. 5 W.). Habitat Management Plans will be prepared for lands acquired for the recovery of this species or for existing lands determined to be of significant value to the species. Timber harvest or other vegetation altering activities on all BLM-administered lands (6,161 acres) within the general area of distribution will occur only if determined to be beneficial to the Columbian White-tailed deer or until definitive information is available on the level of use and value of the area in meeting recovery plan goals.

Townsend's Big-eared Bat

Townsend's big-eared bat roosts and hibernacula will be protected and buffered by 600 ft. to maintain the integrity of sites. Access and human disturbance will be limited near roosts and hibernacula to prevent detrimental impact to colonies. The use of pesticides which are detrimental to prey species or their habitat within the normal hunting range of known bat nursery colonies and hibernacula will be restricted. The restriction will apply on an area within a two mile radius or until site specific monitoring proved otherwise. BLM will pursue acquisition of the Scott Mountain hibernaculum consisting of approximately ten acres.

Other Wildlife Habitat

Wildlife Tree and Down Log

All soft snags will be retained consistent within safety standards, three hard snags per acre (larger than 20 inches dbh and ten feet tall), and two green trees per acre, larger than 20 inches dbh. Where available prior to timber harvest, a total of 350 linear feet per acre of down logs will be retained in final harvest timber sale units. These will include all Class 1 logs if hollow or rotten and Class 2 and 3 logs larger than 20 inches in diameter. Smaller material will be left on site unless removal is needed for tree planting.

Roosevelt Elk Habitat

Precommercial thinning projects will provide for maintenance of existing game trails free of slash accumulation that impede big game movement.

Management of elk habitat will be emphasized in the Tyee, Camp Creek, and Deadman Mountain elk management areas. The following guidelines will be adopted for timber harvest units:

1. Thirty percent of the harvest units will be small units (15 to 20 acres) with irregular boundaries.

2. Within harvest units the distance to cover will not exceed 500 feet.

3. Minimum width of cover adjacent to harvest units will be 200 feet.

Road management within the Tyee, Camp Creek, and Deadman Mountain elk management areas will be guided by a goal to limit the amount of habitat available to vehicle access and the increased disturbance and poaching which can occur with such access. Disturbance from vehicle access will be limited by:

1. Implementing year long road closures on approximately 20 miles of existing roads.

2. Implementing approximately 15 miles of year long road closure on existing roads in the Deadman Mountain elk management area to establish approximately 6000 acres (at the head of Days and Coffee Creeks) with restricted disturbance.

3. Use and management of newly constructed roads will be guided by BLM's effectiveness in limiting open road densities to 1.5 to 2.5 miles per square mile of BLM-administered lands.

4. Spur roads not needed over a ten year or longer period will be closed to achieve a road density of 1.5 to 2.5 miles per square mile of BLM-administered lands.

In addition to the harvest unit guidelines for the Tyee, Camp Creek, and Deadman Mountain elk management areas, the overall landscape on BLM-administered lands within these areas will be managed under the following guidelines:

1. BLM-administered land outside of Habitat Conservation Areas will be managed to achieve a forage/cover habitat ratio of 70/30 across the landscape.

2. On 50 percent or more of the harvest units a legume seed mix will be applied to improve forage quality.

3. Retain a screen of trees between open roads and harvest units when the unit is largely visible from the road.

Osprey Habitat

On BLM-administered lands within 1/4-mile of known osprey nest sites (2,500 total acres), nest trees and adjacent perch trees will be protected and disturbance will be restricted between March 20 and August 31. Adequate nest and perch replacement trees will be retained within 1/4-mile of nest sites.

Other Raptor Habitat

An allocation of 500 acres of forest land will be made to be used for protecting known and future raptor nest sites not protected by other management recommendations.

Special Habitat Areas

Special habitat areas will be buffered by 100-300 feet to protect their plant community structure, species composition, and ecological processes. The special habitat buffer will be an area designated and managed for the protection or enhancement of the special habitat. Activities such as timber harvest, timber salvage, and prescribed burning will be permitted within the buffers when they are considered necessary for special habitat restoration and will benefit resident special habitat species. Water courses flowing into and out of wetland habitats will be maintained.

Special Areas

Six existing Special Areas will be retained, four of these existing Special Areas will be expanded. Three new Special Areas will be designated. Total allocation will be 5,102 acres. See Table 2-5. The existing Brad's Creek and Golden Bar Areas of Critical Environmental Concern will be included in the new Umpqua Wildlife Area of Critical Environmental Concern under this alternative. All Area of Critical Environmental Concern/ Research Natural Areas will be withdrawn from locatable mineral entry and will have a no surface occupancy stipulation for leasable minerals.

Recreation

Cow Creek, Umpqua River, and the North Umpqua River will be managed as a Special Recreation Management Areas. Interpretive opportunities along these Special Recreation Management Areas will be emphasized. Emphasis will also be put on recreational gold panning, camping, hiking, mountain biking, wildlife observation, picnicking, fishing, river sports, and other dispersed recreational opportunities in this Special Recreation Management Area.

All existing recreation sites and trails will be maintained and managed. See Table 2-3.

To develop the Woolley Pond and Island Creek potential recreation sites, land acquisition will be

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pursued. This land acquisition will involve acquiring approximately 40 acres in two different ownerships located in Section 12, T. 22 S., R. 6 W., W.M., for the Hardscrabble site, and approximately 60 acres in Section 1, T. 31 S., R. 7 W., W.M. and Section 36, T. 30 S., R. 7 W., W.M. for the Island Creek site.

The following existing or potential Recreation sites will be withdrawn from locatable mineral entry or have their existing withdrawals expanded:

Cow Creek Recreational Gold Panning Area
Iron Mountain Gold Panning Area
Island Creek Recreation Site
North Umpqua Trail Primitive Campsite
Osprey Boat Ranch
Pickett Bridge Recreation Site
Susan Creek Recreation Site

A total of 435 acres will be identified for withdrawal from public land laws and the mining law.

To retain options for future development of high value potential recreation sites and facilities for dispersed recreation opportunities, no timber sales other than salvage sales of dead and dying timber will be made from 2,264 acres encompassing the following areas.

Potential Recreation Sites

Brickyard Pond
Chimney Rock Pond
Eagleview Campground
Hubbard Creek Off Highway Vehicle Area
Iron Mountain Gold Panning Area
Island Creek Recreation Site
Lavadoure Boat Ramp
Michigan Springs
North Umpqua Trail Primitive Campsite
Osprey Boat Ramp
Pickett Bridge Recreation Site
Red Top Pond
Swiftwater Day Use
Susan Creek Group Reservation Campsite
Weaver Pond Recreation Site
Woolley Pond Recreation Site

Potential Trails

Cougar Creek Trail
Cow Creek Bluffs Trail
Deadman Mountain Trail
Miner-Wolf Watchable Wildlife Trail
Salt Creek Trail
Susan Creek Falls Barrier Free Trail
Tyee Mountain Trail
Upper Susan Creek Falls Trail
Wolf Creek Falls Trail Extension

Special Recreation Management Areas

Cow Creek Canyon Special Recreation Management Area* (1,540 acres)
Umpqua River Special Recreation Management Area* (2,240 acres)
Continue existing North Umpqua Special Recreation Management Area* (1,620 acres)

*Encompasses 1/4-mile each side of Cow Creek and Umpqua River

An exception will be made in the event a natural disturbance (e.g., fire, windstorm) destroyed the high value recreation potential of the area.

Around the man made ponds where helicopters may be dipping water for fire suppression, trees will be cut when necessary to maintain open flyways to the pond.

To develop the proposed Cow Creek Bluffs Trail and the Upper Susan Creek Falls Trail, acquisition of access will be pursued across approximately 4,000 feet of private land.

A total of 285,661 acres will be open to Off Highway Vehicle use. (See Table 2-1 for comparisons of Off Highway Vehicle designations).

A total of 11,869 acres will be closed to Off Highway Vehicle use, including: 9,655 acres previously closed in the 1983 Management Framework Plan. An additional 1,840 acres of lands designated as Area of Critical Environmental Concern/Research Natural Areas, and 374 acres of lands identified as containing special status plants. An additional 120,443 acres of land will be placed in an Off Highway Vehicle limited category allowing Off Highway Vehicles only on designated roads and trails and 1,395 acres will be limited to official use only. Within this area, comprised of 517 road spurs totaling 230 miles, a 50 foot wide corridor will be closed to the general public and will be open for permitted, authorized use only. Two Areas of Critical Environmental Concern will also be limited to designated roads and trails (947 and 1620 acres respectively).

Wild and Scenic Rivers

No additional rivers will be recommended suitable for federal designation as part of the National Wild and Scenic Rivers system.

Visual Resources

All lands except Rural Interface Areas (see below) will be managed as inventoried for their visual characteristics. Acres that will be managed for each Visual Resource Management Class are shown in Table 2-1.

Land Tenure

Exchanges or acquisitions will be made to benefit any of the resources managed. Exchanges involving disposal of timber lands to acquire lands containing greater nontimber values will be emphasized. Lands other than available commercial forest lands that meet criteria (1) or (2) of the Federal Land Policy and Management Act Sec. 203(a) will be available for disposal through sale, but sales of land that meet only criteria (3) will not be made. (See Land Tenure Management, Common to All Alternatives for explanation of criteria). No lands will be leased, except leases and conveyances under the Recreation and Public Purposes Act in Zones 2 and 3 will be made to provide appropriate facilities or services.

Areas identified for acquisition and/or land withdrawal are identified in Special Areas, Special Status Species Habitat, Wildlife Habitat, Water Quality and Riparian Areas, and Recreation sections of this alternative.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws and open to sale of salable minerals. See Tables 2-7, 2-8, and 2-9. Withdrawals totaling 3,101 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3.

Rural Interface Areas

There are 8,552 acres of BLM-administered lands within 1/4-mile of private land in identified Rural Interface Areas zoned by Douglas County for one to five acre lots which will be managed for Visual Resource Management Class II objectives. The following alternative timber management practices will not be applied on those lands: herbicide spraying, clear cutting, and prescribed burning. Future oil and gas development within 1/4-mile of these areas will be allowed, but with no surface occupancy. See Table 2-1 for comparison of BLM-managed acres located within identified Rural Interface Areas by alternative.

Alternative E

Water Quality and Riparian Areas

Riparian Management Areas will be established with average widths on each side of the following streams and other waters: 1st order, 50 feet; 2nd order, 60 feet; 3rd order, 140 feet; 4th order, 200 feet; 5th order, 280 feet; 6th order and larger, 320 feet; and other waters (such as lakes), 200 feet. Actual riparian management area widths will be determined by on the ground vegetation and stream characteristics.

Land acquisition will be pursued to acquire lands to maximize public land ownership within the experimental/demonstration watersheds and Canton Creek.

Old-Growth and Mature Forest

Forest lands in the Timber Production Capability Classification categories of nonsuitable and suitable woodland, plus suitable commercial forest land on Site V lands and the fragile gradient - restricted component of the fragile suitable Timber Production Capability Classification category, will not be subject to planned harvest. Other forest lands allocated for riparian management areas, recreation sites, proposed recreation river corridors, undisturbed protection of special status species, and Areas of Critical Environmental Concerns will also not be subject to planned harvest. These forest lands total 114,700 acres, of which 36,300 acres currently are old-growth and 26,800 acres are mature forest.

An additional 76,700 acres of existing old-growth forest stands plus 43,900 acres of mature forest will not be subject to planned harvest. In addition 60,000 acres of forest land within 400 feet of stands over 150 years old will not be subject to planned harvest in order to assist in maintaining natural ecological elements, protect the older stands from edge effect and natural disaster, and interconnect them into a sustainable network. Also not be subject to planned harvest are 55,953 acres of forest land in early, mid, or late seral stages not accounted for in previous categories, but lying within approximately two miles of spotted owl nests or habitat cores occupied in recent years, or allocated to headwater protection, or cavity dwellers.

Timber

There are 23,900 acres available for unrestricted timber practices, and 23,400 acres for restricted timber practices. See Tables 2-1. Projected ten year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual timber sale quantity for the expected ten year life of the plan will be 3.2 mmcf (18 MMBF Scribner short log).

Special Status Species Habitat

All BLM-administered land will be managed for the conservation and protection of special status species and their habitats. Field or office reviews will be conducted on all proposed actions. When it is considered biologically appropriate, special status species habitat will be buffered by 600 feet from all surface disturbance and harvest of timber. Other special status species will be protected to varying degrees on all BLM-administered lands. See Table 2-1.

Bald Eagle Habitat

The Umpqua River Corridor Habitat Management Plan for bald eagles will continue to be implemented. All designated lands managed for bald eagles will be retained and acquisition of conservation easements or ownership of land within active or future occupied nest sites will be pursued. Habitat Management Plans will be developed on active bald eagle sites not covered by an existing plan (9,800 acres).

A 1/2-mile protective corridor will be provided on both sides of the Umpqua River system in which the management guidelines listed under all previous alternatives will be applied. In addition, inventories will be conducted for communal winter roosts along river corridors and on the uplands. A 1/4-mile buffer will be established around eagle roosts located in the future to maintain environmental conditions and limit disturbance during the winter months. Withdraw bald eagle occupied nest sites from mineral entry where needed to protect habitat components and limit disturbance.

Peregrine Falcon Habitat

At present there are no known Peregrine falcon nesting sites on district BLM-administered lands. Peregrine falcon nesting cliffs occupied in the future will have seasonal disturbance restrictions within 1/2-mile placed around them including restrictions on mining and mineral leases. Occupied sites will be protected to maintain features important to peregrines. Pesticides which have a negative effect on prey species or their habitat will not be applied within two miles of active sites. Habitat Management Plans will be written for all active Peregrine falcon sites. The adequacy of suitable nesting ledges for Peregrine falcons will be evaluated at all potential sites on BLM-administered lands and ledges will be created where lacking.

Columbian White-tailed Deer

In order to achieve the recovery plan goal of assuring 5,500 acres of secure habitat for the Columbian White-tailed deer, acquisition of suitable habitat will be pursued within the core area (primarily T. 26 S., and T. 27 S., R. 5 W.) Habitat Management Plans will be prepared for lands acquired for the recovery of this species or for existing lands determined to be of significant value to the species. Timber harvest or other vegetation altering activities on all BLM-administered lands (6,161 acres) within the general area of distribution will occur only if determined to be beneficial to the Columbian White-tailed deer or until definitive information is available on the level of use and value of the area in meeting recovery plan goals.

Townsend's Big-eared Bat

Townsend's big-eared bat roosts and hibernacula will be protected and buffered by 600 ft. to maintain the integrity of sites. Access and human disturbance will be limited near roosts and hibernacula to prevent detrimental impact to colonies. The use of pesticides which are detrimental to prey species or their habitat within the normal hunting range of known bat nursery colonies and hibernacula will be restricted. The restriction will apply on an area within a two mile radius or until site specific monitoring proved otherwise. BLM will pursue acquisition of the Scott Mountain hibernaculum consisting of approximately ten acres.

Other Wildlife Habitat

Wildlife Tree and Down Log

All soft snags will be retained consistent with safety standards, three hard snags per acre (larger than 20 inches dbh and ten feet tall), and two green trees per acre, larger than 20 inches dbh. In addition, 20 percent of the land in each harvest unit will be

retained in two acre or larger patches as unentered cavity nester habitat.

Where available, prior to timber harvest, a total of 350 linear feet per acre of down logs will be retained in final harvest timber sale units. These will include all Class 1 logs if hollow or rotten and Class 2 and 3 logs larger than 20 inches in diameter. Smaller material will be left on site unless removal is needed for tree planting.

Amphibian Habitat

To provide habitat for amphibians and nesting for pileated woodpeckers, BLM will protect a 40 acre block in each section where BLM administers at least half of the land by withdrawing from planned harvest an additional 635 acres of forest land (the oldest stands concentrated around headwater streams, not set aside for other purposes).

Roosevelt Elk Habitat

Precommercial thinning projects will provide for maintenance of existing game trails free of slash accumulation that impede big game movement.

Management of elk habitat will be emphasized in the Tyee, Deadman Mountain, Rock Creek, and Little River elk management areas. The following guidelines will be adopted for timber harvest units:

1. Thirty percent of the harvest units will be small units (15 to 20 acres) with irregular boundaries.

2. Within harvest units the distance to cover will not exceed 500 feet.

3. Minimum width of cover adjacent to harvest units will be 200 feet.

Road management within the Tyee, Deadman Mountain, Rock Creek, and Little River elk management areas will be guided by a goal to limit the amount of habitat available to vehicle access and the increased disturbance and poaching which can occur with such access. Disturbance from vehicle access will be limited by:

1. Implementing year long road closures on approximately 20 miles of existing roads as identified in the current Management Framework Plan.

2. Implementing approximately 15 miles of year long road closure on existing roads in the Deadman Mountain elk management area to establish approximately 6,000 acres (at the head of Days and Coffee Creeks) with restricted disturbance.

3. Use and management of newly constructed roads will be guided by BLM's effectiveness in limiting open road densities to 1.5 to 2.5 miles per square mile of BLM-administered lands.

4. Spur roads not needed over a ten year or longer period will be closed to achieve a road density of 1.5 to 2.5 miles per square mile of BLM-administered lands.

In addition to the harvest unit guidelines for the Tyee, Camp Creek, Deadman Mountain, Rock Creek, and Little River elk management areas, the overall landscape on BLM-administered lands within these units will be managed under the following guidelines:

1. On 50 percent or more of the harvest units a legume seed mix will be applied to improve forage quality.

2. Retain a screen of trees between open roads and harvest units when the unit is largely visible from the road.

In cooperation with the Oregon Department of Fish and Wildlife, conduct elk transplants to supplement existing numbers and establish new herds in the Rock Creek, Little River, White Rock, West Fork Cow Creek, Middle Creek, and Green Butte elk areas.

The Tyee elk management area will be targeted for more balanced management of all elk habitat through blocking of public ownership of lands. These two management areas will be priority areas for increasing BLM-administered lands as exchange opportunities arise.

Wild Turkey Habitat

Maintain all oak stands within designated turkey habitat utilizing a variety of methods including prescribed fire. Establish legume seeding areas in harvest units of three to five acres in size and distributed across the landscape at a rate of four or five per section in designated turkey habitat.

Osprey Habitat

Osprey nesting and forage habitat will be provided (8,385 acres) adjacent to major water areas (Umpqua Rivers, Cow Creek, Elk Creek, Ben Irving, and Cooper Creek Reservoirs) by protecting existing and

potential nest trees, adjacent perch trees and provide for adequate replacement trees. Disturbance will be restricted within 1/4-mile of active nest sites from March 20 to August 31.

Other Raptor Habitat

An allocation will be made of 1,000 acres of forest land to be used for protecting known and future raptor nest sites not protected by other management recommendation.

Black Bear, Cougar, Black-tailed Deer

Since it also enhances cougar, black bear, and black-tail deer habitat, practices such as retention of cover, seeding, and road management specified for elk management areas will be expanded to cover all lands in the district.

Special Habitat Areas

Special habitat areas will be buffered by to 100-300 feet to protect their plant community structure, species composition, and ecological processes. The special habitat buffer will be an area designated and managed for the protection or enhancement of the special habitat. Activities such as timber harvest, timber salvage, and prescribed burning will be permitted within the buffers when they are considered necessary for special habitat restoration and will benefit resident special habitat species. Water courses flowing into and out of wetland habitats will be maintained.

Special Areas

Six existing Special Areas will be retained, four of these existing Special Areas will be expanded. Three new Special Areas will be designated. Total allocation will be 5,102 acres. See Table 2-5. The existing Brad's Creek and Golden Bar Areas of Critical Environmental Concerns will be included in the new Umpqua River Wildlife Area of Critical Environmental Concern under this alternative. All Area of Critical Environmental Concern/Research Natural Areas will be withdrawn from locatable mineral entry and will have a no surface occupancy stipulation for leasable minerals.

Recreation

Cow Creek Canyon and the Umpqua River will be managed as a Special Recreation Management Areas. Interpretive opportunities along the Cow Creek Back Country Byway and Loon Lake Back Country Byway will be emphasized. Emphasis will also be put on recreational gold panning, camping, hiking, and other dispersed recreational opportunities in these Special Recreation Management Areas.

All existing recreation sites and trails will be maintained and managed. See Table 2-3.

To develop the Woolley Pond and Island Creek potential recreation sites, land acquisition will be pursued. This land acquisition will involve acquiring approximately 40 acres in two different ownerships located in Section 12, T. 22 S., R. 6 W., W.M., for the Woolley Pond site, and approximately 60 acres in Section 1, T. 31 S., R. 7 W., W.M. and Section 36, T. 30 S., R. 7 W., W.M. for the Island Creek site.

The following existing or potential recreation sites will be withdrawn from locatable mineral entry or have their existing withdrawals expanded:

- Cow Creek Recreational Gold Panning Area
- Iron Mountain Gold Panning Area
- Island Creek Recreation Site
- North Umpqua River Special Recreation Management Area
- North Umpqua Trail Primitive Campsite
- Osprey Boat Ramp
- Pickett Bridge Recreation Site
- Susan Creek Recreation Site

A total of 1,807 acres will be identified for withdrawal from public land laws and the mining law.

To retain options for future development of high value potential recreation sites and facilities for dispersed recreation opportunities, no timber sales other than salvage sales of dead and dying timber will be made from 2,264 acres encompassing the following areas.

Potential Recreation Sites

- Brickyard Pond
- Chimney Rock Pond
- Eagleview
- Hubbard Creek Off Highway Vehicle Area
- Iron Mountain Gold Panning Area
- Island Creek Recreation Site
- Lavadoure Boat Ramp
- Michigan Springs
- North Umpqua Trail Primitive Campsite
- Osprey Boat Ramp
- Pickett Bridge Recreation Site
- Red Top Pond

South Bank Swiftwater Day Use (North Umpqua Trailhead)
Susan Creek Group Reservation Campsite
Weaver Pond Recreation Site
Woolley Pond Recreation Site

Potential Trails

Alexander Butte Trail
Ben Irving Trail
Bushnell Irwin Rocks Trail
Cougar Creek Trail
Cow Creek Bluffs Trail
Deadman Mountain Trail
Miner-Wolf Creek Watchable Wildlife Trail
Red Top Trail
Salt Creek Trail
Susan Creek Falls Barrier Free Trail
Tyee Mountain Trail
Upper Susan Creek Falls Trail
Wolf Creek Falls Trail Extension

Potential Special Recreation Management Areas

Cow Creek Canyon Special Recreation Management Area* (1,540 acres)
Umpqua River (2,240 acres)

*Encompasses 1/4-mile each side of the river or roadway.

An exception to timber salvage or harvest will be made in the event a natural disturbance (e.g., fire, windstorm) destroyed the high value recreation potential of the area or to remove safety hazard trees.

Around man made ponds where helicopters may be dipping water for fire suppression, trees will be cut when necessary to maintain open flyways to the pond.

Before Cow Creek Bluffs Trail and the Upper Susan Creek Falls Trail could be built, acquisition of access will be pursued across approximately 4000 feet of private land.

A total of 11,681 acres in the Hubbard Creek Off Highway Vehicle area will be open to Off Highway Vehicle use; 394,423 acres will be limited to designated roads and trails; 1,395 acres will be limited to official use only, along 517 spur roads; 9,655 acres currently closed to Off Highway Vehicle use will continue to be closed. In addition, 1,840 more acres of lands designated as Areas of Critical Environmental Concern and 374 acres of lands identified as containing special status plant species will also be closed to Off Highway Vehicle use. Off Highway Vehicle use will not be allowed on any designated hiking trails. See Table 2-1 for comparison of Off Highway Vehicle designations.

Wild and Scenic Rivers

A total of 185 miles (Cow Creek 26 miles, Smith River 15 miles, South Umpqua 73 miles, Canton Creek 14 miles, and Umpqua 57 miles) will be found suitable for Federal designation as part of the National Wild and Scenic River system, with a recreation classification.

Visual Resources

Visual Resource Management Class I management will be provided for all lands so inventoried plus all BLM-administered lands adjacent to (within 1/4-mile) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the federal Wild and Scenic Rivers Act. Visual Resource Management Class II management will be provided for lands in identified Rural Interface Areas (see below), and all remaining lands inventoried as Visual Resource Management Class II. Land inventoried as Visual Resource Management Class III or IV will be managed as Class III. Acres that will be managed for each Visual Resource Management Class are shown in Table 2-1.

Land Tenure

Exchanges or acquisition will be made to benefit any of the resources managed. Exchanges involving disposal of timber lands to acquire lands containing greater nontimber values will be emphasized. Sales of lands other than available commercial forest lands will be made to dispose of lands that meet criteria (1) or (2) of the Federal Land Policy and Management Act Sec. 203(a) but sales of land which meet only criterion (3) will not be made. No lands will be leased, except leases and conveyances under the Recreation and Public Purposes Act in Zones 2 and 3 will be made to provide appropriate facilities or services. Areas identified for acquisition and/or land withdrawal are identified in Special Areas, Special Status Species Habitat, Other Wildlife Habitat, Water Quality and Riparian Areas, and Recreation sections of this alternative.

Energy and Minerals

The majority of the mineral estate administered by the BLM will continue to be available for leasable minerals, open to location under mining laws and open to sale of salable minerals. See Tables 2-7, 2-8 and 2-9. Withdrawals totaling 4,473 acres will be proposed under this alternative for Area of Critical Environmental Concern/Research Natural Areas and recreation sites. See Tables 2-5 and 2-3.

Rural Interface Areas

There are 24,052 acres of BLM-administered lands within 1/2-mile of private lands in the identified Rural Interface Areas zoned by Douglas County for one to five acre lots which will be managed for Visual Resource Management II objectives. Harvesting will employ multiple aged or even aged management silvicultural systems where feasible from a logging and stand management perspective, and small (under five acre) clearcuts or shelterwoods elsewhere. The silvicultural systems employed will not include the use of prescribed fire or herbicides. Future oil and gas development within 1/2-mile of these areas will be allowed, but with no surface occupancy. See Table 2-1 for BLM acres located within identified Rural Interface Areas by alternative.

Coordination and Consultation

The implementation of this RMP and the overriding SEIS ROD, calls for a high level of coordination and cooperation among agencies. A formal procedure for interagency coordination has been created by a Memorandum of Understanding for Forest Ecosystem Management that has been entered into by the White House Office on Environmental Policy, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Environmental Protection Agency. The Memorandum of Understanding created several interagency groups, including the Interagency Steering Committee, Regional Interagency Executive Committee, and Regional Ecosystem Office. A detailed description of these groups is included in Attachment A, Section E, Implementation, of the SEIS ROD.

Consultation under the Endangered Species Act will emphasize an integrated ecosystem approach. This will include involving the Fish and Wildlife Service and the National Marine Fisheries Service in all relevant implementation planning, so their views can be made known. Actions proposed to implement this RMP will undergo consultation, either formal or informal, as appropriate. Consultation for the northern spotted owl on activities that are consistent with the standards and guidelines of the SEIS ROD and that would not result in "take" of a listed species is expected to be informal. If take would result, incidental take statements would be provided through formal consultation.

Concurrent coordination with the Environmental Protection Agency and Oregon Department of Environmental Quality on water quality standards and beneficial use requirements of the Clean Water Act will minimize project impacts. Similar coordination with the Environmental Protection Agency, Department of Environmental Quality and U.S. Forest Service on minimizing impacts of emissions from prescribed burning will occur.

Use of the Completed Plan

Many of the management activities described in this RMP/EIS would be accomplished through contracts and permits. Performance standards are developed and included in a contract or permit. They require the contractor or permittee to comply with applicable laws, regulations, policies, and plans. Selection of performance standards is governed by the scope of the action to be undertaken and the physical characteristics of the specific site. The standards, which include design features and mitigating measures, must be followed in carrying out an action.

Site specific planning by interdisciplinary teams will precede most on-the-ground management activities. Interdisciplinary teams are comprised of relevant resource management disciplines. The interdisciplinary process includes field examination of resources, selection of alternative management actions, analysis of alternatives, and documentation to meet National Environmental Policy Act requirements. Adjacent land uses will be considered during site specific land management planning.

In addition to being routinely monitored, the RMP will be formally evaluated at the end of every third year after implementation begins, until such time as preparation of new plans, that would supersede the

RMP over a substantial majority of its area, is well under way. The reason for the formal evaluation is to determine whether there is significant cause for an amendment or revision of the plan. Evaluation includes a cumulative analysis of monitoring records, with the broader purpose of determining if the plan's goals and objectives are being or are likely to be met, and whether the goals and objectives were realistic and achievable in the first place.

Evaluation will also assess whether changed circumstances (such as changes in the plans of other government agencies or Indian tribes) or new information so altered the levels or methods of activities or the expected impacts (on water, wildlife, socioeconomic conditions, etc.), that the environmental consequences of the plan may paint a seriously different picture than those anticipated in the PRMP/FEIS.

As part of these third year evaluations, the allowable sale quantity will be reevaluated, to incorporate the results of watershed analyses; monitoring; further inventory; and site specific, watershed specific or province-level decisions.

If an evaluation concludes that the plan's goals are not achievable a plan amendment or revision will be initiated. If the evaluation concludes that land use allocations or management direction need to be modified, a plan amendment or revision may be appropriate. An analysis will address the need for either. If the analysis determines that amending the plan is appropriate, the amendment process set forth in 43 CFR 1610.5-5 or 1610.5-6 would be followed. If amendment is not appropriate, NEPA procedures would still be followed before the modification is approved, along with coordination through the Regional Ecosystem Office and the Regional Interagency Executive Committee if SEIS ROD standards and guidelines or land use allocations would be modified. Figure 2-1 shows how monitoring and/or evaluation could lead to a revision of management direction or other changes in the RMP.

No additional evaluations of this type would be done unless some changed circumstance or unusual event causes the continuing validity of the plan to be questioned. Following completion of each plan evaluation, a summary of its findings will be included in the district's annual program summary.

In future years, after preparation of new plans that would substantially supersede the RMP is well under way, if some circumstances change or unusual events occur of a magnitude that question BLM's ability to meet some of the remaining plan objectives, interim management adjustments may be made to meet those objectives, without a plan amendment. The kind of circumstance which could lead to such an adjustment might be an announcement of research findings which clearly establish that some of the plan's goals and objectives are unlikely to be met. The kind of unusual event which could lead to such an adjustment might be a major catastrophe such as a wildfire or windstorm causing extensive damage to forest stands. Similar interim adjustments can be made at any time during the life of the plan, pending evaluation and possible plan amendment.

Adaptive Management

This approach to evaluation and interim adjustment will frame a process of adaptive management, permitting effective response to changing knowledge. Adaptive management is a continuing process of action based monitoring, researching, evaluating and adjusting with the objective of improving the implementation and achieving the goals of the RMP. The RMP is based on current scientific knowledge. To be successful, it must have the flexibility to adapt and respond to new information. Under the concept of adaptive management, new information will be evaluated and a decision will be made whether to make adjustments or changes. The adaptive management approach will enable resource managers to determine how well management actions meet their objectives and what steps are needed to modify activities to increase success or improve results.

The adaptive management process will be implemented to maximize the benefits and efficiency of the RMP. This may result in the refinement of management direction or land use allocations which may require amendment of the RMP. Adaptive management decisions may vary in scale from individual watersheds, specific forest types, physiographic provinces, or the entire planning area. Many adaptive management modifications may not require formal changes to the RMP.

The model displayed in Figure 2-3 identifies the various steps, activities, and outline of a procedure for the adaptive management process. This diagram conveys the general concept, and is valuable as a starting point, for understanding adaptive management. A full and detailed explanation of the model, which is beyond the scope of this discussion,

would require that each step be further broken down and defined.

New information that would compel an adjustment of strategy may come from monitoring, research, statutory or regulatory changes, organizational or process assessments, or any number of additional sources. During the evaluation process, personnel will analyze the information to determine the nature, scope, and importance of the new information.

Adaptive management could entail modification of silvicultural prescriptions to respond to increasing knowledge providing greater certainty about anticipated climate change or to respond to increasing knowledge about the habitat needs of spotted owls. Adaptive management could equally entail modification of rather localized management practices to respond to the results of monitoring.

Any potential new management actions identified after RMP/ROD approval would be reviewed before BLM moves to implement them. For example, if a new Area of Critical Environmental Concern proposal meets BLM criteria for consideration, the District Manager may prescribe interim management measures for the remaining life of the plan. Such interim management must meet the objectives of the RMP, except where inconsistent with the regulations regarding potential Areas of Critical Environmental Concern, and would be subject to analysis in an EIS or Environmental Assessment linked to a proposed plan amendment or a broader plan revision.

Watershed Analysis

Watershed analysis is one of the principal analyses that will be used to meet the ecosystem management objectives of this RMP. Watershed analyses will be the mechanism to support ecosystem management at approximately the 20 to 200 square mile watershed level. Watershed analysis, as described here, focuses on its broad role in implementing the ecosystem management objectives prescribed by these standards and guidelines. The use of watershed analysis, as described in the Aquatic Conservation Strategy, is a more narrow focus and is just one aspect of its role.

Watershed analysis will focus on collecting and compiling information within the watershed that is essential for making sound management decisions. It will be an analytical process, not a decision making process with a proposed action requiring NEPA documentation. It will serve as the basis for developing project specific proposals, and determining monitoring and restoration needs for a watershed. Some analysis of issues or resources may be included in broader scale analyses because of their scope. The information from the watershed analyses will contribute to decision making at all levels. Project specific NEPA planning will use information developed from watershed analysis. For example, if watershed analysis shows that restoring certain resources within a watershed could contribute to achieving landscape or ecosystem management objectives, then subsequent decisions will need to address that information.

The results of watershed analyses may include a description of the resource needs, issues, the range of natural variability, spatially explicit information that will facilitate environmental and cumulative effects analyses to comply with NEPA regulations, and the processes and functions operating within the watershed. Watershed analysis will identify potentially disjunct approaches and conflicting objectives within watersheds. The information from watershed analysis will be used to develop priorities for funding and implementing actions and projects, and will be used to develop monitoring strategies and objectives. The participation in watershed analysis of adjacent landowners, private citizens, interest groups, industry, government agencies, and others will be promoted.

Watershed analysis will be an ongoing, iterative process that will help define important resource and information needs. As watershed analysis is further developed and refined, it will describe the processes and interactions for all applicable resources. It will be an information gathering and analysis process, but will not be a comprehensive inventory process. It will build on information collected from detailed, site specific analyses. Information gathering and analysis will be related to management needs, and not be performed for their own sake. While generally watershed analysis will organize, collate, and describe existing information, there may be critical information needs that must be met before completing the analysis. In those instances, the additional information will be collected before completing the watershed analysis. In other instances, information needs may be identified that are not required for completing the watershed analysis but should be met for subsequent analyses, planning, or decisions.

Watershed analysis is a technically rigorous procedure with the purpose of developing and documenting a scientifically based understanding of

the ecological structures, functions, processes and interactions occurring within a watershed. The scope of the analysis for implementing the ecosystem management objectives of these standards and guidelines may include all aspects of the ecosystem. Some of these aspects include beneficial uses; vegetative patterns and distribution; flow phenomena such as vegetation corridors, streams, and riparian corridors; wind; fire (wild and prescribed fire, and fire suppression); wildlife migration routes; dispersal habitat; terrestrial vertebrate distribution; locally significant habitats; human use patterns throughout the ecosystem; cumulative effects; and hydrology. The number and detail of these aspects considered will depend on the issues pertaining to a given watershed.

In the initial years of implementation, the process for watershed analysis is expected to evolve to meet long-term objectives. However, some projects proposed for the first few years of implementation are in areas that require watershed analysis prior to approval of the projects (i.e., Key Watersheds and Riparian Reserves). In Fiscal Years 1995-96, watershed analysis done for these projects may be less detailed than analyses that are completed in later years. Regardless, analysis done during the initial years (Fiscal Year 1995-96) will comply with the following guidance:

- The goal of the analysis is to determine whether the proposed actions are consistent with the objectives, land use allocations and management direction of the RMP.
- Existing information will be used to the greatest extent possible, with new information collected, to the maximum extent practicable, to fill crucial data gaps.
- Analysis will address the entire watershed, even though some areas may be analyzed at a lower level of precision, and the analysis of issues may be prioritized.
- Information from the analysis will flow into the NEPA documentation for specific projects, and will be used where practicable to facilitate Endangered Species Act and Clean Water Act compliance.
- Restoration opportunities will be identified.

A pilot watershed analysis program has been initiated to develop and test an effective long-term process. A scientifically peer reviewed Watershed Analysis Guide will be finalized based on experiences gained in the pilot program.

The results of watershed analysis will influence final decisions both on timing of land disturbing activities such as timber sales and on application of design features and mitigating measures, including Best Management Practices for water quality protection. Monitoring and evaluating the effectiveness of Best Management Practices is required by Oregon's Nonpoint Source Management Plan to ensure that water quality standards are achieved and that beneficial uses are maintained. When monitoring identifies previously unanticipated impacts, the information gained from that monitoring will be used in subsequent development of mitigating measures, including Best Management Practices, and considered in future watershed analyses.

Factored into these decisions on land disturbing activities, where appropriate, would be an assessment of compliance with the antidegradation policy of Oregon's Water Quality Standards (OAR 340-41-026(1) (a). These standards apply to existing high quality waters which exceed those levels necessary to support recreation and the propagation of fish, shellfish and wildlife.

Proposed timber sales and other land disturbing activities will incorporate the interactive (adaptive management) process for developing, implementing and evaluating nonpoint control to determine if water quality goals have been met. Modification of nonpoint source controls, including Best Management Practices, will be adjusted based upon sound scientific evidence. Where necessary, appropriate actions to mitigate adverse effects on water quality will be taken to protect designated beneficial uses.

Requirement for Further Environmental Analysis

Site specific planning by Interdisciplinary Teams would precede most on-the-ground management activities. Interdisciplinary Teams are comprised of relevant resource management disciplines. The Interdisciplinary Team process includes field examination of resources, identification of alternative management actions, and analysis. Adjacent land uses would be considered during site specific land management planning.

Site specific Environmental Analysis and documentation (including Environmental Assessments, categorical exclusions or administrative determinations where appropriate, and RMP conformance determination) would be accomplished for each action or type of treatment under consideration. Where the action is to be accomplished by a contractor or timber sale purchaser, the Environmental Assessment or other environmental analysis is a primary means for determining appropriate contract stipulations. Where the action is to be accomplished by BLM personnel, the environmental analysis is a primary means for determining how it will be conducted. When determining whether activities retard or prevent attainment of Aquatic Conservation Strategy objectives, the scale of analysis typically will be BLM analytical watersheds or similar units.

Watershed analysis or province analysis will often precede environmental analysis of specific proposals, and the findings of such preceding analyses will be addressed in documentation of the environmental analyses. Similarly, late-successional reserve assessments will precede activities in those reserves and their findings will be addressed in environmental analysis of those activities. Ultimately, watershed analysis will serve as the basis for developing project specific proposals and determining monitoring and restoration needs for a watershed. Project specific NEPA planning will use information developed from watershed analysis. By improving understanding of the ecological structures, functions, processes, and interactions occurring within a watershed, watershed analysis will enhance the ability to predict direct, indirect, and cumulative impacts of specific proposals in that watershed.

General

Analyses of proposals for the use of prescribed fire will adhere to the requirements of the Clean Air Act and the State Implementation Plan (including the Visibility Protection Plan and Smoke Management Plan. Conformity determinations - to evaluate whether BLM actions comply with State Implementation Plan - will be conducted in association with site specific environmental analysis, where emissions can be most reasonably forecasted in quantified terms. These analyses will specifically evaluate the effects of project specific prescribed burning on nonattainment areas.

Accurate assessment of local and airshed level air quality effects of ecosystem management may require cumulative effects analysis, reflecting all relevant BLM actions, as well as expected actions of other parties. Coordination with other agencies is implicit. Cumulative effects analysis will include consideration of the effects on visibility and regional haze. Where extensive fuel hazard reduction by prescribed burning is considered, the analysis also will consider the impact of prescribed burning on wildfire emissions. This will be done in a quantified tradeoff analysis, comparing emissions from prescribed burning with potential emissions from wildfires if prescribed burning is not accomplished. Factors considered when establishing the geographic boundaries for a cumulative effects analysis include whether the action will result in impacts that cross administrative boundaries, and whether the action will affect sensitive air quality regions (i.e. Class I areas and nonattainment areas). Resultant analysis may be based on airsheds.

Interdisciplinary impact analysis will be tiered within the framework of this and other applicable Environmental Impact Statements. Tiering is used to prepare more specific documents without duplicating relevant parts of previously prepared general documents. The more specific Environmental Assessment or other environmental analysis cannot lead directly to a change in the decisions based on the more general EIS to which it is tiered. It could, however, result in some interim management direction pending plan revision, or a proposal to amend the plan. If an Environmental Assessment indicates potential for significant impacts that are seriously different from those described in an existing EIS, a new EIS (or supplement to this or another EIS) may be required.

Specific proposals for treatment to manage competing vegetation would be addressed in site specific Environmental Assessments tiered to BLM's EIS, Western Oregon Program-Management of Competing Vegetation, 1989. Specific proposals for control of noxious weeds would be addressed in site specific Environmental Assessments tiered to BLM's EIS, Northwest Area Noxious Weed Control Program, 1986 as supplemented in 1987.

Availability of Environmental Assessments for public review will be announced in a minimum of one, and generally all, of the following ways:

- News release distributed to the newsroom of area newspapers, TV, and radio stations.
- Notices posted in the public area at the Roseburg Office.

- Mailings to known interested/affected people, groups, tribal units, governmental agencies and businesses. These mailings may include, but are not limited to, periodic District program planning and project update progress reports.

- Legal notices in one or more newspapers circulated in the project area.

Management Assessments and Plans

A management assessment will be prepared for each large Late-Successional Reserve (or group of smaller Late-Successional Reserves) before habitat manipulation activities are designed and implemented. These assessments may be developed as part of province level planning or as stand alone assessments. If developed to stand alone, the assessments will be closely coordinated with subsequent watershed analysis and province level planning. SEIS ROD standards and guidelines should be refined at the province level prior to development of Late-Successional Reserve assessments. Late-Successional Reserve assessments will generally include:

- A history and inventory of overall vegetative conditions within the reserve.

- A list of identified late-successional associated species known to exist within the Late-Successional Reserve and information on their locations.

- A history and description of current land uses within the reserve.

- A fire management plan.

- Criteria for developing appropriate treatments.

- Identification of specific areas that could be treated under those criteria.

- A proposed implementation schedule tiered to higher order (i.e., larger scale) plans.

- Proposed monitoring and evaluation components to help evaluate if future activities are carried out as intended and achieve desired results.

Only in unusual circumstances will silvicultural treatments, including prescribed fire, precede preparation of this management assessment. Late-Successional Reserve assessments are subject to review by the Regional Ecosystem Office. Until Late-Successional Reserve assessments are completed, fire suppression activities should be guided by land allocation objectives in coordination with local resource management specialists.

Projects and activities within Late-Successional Reserves (including restoration, recreation, projects for public safety, thinning, and salvage) may proceed in fiscal years 1995-96 using initial Late-Successional Reserve assessments done at a level of detail sufficient to assess whether the activities are consistent with the objectives of the Late-Successional Reserves.

The Adaptive Management Area will have a plan. An individual public, interagency approach to planning will be developed for the Adaptive Management Area. The plan should address or provide:

- A shared vision of the Adaptive Management Area, (e.g., the kind of knowledge the participants hope to gain). Identification of the desired future conditions may be developed in collaboration with communities, depending on the area.

- Learning which includes social and political knowledge, not just biological and physical information.

- A strategy to guide implementation, restoration, monitoring, and experimental activities.

- A short-term (three to five year) timber sale plan and long-term yield projections.

- Education of participants.

- A list of community strategies, resources, and partners being used.

- Coordination with overall activities within the province.

- A funding strategy.

- Integration of the community strategies and technical objectives.

Management of Newly Acquired Lands

Lands may come under BLM administration after completion of the RMP/ROD through exchange, donation, purchase, revocation of withdrawals of other Federal agencies, or relinquishment of Recreation and Public Purpose Act leases. Newly acquired or administered lands or interests in lands would be managed for their highest potential or for the purposes for which they are acquired. For example, lands acquired within "special management areas" with Congressional or RMP allocation/ direction will be managed in conformance with guidelines for those areas. If lands with unique or fragile resource values are acquired, it may be appropriate to protect those values until the next plan revision.

Lands acquired with no identified special values or management goals would be managed in the same manner as surrounding or comparable BLM-administered lands. This implies typical timber harvest opportunities, intensive timber management practices, management of the mineral estate, standard operating procedures, and precommitted mitigation measures.

Costs of Management

The costs of implementing the alternatives would vary, primarily according to the complexity of management proposed the amount of timber that would be offered for sale, and the intensity of management of other resources.

Those alternatives that propose mostly traditional timber management approaches (NA, A, B, D, and E), even though they allocate widely variable acreage for that purpose, would entail timber management costs essentially proportional to the proposed timber sale volume. These would be consistent with past management costs for this purpose. The alternatives that exclude the most lands from timber harvest would tend to increase costs per unit of timber sold, as necessary road investments and maintenance costs would be prorated against less volume. Countervailing savings may occur, however, as the more restrictive alternatives tend to leave those lands requiring the least costly mitigation available for harvest.

In contrast, the costs of nontraditional forest management as proposed in the PRMP and Alternative C would be much higher per unit of timber sold than for the other alternatives. The PRMP, with its requirements for watershed analysis, [Late-Successional Reserve assessments, Adaptive Management Area plans] and watershed restoration, entails costs not associated with the other alternatives. Many of these additional costs of the PRMP and Alternative C are associated with the ecosystem management approach which focuses on functions of ecosystems. Many of these functions and related forest conditions are not recognized in quantifiable market values and many expected outcomes will not be realized until many years after investments are made.

The annual cost of implementing Alternative NA would be similar to the Roseburg District's Fiscal Year 1993 budget, with slight adjustment for inflation, or approximately $13,000,000. Cost estimates for Alternatives A, B, C, D, and E have not been developed. The initial annual cost of implementing the PRMP is reflected in the Presidents' Fiscal Year 1995 budget, approximately $16,000,000 for the Roseburg District. There is not yet, however, a clear understanding of what the management needs and costs of the ecosystem management approach will be, so future year budget estimates may differ as experience is gained in implementing the PRMP.

The Budget Link

Timber sale levels and associated programs will be reduced if annual funding is not sufficient to support the relevant actions assumed in the plan, including mitigation and monitoring. The extent of the reduction will be based on the principle of program balance as envisioned in the plan. For example, if funding in a given year is sufficient only to support half of planned annual investments in precommercial thinning, the otherwise anticipated timber sale volume for that year would be reduced by half of the portion of the declared Allowable Sale Quantity attributable to precommercial thinning. If, in subsequent years, budget levels permit BLM to eliminate the backlog of unfunded investments that have accumulated, timber sale levels will be adjusted upward to the extent that the work can be accomplished. If subsequent budget levels create a cumulative shortfall over a few years, the Allowable Sale Quantity will be adjusted downward.

This principle will apply similarly to management of roads and other facilities. If maintenance of such facilities is not adequately funded, some of them may be closed to scale back management commitments to the level that is budgeted.

Monitoring

The BLM planning regulations (43 CFR 1610.4-9) call for the monitoring and evaluation of resource management plans at appropriate intervals.

Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The implementation of the RMP will be monitored to ensure that management actions: follow prescribed management direction (implementation monitoring), meet desired objectives (effectiveness monitoring), and are based on accurate assumptions (validation monitoring) (see Appendix U). Some effectiveness and most validation monitoring will be accomplished by formal research.

Monitoring will be an integral component of many new management approaches such as adaptive management and ecosystem management.

Adaptive management is based on monitoring that is sufficiently sensitive to detect relevant ecological changes. In addition, the success of adaptive management depends on the accuracy and credibility of information obtained through inventories and monitoring. Close coordination and interaction between monitoring and research are essential for the adaptive management process to succeed. Data obtained through systematic and statistically valid monitoring can be used by scientists to develop research hypotheses related to priority issues. Conversely, the results obtained through research can be used to further refine the protocols and strategies used to monitor and evaluate the effectiveness of RMP implementation.

Monitoring results will provide managers with the information to determine whether an objective has been met, and whether to continue or modify the management direction. Findings obtained through monitoring, together with research and other new information, will provide a basis for adaptive management changes to the plan. The processes of monitoring and adaptive management share the goal of improving effectiveness and permitting dynamic response to increased knowledge and a changing landscape. The monitoring program itself will not remain static. The monitoring plan will be periodically evaluated to ascertain that the monitoring questions and standards are still relevant, and will be adjusted as appropriate. Some monitoring items may be discontinued and others may be added as knowledge and issues change with implementation.

Watershed analysis is one of the principal analyses that will be used to meet the ecosystem management objectives. Information from watershed analysis will also be used in developing monitoring strategies and objectives. Specific to monitoring, the results and findings from watershed analysis are used to reveal the most useful indicators for monitoring environmental change, detect magnitude and duration of changes in conditions, formulate and test hypotheses about the causes of the changes, understand these causes and predict impacts, and manage the ecosystem for desired outcomes. Watershed analysis will provide information about patterns and processes within a watershed and provide information for monitoring at that scale.

The monitoring process will collect information in the most cost effective manner, and may involve sampling or remote sensing. Monitoring could be so costly as to be prohibitive if it is not carefully and reasonably designed. Therefore, it will not be necessary or desirable to monitor every management action or direction. Unnecessary detail and unacceptable costs will be avoided by focusing on key monitoring questions and proper sampling methods. The level and intensity of monitoring will vary, depending on the sensitivity of the resource or area and the scope of the proposed management activity.

RMP monitoring will be conducted at multiple levels and scales. Monitoring will be conducted in a manner that allows localized information to be compiled and considered in a broader regional context, and thereby address both local and regional issues. At the project level, monitoring will examine how well specific management direction has been applied on the ground and how effectively it produces expected results. Monitoring at broader levels will measure how successfully projects and other activities have achieved the objectives for those management areas.

Monitoring will be coordinated with other appropriate agencies and organizations in order to enhance the efficiency and usefulness of the results across a variety of administrative units and provinces. The approach will build on past and present monitoring work. In addition, specific monitoring protocols, criteria, goals, and reporting formats will be

developed, subject to review and guidance of the Regional Ecosystem Office. This guidance will be used to augment and revise the monitoring plan and facilitate the process of aggregating and analyzing information on provincial or regional levels.

Monitoring results will be reported in an "Annual Program Summary", which will be published starting the second year following initial implementation of this RMP. The Annual Program Summary will track and assess the progress of plan implementation, state the findings made through monitoring, specifically address the Implementation Monitoring Questions posed in each section of this Monitoring Plan and serve as a report to the public.

Each Resource Area will be responsible for the collection, compilation and analysis of much of the data gained through monitoring activities. Resource Areas will report their findings and recommendations to the District for consolidation and publication in the Annual Program Summary.

The monitoring plan for the RMP is tiered to the Monitoring and Evaluation Plan for the SEIS Record of Decision. That Monitoring and Evaluation Plan is not yet fully refined. Therefore, this Monitoring Plan is not complete. BLM has been, and will continue to be, a full participant in the development of the SEIS Monitoring and Evaluation Plan. Ongoing BLM effectiveness and validation monitoring will continue where it is relevant to Resource Management Plan direction (e.g., stocking surveys, threatened and endangered species studies, and water quality measurements).

The SEIS and RMP monitoring plans will not identify all the monitoring the Roseburg District will do. Activity and project plans may identify monitoring needs of their own.

Research

A research plan will be developed by the Research and Monitoring Committee identified in the SEIS ROD.

Ongoing research in Riparian Reserves will be analyzed to insure that significant risk to the watershed does not exist. If significant risk is present and cannot be mitigated, study sites will be relocated. Some activities not otherwise consistent with the objectives may be appropriate, particularly if the activities will test critical assumptions of the President's Forest Plan; will produce results important for establishing or accelerating vegetation and structural characteristics for maintaining or restoring aquatic and riparian ecosystems; or the activities represent continuation of long-term research. These activities will be considered only if there are no equivalent opportunities outside of Riparian Reserves and Key Watersheds.

Tables follow

Table 2-1. Comparisons of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Water Quality and Riparian Zones		
Protection of Riparian Management Areas (Average width in feet each side of stream)		
Stream Order: 1	*	
2	*	
3	*	105
4	*	150
5	*	210
6+	*	240
Lakes, ponds, and other waters	NA	150
RMA (acres)	NA	34,576
Riparian Reserves (acres)	113,500	NA
Fragile Soils: Acres excluded from harvest or other ground disturbing activities (i.e., FGR acres in Alternative E)		0

*Riparian Reserve Widths: Fish bearing streams – 300 ft or 2 site potential trees
Permanent flow, non-fish bearing streams – 150 ft or 1 site potential tree
Intermittant streams – 100 ft or 1 site potential tree
(For complete description of Riparian Reserves, see Chapter 2, Riparian Reserves)

Old Growth and Mature Forest Habitat		
Management Direction	Manage 44% of the land as Late-Successional Reserves. Manage 23% of land as Riparian Reserves. Manage 6% of the land as Connectivity/ Diversity Blocks for old growth associated species.	Manage 29% of the land as an old growth emphasis area. Manage 16% of land as connectivity area for old growth associated species.
Acres managed for retention and development of older forest.	305,500	144,600
Acres managed for maintenance of older forest characteristics.	28,700	66,400
Older Forest Retained.	104,700	61,200

No Action	A	B	C	D	E
					50
				60	60
100	75	75	105	140	200
100	75	100	150	200	200
100	75	140	210	280	280
100	75	160	240	320	320
	75	100	150	200	400
18,300	16,886	18,220	29,308	52,282	61,764
NA	NA	NA	NA	NA	NA
0	0	0	0	0	105,577
		Contribute to habitat diversity and old growth in a corridor system with blocks of 640 acres connected by 80-acre stepping-stone blocks.	Manage for retention and improvement of biological diversity maintaining 16% of the land in restoration and retention blocks.	Manage as recommended by the 1990 Conversation Strategy for the northern spotted owl.	Contribute to habitat diversity protecting existing stands over 150 years old, suitable spotted owl habitat within two miles of each spotted owl site and additional habitat to benefit amphibians and pileated woodpeckers.
0	0	30,400	77,900	133,400	343,700
35,900	0	0	270,200	0	0
42,800	13,900	31,100	48,200	73,400	115,500

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Timber		
Forest Management Allocations (acres):		
Intensive	61,200[4]	144,300
Restricted	28,700[4]	188,300
Woodlands	0	0
Enhancement of Other Uses or Not Available	305,500	63,000
Practices (assumed average annual acres for 1st decade):		
Regeneration		
Harvest	11,900	32,200
Woodland Regeneration Harvest	0	0
Commercial Thinning/Density		
Management Harvest	840/660	1300/5100
Brushfield/Hardwood Conversion	150	500
Site Preparation		
Prescribed Fire	8400	24,200
Other	500	1,600
Planting, regular stock	2,850	3,900
Planting, genetic stock	11,400	34,700
Stand Maintenance/Protection	8,300	21,600
Stand Release/Precommercial Thinning	39,000	52,800
Fertilization	14,400	58,200
New Road Construction (miles/acres)	65/350	215/1173
Harvest (MMCF)	7.0	16.3
Harvest (MMBF)	45	105
Special Status Species including threatened and Endangered Species Habitat		
Management Direction	Manage habitats of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.	Manage habitats of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.
Acres managed for all Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species plants and animals	419,007	419,007
Wildlife (Including Fisheries)Habitat		
Buffer width, special habitats (feet)	100-200	100-200
Fish habitat improvement (miles)	25	25

No Action	A	B	C	D	E
331,600	353,300	318,900	0	0	23,900
35,900	0	2,400	207,200	207,200	23,400
NA	2,900	2,600	*	0	0
34,400	39,400	71,600	125,300	188,400	348,200
57,000	74,000	66,600	32,400	18,900	6,700
NA	600	500	*	0	0
1400/0	1700/0	1600/0	1100/4300	1000	*
0	600	500	0	300	100
44,500	30,000	30,000	24,300	10,400	5,000
4,000	3,700	3,300	1,600	700	300
52,300	54,100	45,200	19,400	9,300	1,600
15,200	34,700	34,700	19,400	13,300	6,400
70,800	49,600	44,600	21,700	9,300	4,500
40,400	57,000	55,100	43,500	32,400	7,800
55,600	62,300	57,600	47,300	36,300	8,300
500/2727	500/2727	450/2455	190/1036	190/1036	35/191
40.5	47.7	44.0	11.2	14.3	3.2
247	315	291	74	92	18
Manage habitats of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.	Protect habitats of Federal Candidate, State Listed and Bureau Sensitive species where such mitigation would not diminish commercial use.	Same as a plus protect those habitats on public domain lands.	Same as B plus additional protection provided by management for older forests.	Protect habitats Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.	Same as D.
423,896	62,806	113,325	116,965	419,074	419,074
0	0	0	100-200	100-300	100-300
25	25	25	25	25	25

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Special Areas		
Existing ACEC/RNAs retained (#/acres)	4/613	4/613
Other Existing ACECs retained (#/acres)	2/7061	2/7061
New ACEC/RNAs designated (#/acres)	2/964	2/964
Other new ACECs designated (#/acres)	2/1685	1/727
Environmental Education Areas (#/acres)	0	0
Total ACED/RNAs (#/acres)	6/1577	6/1577
Total Other ACECs	4/8746	3/7788
Recreation Resources		
Recreation sites		
Existing (# sites/acres)	12/1136	12/1136
New (# sites/acres)	17/173	17/173
Trails maintained		
Existing (# trails/acres)	6/14	6/14
New (# trails/acres)	13/35	13/35
Special Recreation Management Areas		
Existing (#/acres)	1/1620	1/1620
New (#/acres)	2/3950	2/3950
Back Country Byways (#/miles)		
Existing (#/miles)	3/34	3/34
Proposed (#/miles)	3/70	3/70
Acres open to OHV use	0	405,004
Acres limited to OHV use	423,422	414,659
Acres closed to OHV use	2,166	15,131
Wild and Scenic Rivers		
River segments found suitable for designation:		
As Recreational (#/miles)	0	0
As Scenic (#/miles)	0	0
As Wild (#/miles)	0	0

No Action	A	B	C	D	E
4/613	1/170	4/613	4/613	4/613	4/613
5/7076	0	4/7061	4/7061	2/7061	2/7061
0	0	1/793	3/1922	3/1922	3/1922
0	0	0	0	1/727	1/727
1/85	0	0	0	0	0
4/613	1/170	5/1406	7/2535	7/2535	7/2535
5/7076	1/170	4/7061	3/7788	3/7788	3/7788
12/1136	12/1136	12/1136	12/1136	12/1136	12/1136
7/85	0/0	3/65	7/107	17/173	17/173
6/14	6/14	6/14	6/14	6/14	6/14
3/5	0/0	0/0	5/7	13/35	13/35
1/1620	1/1620	1/1620	1/1620	1/1620	1/1620
1/1540	0/0	0/0	1/1540	2/3950	2/3950
3/34	3/34	3/34	3/34	3/34	3/34
3/70	3/70	3/70	3/70	3/70	3/70
414,245	409,712	408,527	407,703	285,661	11,681
0	0	0	0	121,838	395,818
9,655	9,656	10,841	11,665	11,869	11,869
0	0	0	0	0	185
0	0	0	0	0	0
0	0	0	0	0	0

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Visual Resources		
	Manage as inventoried lands adjacent to recreation sites, state and federal highways, scenic waterways and rivers designated wild and scenic, available forest lands where federal ownership consists of more than half the viewshed and areas of critica environmental concern/research natural areas. Manage rural interface areas as VRM III as a minimum. Manage all other forest lands as VRM IV.	Same as A except on available forestland where BLM administered land is more than half of a viewshed, management as inventoried.
Acres managed VRM Class I	28	28
Acres managed VRM Class II	18,045	38,348
Acres managed VRM Class III	4,385	6,224
Acres managed VRM Class IV	396,546	375,538

No Action	A	B	C	D	E
	Manage available forestlands as VRM Class IV and all other lands as inventoried.	Manage available forestlands as inventoried within 1/4 mile of recreation site, State and Federal highways and designated rivers. Manage other available forestland as VRM Class IV. manage all other lands as inventoried.	Same as A except on available forestland where BLM administered land is more than half of a viewshed, management as inventoried.	Manage all lands as inventoried.	Same as D except manage as VRM Class III all lands inventoried as Class IV, and manage as Class I all lands within 1/3 mile of recreation sites, State and Federal highways and designated rivers.
28	28	28	28	28	6,311
9,300	15,176	30,194	43,514	86,779	141,887
13,600	2,005	6,681	7,189	22,855	271,937
401,070	402,929	383,235	369,403	310,501	0

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Land Tenure		
	Exchanges or acquisitions would be made to benefit any of the resources managed.	Exchanges or acquisitions would be made to benefit any of the resources managed.
Acres identified for retention (Zone 1).	35,930	35,930
Acres potentially eligible for exchange only (Zone 2).	380,749	380,749
Acres potentially eligible for sale or exchange (Zone 3).	13,470	13,470
Rights-of-Way		
Rights-of-way Exclusion Areas (acres)	1577	1577
Energy and Mineral Management		
Acres available for oil and gas and geothermal leasing.	421,062	421,062
Acres closed to oil, gas and geothermal lease.	28	28
Acres open to mining claim location and operation.	414,323	414,323
Acres closed to mining location.	5,050	5,050

No Action	A	B	C	D	E
	Make exchanges to enhance nondeclining timber harvest level on BLM administered land. Sell or lease no commercial timberland.	Make exchanges of O&C and CBWR lands emphasizing opportunities primarily to enhance timber management opportunities. Sell public domain lands and O&C lands other than available commercial forestlands, meeting criteria of FLPMA Sec. 203(a). Make leases to accommodate other appropriate uses.	Same as B except also make exchanges to contribute to conservation of biological diversity.	Emphasize exchanges to acquire lands with nontimber values. Sell lands other than available commercial forestlands, meeting criteria (1) or (2) of FLPMA Sec. 203(a). Lease only under the Recreation and Public Purpose Act.	Same as D.
429,438	35,930	35,930	35,930	35,930	35,930
0	380,749	380,749	380,749	380,749	380,749
711	13,470	13,470	13,470	13,470	13,470
713	195	1406	2535	2535	8846
421,062	421,062	421,062	421,062	421,062	421,062
28	28	28	28	28	28
416,162 3,211	416,960 2,413	415,674 3,699	414,500 4,873	414,323 5,050	412,951 6,422

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Rural Interface Area Management		
Acres considered for alternative management practices	8,552	8,552
Acres where clearcutting, herbicide spraying and prescribed burning excluded	8,552	8,552

[1] See narrative for management direction common to all alternatives..
[2] Order 1 and 2 perennial stream would have a 75-foot Riparian Management Area (RMA) .
[3] Order 1, 2, and 3 fish-bearing streams would have a 150-foot RMA.
[4] Includes acreage as modified in Adaptive Management Area.
* Less than 100 acres

No Action	A	B	C	D	E
0	0	8,552	8,552	8,552	24,052
0	0	0	8,552	8,552	24,052

Table 2-2. Proposed Fish Habitat Enhancement Projects

Priority	Stream	Project Type
1	Wolf Creek (Tyee)	S,R,C,P,M
1	Rader Creek	S,R,C
1	Little Wolf Creek	S,R,C,P
1	Case Knife Creek	S,R
1	Boulder Creek	S,R,M
1	Stouts Creek	S,R,C,M
1	Shively Creek	S,R,M
1	East Fork Shively Creek	S,R
1	Pass Creek	S,R,M
1	East Pass Creek	S,R
2	South Fork Smith River	S,R,C
2	Little south Fork Smith River	S,R,C
2	Yellow Creek	S,R,C
2	Olalla Creek	S,R
2	Thompson Creek	S,R
2	Deadman Creek	S,R
2	Middle Fork Deadman Creek	S,R
2	Lee's Creek	P
2	Slide Creek	P
2	Cavitt Creek	S,R,P
2	Canton Creek	S,R
3	Upper Smith River	S,R,C
3	Martin Creek (Drain)	S,R
3	Fate Creek	S,R
3	Days Creek	S,R
3	Dompier Creek	S,R
3	Union Creek	S,R
3	Martin Creek (Dillard)	S,R

S=Structures
R=Rearing Habitat
P=Passage
C=Riparian Conversion
M=Monitoring

Table 2-3. Potential and Existing Recreation Sites and Trails

	Alternatives						
	NA	A	B	C	D	E	PRMP
Existing Rec Sites							
Susan Creek	Y	Y	Y	Y	Y	Y	Y
Millpond	Y	Y	Y	Y	Y	Y	Y
Rock Creek	Y	Y	Y	Y	Y	Y	Y
Scaredman	Y	Y	Y	Y	Y	Y	Y
Cavitt Creek	Y	Y	Y	Y	Y	Y	Y
Swiftwater	Y	Y	Y	Y	Y	Y	Y
Tyee	Y	Y	Y	Y	Y	Y	Y
Gunter Wayside	Y	Y	Y	Y	Y	Y	Y
Cow Cr. Recreational Gold Pan Area**	Y	Y	Y	Y	Y	Y	Y
Lone Rock Boat Launch	Y	Y	Y	Y	Y	Y	Y
Emile	Y	Y	Y	Y	Y	Y	Y
North Umpqua Trailhead							Y
Potential Rec Sites							
North Umpqua Trail Primitive Campsite**	Y	N	N	Y	Y	Y	Y
Susan Creek Group Reservation Camp	Y	N	N	N	Y	Y	Y
Eagleview **	N	N	N	N	Y	Y	Y
Osprey Boat Ramp**	Y	N	Y	Y	Y	Y	Y
Hardscrabble+	N	N	Y	Y	Y	Y	Y
Island Creek** +	Y	N	N	N	Y	Y	Y
Weaver Road Pond	Y	N	N	N	Y	Y	Y
Michigan Springs	N	N	N	N	Y	Y	Y
Brickyard Pond	N	N	N	N	Y	Y	Y
Chimney Rock Pond	N	N	N	N	Y	Y	Y
Pickett Bridge**	N	N	N	N	Y	Y	Y
Lavadoure Boat Ramp	N	N	N	N	Y	Y	Y
Red Top Pond	N	N	N	N	Y	Y	Y
Iron Mountain Gold Panning**	Y	N	Y	Y	Y	Y	Y
Hubbard Creek OHV Area	N	N	N	N	Y	Y	Y
Olalla-Thompson Creek **							Y
Existing Trails							
North Umpqua Trail	Y	Y	Y	Y	Y	Y	Y
Susan Creek Falls Trail	Y	Y	Y	Y	Y	Y	Y
Wolf Creek Falls Trail	Y	Y	Y	Y	Y	Y	Y
Susan Creek Complex Trails**	Y	Y	Y	Y	Y	Y	Y
Deadline Falls Watchable Wildlife Trail	Y	Y	Y	Y	Y	Y	Y
Miner-Wolf Cr Watchable Wildlife Tr **	Y	N	N	Y	Y	Y	Y

Table 2-3. Potential and Existing Recreation Sites and Trails (continued)

	Alternatives						
	NA	A	B	C	D	E	PRMP
Potential Trails							
Cow Creek Bluffs Trail+ **	N	N	N	N	Y	Y	Y
Salt Creek Trail+	Y	N	N	N	Y	Y	Y
Deadman Mountain Trail	N	N	N	Y	Y	Y	Y
Wolf Creek Falls Trail Extension	N	N	N	Y	Y	Y	Y
Upper Susan Creek Falls Trail	N	N	N	N	Y	Y	Y
Susan Creek Falls Barrier Free Trail	Y	N	N	Y	Y	Y	Y
Tyee Mountain Trail	N	N	N	Y	Y	Y	Y
Eagleview Trail	Y	Y	Y	Y	Y	Y	Y
Red Top Pond Trail							Y
Ben Irving Trail							Y
Alexander Butte Trail							Y
Bushnell-Irwin Rocks Trail							Y
Cougar Creek Trail							Y
Potential SRMA							
Cow Creek Canyon SRMA	Y	N	N	Y	Y	Y	Y
Umpqua River SRMA							Y

Y = Yes, N = No
+ Land acquisition needed.
** Proposed Withdrawal from public land and mineral law.

Table 2-4. Classifications and Withdrawals Recommended for Termination or Revocation

Case No.	Withdrawing Agency	Original Purpose	Rationale for Termination Revocation
OR 05564	BLM	Small Tract Act Classification	Land is now leased under Sec. 302 of the FLPMA of 1976.
OR 010044	BLM	Recreation and Public Purpose	Lease terminated
OR 011654	BLM	Small Tract Act	Lease terminated Classification
OR 16775	BLM	Small Tract Act Classification	Land is now leased under Sec. 302 of the FLPMA of 1976

Table 2-5. Proposed Land Allocations (acres) for Special Areas

Special Area	Current Designation	Proposed Designation	Proposed Allocation NA	A	B	C	D	E	PRMP
Bear Gulch	None	ACEC/RNA	0	0	0	330	330	330	330
Beatty Creek	RNA	ACEC/RNA	173	0	173	331	331	331	331
Brad's Creek*	ACEC	ACEC	127	0	127	127	0*	0*	0
Bushnell-Irwin Rocks	None	ACEC/RNA	0	0	683	958	958	958	958**
Golden Bar*	ACEC	ACEC	93	0	93	93	0*	0*	0
Little River Arch	ONA	NONE	15	0	0	0	0	0	0
Myrtle Island	RNA	ACEC/RNA	30	0	30	30	30	30	30
North Bank	ACEC	ACEC	6221	6221	6221	6221	6221	6221	6221
North Myrtle Creek	ACEC/RNA	ACEC/RNA	240	0	240	472	472	472	472
North Umpqua River	ACEC	ACEC	1620	0	1620	1620	1620	1620	1620
Red Pond	EEA	ACEC/RNA	85	0	0	134	134	134	134
Tater Hill	ACEC/RNA	ACEC/RNA	170	170	280	280	280	280	280
Umpqua River Wildlife Area	None	ACEC	0	0	0	0	947	947	947
TOTAL			8774	6391	9467	10596	11323	11323	11323

*Acreage included in the Umpqua River Wildlife Area ACEC.
**Bushnell-Irwin Rocks designated as an ACEC under the PRMP.

Table 2-6. Acres of Protected Special Status Plant Habitat and Buffers by Alternative

Species	Category	Alternatives NA	A	B	C	D	E	PRMP
Aster vialis	FC	9	0	0	0	9	9	9
Astragalus umbraticus	AS	0	0	0	0	33	33	0
Bensoniella oregana	FC	3	0	0	0	3	3	3
Calochortus coxii	FC	71	6	9	9	71	71	71
Calochortus umpquaensis	FC/SE	123	38	38	38	123	123	123
Cimicifuga elata	FC	1	0	0	0	1	1	1
Horkelia conqesta ssp. congesta	FC	15	15	15	15	15	15	15
Lewisia cotyledon var. howellii	FC	56	56	56	56	56	56	56
Limnanthes gracilis var. gracilis	BS	2	2	2	2	2	2	2
Lupinus sulphureus var kincaidii	FC	2	1	1	1	2	2	2
Mimulus kelloggii	AS	0	0	0	0	5	5	0
Polystichum californicum	AS	0	0	0	0	11	11	0
Romanzoffia thompsonii	BS	30	30	30	30	30	30	30
Sedum spathulifolium ssp. purdyi	AS	0	0	0	0	19	19	0
Wolffia borealis	AS	9	9	9	9	9	9	9
Total Habitat Acres		321	156	160	160	421	421	338
Total Habitat Acres-Percent		67	31	32	32	100	100	67
Total Buffer Acres		0	0	458	458	996	2719	766

AS = Assessment Species
BS = Bureau Sensitive
FC = Federal Candidate
SE = State Endangered

Table 2-7. Oil and Gas and Geothermal Lease Restrictions (Acres)[1]

Restriction	NA	A	B	C	D	E	PRMP
Closed - Nondiscretionary	28	28	28	28	28	28	28
Closed - Discretionary	0	0	0	0	0	0	0
Open - No Surface Occupancy	8,078	5,709	8,785	9,914	10,641	10,641	9,683
Open - With Standard Lease Terms	388,946	378,949	367,373	351,195	159,775	252,735	356,329
Open - With Additional Restrictions	22,321	34,741	43,187	58,236	248,929	155,969	53,333

[1] Total acres include 1,717 acres of split estate.

Table 2-8. Locatable Mineral Restrictions (Acres)

Restriction	NA	A	B	C	D	E	PRMP
Closed - Nondiscretionary	294	294	294	294	294	294	294
Closed - Discretionary	2,917	2,119	3,405	4,579	4,756	6,128	4,776
Open - Standard Requirements	395,349	396,226	394,720	393,546	366,247	391,270	366,247
Open - With Additional Restrictions	20,814	20,814	20,814	20,814	48,076	21,681	20,814

Table 2-9. Salable Mineral Restrictions (Acres)[1]

Restriction	NA	A	B	C	D	E	PRMP
Closed - Nondiscretionary	28	28	28	28	28	28	28
Closed - Discretionary[2]	6,689	4,446	7,522	8,615	9,378	9,378	8,387
Open - Standard Requirements	407,436	409,679	406,603	405,474	380,747	404,747	381,738
Open - With Additional Restrictions[3]	5,218	5,218	5,218	5,218	29,218	5,218	29,218

[1] Total acres include 1,717 acres of split estate.
[2] Withdrawals, ACECs, cultural sites, areas suitable for designation as a recreational river.
[3] Time restrictions within 1/4-mile of any migratory bird site.

Table 2-10. Special Recreation Management Areas

Name of SRMA	Acres	Status	Type	Features / Designations
North Umpqua River	1,620	Existing	Congressional	Wild & Scenic River, National Scenic Byway, Area of Critical Environmental Concern, National Recreation Trail, Watchable Wildlife Sites, Intensive Recreation Developments.
Cow Creek	1,710	New	Administrative	Back Country Byway, O&C History, Watchable Wildlife Sites, Existing and Potential Recreation Developments.
Umpqua River	2,240	New	Administrative	Existing and Potential Recreation Developments, Watchable Wildlife, Back Country Byway, Interpretation of Timber Harvesting.

Special Recreation Management Area acreages include a minimum of 1/4-mile on each side of respective rivers, roads, or recreation sites.

Table 2-11. Lands Available For Scheduled Timber Harvest

Land Use Allocation	Net Land Use Allocation	Gross mapped Land Use Allocation
Matrix		
General Forest Management Areas (including Visual Resource Management Class II, Rural Interface, and TPCC restricted)	54,900	152,330
Connectivity/Diversity Blocks	26,900	70,950
Adaptive Management Areas	8,100	19,260

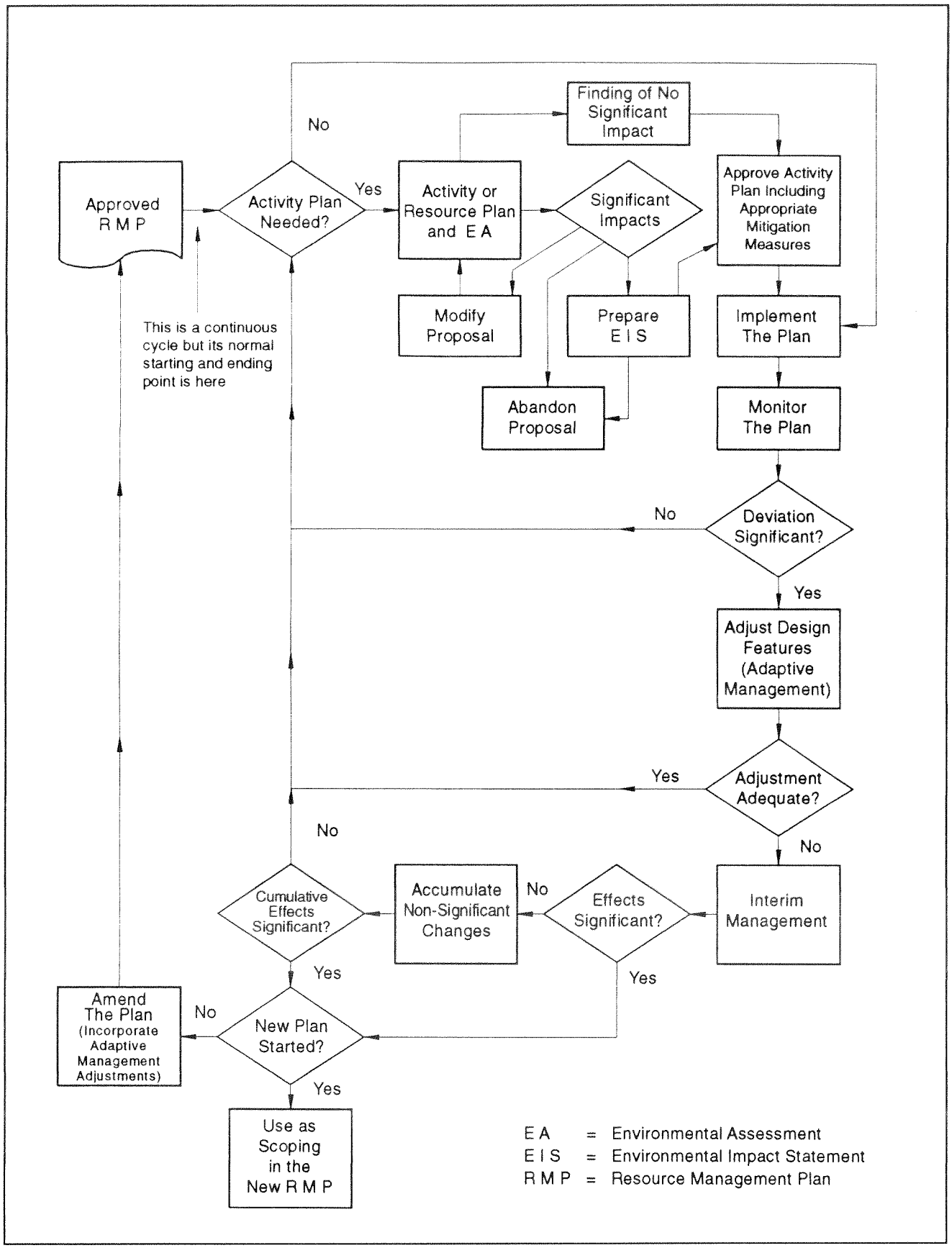
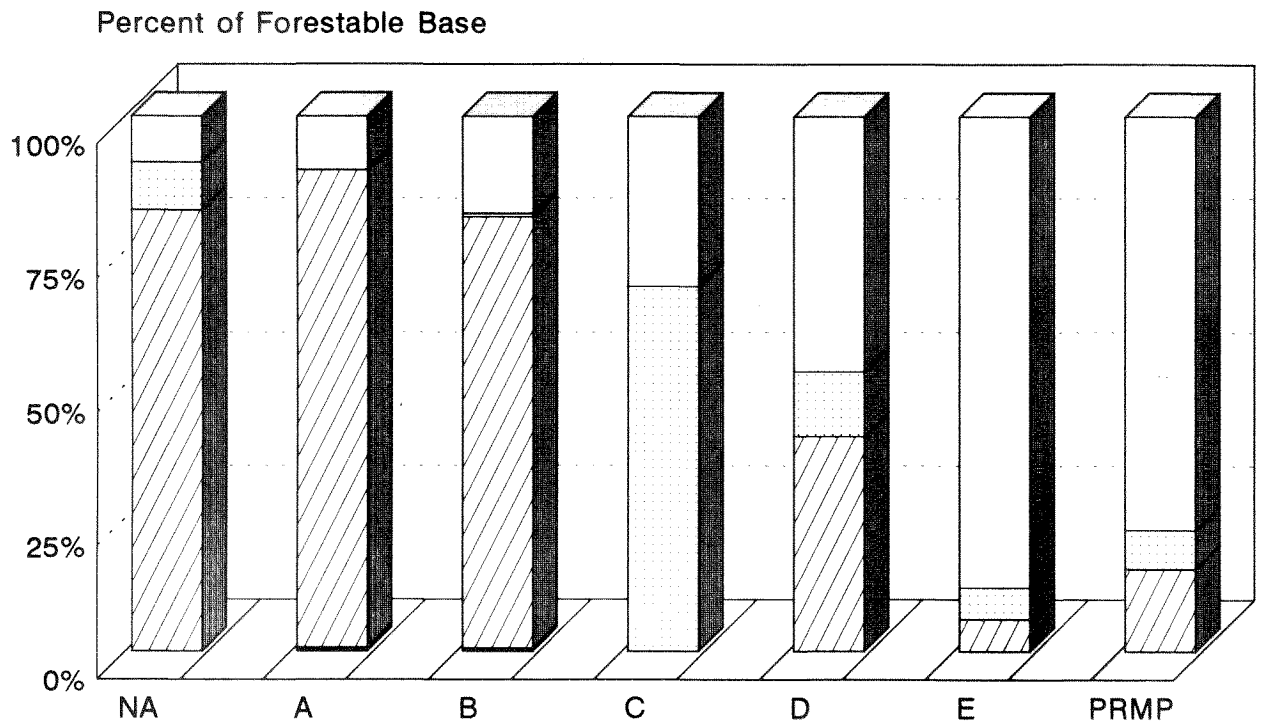


Figure 2-1. *Process for Changing the Resource Management Plan*

Figure 2-2. Availability of Forest Lands and Woodlands for Timber Production by Alternative



	NA		A		B		C		D		E		PRMP	
SMA's (Out-of-Base)	34,400	8.6%	39,400	10.0%	71,600	18.1%	125,300	31.7%	188,400	47.6%	348,200	88.0%	305,500	15.9%
Restricted Base	35,900	8.9%	0	0%	2,400	0.6%	270,200	68.3%	47,900	12.1%	23,400	5.9%	28,700	47.6%
Intensive Base	331,600	82.5%	353,300	89.3%	318,900	80.6%	0	0%	159,300	40.3%	23,900	6.0%	61,200	36.5%
Suitable Woodlands	0	0%	2,900	0.7%	2,600	0.7%	100	0%	0	0%	0	0%	0	0%

SMA: Special Management Areas, Reserves in the PRMP, lands managed for resources other than timber.

Figure 2.2. *Availability of Forest Lands and Woodlands for Timber Production by Alternative*

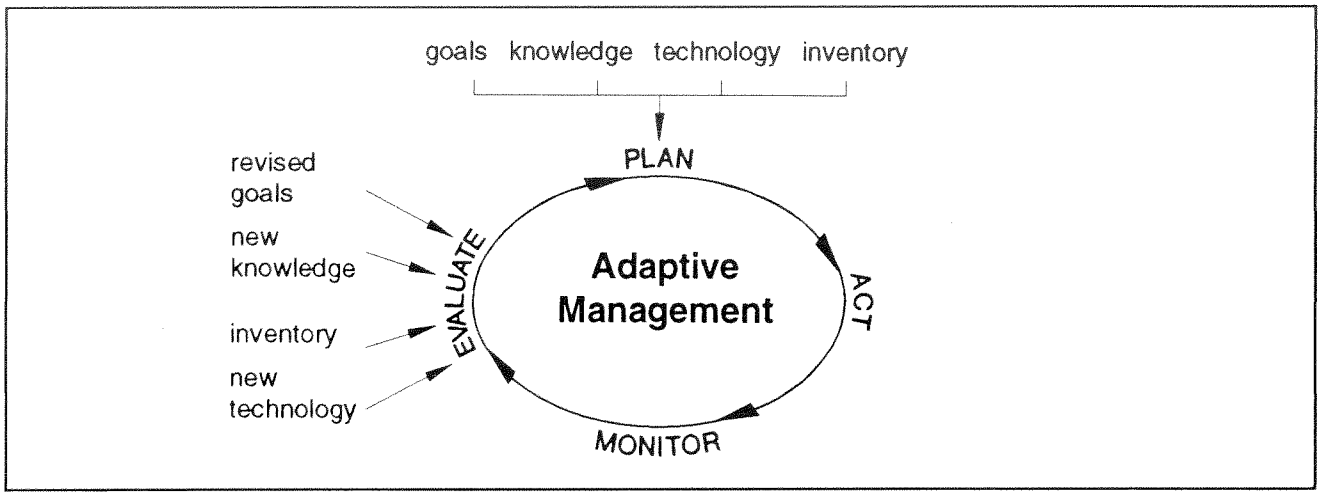
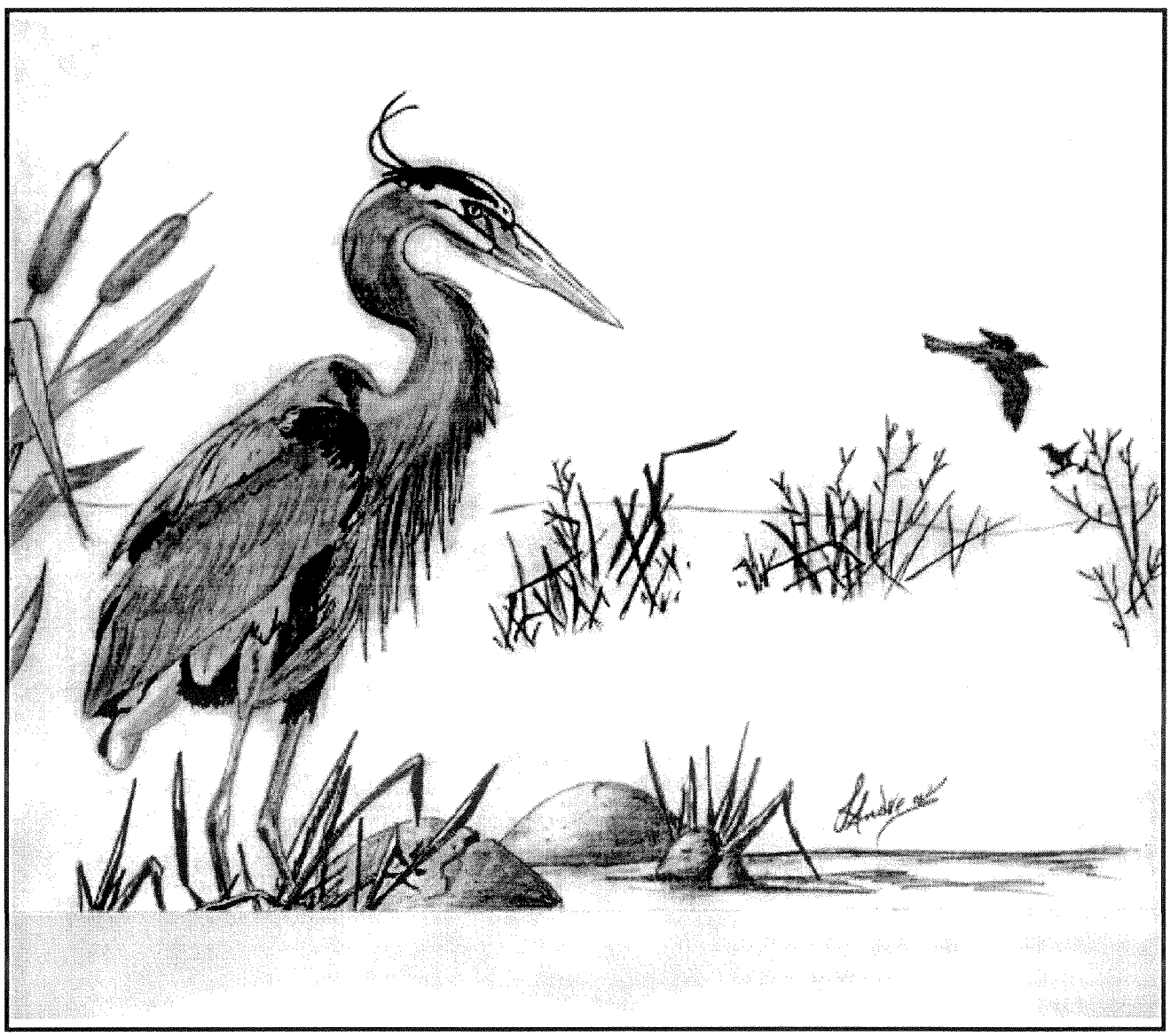


Figure 2-3. *Adaptive Management Process*

Chapter 3
Affected Environment



Summary of Major Changes from Chapter 3 of the Draft Resource Management Plan

The watershed condition index discussion has been dropped. A brief discussion of SEIS Special Attention Species has been incorporated into the Special Status Species section.

Introduction

This chapter describes the physical, biological, and socioeconomic characteristics of the BLM-administered lands as they now exist on the Roseburg District. Emphasis has been placed on resources that could be affected by BLM management alternatives as described in Chapter 2. Information provided is commensurate with the importance of impacts, and less important material has been summarized or simply referenced.

The primary sources of information used in preparing this chapter were BLM Planning System documents developed by the district. The Analysis of the Management Situation, and other resource inventories are available for review at the Roseburg District Office, 777 Garden Valley Blvd., Roseburg, OR 97470, during normal working hours. Other references are cited within the text by author and date of publication. A listing of these references appears in the References Cited section.

Preparation of this chapter is heavily dependent on the Bureau Automated Resource Data and supporting Geographic Information System technology. Acres used, unless otherwise noted, are derived from Automated Resource Data/Geographic Information System. As they are computer generated they may not be the same as shown on the Master Title Plats, which are computed from cadastral survey notes and represent official acres. Likewise, Automated Resource Data acres may differ from previously published BLM statistics, inventory records, timber sale maps or similar documents.

Climate

The area has a temperate marine climate with warm summers and mild, wet winters. In Roseburg, the mean maximum temperature is 84° F, the mean minimum is 33° F. The record high was 109° F in 1946 and the record low was -6° F in 1888. Monthly precipitation, mostly as rain, ranges from 5.46 inches in Riddle and 8.89 inches in Reston during January to less than 0.3 inches during July. Average precipitation is about 45 inches annually in the Roseburg District. The maximum recorded was 60 inches at Twelvemile Creek. Snow may block roads in some winters, but snow is generally short-lived.

Air movement patterns are predominately from the north, except during the late fall and early winter months (November, December, January), when winds are southerly. Mean yearly wind speeds in Roseburg are 4.5 miles per hour.

During the late summer and fall months, the valleys and interior hills of Douglas County are subject to frequent night-time inversions — cool air stabilizing below warmer air above. Specific information on the extent and duration of these conditions within the area is not available.

Geology and Topography

The Roseburg District is located within the Coast Range, the Klamath Mountain and the Western Cascades physiographic provinces. The Coast Range is made up of submarine basalts and marine sediments of the Tyee and Umpqua Formations. The Klamath Mountain province is geologically complex, consisting of marine sediments, plutonic and volcanic rocks that have been folded, faulted, and metamorphosed. The topography is rugged due to the resistant type of rock found there. Serpentine is fairly widespread in the Klamath Mountains, and extends northeasterly from the Cow Creek area through the central and southern part of the district. Granite and diorite bedrock are found in several large areas in the southeastern part of the district. These erode easily, creating steep, short sideslopes and sharp ridges.

Also found in the Klamath Mountain province are thickly bedded sandstone and thin interbeds of mudstone, volcanic rock sometimes called

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greenstone because of the abundance of chlorite, and a chert pebble conglomerate overlain by sandstone, siltstone and conglomerate. The Western Cascade Province is characterized by a rugged topography with irregular ridges and deep narrow valleys. The rocks are mostly volcanics. Intrusive rock bodies in the Western Cascades are generally small and consist of plugs, dikes, sills, and domes.

Throughout the district, slopes range from zero percent to vertical and average about 60 percent. Over 40 percent of the area has slopes in excess of 65 percent. Elevations range from 150 feet at Elkton, 500 feet at Roseburg and 650 feet at Myrtle Creek to 2,800 feet at Baughman Lookout, 3,900 feet at Dutchman Butte, 4,400 feet at Deadman Mountain and 4,800 feet at Huckleberry Mountain.

Lands and Transportation

Land Status

As shown on Map 1-2, BLM-administrated lands are primarily in a checkerboard ownership pattern. Table 3-1 displays the BLM ownership by county within the planning area. The BLM ownership is approximately 29 percent of the district.

Land Tenure

Under the land use plan approved in 1983, the district has sold nine parcels of public land totaling approximately 60 acres. No lands were acquired through revocation of withdrawals or land exchanges.

The district currently has several documented exchange proposals, and receives inquiries and verbal proposals on a regular basis.

Proposed land tenure adjustments under this plan will be conducted under the following concept: public lands are designated into three zones which identify the relative importance to efficient and beneficial resource management of the lands. A general description of each zone may be found in Chapter 2.

When Oregon was admitted to the union as a state, the Federal government granted title to sections 16 and 36, to aid in the support of schools. Under the grant, the State of Oregon is entitled to select another 5,202.29 acres of public domain land. The State is preparing to select the lands called "in-lieu lands" in Western Oregon.

State ownership of the beds and banks of navigable bodies of water was granted to Oregon in 1859 as an incidence of statehood. In the Roseburg District, the division of state lands has determined there is sufficient evidence to support a claim of navigability and state ownership for portions of the North and South Umpqua Rivers. More detail is provided in Appendix P.

Table 3-1. Lands within Planning Area by County and Public Land Status

	Acreage of				
County	O&C	CBWR	PD	Total Surface	Reserved Minerals
Douglas	390,978	13,924	18,426	423,328	1,717
Lane	280	0	0	280	0
Jackson	320	0	0	320	0
Totals	391,578	13,924	18,426	423,928*	1,717

* Acreages based on most recent surveys taken from Master Title Plats.
O&C - Oregon & California Act of 1937
CBWR - Coos Bay Wagon Road
PD - Public Domain

Land Use Authorizations

There are five Federal Land Policy Management Act section 302 leases, covering approximately four acres, currently administered by the district. These leases are for residences partially or wholly located on public land. Douglas County maintains Richard Baker County Park as a day use area under a Recreational and Public Purpose lease.

Withdrawals and Classifications

Withdrawals and classifications existing on the district are shown in Appendix V. Withdrawals generally segregate lands from operations under the general non-discretionary land laws, mining laws, and sometimes the mineral leasing laws but they do not always necessarily affect BLM surface management. Classifications generally segregate the lands from all forms of appropriations under the public land laws, including the mining laws, but not the mineral leasing laws. All BLM withdrawals and classifications existing in 1984 which are subject to the review provisions of Federal Land Policy Management Act 204(l) and 202(d) have been reviewed (except powersite classifications, reserves, and water power designations) and recommendations for continuance, termination, or reduction in size have been forwarded to the Oregon State Office.

All powersite reserve classifications, water power designation withdrawals, and other agency withdrawals are scheduled to be reviewed during the 1990s. No withdrawal petition applications or relinquishments are pending.

Rights-of-Way Corridors, Major Rights-of-Way and Leases

Existing undesignated right-of-way corridors include Bonneville Power Administration and private utility transmission lines. These corridors are shown on Map 3-1 and include lines of 115kV and greater voltage. The Western Regional Corridor Study Map (1992) identifies existing corridors within the planning area. The future upgrading of existing transmission lines is considered likely and may require additional right-of-way width. Pacific Power plans to submit an application to renew their North Umpqua Hydroelectric Project, Federal Energy Regulatory Commission Project 1927.

There are no other permit applications for Federal Energy Regulatory Commission hydroelectric projects in the planning area. To date solar and wind power electrical generation has not occurred on public land. Advances in technology during this planning period could increase interest in the public lands for developing these alternative energy resources.

Douglas County is reviewing the possibility of building Milltown Hill Dam. This project requires acquisition of private land and rights-of-way across public land for access and water impoundment.

Additional rights-of-way have been granted for: the construction of logging roads, driveways and utility lines for servicing residences, domestic and irrigation water pipelines, legal ingress and egress, etc. Many of these grants are within or adjacent to road clearing limits.

Because public and private lands are intermingled within the district boundary, each party must cross the lands of the other in order to access their timber. Throughout most of the district this has been accomplished through Reciprocal Logging Road Right-of-Way Agreements with neighboring private landowners. The individual agreements and associated permits (a total of 140 on the district) are subject to the regulations which were in effect when they were executed or assigned. Appendix W displays the individual agreements.

Communication Sites

There are six communication sites located on public land in the district with locations shown on Map 3-1. Five are developed sites with numerous users and are occupied with two-way, microwave and low power translator type users; these uses are generally compatible. A passive reflector has been installed on the sixth site. Users with high power transmissions are usually not compatible with existing uses on these developed sites. There is a high probability of need for additional sites in the future to accommodate all user groups and to satisfy the demand expected to be created by new technology including satellite communications, cellular mobile, etc. Additional sites have not been identified by the public, but it is assumed that the higher elevation areas will be targeted.

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Roads

In support of the timber management program, an average of 60 miles of road per year have been constructed and an average of 1100 miles of road per year maintained during the period 1983-1990. Table 3-2 displays the current inventory of BLM controlled roads. Existing roads occupy approximately 15,900 acres. Easements and/or reciprocal right-of-way agreements provide physical access to approximately 90 percent of district lands for timber management. The district has also developed 120 man-made structures or access points in streams and rivers to provide water for the prescribed fire program, for suppression of wildfire or for use in road construction or maintenance operations.

The miles of road on the district which are controlled or improved by the BLM, including roads under contract, are listed by Federal Highway Functional Classification (1989), as single or double lane, and by surfacing type. They are displayed in Table 3-2.

Air Resources

The federal Clean Air Act, as amended in 1990, is designed to reduce air pollution, protect human health, and preserve the Nation's air resources. To protect air quality, the Clean Air Act requires federal agencies to comply with all federal, state and local air pollution requirements (Section 118).

Several federal air quality programs under the Clean Air Act regulate prescribed burning and other activities. The National Ambient Air Quality Standards are set to protect human health and welfare. Pollutant concentrations that exceed the National Ambient Air Quality Standards endanger public health. Air pollutants for which federal National Ambient Air Quality Standards have been established are called "criteria" air pollutants. They include particulate matter (PM10), sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide and lead.

Table 3-2. Current Road Inventory

	Current Miles (As of October 1991)				
	Functional Classification[1]			Standard	
Surface Type	Arterial	Collector	Local	Single Lane	Double Lane
Natural	0	17	442	460	0
Pit Run	7	134	411	554	0
Grid Rolled	0	13	133	146	0
Screened Base	0	0	1	1	0
Aggregate Base	8	91	222	321	0
Aggregate Surface	71	344	805	1,208	11
Bituminous Surface	128	23	5	77	78
Crushed Sandstone	0	4	33	38	0
Totals	214	626	2,052	2,805	89

[1] Functional classifications are defined as follows: (US Department of Transportation, Federal Highway Administration 1989):

Arterial Roads - These provide service to large land areas, and usually connect with public highways or other arterial roads to form an integrated network of primary travel routes. The location and standards are often determined by a demand for maximum mobility and travel efficiency, rather than specific resource management service. They are usually developed and operated for long term land and resource management purposes and constant service.
Collector Roads - These serve smaller land areas and are usually connected to an arterial or public highway. They collect traffic from local roads or terminal facilities. The location and standards are influenced by long-term multi-resource service needs, as well as by travel efficiency. Collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.
Local Roads - These roads connect terminal facilities[2] with collector or arterial roads or public highways. The location and standard are usually determined by the need to serve a specific resource activity or project, rather than travel efficiency. Local roads may be developed and operated for either long or short-term service.

[2] A terminal facility is usually a site at the end of a road or adjacent to a road, such as trailheads, landings, viewpoints, wayside stops, parking spurs, or comfort stations. The access to terminal facilities is usually less than 0.1 miles in length and is considered an integral part of the parent road. Terminal facilities are found on all three road classifications.

The Clean Air Act requires each state to develop, adopt, and implement a State Implementation Plan (sometimes referred to as a SIP) to ensure that the National Ambient Air Quality Standards are attained and maintained for the criteria pollutants. These plans must contain schedules for developing and implementing air quality programs and regulations. State Implementation Plans also contain additional regulations for areas that have violated one or more of the National Ambient Air Quality Standards. These areas are called "nonattainment areas." If states fail to submit State Implementation Plans, or fail to adhere to schedules therein, the Environmental Protection Agency has the authority to impose federal sanctions or federal implementation plans.

The Clean Air Act established the Prevention of Significant Deterioration program which prevents areas that currently have clean air from being degraded. This program defines three area classifications based on air quality: Class I, Class II, and Class III. Class I areas are subject to the most limiting restrictions regarding how much additional pollution can be added to the air while still protecting air quality. All National Parks and some Wilderness Areas within the planning area are designated Class I; all lands administered by the Forest Service and Bureau of Land Management within this planning area are Class II. There are no Class III areas within the planning area.

As a national goal, the Clean Air Act also sets the protection of visibility in Class I areas. The visibility protection program provides for remedying existing, and preventing future, impairment to visibility.

The Clean Air Act gives federal land managers of Wilderness Areas (Class I areas) the affirmative responsibility to protect Air Quality Related Values from adverse impacts of air pollution (Section 165(d)). These are values within Class I areas, such as visibility, biological diversity, and water quality, that are necessary to protect.

State and local governments have the authority to adopt their own air quality rules and regulations. These rules can be incorporated into the State Implementation Plan if they are equal to, or more protective than, federal requirements. For example, some states have incorporated smoke management provisions for prescribed burning into their plans.

The State of Oregon Department of Environmental Quality has a State Implementation Plan that has been approved by the Environmental Protection Agency. This State Implementation Plan addresses the criteria pollutants emitted from prescribed burning (PM10), visibility, and smoke management.

The conformity provisions of the Clean Air Act (Section 176(c)), prohibit federal agencies from taking any action that causes or contributes to a new violation of the National Ambient Air Quality Standards, increases the frequency or severity of an existing violation, or delays the timely attainment of a standard. Section 176(c) specifically states that federal agencies must ensure that their actions conform to the applicable State Implementation Plan. The Environmental Protection Agency is required to promulgate criteria and procedures for demonstrating and ensuring conformity of federal actions to a State Implementation Plan. The Environmental Protection Agency finalized these regulations on November 30, 1993 (58 FR 63214). Because prescribed fire emissions affect air quality, conformity determinations must be made at subsequent planning levels, such as watershed and landscape-level analyses, and project/site-specific analyses.

Criteria pollutants emitted from or formed as a result of prescribed fire include particulate matter (PM10), oxides of sulfur and nitrogen, carbon monoxide and ozone. Health effects associated with exposure to criteria pollutant levels greater than the National Ambient Air Quality Standards vary, and include lung damage, the reduction of the blood's ability to carry oxygen, eye irritation, chest pain, nausea, and an increased respiration rate. In terms of effects other than on human health (termed welfare effects), recent studies indicate that some aspects of forest health are adversely affected by several criteria pollutants produced by fire. Additional research is necessary to determine the human health and welfare effects specific to prescribed fire emissions.

Many other noncriteria, but potentially toxic, pollutants are emitted by prescribed fire, including polynuclear aromatic hydrocarbons (sometimes referred to as PAHs) and aldehydes. Effects vary from exposure to these pollutants emitted during combustion. Some polynuclear aromatic hydrocarbons are known or potential carcinogens; other components, such as aldehydes, are acute irritants. Many of these air toxics dissipate or bind with other chemicals soon after release, making it difficult to estimate human exposure and consequential health effects. Additionally, the health and welfare effects of air toxics released by prescribed burning or wildfires have not been directly studied.

PM10 is a term used to describe airborne solid and liquid particles 10 micrometers or smaller in size.

Because of its small size, PM10 readily lodges in the lungs, thus increasing levels of respiratory infections, cardiac disease, bronchitis, asthma, pneumonia, and emphysema. The Environmental Protection Agency is considering a more stringent National Ambient Air Quality Standards for PM10 because recent studies indicate that the current National Ambient Air Quality Standards may not be adequate to protect individuals with a greater sensitivity to these particulates. Typical sources of PM10 include industrial processes, woodstoves, roads, agricultural practices, and prescribed fires and wildfires.

The air quality analysis in this Environmental Impact Statement focuses primarily on the impacts of particulate matter from prescribed burning. Particulate matter (PM10) is of the most interest because of the large quantities emitted from fires, the potential contribution of PM10 from prescribed and wildfires to pollutant concentrations above the PM10 standard, the major reduction of visibility caused by PM10, and the role PM10 plays as a carrier of other toxic pollutants.

The population centers of Eugene/Springfield, Oakridge, Grants Pass, Medford Air Quality Management Area, Klamath Falls, and LaGrande are currently in violation of the PM10 standard and classified as non-attainment areas for this pollutant. The non-attainment status of these communities is generally not attributable to prescribed fire. In addition, the air quality in Grants Pass has significantly improved and it may be removed from the list of non-attainment areas.

The Smoke Management Plan is administered by the Oregon Department of Forestry as an element of the State Implementation Plan which is administered by the Oregon Department of Environmental Quality. The Smoke Management Plan has classified certain population centers as designated areas and specific recreation areas during periods of heavy public use, as smoke sensitive areas. Smoke management instructions, which the Roseburg District follows, are issued by Oregon Department of Forestry under the Smoke Management Plan. These instructions direct the ignitions of prescribed fires based on favorable atmospheric conditions that disperse smoke in consideration of designated/special use areas. Map 3-2 shows the "designated areas"; Class I areas, which are defined as wilderness areas over 10,000 acres in size, and Class II areas with the potential of becoming Class I areas within the Roseburg District.

The Clean Air Act gives the National Ambient Air Quality Standards and goals for visibility. Visibility goals are established to prevent significant deterioration of the visibility in Class I wilderness areas which were in existence on August 7, 1977. The Oregon Visibility Protection Plan outlines the goals toward rectifying existing impairment and protecting future visibility. In an effort to determine the effectiveness of the standards and goals toward meeting improved air quality, strategies have been established that describe specific actions to be taken regarding prescribed fire. In order to determine if air quality improvement is occurring according to the Smoke Management Plan, a base line time period from 1976-1979 was established for particulate emissions. The major strategy identified in the Smoke Management Plan identifies a 50 percent reduction in particulate emissions by the year 2000. Current data indicates that particulate emissions have been reduced by approximately 42 percent since the baseline period was established.

Weather patterns strongly influence air quality and smoke management by controlling the dispersion of emissions from fires. The primary weather conditions that affect dispersion are atmospheric stability, mixing height, and transport wind speed. Atmospheric stability refers to the tendency for air to mix vertically through the atmosphere. Mixing height is the vertical distance through which air is able to mix. Transport wind speed is a measure of the ability of air to carry emissions away from a source horizontally. These three factors determine the ability of the atmosphere to disperse and dilute emissions that are released from prescribed fires and wildfires.

The physiography, or physical shape, of landscapes interacts with and controls some weather patterns that influence emission dispersion. Many of the interior basins of the Pacific Northwest (e.g., the Willamette Trough and many southwest Oregon river valleys) can trap emissions during periods when the atmosphere is relatively stable and winds are light. The mixing height is shallow, and pollutants may accumulate near the ground in these basins. This atmospheric condition is most likely to occur at times from November to March. However, little underburning or broadcast burning occurs at this time of year. In other physiographic provinces, and during the remainder of the year, prescribed burning is conducted when transport winds are not expected to carry emissions to smoke-sensitive areas in quantities that affect Prevention of Significant Deterioration increments and visibility. Furthermore, prescribed burning activities are coordinated with state and local air quality agencies to ensure that atmospheric stability and mixing heights are advantageous for dispersion.

Prescribed fire use during the recent past was analyzed to assess the effect on air quality of implementing the alternatives in this Environmental Impact Statement. The years 1985 through 1992 were analyzed because prescribed fire use trends for this period were representative of recent forest management practices, and because data quality was reasonably good. Detailed reporting of prescribed fire statistics is required in the Oregon Smoke Management Plan.

Prescribed burning during the mid-to-late 1980's reflects a large amount of burning to dispose of harvest residues (usually called "slash burning") and to reduce moisture stress and growing-space competition from other onsite vegetation. Slash burning was used to reduce wildfire hazard and to prepare harvested sites for planting. Very little (less than 10 percent) of the burning that occurred from 1985 to 1992 was for ecosystem management purposes. From 1990 to 1992, PM10 emissions from prescribed burning declined rather sharply. During that period, the acreage requiring prescribed fire for slash burning and site preparation was reduced due to decreased timber harvesting. Emissions also decreased with the use of emission reduction techniques.

Table 3-3 shows a steady decrease in the tons per acre emissions from the calculated baseline period of 1976-1979. The average annual Roseburg District prescribed fire fuels consumption per acre during the 1976-1979 period was 103,238 tons on 2,264 acres, and during 1984-1988 it was 111,382 tons on 3,350

Table 3-3. Annual Slash Consumption and Pollutant Emissions[1]

Year	BLM acres Burned	Consumption Rate(Ton/ac.)	Tons Consumed	TSP[2]	PM10[3]	Volatile Compounds Organic[4]	Carbon Monoxide[5]	Sulfur Oxides[6]	Nitrous Oxides[7]	Total Contaminants
1976	2,264	45.6	103,238	1,698	(1,296)	1,291	13,984	206	206	17,384
1977	2,264	45.6	103,238	1,698	(1,296)	1,291	13,984	206	206	17,384
1978	2,264	45.6	103,238	1,698	(1,296)	1,291	13,984	206	206	17,384
1979	2,264	45.6	103,238	1,698	(1,296)	1,291	13,984	206	206	17,384
1980	2,409	33.4	80,461	1,324	(1,010)	1,006	10,898	161	161	13,550
1981	1,389	33.4	46,393	763	(582)	580	6,284	93	93	7,813
1982	1,249	33.4	41,717	686	(524)	521	5,651	83	83	7,025
1983	1,870	33.4	62,458	1,027	(784)	781	8,460	125	125	10,518
1984	1,656	33.4	53,310	877	(669)	666	7,221	107	107	8,978
1985	2,960	33.4	98,864	1,626	(1,241)	1,236	13,391	198	198	16,648
1986	3,095	33.4	103,373	1,700	(1,297)	1,292	14,002	207	207	17,408
1987	2,900	33.4	96,860	1,593	(1,216)	1,211	13,120	194	194	16,310
1988	2,788	33.4	93,119	1,532	(1,169)	1,164	12,613	186	186	15,681
Total:	**29,372**		**1,089,509**	**17,922**	**(13,673)**	**13,619**	**147,574**	**2,179**	**2,179**	**183,473**
Average										
1976-79	2,264		103,238	1,698	(1,296)	1,290	13,984	206	206	17,384
1981-84	1,541		50,970	838	(640)	637	6,904	102	102	8,583
1985-88	2,936		98,054	1,613	(1,231)	1,226	13,281	196	196	16,512
1981-88	2,238		74,512	1,226	(935)	931	10,093	149	149	12,547
Total Dist. Average	**2,259**		**83,808**	**1,379**	**(1,052)**	**1,048**	**11,352**	**168**	**168**	**14,113**

[1]Average emissions of carbon dioxide and water vapor are greater than 90 percent of all emissions and are not included in this table. Carbon dioxide emissions average 1 to 1-1/2 tons fuel consumed.
[2]Average emission is 34 pounds/ton fuel burned for broadcast burn and 12 pounds/ton fuel burned for piles.
[3]Average emission is 26 pounds/ton fuel burned for broadcast burn and 8 pounds/ton fuel burned for piles. As the PM 10 is a component of Total Suspended Particulate it is not included in the total contaminants.
[4]Volatile Organic Compounds are a diverse class of compounds containing hydrogen, carbon and oxygen. Average emission is 25 pounds/ton burned.
[5]Average emission is 20 to 500 pounds/ton fuel. Carbon monoxide is unstable and dissipates rapidly in the atmosphere. (Used 270 lb./ton.)
[6]Sulfur oxides (SOx), which includes sulfur dioxide, are produced in small quantities and have average emissions of 4 pounds/ton fuel burned.
[7]Nitrous oxides (NOx), which includes nitrogen dioxide, have average emissions of 4 pounds/ton fuel burned.
Sources: Sandberg, et.al., (1979); U.S EPA (1978), and Ward, et.al., (1988).

acres. The Roseburg District has reduced fuels consumption by 12.4 tons per acre below the baseline period.

This reduction in particulate matter emissions is due to a change from fall to spring scheduling of prescribed fire projects. In spring-like burning, the larger fuels are not consumed due to high fuel moisture. Fuel consumption is lower, creating less emissions, with smoke dispersal easier to achieve under the general meteorological conditions that prevail at this time. The use of advanced firing techniques such as rapid aerial ignition reduce emissions by accelerating the combustion process while hand and machine piling allow for burning during the late fall and winter when weather conditions are optimal for smoke dispersion. Burning of piled material is generally a more efficient method of combustion and can be scheduled during unstable weather conditions which are the best for smoke dispersion. The reduction is also attributed to the use of alternatives to burning. Removal of heavy fuels, boles and limbs, for use as secondary wood products, power generation, and firewood, will have some application in the future, but the use of this material is dependent upon environmental constraints and available markets.

Misconceptions concerning the relationship between woodstoves and prescribed fire continue despite the data collected. While industrial sources and dust account for a major part of non-attainment in some areas, woodstove particulate pollution is the major cause of non-attainment in Klamath Falls, Medford Air Quality Management Area, Grants Pass, LaGrande, Oakridge, and Eugene/Springfield. Generally, non-attainment status is the result of winter periods of air stagnation and woodstove use. Prescribed fire conducted at the same time as woodstove use, under the guidance of the Smoke Management Plan, is not a significant contributor to non-attainment status.

Particulate matter entering a designated area from a prescribed fire is called an intrusion. These intrusions are classified from light to heavy. During a three year period (1987-89), an average of 25 intrusions occurred per year in Western Oregon (Oregon Department of Forestry report) which were generally light to moderate in intensity and of short duration. A paper entitled "A Report on Prescribed Burning in Oregon, 1990", prepared for the Joint Interim Environment, Energy, and Hazardous Material Committee of the Oregon Legislature shows that forestry prescribed fire smoke is not a major contributor to PM10 non-attainment.

Not all harvest units require treatment by prescribed fire. Some are not treated or treated by mechanical means. The decision to use prescribed fire as a treatment depends on the resource management objectives for a site. One site may require prescribed fire to meet silvicultural and fire hazard objectives, while another site may require prescribed fire to meet ecological/biological diversity objectives. Other sites may not have particular silvicultural or fire hazard constraints and be treated by a mechanical means or may not require any treatment. Mechanical or no treatment may not reduce the amount of fuel and the wildfire hazard may still require consideration.

Soils

Soil is a highly variable and complex layer of unconsolidated material. It consists of airspace, water, chemicals, gases, organic material, living organisms, and rock fragments. Soil is a fundamental component of the environment upon which all renewable resources of the Roseburg District are dependent. The combined influences of time, parent material, climate, living organisms, and topography of a site have interacted to form a soil with a unique set of characteristics. These characteristics determine the productivity and management requirements of each soil.

Soils provide many functions such as storing and delivering water to streams and lakes as well as providing a medium for plant growth. The concept of soil productivity is a measure of a soil's ability to produce vegetation. Vegetation growth requires that the soil provide adequate moisture, aeration, nutrients, and anchorage. A number of soil properties (organic matter content, nutrients, texture, structure, porosity, and depth) are recognized as important for vegetation growth. These properties are influenced by soil displacement, compaction, erosion, and organic matter removal.

Soils information (distribution and characteristics) has been collected by Soil Conservation Service and BLM soils scientists and is available at the district office. The Soil Conservation Service has mapped soils on the district at a scale of 1:24,000. The Soil Conservation Service has provided detailed soil characteristics including profile descriptions, texture classification, permeability, available water capacity, pH, etc. as well as interpretations by soil series.

The Soil Conservation Service has delineated large areas that have a distinctive pattern of soils,

topography, and drainage. Each delineation, or soil association, is a unique natural landscape and consists of one or more major soils and some minor soils. Twenty-five soil associations occur in the district. The soil associations were mapped using soil, climate (temperature and precipitation), landform, and geologic data. More detailed soil information is available at the district office.

An intensive inventory, Timber Productivity Capability Classification, provides site specific information concerning land the district manages (see Timber Resources section). This information identifies fragile sites where the timber growing potential is easily reduced due to inherent soil properties and landform characteristics. Detailed information and classification descriptions are contained in the Roseburg District Timber Production Capability Classification Handbook, Oregon Handbook 5251, and in the timber resources section of this chapter.

Table 3-4 displays acreage of fragile forest sites that are judged to be biologically and/or environmentally incapable of supporting a sustained yield of forest products; these acreage are Timber Production Capability Classification classified as Fragile Nonsuitable Woodland and are not included in the Commercial Forest Land base. Lands not included in the Commercial Forest Land base because of critical moisture supplying capacities, severe nutrient problems, or high ground water levels may be harvested only when it is essential to the harvesting of adjacent Commercial Forest Land. However, lands that are out of the base because of critical slope gradients and mass movement potential receive total protection from all harvesting and site preparation activities.

Table 3-5 displays acreage of forest sites less fragile than the Nonsuitable woodland acres. These sites (fragile suitable, restricted) are judged to be subject to unacceptable soil productivity loss as a result of forest management activities, unless special restrictive or mitigation measures (see Best Management Practices, Appendix J) are used to protect them.

Water Resources

The Federal Water Quality Act of 1987 directs federal agencies to comply with all State substantive and procedural requirements to restore and maintain water quality necessary to protect identified beneficial uses. For silvicultural activities, these requirements focus on nonpoint source pollution and include designated beneficial uses, water quality criteria, and a antidegradation policy which together are addressed through the design, implementation, monitoring, and evaluation of Best Management Practices. Water resource responses to forest management practices are described by forest hydrology which is a collection of complex processes that transform precipitation to streamflow and/or groundwater. Appendix X discusses these processes and their relationship to forest management practices.

Table 3-4. Fragile Nonsuitable Woodland[1]

Classification of Woodland	Acres	Percent BLM Forest Land Base
Soil Moisture	13,965	3.4
Nutrient	4,525	1.1
Slope Gradient	1,834	0.5
Mass Movement Potential	1,212	0.3
Surface Erosion Potential	0	0.0
Groundwater	433	0.1
Total	21,969	5.4

[1]These are lands where timber growing potential will be reduced due to soils having critical moisture supplying capacities, severe nutrient problems, critical slope gradients, mass movement potential, severe surface erosion potential, or high ground water levels. See the "TPCC Classification" BLM Manual Supplement, Oregon State Office Handbook 5251-1 for more detailed description (USDI,BLM,OSO 1986b).

Table 3-5. Fragile Suitable, Restricted Forest Land[1]

Classification of Forest Land	Acres Land Base	Percent BLM Forest
Soil Moisture	20,090	4.9
Nutrient	768	0.2
Slope Gradient	105,577	25.6
Mass Movement Potential	22,584	5.5
Surface Erosion Potential	4,991	1.2
Groundwater	3,884	0.9
Total	157,894	38.3

[1]These are lands where the timber growing potential may be reduced due to the soils having critical moisture supplying capacities, severe nutrient problems, critical slope gradients, mass movement potential, severe surface erosion potential, or high ground water levels. See the "Timber Production Capability Classification" BLM Manual Supplement, Oregon State Office, Handbook 5251-1 for more detailed description (USDI,BLM,OSO 1986b).

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The beneficial uses and water quality criteria have been identified by the Oregon Department of Environmental Quality for the 14 major river basins defined by Oregon Water Resources Department. The Roseburg District is within the Umpqua and South Coast basins. The beneficial uses are listed in the Oregon Administrative Rules for the Umpqua (Oregon Administrative Rule 340-41-282) and South Coast (Oregon Administrative Rule 349-41-322) basins. The more common beneficial uses on the Roseburg District include rearing and spawning habitat for salmonoids, resident fish and aquatic life, domestic water supply, fishing, water contact recreation, irrigation, and aesthetic quality. Appendix CC has a complete listing of beneficial uses for these basins. The Department of Environmental Quality has also defined the water quality criteria for the Umpqua (Oregon Administrative Rule 340-41-285) and South Coast (Oregon Administrative Rule 340-41-325) basins to protect these designated beneficial uses. The general basin guidelines and antidegradation policy are stated in Oregon Administrative Rule 340-41-026.

Oregon water law considers all water to be public owned. The right to store and/or apply surface and ground water to a beneficial use is granted through a appropriative process by the Oregon Water Resource Department (Oregon Water Laws, Volume I, Chapter 537). The BLM participates in this process for forest management related water uses.

Existing Water Resources

The Roseburg District is divided into 15 major watersheds within the Umpqua and South Coast basins that are called Analytical Watersheds. Analytical Watersheds were identified to display Watershed condition on a large landscape level. Each Analytical Watershed was selected according to topography and basin size; they range from 39,477 acres (Canton Creek) to 224,236 acres (Elk Creek). The Middle Fork Coquille Analytical Watershed in the South Coast basin is a shared watershed with approximately 20 percent of the area on the Roseburg District and the remaining on Coos Bay District (see Map 3-3). The Umpqua Basin contains 14 of the Analytical Watersheds which are listed in Table 3-6 with total watershed area, percent of watershed in BLM management, and miles of BLM managed streams by stream order. The Roseburg District does not manage 100 percent of any Analytical Watershed. The largest percentage of BLM

Table 3-6. Roseburg District Analytical Watersheds in the Umpqua Basin

Watershed Name	Analytical Watershed Acres	Percent of Watershed in BLM Management	Stream Order	Miles of Stream
Upper Smith River	50,907	62	1&2	309
			3	65
			4	31
			5	27
			6+	23
Elk Creek	224,236	25	1&2	1,240
			3	246
			4	126
			5	71
			6+	74
Calapooya	183,661	8	1&2	414
			3	153
			4	76
			5	38
			6+	26
Upper Umpqua Frontal	79,384	46	1&2	176
			3	85
			4	40
			5	22
			6+	26
Lower North Umpqua	108,114	4	1&2	96
			3	40
			4	15
			5	8
			6+	1
Little River	47,113	37	1&2	144
			3	42
			4	16
			5	11
			6+	19
Rock Creek	88,925	46	1&2	239
			3	97
			4	36
			5	12
			6+	24
Canton Creek	39,477	45	1&2	235
			3	35
			4	16
			5	8
			6+	11

Table 3-6. Roseburg District Analytical Watersheds in the Umpqua Basin (continued)

Watershed Name	Analytical Watershed Acres	Percent of Watershed in BLM Management	Stream Order	Miles of Stream
South Umpqua/ Roseburg	122,868	4	1&2	95
			3	42
			4	21
			5	5
			6+	12
Lower South Umpqua	65,740	38	1&2	321
			3	76
			4	30
			5	26
			6+	27
Olalla/Lookingglass	134,934	24	1&2	433
			3	130
			4	69
			5	42
			6+	29
Myrtle Creek	76,230	41	1&2	279
			3	87
			4	50
			5	27
			6+	26
Upper South Umpqua	101,693	43	1&2	465
			3	114
			4	57
			5	31
			6+	25
Cow Creek	116,250	36	1&2	694
			3	140
			4	66
			5	36
			6+	43

land in an Analytical Watershed is 62 percent in the Upper Smith River.

There are 29 community water systems within the district boundary (see Map 3-4). The BLM-administered land within the associated watersheds range from zero to 70 percent of the total area. Table 3-7 lists these community systems with the source watershed, population served, and watershed ownership.

The Roseburg District has entered into memorandums of understanding with the cities of Drain, Riddle, and Canyonville. The objective of these agreements is to maintain the best water quality through specific Best Management Practices. A Special Land Use Permit has been issued to the City of Myrtle Creek for watershed protection which includes the city intake and the adjoining 190 acres.

A hydrologic system of stream classification called stream order (Strahler, 1957) has been adopted for this planning process. For this system, unbranching headwater streams are first order, two first orders join to make a second order stream, two second orders join to make a third order, and so forth. The miles of stream by order on the Roseburg District administrated lands in the Umpqua basin are displayed in Table 3-6. The first and second order streams are generally intermittent and third order and larger are perennial. The first and second order streams have the highest stream density.

Stream order does describe stream value relative to beneficial uses. However, stream protection measures at the project level have recognized site specific beneficial uses and identified no harvest buffer areas along streams. The most critical beneficial uses recognized are anadromous and resident fisheries and domestic use.

There are small unnamed lakes, ponds, pump chances, and various size reservoirs within the district boundary. A comprehensive inventory of the small waterbodies is not available. Under Oregon's water right appropriation process, Roseburg District has received either a permit or certificate for the right to store water in five small reservoirs/pump chances (less than 9.2 acre-feet). At least 20 more existing reservoirs/pump chances have pending applications with the Oregon Water Resources Department. The district constructed these sites to provide water for general forest management uses.

There are two county developed reservoirs adjacent to BLM-administrated land that have been constructed for summer streamflow augmentation and flood control. These reservoirs are Ben Irving in the Olalla-Lookingglass Analytical Watershed and Platt I in the Calapooya Analytical Watershed. There are tributaries to these reservoirs that originate on BLM-administered land. The beneficial uses of these waterbodies include fishing, boating, water contact recreation, irrigation, domestic water use, resident fish and aquatic life, and wildlife.

Streamflow measurements have been taken across the district both at gaging stations and other sites by

Table 3-7. Community Water Systems

Community System Name	Source Watershed	Population Served (Number)	Status of Filter	Watershed Area (Ac) BLM	Other	Total
Drain, City of	Bear Creek, Allen Creek	1,200	Yes	1,423	2,973	4,396
Drain, City of	Billy Creek	1,200	Yes	2,695	4,613	7,308
Canyonville, City of	O'Shea Creek	1,100	Yes	2,289	2,866	5,155
Canyonville, City of	West Fork Canyon Creek	1,100	Yes	5,645	7,508	13,154
Canyonville, City of	Canyon Creek	1,100	Yes	6,569	2,722	9,291
Clarks Branch Water Assoc.	South Umpqua River	145	Yes	29,935	50,600	80,019
Clarks Branch Water Assoc.	Bilger Creek	145	Yes	285	553	838
Elkton, City of	Umpqua River	180	Yes	96,848	340,456	437,304
Glide Water Assoc.	North Umpqua River	1,000	Yes	38,777	54,303	93,080
Lawson Acres Water Assoc.	Cow Creek	55	Yes	3,341	4,550	6,791
Milo Academy	South Umpqua River, Lick Cr.	310	Yes	10,396	12,490	22,886
Myrtle Creek, City of	South Umpqua River	3,245	Yes	250	3,480	3,700
Myrtle Creek, City of	Springbrook (5 Springs)	3,245	Yes	235	1,101	1,336
Riddle, City of	Russell Creek	75	No	1,791	1,592	3,383
Riddle, City of	Cow Creek	1,145	Yes	36,591	57,038	93,629
Ridgewood Water District	North Umpqua River	80	Yes	1,278	25,951	27,235
Roberts Creek Water Dist.	South Umpqua River	5,500	Yes	0	4,691	4,691
Roseburg, City of Winchester	North Umpqua River WTP*	24,000	Yes	18,363	108,860	127,223
Roseburg, City of Oakland	Calapooya Creek	6,000	Yes	5,213	61,244	66,457
Sutherlin, City of	Calapooya Creek	4,000	Yes	4,995	47,170	52,165
Sutherlin, City of	Cooper Creek	4,000	Yes	244	2,661	2,905
Tiller Ranger Station	South Umpqua River	100	Yes	10,590	62,742	73,332
Tri City Water District	South Umpqua River	3,000	Yes	34,160	67,074	101,234
Susan Creek Village	North Umpqua River	50	Yes	21,502	15,930	37,433
Wolf Creek Job Corps Users	Little River	340	Yes	3,046	12,161	15,207
Winston Dillard Water Dist.	South Umpqua River	4,500	Yes	24,707	108,610	132,717
Yoncalla, City of	Adams Creek	815	Yes	432	665	1,097
Yoncalla, City of	Wilson Creek	815	Yes	0	683	683
Umpqua Basin Water Assoc.	North Umpqua River	5,000	Yes	0	2,801	2,801

*WTP - Water Treatment Plant

the U.S. Geological Survey, Douglas County, and the Roseburg BLM. The data type includes continuous and instantaneous flow. The district is currently involved in a cooperative agreement with Douglas County Water Resources Survey for the stream gaging of four streams on the district. These streams and respective Analytical Watersheds are Canton Creek in the Canton Creek Analytical Watershed, Rock Creek in the Rock Creek Analytical Watershed, Days Creek in the Upper South Umpqua Analytical Watershed, and Smith River in the Upper Smith River Analytical Watershed. The streamflow period of record starts in 1980 for Canton Creek, 1981 for Rock Creek and Smith River, and 1985 for Days Creek. The area adjusted mean daily minimum and maximum extremes of record shown in Table 3-8.

Table 3-8. Streamflow Measurement

	Area sq mi	Minimum flow cfsm	Maximum Flow cfsm
Canton Creek	54.6	0.12	146.5
Rock Creek	97.6	0.05	74.0
Days Creek	13.4	0.00	43.4
Smith River	21.0	0.02	69.5

Units: • sq mi is area from station in square miles;
• cfsm is streamflow adjusted for area in cubic feet per second per square mile.

The only coinciding station occurrence of a maximum flow is at Canton Creek and Rock Creek on February 22 and 23, 1986. The overall response for the North Umpqua River watershed, which contains these two streams, was estimated to be a five-year flood event that peaked twice within 24 hours. For the many occurrences of zero flow at the Days Creek station, there are corresponding minimum flows for the other streams but not more than one stream at a time.

Water yield for the Analytical Watersheds as inches of annual watershed runoff, average annual streamflow, the estimated 25 year peak flood, and average annual minimum streamflow are displayed in Table 3-9. The water yield is influenced by the differences in precipitation, soil characteristics, and topography. To illustrate these influences across the district, the water yields (adjusted by area) for selected Analytical Watersheds were compared. For this comparison, the Analytical Watersheds were located in the interior valley and mountainous landforms. In the valley, the South Umpqua-Roseburg, Lower South Umpqua, and Olalla-Lookingglass Analytical Watersheds receive an average annual precipitation of 35 to 45 inches. The annual yields are approximately 1.8 cfsm. The higher precipitation and mountainous location of the Rock Creek and Canton Creek Analytical Watersheds receive 65 to 75 inches and annually yield 2.8 to 3.3 cfsm, respectively.

Ground water yield in most areas of the Umpqua Basin are limited but generally have good quality with the exception of a few localized problems. There is a lack of good baseline information to completely assess the current status of groundwater quantity or quality (Oregon Water Resources Department 1985 and 1989). Of the limited information, the interior valley in the area of Myrtle Creek-Glendale, Winston, Sutherlin, and Drain-Yoncalla and western Douglas County, in the Umpqua River and upper Smith River areas, have specific study information by the U.S. Geological Survey.

In the Myrtle Creek-Glendale area (Frank, 1979), coarse sand and gravel beds deposited in some river bottoms are the most permeable and best water yield units. However, the study stated that the real extent and saturated thickness of these alluvial deposits are too small to make them an important source of groundwater supply. These deposits could potentially yield as much as 50-100 gallons per minute, while other volcanic formations nearby yield less than five gallons per minute.

In the Winston area (Robison, 1978), the sedimentary rock formation commonly yields less than ten gallons

Table 3-9. Water Yield

Analytical Watershed	Avg. Annual Precip	Annual Yield (inches)	Avg Annual Flow (cfs)	25 yr** Flood (cfs)	Avg Minimum Flow (cfs)
Upper Smith River	55	35.57	184	13,220	56
Elk Creek/Roseburg	50	25.50	658	45,585	357
Calapooya	45	30.65	648	35,655	342
Upper Umpqua Frontal	50	27.57	252	18,260	78
Lower North Umpqua*	40	37.97	473	18,720	206
Little River	55	35.98	195	8,935	66
Rock Creek	65	37.84	383	20,200	313
Canton Creek	75	44.15	201	9,075	65
South Umpqua/Roseburg	35	23.14	327	19,410	65
Lower South Umpqua	35	24.66	187	10,910	35
Olalla/Lookingglass	45	24.23	376	27,095	36
Myrtle Creek	40	23.14	203	12,440	76
Upper South Umpqua	40	24.66	289	17,720	55
Cow Creek	50	25.79	345	23,730	59

* regulated flow
** Twenty-five year flood discharges are based on acreage within Analytical Watersheds and not on predicted flood levels of major streams in watersheds.

per minute and the basalt less than five gallons per minute. The alluvium deposits are not saturated everywhere in this area making it a poor ground water source. Most wells in the Winston area provide enough water for household use but not adequate for irrigation, community, or large industrial use.

In the Sutherlin area (Robison, 1974), the alluvium is the major source of ground water. The alluvium saturated thickness is sufficient to yield at least ten gallons per minute. The Tyee Formation, sandstone and siltstone, to the west of Sutherlin yields from less than one gallon per minute to as much as 20 gallons per minute. Most wells in the Sutherlin area provide adequate yield for household use but not other larger needs.

In the Drain-Yoncalla area (Robison, 1977), the dominate water yield formations are the sedimentary rocks and the Tyee Formation of sandstone and siltstone. The sedimentary commonly yields less than ten gallons per minute while the sandstone can yield from one to 50 gallons per minute. The potentially higher yielding depth of the sandstone is less than 100 feet. The ground water yield in the area provides adequate amount for household use but not other larger needs.

In western Douglas County (Curtiss, 1984), the alluvium along the Umpqua River can yield from four to 200 gallons per minute. The more dominate sedimentary rocks yield from a few gallons per minute to about 20 gallons per minute. The sedimentary rocks often barely yield adequate amounts for household use.

The Roseburg District is not presently involved in groundwater monitoring other than the maintenance of seven domestic wells utilized for recreation and storage tank replacement. These wells are located at the following recreation sites: Susan Creek Campground (two), Susan Creek day use area, Scaredman Campground, Mill Pond Campground, Cavitt Creek Campground, and Tyee Campground. The district is also addressing the potential for groundwater contamination through the replacement of ten underground storage tanks.

The North Umpqua River has been designated a National Wild and Scenic River which makes it a potential candidate for Outstanding Resource Water classification (Oregon Administrative Rule 340-41-026 (D)). BLM manages 8.4 of the total 33.8 river miles that were designated. Presently, there are no other district stream candidates for Outstanding Resource Water. For additional information on the North Umpqua River, see the Wild and Scenic Rivers section of this chapter.

Water right applications have been filed by the Roseburg District with the Oregon Water Resources for storage and surface water appropriation. The district has been granted four certificates and one permit to store water and one certificate and two permits to appropriate surface water. During 1989-1991 the district filed over 50 applications for storage and/or surface water appropriation. These applications are in permit review status. All district wells meet the ground water volume exemption for filing under Oregon water law and are located at recreational sites.

Existing Stream Channel Condition

The condition of a stream channel has a significant effect on downstream water quality parameters and various beneficial uses. Channel condition can also be affected by up slope condition. Because of the variety of beneficial uses within each Analytical Watershed, as shown in Appendix CC, no one set of stream channel conditions is best. The channel condition depends on the dominant channel process such as deposition or scour of the stream bank and bed. The abundance of stable large woody debris and a healthy riparian ecosystem are also very important factors.

Large woody debris is important to the proper function of streams and rivers. Besides providing habitat for aquatic organisms, this material regulates flow, reduces flood peaks, maintains low flows, prevents erosion, and traps sediment by improving channel storage. Before the mid 1980s, the policy was to remove woody debris from streams. For this reason, many of the streams in all watersheds lack adequate large woody debris.

Future large woody debris recruitment from riparian areas along first and second order channels is limited compared to larger order fishery stream segments. The first and second order stream protection has been mostly contractual specifications and few buffers. Harvesting activities have reduced the overall amount of large woody debris for channel storage of sediment and dissipating stream energy during winter streamflow and storm runoff. Third order and larger have had a variety of stream protection measures which includes no harvest buffers. In the these buffer

stream segments, future large woody debris would be available.

Overall stream channel condition from survey information is unavailable for most streams on the district. However, Oregon Fish and Wildlife Department is currently leading a county wide cooperative stream survey on both federal and private lands. The survey information will greatly improve the district's understanding of stream channel condition.

Existing Upland Conditions

Land and water management are integrally related. The quantity and quality of water in a stream system directly depends on the nature and management of it's watershed (Oregon Administrative Rule 690-41-050). Upland conditions result from climate, geology, soil, topography, vegetation, and land management activities in addition to natural events occurring in a watershed such as wildfire, floods, windstorms, and landslides.

The risk of water quality degradation from natural or human-caused upland conditions exist in varying degree in each Analytical Watershed. The more evident locations associated with surface erosion and mass movement have been classified as Fragile Nonsuitable Woodland in the district's Timber Productivity Capability Classification. This information is discussed in the Soil section of this chapter.

Existing Water Quality Conditions

In 1988, the Oregon State Department of Environmental Quality did an extensive inventory of water quality problems in the State. The results are reported in the Non-point Pollution Assessment Report. Water quality problems are encountered throughout Roseburg District Analytical Watersheds (Appendix Y). Streams where a severe impairment of one or more beneficial uses was reported were designated as A1, while A2 streams are those where conflicting reports on water quality and beneficial use impairment have yet to be resolved. Streams designated as B are those where a moderate impairment of one or more beneficial uses was reported. The Roseburg District has 29 streams rated as A1.

Streams or other waterbodies that have particularly persistent water quality problems and impairment of the support of beneficial use are designated as "water quality limited" by the Clean Water Act (Clean Water Act, Section 303) and require the establishment of Total Maximum Daily Loads. Total Maximum Daily Load is equivalent to the greatest amount of pollution a waterbody can receive without violating water quality standards (Department of Environmental Quality 1986b).

In the planning area, the South Umpqua River has been designated water quality limited by the Department of Environmental Quality. The numeric standards violated are for pH, ammonia toxicity, and dissolved oxygen. The beneficial uses affected are aquatic life and aesthetics. The U.S. Geological Survey is assessing these water quality parameters for the Department of Environmental Quality. The Total Maximum Daily Load parameters are phosphorous, ammonia, and nitrogen.

The Department of Environmental Quality has stated that within the Umpqua River Basin, where most of the land is classified forest land (89 percent), "the most commonly cited causes of beneficial use degradation were vegetation removal along stream banks and road locations next to streams" (in 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution). The most commonly cited land use associated with these disturbances was forestry.

Stream temperature has been sampled across the district. During the summer months all streams monitored exceeded 58 degrees, which is the Umpqua Basin water quality criteria. This means that no temperature increases are allowed in order to protect the beneficial uses. These streams included the cooperative gaging stations with Douglas County at Canton Creek, Rock Creek, Days Creek, and Smith River. Other streams monitored by district personnel are: Pass Creek and its tributary Call Creek in the Canton Analytical Watershed; and Middle Deadman Creek in Upper South Umpqua Analytical Watershed.

Sediment suspended in water is the most visible water quality characteristic in streams. Curtiss (1975) and Onions (1969) reported average annual total sediment yields for streams that flow through Roseburg administered lands and private lands. The sediment yield was 310 tons per square mile for the South Umpqua River at Tiller, 260 tons per square mile for Olalla Creek near Tenmile, 1,900 tons per square mile for Lookingglass Creek near Brockway, 890 tons per square mile for Calapooya Creek near Oakland, and 710 tons per square mile for Elk Creek

near Drain. The sediment range for this study was sampled at Olalla Creek and Lookingglass Creek.

The district has operated automatic water samplers to collect turbidity and suspended sediment samples. These stations included baseline and project evaluations. The data for these stations are currently being reduced and entered into digital format for later analysis.

Vegetation

The vegetation of Oregon has been characterized by Franklin and Dyrness (1973) on the basis of physiographic provinces and vegetation zones. Physiographic provinces are determined by physiography, geology, and soils and vegetation zones by potential (climax) vegetation. According to this system of classification, the Roseburg District is located in the Coast Range, Western Cascade, and Klamath Mountain Provinces and the Western Hemlock, Mixed Conifer, and Interior Valley Vegetation Zones.

Upland vegetation occurring within these vegetation zones in the planning area has been divided into five plant groups. Each plant group represents an association of plant communities with the same major early seral species, the same late seral dominant conifer species, and similar management potential. For the Roseburg District these are:

1. Mixed Conifer/Interior Valley/Grass (MC-IV-GR). This plant group is located in the interior valley of the Umpqua River basin and the upper reaches of the Middle Fork of the Coquille River typically below 1,500 feet elevation. Grasses, herbaceous vegetation, poison oak, and deciduous brush, such as deerbrush (ceanothus), characterize the early seral stage. These species develop the first year after disturbance and may offer severe competition for several years. Conifer species present are predominately Douglas-fir and ponderosa pine. Incense cedar and Jeffrey pine may dominate in areas where serpentine soils are present. Hardwood trees may be present and compete with conifers for moisture and light if in dense concentrations.

2. Mixed Conifer/Madrone-Deciduous Brush/Salal (MC-MB-SA). This group is located along the southern boundary of the planning area starting in the Tiller area and extending west to Big Dutchman Butte and south to district boundary. The conifer overstory consists primarily of Douglas- fir with incense cedar and ponderosa pine prevalent in some areas. Brush species include ocean spray, poison oak, and deerbrush. Salal occupies cooler sites. Golden leaf chinquapin occurs in both shrub and tree forms along with canyon live oak on drier sites. Varnish leaf ceanothus is at times the dominant shrub species during the early seral stages in the western portion of this plant group.

3. Douglas-fir/Rhododendron-Ceanothus/Salal (D-CE-SA). This group is located along the eastern portion of the planning area generally above 2500 feet elevation. Douglas-fir is the predominant overstory species with western hemlock, western red cedar, and sugar pine as associated stand components. Western white pine may make up much of the stand at the highest elevations in the district. Brush species include Pacific rhododendron and salal. Snow brush and varnish leaf ceanothus can become established on disturbed sites. Golden leaf chinquapin in shrub and tree forms is prevalent in some localities. All of the above brush species compete for light and moisture with conifer seedlings in the early seral stage.

4. Douglas-fir/Mixed Brush/Salal (D-B-SA). This group is located at mid elevations approximately 1,500 to 2,500 feet. This group is similar to the Mixed Conifer/Madrone-Deciduous Brush/Salal group in management requirements and responses. Overstory is predominately Douglas-fir with incense cedar and grand fir present over most of the range. Big leaf maple may make up part of the stand component and may sprout vigorously on disturbed sites. Brush species include ocean spray, hazel, and willow. Red alder is usually found in drainages where streams provide adequate moisture. Moisture is normally not a limiting factor and sites are usually resilient to fire. Light is the principle limiting factor to conifer establishment in the early seral stage.

5. Douglas-fir/Red Alder/Vine Maple (D-RA-VM). This group is located along the western edge of the planning area and in the upper South Smith River drainage. The predominate overstory species is Douglas-fir. Western hemlock is dominant in localized areas. Red alder is found in drainages and on wetter sites. Vine maple, hazel, willow, and other deciduous brush species make up a large component of the understory. Moisture is ordinarily not a limiting factor to conifer establishment, but sprouting brush and red alder may limit light necessary for conifer growth. Vegetation composition is influenced by onshore flow of moist marine air.

Five seral stages have been described for the plant groups that occur on the district. The general trend is from high net primary productivity with low biomass

and a high rate of change in species composition in early seral stages, to low net primary productivity, high biomass, and a low rate of change in species composition in late seral stages. A detailed description of each seral stage is provided in the glossary. Table 3-10 displays the dominant vegetation of each plant group by seral stage. Table 3-11 displays the acres of each plant group by seral stage. Map 3-12 displays the location of the five plant groups. Figure 3-1 displays forest seral stages.

Riparian vegetation is restricted to areas adjacent to intermittent or perennial water such as lakes, ponds, rivers, and streams. Composition varies depending on the composition of surrounding upland vegetation, soil characteristics, and hydrology. Riparian areas are generally more complex than adjoining upland plant communities due to the presence of larger trees, greater diversity of species, more Large Woody Debris, and greater structural diversity. Herbs and shrubs are typically more abundant than in adjacent upland communities. Black cottonwood, Oregon ash, and California laurel are common at lower elevations. An association of common sword fern and Oregon wood sorrel in the understory and western hemlock and western red cedar in the overstory is characteristic at higher elevations. Wildlife habitat values of riparian areas are discussed in the Animals section of the Environmental Impact Statement.

Wetland vegetation is often distinct from riparian vegetation. Wetlands occur in areas where the water table is at or near the soil surface for extended periods and which contain hydric soils. Forested wetlands support tree species such as Oregon ash, red alder and western red cedar and are often associated with

Table 3-10. Dominant Plant Group Vegetation[1] by Seral Stage

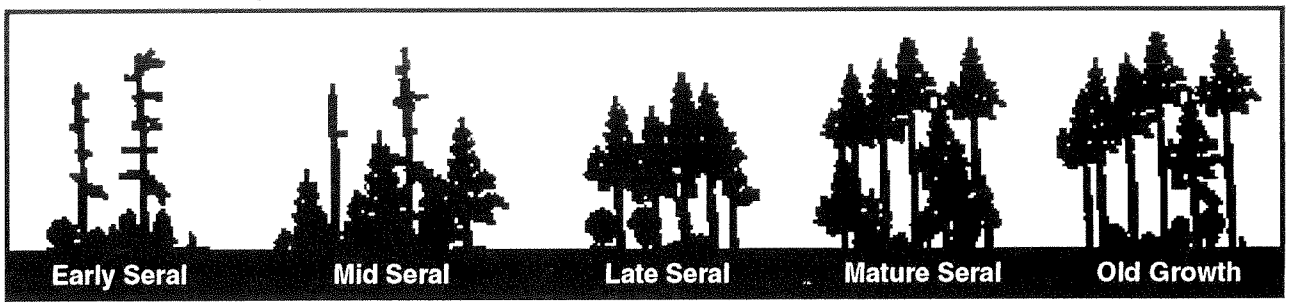
Plant Group	Seral Stage (Age Class) Early (0-10)	Mid (20-40)	Late (50-90)	Mature (100-190)	Old Growth (200+)
MC-IV-GR	G-He-Sh	C-Sh-Hd	C-Hd	C	C
MC-MB-SA	He-Hd-C	C-Sh-Hd	C-Hd	C	C
D-CE-SA	Sh-He	C-Sh	C	C	C
D-B-SA	Sh-He-Hd	C-Sh-Hd	C-Hd	C	C
D-RA-VM	Sh-He-C	C-Hd-Sh	C-Hd	C	C

[1]Seral Vegetation: G=Grass, He=Herb, Sh=Shrub, Hd=Hardwood, C=Conifer

Table 3-11. Acres of Each Plant Group by Seral Stage

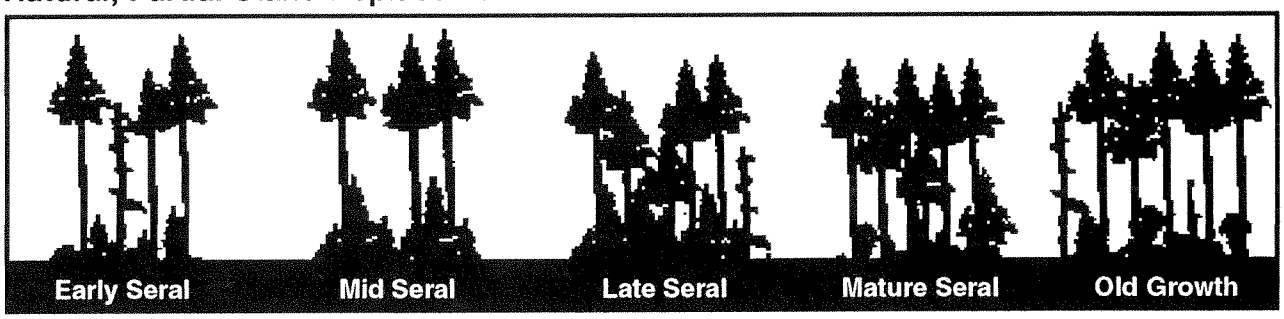
Plant Group	Seral Stage (Age Class) Early (0-10)	Mid (20-40)	Late (50-90)	Mature (100-190)	Old Growth (200+)
MC-IV-GR	39,955	32,363	14,630	38,206	34,628
MC-MB-SA	12,231	5,572	4,420	6,591	17,138
D-CE-SA	10,389	6,458	3,756	10,432	21,768
D-B-SA	21,417	22,475	9,282	18,790	27,217
D-RA-VM	11,301	16,367	7,127	12,777	14,505
Total Acres	95,293	83,235	39,215	86,796	115,256
Total Percent	23	20	9	21	27

Natural, Catastrophic Stand Replacement



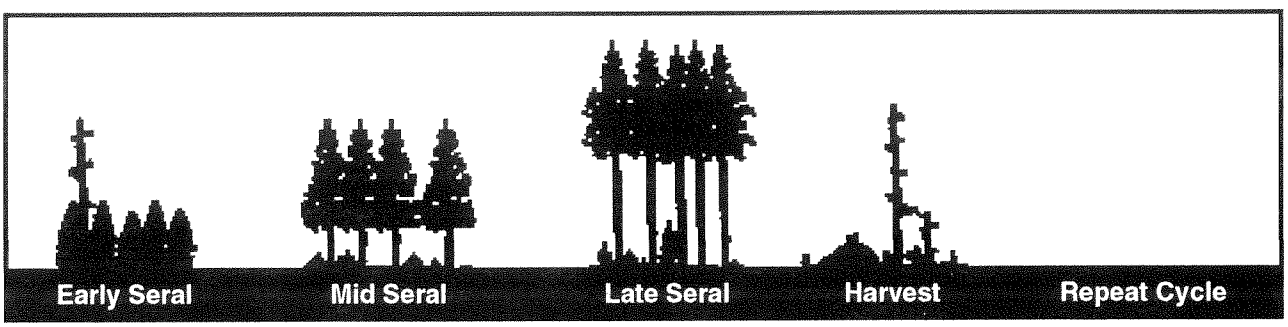
The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings (and very few living trees which serve as a seed source). Succession progresses in a more or less even-aged sequence, with vertical and fine grained diversity developing in the mature seral state and being fully expressed in the old growth stage.

Natural, Partial Stand Replacement



This succession path is very common in southwestern Oregon. The first seral stage consists of a patchwork of surviving green overstory trees, dead trees, and down trees. Patches contain young conifers, forbs, and hardwoods. Development is uneven-aged and patchy with vegetation developing in the understory and in patch openings, while overstory trees slowly die, turn into snags and fall.

Even-age Managed Forest



This successional path begins after nearly complete removal of conifer volume in logging, leaving a few snags and a small amount of down wood. Development is even-aged and is truncated by harvest in short rotations.

Figure 3-1 *Seral Stages*

skunk cabbage. Nonforested wetlands support shrubs such as willow and spirea and herbaceous plants such as horsetails, rushes, sedges, grasses, and cattails plus a wide variety of showy flowering plants such as arrowleaf groundsel, checker mallow, black head, and tiger lily. Wildlife habitat values and water quality values are discussed in the Animals and Water Resources sections of the Environmental Impact Statement. The amount and distribution of wetlands in the planning area is unknown.

Aquatic vegetation is restricted to areas of free flowing or standing water and occur in the form of floating plants, such as pondweed and duckweed, submersed plants, such as white water-buttercup and bladderwort, and emergent plants, such as cattail, rushes, and sedges. Most of the district's aquatic vegetation is found in artificial reservoirs and in rivers and streams. There are few natural lakes and ponds. Two undisturbed permanent ponds which support aquatic vegetation typical of the planning area have been proposed as an Area of Critical Environmental Concern.

Other types of vegetation found in the planning area occur in unique ecosystems, also referred to as special habitats. Special habitats are forested and nonforested habitats that contribute to the overall biological diversity within the district. (See Glossary). They often support unusual or unique vegetation communities and are managed as special status plant or animal habitat or as Special Areas. Special habitats that are managed as special status plant or animal habitat are managed for the benefit of the special status species. Special habitats located in Special Areas are managed as Areas of Critical Environmental Concern. The amount and distribution of special habitats in the planning area is unknown.

Noxious weeds are specific plant species considered undesirable, troublesome, and difficult to control. They occur on both forest and nonforest lands in the planning area. Noxious weeds are classified as priority 1 (potential new invaders), priority 2 (possible to eradicate), and priority 3 (established populations which may be capable of control or being prevented from further spread). Table 3-12 shows the major species of concern within the planning area.

Management of noxious weeds is in accordance with the Oregon Noxious Weed Control, Record of Decision (BLM 1986, 1987a). Local direction is provided by a Noxious Weed Control Plan. An Environmental Assessment is prepared for all control activities on an annual basis.

Table 3-12. Noxious Weed Species

Species	Priority
Rush skeletonweed (Chondrilla juncea)	2-3
Tansy ragwort (Senecio jacobaea)	3
Gorse (Ulex europaeus)	3
Canada thistle (Cirsium arvense)	3
Scotch broom (Cytisus scoparius)	3
St. Johnswort (Hypericum perforatum)	2-3

Leased grazing occurs on less than three percent of the acreage administered by the Roseburg District. The district grazing program currently consists of 765 animal unit months on 11,871 acres. There have been no known significant impacts to vegetative communities in the past due to grazing on Roseburg district administered lands.

Special Forest Products

Special Forest Products are located throughout the district. Numerous plant species are harvested for personal and commercial use. A partial listing of existing or potential Special Forest Products and their uses are found in Appendix S. Although qualitative information exists for most Special Forest Products, quantitative information for many of them is not available because inventories have not been done. The forest stand exam inventory data currently being collected in the district contains elements which document the occurrence of some Special Forest Products.

Documentation of these products occurs when they are harvested under permit. Those that have been sold for harvesting under permit between FY87 and 91 in the Roseburg District are shown in Appendix S.

Special Forest Products are legally removed from the forest through the use of permits or without permit for certain amounts of specific Special Forest Products (under sections from 43 CFR 5500 and/or 8365).

AR_05146

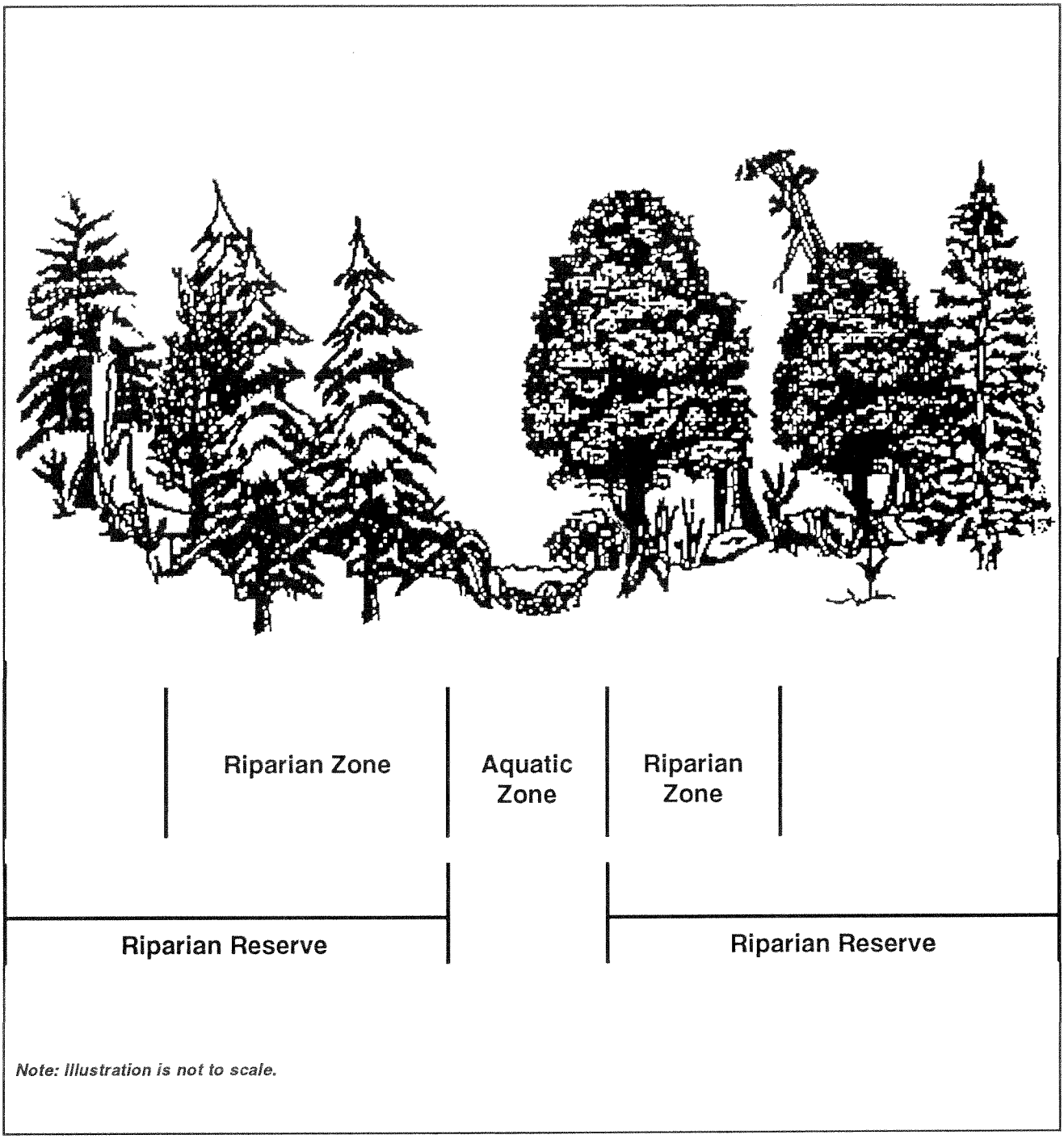


Figure 3-2 *Riparian Areas-Vegetation Type*

Riparian Zones

Riparian zones are the vegetated areas immediately adjacent to rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows (see Figure 3-2). The vegetation and microclimate conditions in riparian zones are products of the combined presence and influence of perennial or intermittent water and associated high water tables, and soils which exhibit some wetness characteristics.

Table 3-13. Existing Conditions of Riparian Zones on BLM-Administered Lands. Acres of Each Condition Class[1] by Stream Order

Stream Order	1 (min.)	2 (min.)	3 (fair)	4 (good+)	Total
3	2,595	675	1,439	3,749	8,458
4	1,490	391	1,530	1,825	5,236
5	1,080	169	1,118	766	3,133
6	346	75	787	2	1,210
7	125	27	507	0	659
8	19	12	33	1	65
9	5	9	104	1	119
Total:	5,660	1,358	5,518	6,344	18,880

[1] Riparian condition class equates to size of trees (dbh) in riparian zones:
Class 1 (minimal condition) = 0-5 inch trees
Class 2 (minimal condition) = 5-11 inch trees
Class 3 (fair condition) = 11-21 inch trees
Class 4 (good to optimal condition) = 21+ inch trees

Source: District timber inventory

Riparian zones occur throughout drainage systems and extend from the smallest headwater streams to the largest rivers. The size and extent of riparian zones depends largely on watershed characteristics such as topography, soils, rainfall, water quantity, stream conditions, and width of floodplain. On BLM-administered lands in the planning area, riparian habitat is found along 837 miles of third through ninth order streams. The number of third through ninth order stream miles by watershed is shown in Table 3-6 (see Water Resources section). Riparian acres comprise 4.5 percent of the land base or 18,880 acres (see Table 3-13) and riparian vegetation along small, perennial third order streams makes up 45 percent of these stream riparian acres.

Riparian zones are key components of biological diversity in a watershed, displaying a greater variety of plant and wildlife species and vegetative structure than adjoining ecosystems. Many wildlife species depend on food, water, shade, cover, and other unique and diverse habitat niches offered by riparian zones. Larger, more mobile wildlife species use riparian habitat as travel corridors to and from summer and winter ranges, and as habitat connectors between feeding, resting, hiding, breeding, brooding, and rearing habitats (see Wildlife section). Standing mature riparian coniferous vegetation (i.e. average tree size greater than 21" dbh) has structural components to maintain water quality, lessen peak flows, control erosion, and increase ground water recharge. Standing riparian vegetation helps regulate water temperature through shading and provides major life requirements (e.g. cover and food sources) for a variety of aquatic animals (Brown 1985). Downed trees in a stream or floodplain supplied from the riparian zone, provide terrestrial animal cover and food, dissipate water energy, trap sediments, increase water storage, change flow patterns, and maintain and improve aquatic habitat conditions.

Riparian streambank vegetation is critically important for fish, providing undercut streambanks for escape cover, lowering summer water temperatures through shading, and reducing streambank erosion that can cause sedimentation in spawning and rearing areas. Streambank vegetation contributes terrestrial insects, leaves, limbs, and trunks that drive the aquatic food chain and provide habitat for organisms.

Under natural conditions, conifers (western redcedar, hemlock, and Douglas-fir) dominate riparian overstories in small V-shaped drainages, while deciduous trees (red alder, bigleaf maple, black cottonwood, and Oregon ash) gradually become more dominant in overstories as streams increase in size. Understory trees (vine maple), herbs, and shrubs are generally more abundant in riparian areas than in upland communities.

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The structure and size of undisturbed riparian zones change as stream size increases. Generally, the width of riparian zones increases in a downstream direction and the influence of the riparian zone on the stream diminishes in a downstream direction. In undisturbed first and second order streams, the stream channel is continuously shaded by vegetation due to narrow channel width. Woody debris and streamside vegetation play an important role as energy dissipators on these steep gradient headwater streams. Leaves, needles, woods, and insects from the adjacent forest provide the bulk of the food base for the aquatic communities downstream (Sedell et al. 1988). These riparian areas are not inventoried. The current management plan does not protect these streams and as a result most of them have been logged during timber harvest and are in minimal or fair condition.

Third and fourth order streams have wider channels with less canopy shading the stream. Large Woody Debris is important for habitat and as an energy dissipator, although high flows may move this material downstream. The direct influence of riparian areas is moderated in fifth order and larger streams but remains important. Large Woody Debris provides important fish habitat. Food resources for aquatic organisms are from algae and organic matter from upstream reaches (Sedell et al.).

Until the late 1960s, roads were placed along streams for ease of construction. Streams followed the path of lease gradient, and stream valley bottoms provided the flattest areas for road surfaces. Road prisms in stream valleys restrict the meander potential of streams and eliminate vegetative cover in the right-of-way.

Riparian protective measures during timber harvest began informally in the 1970's (buffer with some harvest), were formalized in the 1983 Management Framework Plan (no cut buffers) and are more protective with this Draft Resource Management Plan/Environmental Impact Statement. Prior to protection, riparian areas were completely harvested. Stream temperatures were elevated above present Department of Environmental Quality standards. Most of these areas are in a state of recovery. Many of these riparian areas, especially in the Coast Range, are now dominated by red alder. These areas that were unprotected lack the conifer component that will supply future Large Woody Debris to streams, and large woody material for terrestrial species such as amphibians.

Riparian zone monitoring in 1991 and 1992 provided general observations of existing conditions. Monitoring indicated that protection has improved over time. Timber sales planned five to ten years ago retained buffers that averaged 10-30 percent less than the prescribed amount. On the average, sales that were laid out on the ground in 1992 met the prescribed distance.

BLM biologists evaluated the condition of riparian zones in all seral stages. The method used average tree size derived from the Forest Operations Inventory database as the indicator of riparian habitat condition. Condition class for riparian acres is based on tree size along with the results of timber harvest, mining and grazing activities, and road construction (e.g. riparian areas with cleared road right-of-ways will never reach optimum condition).

The existing conditions of riparian zones are displayed in Table 3-13. Generally, riparian conditions have been degraded by road construction and forest management practices. Currently, 37 percent of the acres of the riparian zones in third order and larger streams are in minimal condition, with average tree size less than 11" dbh, 29 percent are in fair condition and 34 percent are in good to optimal condition. Riparian habitat in smaller intermittent streams is not protected and is generally in minimal to fair condition. Under the current management plan, it will remain in that condition.

Wildlife

An estimated 298 vertebrate wildlife species which includes mammals, birds, reptiles, and amphibians, are known or suspected to exist within the Roseburg District. This includes 70 mammals, 191 birds, 18 reptiles, and 19 amphibians. Generally, populations of the various species on BLM-administered lands have not been inventoried, and other than some special status species, numbers are unknown. The Oregon Department of Fish and Wildlife is relied upon for information on distribution and population levels for certain species, such as roosevelt elk, black bear, black-tailed deer, turkey, mountain lion, and upland game species. Species which are known or suspected to obtain at least one of their life requirements (i.e., breeding, feeding, or resting) within the various seral stages and unique habitat types in the planning area are shown in Appendix Z. This Resource Management Plan focuses on priority wildlife species including special status species and several other important species. Special status species, which include federal threatened and endangered, federal proposed, federal candidate 1 and 2, state threatened and endangered, BLM

Table 3-14. Priority Animal Species[1]

Species	Reason For Priority	Primary Habitat[2]	Population Level/Trend[3]
Osprey	HI[4]	f,h	Moderate/Increasing
Golden Eagle	HI	a,b,d,e,g,h	Low/Stable
Dominant Woodpeckers[5]	HI	a,d,e,f,h,j,k	Low/Decreasing
Black Bear	Game	a,b,c,d,e,f,j	Moderate/Stable
Mountain Lion	Game	a,b,d,f,g	Low/Increasing
Roosevelt Elk	Game	a,b,c,d,e,f	Low-Moderate/Stable
Black-tailed Deer	Game	a,b,c,d,e	High/Stable
Wild Turkey	Game	a,b,f,k	Moderate/Increasing

[1]Does not include special status species
[2]Primary habitat includes breeding, feeding or resting sites within the following seral stages and special habitats (after Brown 1985):
a = early seral
b = mid seral
c = late seral
d = mature
e = old growth
f = riparian
g = talus slope/cliff
h = snags
i = coastal
j = dead and downed
k = hardwood
[3]Determined by district biologist based on field observations and consultation with other agencies. Population levels of many wildlife species are difficult to determine and therefore must be considered estimates only.
[4]HI = High interest and concern (species considered vulnerable to impacts from management activities.)
[5]Includes Downy and Hairy Woodpeckers, Northern Flicker, and Yellow bellied Sapsucker.

sensitive, and Oregon Natural Heritage Program listed species defined as BLM assessment, are dealt with in the Special Status Species section. This wildlife section covers other priority species including important game species and other species considered vulnerable to impact from management activities. A list of these species is provided in Table 3-14 along with information on habitat affinities and population levels.

Each of these priority species requires a specific set of habitat conditions. These conditions may be found within one or many of the plant communities and seral stages which occur in the planning area. For example, osprey are found primarily in riparian and adjacent upland forests with snags, whereas black bears are found in six habitat types.

Conifer forest habitats are discussed below in terms of seral stage: early, mid, mature, and old age.

The early seral stage provides a range of conditions from initial grass-forb through shrub to shrub-sapling phase. Approximately 95,293 acres are currently in the early phase. Naturally created early seral stage could have an abundance of snags and dead woody material whereas these components are typically greatly reduced on timber harvest sites. Forage production for deer and elk is at a peak during this stage, declining in the latter years as the conifer canopy closes. The availability of increased forage production for all big game species is influenced by road densities and levels of use, size of openings, and slash remaining on the area.

The mid seral stage is characterized by a closed canopy condition and an absence of understory vegetation. Currently 83,235 acres are estimated to be in this stage. These areas are of minimal value for foraging but the dense stands provide escape and hiding cover. The diversity of wildlife species on these sites is quite low in comparison to other stages. When remnant snags and down logs are present a greater diversity of species may use the areas.

The late seral stage occurs on 39,215 acres. The forest crown canopy begins to open up allowing sunlight to penetrate to the forest floor with a corresponding increase in forb and shrub vegetation. Natural tree mortality and thinning on the stand begin

to increase snag levels above earlier seral stages. Where legacies of previous old-growth stands remain such as large snags, larger trees and large down logs, the forest can provide habitat for species associated with mature and old-growth forest.

The mature seral stage (usually stands between 100-200 years of age) begins to diversify in stand structure both vertically and horizontally. Large trees and snags, down and decaying trees, and openings provide a variety of niches for wildlife. Openings in the canopy as a result of tree mortality from disease, insects or windthrow allow increased ground cover of forbs and shrubs. The increased diversity in vegetative cover results in greater feeding and breeding opportunities for a variety of wildlife species. Approximately 86,796 acres of the Roseburg District are in this seral stage. Current management constrains harvest on a portion (33,210 acres) of the stands in this seral stage by prescribing a 250 year rotation.

Old-growth forest, typically stands 200 years or greater in age, comprise 115,256 (27 percent) of the total acres within the Roseburg District. Prominent features of these stands include trees large in both diameter and height, multi-layered tree canopies, large snags and cull trees, down decaying logs, and small forest openings. These features provide breeding and feeding habitat for a variety of wildlife species. For example, the forest canopy and downed logs provide a climate controlled habitat for small mammals like red-backed voles and amphibians such as salamanders and the multi-layered canopy provides cover and small openings for foraging particularly during inclement weather or heavy snow events. Large snags and spike topped trees are particularly important on sites adjacent to major river systems and valley fringes as nest sites and associated perches for osprey, golden eagle, red-tailed hawk, and bald eagle.

In addition to the conifer forest seral stages described above, other habitats within the planning area have been adversely impacted by forest management on district lands. These habitat components and habitats include snags, dead-and-downed wood, stream/riparian zones, cliffs and talus slopes, meadows, wooded swamps, and hardwood stands. There are currently over 150,000 acres of forest land in the district with no or very low levels of usable snags present.

Snags are of special concern, because they provide primary habitat for 52 species of birds and mammals (Appendix Z). Priority species which use snags as primary habitat are the dominant woodpeckers.

Cavity-nesting birds, including woodpeckers and secondary cavity users, feed on insects and play an important role in control of forest insect pests (Brown 1985). Under natural conditions, snags occur throughout the forest as trees die due to natural suppression, fires, insects, and disease. However, logging and current safety and fire prevention measures have resulted in the elimination of most snags on timber harvest units. Current populations of the five dominant woodpeckers (hairy, downy, pileated, red-breasted sapsucker, and northern flickers) on BLM-managed lands within the planning area are estimated by district biologists at 50 percent of potential (based on criteria from Brown, ed. 1985). Most private land harvested in the past 15-20 years have very few wildlife trees remaining. Seven species of cavity users (house wren, Bewick's wren, violet-green swallow, tree swallow, mountain bluebird, western bluebird, and purple martin) prefer early seral stages. Wildlife tree surveys (which includes the tallying of snags and live trees left for wildlife) during the past decade revealed an average of 1.05 wildlife trees per acre following timber harvest on BLM-managed lands.

The only data available on existing numbers of snags occurring on forested lands managed by BLM comes from the timber inventory. The inventory was not designed to count and categorize standing dead trees specifically for wildlife, but it does provide numbers of snags by diameter class for various aged stands. Numbers of snags currently existing on unmanaged stands (stands with no previous treatment) for all forested lands by age class are given in Table 3-15.

Snag abundance has also been summarized by major plant groups. The douglas-fir dominated plant groups on average contain greater numbers of snag

Table 3-15. Existing Snag Numbers In Unmanaged Stands

Diameter Class	Number of Snags Per Acre Age Class Group 40-90	100-140	150-190	200 +
11-14.9	1.2	2.2	5.1	1.2
15-16.9	0.1	0.2	0.0	0.2
17-24.9	0.3	0.8	1.8	0.4
25 +	0.3	0.4	1.0	1.6
Total	1.9	3.6	7.9	4.3

(greater than five) than do the mixed conifer groups (less than three).

Recent concerns have been expressed over species requiring large, dead-and-downed wood on the forest floor (Maser and Trappe 1984; Maser et al. 1988) as approximately 50 species find their primary habitat in dead-and-downed wood (Appendix Z). Although effects on species requiring this habitat are largely unknown, Noble, et al. (1990) recently found that black bears in the central Coast Range of Oregon prefer large rootwads as denning sites. Intensive forest management practices such as slash burning and thinning have reduced the amount of this habitat (Maser and Trappe 1984). When slash burning is done under spring-like conditions, the impact on dead-and-downed wood habitat is reduced.

Stream and associated riparian habitat (see Riparian Section) is of special concern as a large number (75 percent) of terrestrial birds and animals are dependent on these areas for at least a portion of their life functions. Beaver, mink, otter, and raccoon all depend on stream and riparian habitat for a major part of their life requirements. As a group, amphibians (salamanders, frogs) are highly dependent on this habitat, spending all or a major part of the year utilizing it. Waterfowl, shorebirds, great blue heron, kingfishers, and several species of bat are highly dependent on stream habitat for survival. The linear arrangement of riparian habitat and presence of water and cover enhance the suitability of these areas as corridors for local movement or long range migration. Approximately 18,332 acres along third order and larger streams are currently withdrawn from harvest in order to protect riparian values. The adequacy of buffers for protecting wildlife values within the riparian zone cannot be evaluated due to limited monitoring information.

Hardwoods provide primary habitat for about 126 species of wildlife in the planning area (Appendix Z). Because of their lower economic value in comparison to conifers, hardwood stands have been converted to conifer stands (78 acres, 1983-89) and hardwoods in plantations have been controlled to allow conifers to grow with less competition (2,400 acres, 1983-89). In contrast, hardwoods have often increased on disturbed and wet sites. Conifer release by control or suppression of hardwoods has been a practice contributing to the dominance of monotypic, even-aged stands of second growth conifers in many portions of the district. Pacific slope fly catchers, black headed grosbeak, screech owl, and other hardwood oriented species have likely been affected by the suppression of hardwoods.

Wooded swamps and wet meadows are vegetative communities influenced by high water table or standing water for all or a part of the year. Wooded swamps and bogs are often characterized by the presence of skunk cabbage. A number of species including the redlegged frog, northwest salamander, townsend water vole, and several bat species are dependent on these sites. Wet meadows consist of grasses, sedges and forbs, lack a woody overstory and maintain a high, stable water table throughout the year. These moist sites, though limited in size and distribution, can be important foraging sites and wallows for elk and black bear. Currently, there is no information available on the numbers or acres of swamps or meadow sites.

Cliffs and talus slopes are special habitat features that are required by a number of species. Cliffs provide nesting sites or roosts for raptors, swallows, and bats. These and other unique ecosystems make up less than one percent of the district.

Special habitat features are components of the landscape which because or their uniqueness or special function in relationship to surrounding habitat are of added importance to one or more wildlife species. Special features provide forest diversity and include components such as cliffs, talus, wet and dry meadows, bogs, small springs and seeps, seasonal woodland ponds, serpentine balds, hardwood stands, and caves.

The interstitial spaces within talus varies with the size of rock, and along with moisture regimes, determines which species use a particular site. Amphibians use the more moist sites while bats, pika, marmots, bobcat, and cougar use will be influenced by the size of the rock. The value of these sites for wildlife is influenced by human disturbance such as mining for rock aggregate, road construction, and affecting the micro climate by altering surrounding vegetation.

The section below describes status, habitat and population conditions and trends, inventories, monitoring, and current management for high interest species.

Neotropical Migratory Birds

Birds which breed in North America and spend their non-breeding season primarily south of the United States are considered neotropical migratory species. There is considerable variance in the population for any given species wintering south of the United States. Some neotropical birds winter exclusively

south of the United States while for other species this may be true of only a small portion of the population. The Western Working Group for Partners in Flight has listed 118 terrestrial breeding Oregon neotropical birds. A majority of these species occur in western Oregon and the Roseburg District, but in many cases it is not known if western Oregon populations are true neotropical migrants. This is particularly true of those species which winter in substantial numbers within the state.

Concern has been increasing for years over the apparent widespread population declines of neotropical migrants. The cause for these declines are complex, but loss of habitat and related problems are key issues.

Partners in Flight is a domestic and international initiative for the conservation of neotropical migratory birds. The objective of the program is to create an integrated federal, state, and private program for research, monitoring, and habitat management for migratory nongame birds. Through the Western Working Group, a priority ranking for neotropical birds has been developed which takes into account seven criteria and 26 years of bird breeding survey data. Birds with high rankings in the Roseburg District, and therefore of greatest immediate concern, include hermit warbler, Vaux's swift, olive-sided flycatcher, black-throated gray warbler, rufous humming bird, and band-tailed pigeon.

Roosevelt Elk

The Roosevelt elk is highly valued in Oregon as a game species and for public viewing. According to Oregon Department of Fish and Wildlife estimates there are an estimated 1,500 elk in the Roseburg District's Coast Range (1.5- 11.9 elk/sq mi) and 450 elk (1.8-2.6/sq mi) in the Cascade Mountains. The highest densities occur in the Tyee Area.

Roosevelt elk respond to the quantity and quality of forage and cover and their distribution in time and space (Witmer et al. 1985). Elk forage areas include grass-forb, shrub, and open sapling habitat of young seral stages, with less than 60 percent combined canopy closure.

Hiding, thermal, and optimal types of cover are refuge for elk. Hiding cover conceals 90 percent of a standing elk at 200 feet or less. All seral stages except the early age meet hiding cover criteria. Thermal cover requires forest stands at least 40 feet high with a canopy closure of at least 70 percent, which is characteristic of late, mature, and old-growth seral stages. Optimal cover requires stands with dominant trees averaging at least 21 inches dbh and 70 percent closure, characteristic of large sawtimber or old-growth forests (>120 yrs old) with 70 percent closure. Optimal stands have four vegetation layers and a canopy which intercepts snow, but also has dispersed, small openings.

Winter range is an integral component in elk management. Elk tend to use south facing slopes and valley bottoms in the Coast Range during winter because of warmer temperatures, shallower snow and better forage availability. Elk use south facing slopes up to 4,500 ft elevation in the Cascades. Conversely, in summer, north facing slopes offer relief for elk during hot weather.

The interspersion of forage and cover areas in time and space, forage quality, and human disturbance from roads opened to motorized vehicles all appear to influence the use of an area by elk (Witmer et al. 1985). Timber harvest and associated activities have the potential for impacting populations by: reduction of optimal cover, creation of larger (50+ acres) openings which are used less by elk because of distance to escape cover, harassment and poaching of elk by people from a road network, and reduction in forage production and thermal cover.

The current quantity and quality of elk habitat appears to be stable to decreasing. Elk habitat has reached its optimum in most areas and may require improvement, or slowing of its decline. Within the next 50 years current areas used by elk will mature and produce less forage with lower nutritional quality which may result in significant declines of Roosevelt elk (Harris 1984). Even though elk have low dispersal rates into other areas, elk populations could increase under proper management.

Elk management in the district includes provisions for size limitations of clearcuts and spacing the harvest units across the landscape over time. Habitat improvements including seeding, fertilization, road closure, and riparian enhancement generally are considered beneficial to elk. The district has tested grass/legume seedings but has not successfully closed any roads to enhance elk habitat.

To date, limited monitoring of elk numbers yielded no useable data and no habitat monitoring has been conducted.

Elk habitat has been separated into 21 management areas on which management recommendations and assessment of impacts will be made. Elk

Table 3-16. Roosevelt Elk Management Areas

Elk Management Number	Area Name	BLM Acres	Total Acres	Percent BLM
CEEL 01	Gunter	15,717	24,611	64
CEEL 02	Smith River	10,338	20,315	51
CEEL 03	Tom Folley	12,220	23,641	52
CEEL 04	Green Ridge	7,465	14,815	50
CEEL 05	Yellow Butte	6,991	12,775	55
CEEL 06	Tyee	21,858	40,683	54
CEEL 07	Ben More	4,338	10,064	43
CEEL 08	Tyee Mtn.	7,530	16,255	46
CEEL 09	Camp Cr.	11,053	22,679	49
CEEL 10	Middle Mtn.	5,220	9,201	57
CEEL 11	Canton Cr.	25,782	42,926	60
CEEL 12	Rock Cr.	24,251	62,083	39
CEEL 13	Little River	20,137	41,204	49
CEEL 14	Myrtle Cr.	33,454	90,284	37
CEEL 15	Deadman Mtn.	28,227	35,694	79
CEEL 16	Camas Valley	10,480	25,757	41
CEEL 17	W.F. Cow Cr.	26,540	58,516	45
CEEL 18	Twelve Mile	11,595	27,976	41
CEEL 19	Middle Cr.	19,819	44,385	45
CEEL 20	Hyde Ridge	13,302	24,475	54
CEEL 21	Green Butte	10,713	21,240	50
	Total	327,030	669,579	

management areas were selected on the basis of percent of BLM ownership and uniformity of existing elk numbers and management goals. These areas along with their BLM and total acres are given in Table 3-16.

Black Bear

The black bear is common throughout forested regions of the Cascade and Coast Ranges, including the Roseburg District. Management of black bears in Oregon has reflected the polarity of popular opinion about bears. Management has varied between classification of bears as varmints to regulating them as trophy game. An average of 1,350 bears are killed by hunters state-wide each season with an additional 200 taken for damage control.

The state bear population has been estimated at 25,000 animals, with a density of 0.9 bears/sq mi in western Oregon (Oregon Department of Fish and Wildlife 1987a). In southwestern Oregon, one damage control effort suggested densities of at least 1.25 bears per square mile. Oregon Department of Fish and Wildlife obtains age data on bears from tooth samples submitted by hunters and damage control agents. Although there are inherent biases in the data - skewed towards larger males - the sampled age distribution falls within the acceptable limits used in the Idaho 1986 Black Bear Management Plan.

Black bears are omnivorous, depending mostly on succulent grasses, sedges, and forbs in spring and summer, and berries, nuts, roots, and insects in summer and fall. Bears eat meat, fish, and small game, when available.

Habitat of black bears is determined by seasonal availability of food and hiding cover. Radioed bears in coastal habitats were located in relatively inaccessible heavy cover in old-growth or dense second-growth (Lindzey and Meslow 1977). Bears will occasionally use brushy clearcuts if cover is adequate.

The denning season averages 140 days, from late September through April (Wheeler, pers. commun.). Den sites are usually associated with large root masses of dead or live trees, stumps, conifers or hardwoods, snags, or large downed logs.

Black bears are highly adaptable, however, habitat loss due to gradual human encroachment can reduce populations. With habitat reduction, quality food and cover become more critical, and if bears are forced to leave protected enclaves to forage in less protected sites, mortality increases and number decline (Pelton 1982).

Bears and habitat are affected in several ways by timber management. Logging stimulates forage production for foods such as salmonberry, blackberry, hazel, and huckleberry, and improves foods like grasses and forbs for up to 15 years. The increase in forage has a concomitant decrease in cover and logging roads allow easier access for hunters and poachers.

A black bear management plan was adopted by Oregon Department of Fish and Wildlife in 1987 (1987a). Strategies in the plan identified improving bear information and management: hunting, damage control, hunter pursuit seasons, and non-consumptive (viewing) use. The bear population is currently stable (Wheeler pers. commun. 1988) and the 1983 Timber Management Plan Record of Decision provided no specific management direction for the black bear. However, habitat improvement for other species like elk, which includes seedling and fertilization, road closure, maintenance of riparian

areas, snag and down woody debris management, and long term species/successional diversity harvest strategies should benefit black bears.

Mountain Lion

The mountain lion, or cougar is of high public interest, primarily because its presence is viewed as an indicator of the wildness of an area. Cougars inhabit all areas of the district with the largest numbers occurring in the eastern half.

The species has been protected under game regulations since 1967, in response to declining numbers. The Oregon Department of Fish and Wildlife adopted a Cougar Plan in 1987 (Oregon Department of Fish and Wildlife 1987). In 1989, Oregon Department of Fish and Wildlife estimated that 1,185 cougars inhabited western Oregon, about 55 percent of the statewide population. In 1993, the statewide population of mountain lion was estimated at 2,500 animals (Oregon Department of Fish and Wildlife, 1993b).

Cougars are found in close association with deer, their preferred prey (Oregon Department of Fish and Wildlife 1987), but also pursue elk, porcupine, lagomorphs, rodents, skunk, and birds. Cougars typically inhabit mountainous terrain with mature, open forest with boulder areas, rim ledges and ridges (Harcombe (1976). Some western Oregon cougars appeared undaunted by man's activities, but elsewhere studies indicated that human disturbance and logging adversely affected their habitat use (Oregon Department of Fish and Wildlife 1987). Douglas County continues experience high levels of animal damage. Much of the damage is related to the large number of livestock growers in the county and the close proximity of cougar habitat to ranching operations.

Columbian Black-Tailed Deer

In Oregon, the black-tail is valued as a game species, and for public wildlife viewing. They are the most versatile and widely-distributed large mammal species in the district. Oregon Department of Fish and Wildlife estimated spring densities of 26-44 and 16-26 deer/sq mi in the Cascade and Coast Mountain Ranges, respectively.

Black-tails prefer forests interspersed with natural meadows, grassy slopes, brush fields, and other early successional habitat or with man-created (timber harvest, wildfire) openings supporting low shrubs and forbs. Black-tails prefer winter range in stream and valley bottoms below 2,500 ft elevation, and south and SW facing slopes up to 4,500 ft. Thermal cover in mature and old-growth habitats in winter and summer are necessary for protection from extreme weather.

Home ranges of black-tailed deer can average less than a half-mile in diameter for females and young, and about three-fourths of a mile for males. Although the species is considered nonmigratory, they exhibit a definite elevational movement with snow conditions in the foothill and mid-elevation areas of the Cascades.

Timber harvest has a varied effect on black-tailed deer habitat. Five to eight years following clearcutting, food supplies increase and deer use of an area peaks. A gradual decline in deer use follows, as preferred browse plants grow out of reach of deer and are eventually shaded out by conifers. If a clearcut is large, much of it may not be used by deer because of the distance from forage to escape cover. Edgerton (1972) suggested that shelterwood harvest may result in a loss of cover and food supply for deer.

Deer habitat and numbers have remained stable due to a sustained level of timber harvest over the past decade. The 1983 Timber Management Plan Record of Decision had no management guidelines specifically designed to benefit black-tailed deer (USBLM 1983). No deer monitoring has been conducted by the district, but Oregon Department of Fish and Wildlife conducted deer population surveys as part of their annual big game censuses.

Wild Turkey

The Oregon Department of Fish and Wildlife initially released Rio Grand turkey in Douglas County in the early 1980s from stock captured in Texas and Kansas. By the mid 1980s turkeys were being relocated within the county. Adult diurnal use is concentrated in oak/savanah/woodland, recent clearcuts, and open meadows except during the late spring nesting period. During the nesting period hens made significant use of the mature conifer type. Turkeys roosted in five conifer species while rarely using hardwoods. Mean age, height and diameter (dbh) for all roost trees were 100 years, 33 meters, and 50cm respectively (Crawford, 1991).

Current distribution of turkeys covers the valley floors, oak-woodland hills and adjacent conifer forests.

Golden Eagle

Four nest sites used in the past by golden eagles have been located within the district. Three of the four sites are on BLM-managed land and all nests are located in trees. Information on golden eagles has been gathered incidental to other activities and no formal inventory of BLM-managed lands has been conducted to locate golden eagle nests.

Although the golden eagle is typically a bird of open country, it is found throughout the district with the interior valleys and surrounding oak/grasslands providing preferred hunting areas. Early grass/forb seral stages on conifer sites are also utilized by golden eagles to hunt for small mammals and carrion. Throughout the golden eagle's range, cliffs and large conifers provide preferred nesting sites. In the Roseburg District most known nests have been situated in large conifers as suitable nest cliffs are limited in occurrence and distribution.

Fish

Streams, rivers, and other water bodies in the planning area contain substantial habitat for numerous fish species, especially salmon and trout. These aquatic habitats meet at least one of the life history requirements (spawning, rearing, passage, etc.) for more than 25 species of native and introduced non-salmonid fishes and seven species of salmon and trout (see Appendix AA). The descriptions and analyses in this Resource Management Plan are focused on priority fish species which are listed in Table 3-17.

Oregon Department of Fish and Wildlife is responsible for the management of fisheries and their populations (monitoring populations, stocking fish, setting seasons, and other regulations) and the BLM is responsible for management of the habitat (maintaining a healthy aquatic ecosystem that will support a productive fish population).

Within the planning area, the Oregon Department of Fish and Wildlife has indicated that several area fish populations are declining. Several populations have been proposed for State Sensitive listing. They are migratory cutthroat trout in the North Umpqua, Oregon Umpqua chub, chum salmon, and Pacific lamprey. Stocks with documented population declines are coho salmon, North Umpqua summer steelhead, and South Umpqua spring chinook salmon. Suspected declining populations include migratory cutthroat, winter steelhead, and resident trout. The American Fisheries Society places South Umpqua spring chinook and Umpqua basin chum salmon at a high risk of extinction, and Umpqua coho salmon and sea run cutthroat trout at a moderate risk of extinction. South Umpqua summer steelhead are listed as already extinct. Presently, none of these have received a Federal special species status.

The potential of a stream to support fish production is directly related to the quantity and quality of aquatic habitat, which in turn is closely associated with the condition of the riparian area. Historic changes in riparian areas, including the removal of conifers in riparian and upslope areas, have considerably reduced the potential productivity of most streams. Policy from 1970 until the mid-1980s was to remove

Table 3-17. Salmon and Trout Habitat Conditions[1]

Priority Species	Stream Miles	Condition of Habitat (miles)[2] Minimal	Fair	Good/Optimal
Chinook	24	6	7	11
Coho	150	54	47	49
Steelhead	174	58	52	64
Cutthroat	756	295	219	242

Sources: Stream inventories (120 miles) conducted by the district fish biologist and by Oregon Department of Fish and Wildlife; Western Oregon Digital Data Base; and a related factors analysis (i.e., roads affecting riparian areas) completed by the district fish biologist.
[1] Habitat is for streams on BLM-managed lands only.

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woody debris from streams under the belief that it improved fish passage. Many streams in all watersheds are still lacking adequate Large Woody Debris from this activity. Fewer large trees resulted in less instream woody structure, water storage, channel complexity and stability, and suitable water temperatures. Improved riparian and stream channel protection on BLM-administered lands over the last ten years have allowed many stream segments to begin recovering.

However, streams and fish habitat recover much slower than riparian vegetation. Fish habitat can not begin recovery without the roughness component furnished by Large Woody Debris. The large wood provided by a mature, healthy riparian area acts to slow velocity and dissipate energy, form stream meanders, store gravel for spawning, provide cover habitat, nutrients, and a surface (wood and gravel) for aquatic insects (fish food). Without human intervention, this Large Woody Debris will not be available from recovering riparian areas for approximately 200 years. Because of the need to replace Large Woody Debris, the recovery process will take several additional decades.

Streams are directly affected by roads within the floodplain (or valley bottom). These road prisms effectively remove potential habitat from the systems. The riprap used to protect the road system reduces sinuousity, thus straightening the stream, which in turn increases the gradient, stream velocity and energy, transforming the stream substrate into a uniform wider, shallower habitat. Smaller gravel and sediment from road runoff fill pools reducing habitat complexity. Sedell et al. (1988) in a 1941 - 1991 comparison of the same streams, correlates the declines of fish populations to the loss of large pools. As long as roads remain within the floodplain, restricting stream meandering and contributing sediment, fish habitat in the affected areas will never reach optimum condition.

Debris torrents have scoured some stream channels down to bedrock. This represents a loss of habitat types; especially spawning. The habitat in these areas can not begin recovery until a roughness component such as fallen trees start to retain gravel and other complex habitat components.

Of the 837 miles of third order and larger streams within the planning area, 756 miles contain resident fish and 192 miles support anadromous salmon and trout (see Map 3-5). Many of these streams are higher in the watershed and support fish until the gradient increases above 15 percent. Low gradient first and second order intermittent streams function as velocity refuges and/or spawning habitat during winter high flow periods. These first and second order streams have not been inventoried and data is not available.

An analysis of third order and larger streams revealed that 37 percent of streams on BLM-administered lands are in minimal condition, 29 percent are in fair condition, and 34 percent are in optimal condition.

On BLM-administered land, chinook salmon are found in 24 miles of stream, while coho salmon are found in 150 miles of stream, and steelhead trout in 174 miles of stream. Resident cutthroat trout are the most widely distributed sport fish and are found in 756 miles of stream on BLM-administered lands. Habitat conditions, by species, are shown in Table 3-17.

These percentages and mileages were calculated by using tree sizes from harvest units in the Forest Operations Inventory as the basis of the rating. Specific inventories have not been conducted within riparian areas. Reliance on the Forest Operations Inventory has probably resulted in an optimistic stream habitat condition for third order and larger streams. First and second order streams were not included in the analysis, but due to a lack of riparian protection these streams are probably in a minimum to fair condition. The difference between the calculated and actual condition is that stream recovery and condition lags behind riparian condition.

Approximately 120 miles of streams (Stouts Creek, Deadman Creek, Wolf Creek, and South Fork Smith River) were surveyed in 1991 and 1992. The Oregon Department of Fish and Wildlife stream survey method used is a basinwide approach and included all the waters in the watershed that were flowing during the summer low flows. Land ownership included BLM, U.S. Forest Service, timber industry, private agriculture, and individual residences. Data has not been broken down by ownerships to show stream habitat condition of BLM-administered lands. The results reflect overall as well as site specific conditions.

All streams were low in the volume of wood per mile, compared to the Oregon Department of Fish and Wildlife research "benchmark for habitat parameters". Width to depth ratios, pool depth, and amount of bedrock were also in the poor category. Sediment input was a concern in several reaches. These streams are probably representative of the majority of streams within the district. In 1991 thirty stream sites were inventoried for aquatic insects (Wisseman 1992). Based on the "Total Bioassessment Score",

nine sites (30 percent) were severely degraded, 16 sites (53 percent) were moderately degraded, three sites (10 percent) were slightly degraded, zero were not degraded and two (13 percent) were atypical sites and could not be adequately assessed with the methodology. In general, high water refuges, bank stability, spawning habitat, pool depths, and aquatic insect communities have been degraded throughout the district.

There are other factors that may lead to degraded stream and fish habitat conditions that are not accounted for in the stream habitat rating system. Temperatures of many streams bordering agricultural lands in the lower valley bottoms have exceeded 70 degrees F during summer months. Streams that experienced heavy harvest 20-30 years ago with no riparian protection also had high summer temperatures (up to 80 degrees F). Temperature regimes in these streams are recovering as riparian vegetation (shading) recovers. These thermal levels exceed state-established standards.

Beavers may have had a significant beneficial influence on summer stream flow, water temperature and channel stability. Timber harvest of riparian areas, stream cleaning operations, and trapping may have combined to reduce their populations.

Culverts may pose problems to fish populations by prohibiting or limiting fish passage under road crossings. Many culverts in the district are old and in need of structural repair, were installed improperly, or have settled in the middle through road weight and use, so that the ends have been raised requiring culvert inlet jumps. These jumps are particularly critical to upstream migrating spawning adults during below average winter flows and to the small juveniles that overwintered in the mainstem and are returning to small tributaries at the beginning of summer.

Special Status Species and SEIS Special Attention Species/Habitat

Species which are limited in abundance and distribution and have identifiable threats to their existence are managed by the Bureau as special status species. Six separate categories are recognized:

1. Federal threatened and endangered
2. Federal proposed
3. Federal candidate (Category 1 and 2)
4. State threatened and endangered
5. Bureau sensitive
6. Assessment species

Table 3-18 lists the special status plants that are known or suspected to occur in the planning area. There are presently no federal threatened, endangered, or proposed plant species known or suspected on the district.

Special status plant lists are amended as inventory and monitoring data provide new information. Over 60,000 acres of the district has been surveyed for special status plants since 1980. Seventeen species have been documented at 62 locations on 421 acres. Geographic distributions are displayed on the Automated Resource Data System.

Table 3-19 lists the special status animals that are known or suspected to occur in the planning area. There are currently seven mammals, 17 birds, eight amphibians, and four reptiles with special status. Two species have been listed as federally endangered and three as federally threatened. The different habitats used by special status animals are provided in Appendix Z.

Brief descriptions on current knowledge of species occurrence, inventory efforts, habitat use and conditions, and trends are provided below for federally listed and candidate species.

Bald Eagle

The bald eagle is a threatened species in Oregon, under the Federal Endangered Species Act 1973, as amended (Code of Federal Regulations, 1988). The Oregon Endangered Species Act also lists the eagle as a threatened species (Oregon Revised Statues 1987). The recovery plan for the Pacific bald eagle (United States Fish and Wildlife Service 1986) is currently being implemented by cooperating agencies, including BLM.

Surveys of nesting eagles have been conducted annually in the district since 1979 by the Oregon Cooperative Wildlife Research Unit, in cooperation with Roseburg District biologists. Recent surveys revealed that six nesting pairs of eagles occur on district BLM-managed lands, although some alternate nests associated with territories have been on adjacent private land.

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Table 3-18. Special Status Plant Species

COMMON NAME	BOTANICAL NAME	STATUS[1]	Acres
shrubby rock cress	*Arabis koehleri var. koehleri*	FC	30
grass fern	*Asplenium septentrionale*	AS	0
wayside aster	*Aster vialis*	FC	9
woodland milkvetch	*Astragalus umbraticus*	AS	33
bensoniella	*Bensoniella oregona*	FC	3
Cox's mariposa lily	*Calochortus coxii*	FC	71
Umpqua mariposa lily	*Calochortus umpquaensis*	FC/SE	123
tall bugbane	*Cimicifuga elata*	FC	1
clustered lady's slipper	*Cypripedium fasciculatum*	FC	0
Oregon fireweed	*Epilobium oreganum*	FC	0
gold poppy	*Eschscholzia caespitosa*	AS	0
Umpqua swertia	*Frasera umpquaensis*	FC	0
dense-flowered horkelia	*Horkelia congesta ssp. congesta*	FC	15
California globe mallow	*Iliamna latibracteata*	AS	0
imperial lewisia	*Lewisia cotyledon var. howelli*	FC	56
slender meadow foam	*Limnanthes gracilis var. gracilis*	FC	2
Kincaid's lupine	*Lupinus sulphureus var. kincaidii*	FC	2
timwort	*Microcala quadrangularis*	AS	0
Kellogg's monkey flower	*Mimulus kelloggii*	AS	5
three colored monkey flower	*Mimulus tricolor*	AS	0
Howell's montia	*Montia howellii*	FC	0
coffee fern	*Pellaea andromedaefolia*	AS	0
red-root yampah	*Perideridia erythrorhiza*	FC	2
Howell's false caraway	*Perideridia howellii*	AS	0
rough allocarya	*Plagiobothrys hirtus ssp. hirtus*	FC/SE	0
California sword fern	*Polystichum californicum*	AS	11
Thompson's mistmaiden	*Romanzoffia thompsonii*	BS	30
Heckner's stonecrop	*Sedum laxum ssp. heckneri*	AS	0
Purdy's stonecrop	*Sedum spathulifolium ssp. purdyi*	AS	19
humped bladderwort	*Utricularia gibba*	AS	0
lesser bladderwort	*Utricularia minor*	AS	0
water-meal	*Wolffia columbiana*	AS	0
dotted water-meal	*Wolffia borealis*	AS	9

[1]FC=Federal Candidate
SE=State Endangered
BS=Bureau Sensitive
AS=Assessment Species

Table 3-19. Special Status Animal Species

COMMON NAME	SCIENTIFIC NAME	STATUS[1]
Mammals		
Columbian White-tailed Deer	*Odocoileus virginianus leucurus*	FE/SE
Fisher	*Martes pennanti*	FC
Fringed Myotis	*Myotis thysanodes*	BS
Marten	*Martes americana*	AS
Pallid Bat	*Antrozous pallidus*	AS
Townsend Big-eared Bat	*Plecotus townsendii*	FC
White-footed Vole	*Phenacomys albipes*	FC
Birds		
Harlequin Duck	*Histrionicus histrionicus*	FC
Marbled Murrelet	*Brachyramphus marmoratum*	FT
Bald Eagle	*Haliaeetus leucocephalus*	FT/ST
Goshawk	*Accipiter gentilis*	AS
Northern Saw-whet Owl	*Aegolius acadicus*	AS
Great Grey Owl	*Strix nebulosa*	AS
Lewis Woodpecker	*Melanerpes lewis*	AS
Peregrine Falcon	*Falco peregrinus*	FE/SE
Pileated Woodpecker	*Dryocopus pileatus*	AS
Purple Martin	*Progne subis*	AS
Flammulated Owl	*Otus flammeolus*	AS
Northern Spotted Owl	*Strix occidentalis caurina*	FT/ST
Western Meadowlark	*Sturnella neglecta*	AS
Western Bluebird	*Sialia mexicana*	AS
Mountain Quail	*Oreortyx pictus*	FC
Black-backed Woodpecker	*Picoides acticus*	AS
Three-toed Woodpecker	*Picoides tridactylus*	AS
Amphibians		
Cascade Frog	*Rana cascadae*	AS
Spotted Frog	*Rana pretiose*	FC
Clouded Salamander	*Aneides ferreus*	AS
Del Norte Salamander	*Plethodon elongatus*	FC
Oregon Slender Salamander	*Batrachoseps wrighti*	AS
Tailed Frog	*Ascaphus truei*	AS
Red-legged Frog	*Rana aurora*	FC
Foothill Yellow-legged Frog	*Rana boyli*	FC
Reptiles		
California Mountain Kingsnake	*Lampropeltis zonata*	AS
Common Kingsnake	*Lampropeltis getulus*	AS
Sharptail Snake	*Contia tenuis*	AS
Western Pond Turtle	*Clemmys marmorata*	FC
Fish		
Umpqua River		
Cutthroat Trout	*Oncorhychus clarki*	FP
Umpqua Chub	*Oregonichthys kalawatseti*	FC

[1]FE=Federal Endangered
FT=Federal Threatened
FP=Federal Proposed
FC=Federal Candidate
SE=State Endangered
ST=State Threatened
BS=Bureau Sensitive
AS=Assessment Species

An annual average of six to eight eagles have been observed during the winter scattered along the three stems of the Umpqua River but there were no winter concentrations. Most of these birds were adults, and were assumed to be resident. There are no known communal night roosts in the Umpqua basin within the district.

In the Pacific Northwest, bald eagles nest in large old-growth trees, in habitats of primarily ponderosa pine, mixed conifer, Douglas-fir, Sitka spruce/western hemlock, and along large rivers, in black cottonwood (Anthony et al. 1982) and feed primarily on fish. Anthony and Isaacs (1989) found that most nests (84 percent) were within one mile of large bodies of water. The nest trees usually had an open view of the area and a clear flight path to the nest, with perch trees nearby. Nest trees were larger dominant or co-dominants in the stand and were usually components of old-growth or old-aged second growth forests - larger and older than trees produced under 80 - 100 year timber rotations (Anthony and Isaacs 1989).

Eagle communal night roosts described by Anthony et al. (1982) were characterized by mixed conifer and Douglas-fir habitats, where roost trees were larger than trees in the surrounding forest. More favorable micro-climates occurred in communal roost areas than in adjacent forest stands, aiding in energy conservation by the eagles (Stalmaster 1981, Keister 1981).

Human disturbance has impacted both nesting and wintering habitat of bald eagles. Anthony and Isaacs (1989) found a negative relationship between proximity of eagles to clear cuts and main logging roads, and productivity. Other activities such as urban and recreational development, logging, mineral exploration and extraction have also impacted eagles (United States Fish and Wildlife Service 1986). Shooting and pesticide contamination are the primary human-induced causes of eagle mortality. Pesticides that caused egg shell thinning which resulted in lower nest success and productivity (United States Fish and Wildlife Service 1986) are no longer in use.

There has been no loss of known nesting or roosting habitat for bald eagles on district lands under the current land use plan. The number of known nesting pairs in the district has increased by four over the past decade and a statewide trend has seen a doubling of the number of occupied breeding sites since 1980 (Anthony and Isaacs 1989). This increase was due, in part, to an intensified survey effort, but suggests an upward trend toward the population recovery goal for the eagle.

The current management direction set by the 1983 Timber Management Plan Record of Decision (USBLM 1983a) provides for the management of the two nest sites known in 1983. Under this direction, any new sites found during the decade would be afforded equal management consideration.

Since 1983, five additional nest sites consisting of four new pairs and one historic pair were added and protected. Additionally, there are provisions for the management of potential habitat to meet future needs of the species to satisfy recovery plan goals.

There are 2,699 acres of existing and potential habitat designated for bald eagle management under the 1983 Timber Management Plan Record of Decision (USBLM 1983a). The Umpqua Corridor Habitat Management Plan provides specific direction for the management of 3,662 acres encompassing most of the 1983 allocation, plus additional acres added during the preparation of the plan (USBLM 1985).

Columbian White-Tailed Deer

The Roseburg population of Columbian white-tailed deer was listed as endangered in 1978 (Federal Endangered Species Act (Code of Federal Regulations 1988). Prior to this time, the only known population was located along the lower Columbia River.

Surveys of white-tails were carried out by Smith (1981), and recently by Oregon Department of Fish and Wildlife. Smith (1981) estimated densities of white-tails of 23 deer/sq km (the range was 18 to 35 deer/sq km) in a 2,745 hectare study area. Currently, there are an estimated 5,500 - 6,000 white-tails in Douglas County. Although the white-tail ranges includes district lands, no surveys have been conducted to determine numbers specifically on BLM-managed lands.

Columbian white-tails prefer riparian habitat, with 90 percent of all observations from one study documented within one km of the North Umpqua River (Smith 1981). Deer prefer grass-shrub, oak savannah, oak forest, conifer, riparian and woodland/ grassland ecotone habitats (United States Fish and Wildlife Service 1983). Deer use upland oak woodland/grassland areas in late winter and spring, and occupy low, riparian habitats in summer (United States Fish and Wildlife Service 1983).

In the late 1970s, surveys of deer were carried out in upland conifer habitat, adjacent to the valley oak woodlands of the core deer use area. No deer use was documented (J. Lint pers. commun.). After more than a decade of population expansion, the area has not been resurveyed.

Residential and subdivision development, particularly along the North Umpqua River, is the primary threat to riparian habitats used by the white-tail. Brush clearing for pasture has reduced the available woodland/ grassland ecotone, also important to the species (United States Fish and Wildlife Service 1983). The role of district forested habitats on the life cycle of the species has not been determined. Therefore, the effect of timber harvest on the deer is unknown.

Malnutrition and vehicle collisions accounted for 50 percent of the white-tail mortality, with fence entanglement, predation and disease also important factors (Smith 1981). Almost half the road kills occurred in late summer, when deer moved to obtain water and better forage.

Columbian white-tailed deer habitat is currently considered stable and the population appears to be increasing. However, since the majority of vital habitat is in private ownership, it is not considered secure. Until large areas of habitat are secured through easement or purchase, the long-term outlook for the species remains uncertain.

Under the Record of Decision (BLM 1983a) for the Roseburg Timber Management Plan (BLM 1983b) lands were withdrawn from the commercial timber base to maintain habitat conditions suitable for use by deer. The withdrawn locations are: T26S, R4W, Sec 10 [6.7 ac]; T26S, R4W, Sec 17 [11.5 ac]; T27S, R4W, Sec 7 [4 ac].

Townsend's Western Big-Eared Bat

The Townsend's big-eared bat is a candidate species for listing on the federal threatened and endangered species list. The population of Townsend's big-eared bats wintering in western Oregon appears depleted, and is restricted to the Cascade and Calapooya Mountains (Perkins 1987). Perkins (1987) located only two nurseries, concluding it was unclear where the western Oregon population spent the summer. Cross (1976) was able to locate three nursery colonies in SW Oregon (Curry, Josephine, and Jackson Counties).

Perkins (1987) conducted inventories in the district and located hibernacula within the Scott Mt., Tenmile Mt., and Ben Irving Reservoir areas. A nursery was also documented in an unnamed cave.

The bat uses caves, cave-like structures such as abandoned mine tunnels, and buildings for hibernacula in winter, as well as roosts for summer nurseries. In temperate coniferous forests, the bat uses open sapling pole, shrub, and closed sapling pole stand habitats (Scharpf and Dobler 1985). Wet meadows, estuaries, and riparian areas are also important special habitats.

Human disturbance on roosting and hibernation sites used by Townsend's bats will likely result in abandonment. Forest harvest on one site adjacent to a hibernaculum may have caused its abandonment by the bats. Since the bat feeds upon insects and arthropods, pesticide and herbicide use in areas used by bats could adversely affect the local population by reducing the prey base.

Cave habitats in Oregon have not been specifically managed as wildlife habitat and are subject to increasing human disturbance (Perkins 1987). This disturbance could result in a decline in available habitat for the bat if caves that they use are affected. No management of the species is currently being carried out in the district. Inventories are needed to determine the distribution and status of the species, and to determine if there is a need for habitat protection.

Northern Spotted Owl

The northern spotted owl was listed as a threatened species in June 1990, under the Federal Endangered Species Act (1973 as amended). The owl is also listed as threatened under the State of Oregon Endangered Species Act. Final critical habitat was designated for the northern spotted owl on January 15, 1992.

Owl surveys were initiated in the Roseburg District in 1976. Intensive monitoring has been conducted since 1983, although efforts have continued to intensify over time. Between 1985 and 1990, due to an enhanced monitoring effort, there has been an increase in the number of sites located on the district occupied by owl pairs; 35 sites in 1985 vs. 152 sites in 1990. In the same period, the number of sites which produced young ranged from eight in 1985 to 71 in 1990. The number of young located per productive site varied between 1.35 and 1.66 young in the same time period. In 1993, the most recent

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year summarized monitoring information is available, pairs of owls were confirmed at 141 sites and resident singles at 35 sites. In 1993, a relatively poor nesting year, 25 sites produced young with an average of 1.48 young per productive site.

As of 1993 an estimated 85 percent of the district had been inventoried for spotted owls. BLM has identified 266 owl locations on BLM-managed lands, three sites on adjacent National Forest Lands, and 23 sites scattered on private lands (See Map 3-6). Between 1986 and 1993, owl pairs were verified during at least one year at 247 separate locations. Single owls or unconfirmed pairs were found at 45 other locations. Between 1990 and 1993 the number of sites occupied has varied only slightly from 199 to 201 even though the total sites visited increased by 33 from 249 to 282.

Owls have been studied using radio telemetry to determine habitat use and "home range" (Forsman et al. 1977, Postovit 1977, Garcia 1979, Forsman et al. 1984, Meslow et al. 1986). In nine study areas in Oregon, spotted owls used mixed conifer, Douglas-fir/western hemlock, and mostly western hemlock/ Douglas-fir intermixed old-growth and mature forests, although habitat requirements and relationships are complex (see Thomas et al. 1990:143-170). In these study areas, the median amount of area used by each radioed pair varied between 615 and 2,375 acres (range = 563-3,984 acres), depending upon the location and habitat (Thomas et al. 1990:195). Within these forests, the "home range" of radioed owl pairs varied between 1,035 and 10,189 acres (Thomas et al. 1990:194). The median ranged between 1,411 and 6,390 acres depending upon the study area.

Forsman et al. (1985) described the structural characteristics of owl nesting, roosting, and foraging habitat as characterized by old-growth and mature forests. Optimal habitat included an uneven-aged multilayered canopy with overstory trees typically 230-600 yrs old. The age of the uneven-aged understory included young saplings to sawtimber (Franklin et al. 1981). Composite canopy closure was generally 70-80 percent and there was a high number of old trees with structural damage and decay, which could be important nesting sites for owls.

Since the early 1800s, timber harvest in Oregon and Washington, west of the crest of the Cascades old-growth forest has been reduced to approximately one-third (5 million acres) of the estimated original amount (Franklin and Spies 1986). Of the estimated 5.4 million acres of old-growth/mature forest remaining, about 63 percent is available for harvest (U.S. Forest Service 1986). In 1990, old-growth/ mature forest comprised about 202,000 acres of district administered land.

The fragmentation of old-growth and mature habitat from timber harvest results in the degradation of individual owl habitat areas and movement corridors between habitats. Several factors then begin to work against the owl including lower dispersal/survival of young, greater risk of avian predation on owls (Dawson et al. 1986, Simberloff 1987), and increased colonization of barred owls, which may out compete spotted owls (Forsman and Booth 1986, Forsman and Meslow 1986, Allen et al. 1987, Hamer et al. 1987, Hamer and Samson 1987). The net effect has the potential to isolate subpopulations of owls, which can reduce genetic exchange and lower populations, thereby increasing the risk of further loss to the effects of an adverse random event (Dawson et al. 1986).

There are approximately 207,000 acres of suitable roosting, foraging, or nesting habitat (Habitat 1 and 2 as described in Chapter 4) on BLM-administered lands in the Roseburg District. The population trend for spotted owls is inconclusive based on occupation of known sites due to varying levels of effort since monitoring began. The draft Northern Spotted Owl Recovery Plan reported rates of population change for various study areas. The rate of change for resident female spotted owls in the Roseburg District was reported as 0.9405 or a decline of approximately six percent per year.

Final critical habitat became effective for the northern spotted owl on February 14, 1992 (50 Code of Federal Regulations Part 17). A total of 220,984 acres of BLM-administered lands are currently critical habitat within the Roseburg District. Of the total critical habitat acreage, 121,111 acres are suitable nesting, roosting, or foraging habitat while the remainder may or may not function as dispersal habitat.

Marbled Murrelet

The marbled murrelet is a federally listed threatened species (50 Code of Federal Regulations Part 17, Oct. 1, 1992). The marbled murrelet is a small seabird of the Alcidae family and the only member to nest in trees. Murrelets have been detected up to 50 miles inland although in Oregon the furthest inland detection at the time of listing was 35 miles. Marbled murrelets are not evenly distributed from the coast to maximum inland distances. Levels of detection in Oregon are greatest close to the coast with observations most often within 12 miles of the ocean.

Marbled murrelets are semi-colonial in their nesting habits and inland detections often involve more than one bird. Marbled murrelets nest in older forests characterized by large trees, multi-storied stands, and a moderate to high canopy closure. Large limbs or deformities for nest platforms must be a component of the stand. Marbled murrelets also will use younger stands (80+ years) which contain an old-growth tree component. In Oregon all located nest sites or occupied sites have occurred in old-growth forests or mature stands with an old-growth tree component.

Surveys for marbled murrelet in the Roseburg District have been limited in scope with the greatest effort occurring in 1992 and 1993. Sixty-one sites involving 202 stations were surveyed during 1992 and 1993. These sites have been concentrated along (within 1 mile) the Umpqua and Smith Rivers, which provide two primary travel corridors from lands in the Roseburg District to the coast. Marbled murrelets have been detected and displayed occupation behavior at two sites as of the end of 1993. No nesting has been confirmed.

The amount of suitable marbled murrelet nesting habitat on BLM-administered land has been estimated by utilizing forest inventory, spotted owl habitat 1 and 2, and knowledge of the area biologists. The habitat has been categorized into zones which represent distances inland from the coast and are presented in Table 3-20.

Peregrine Falcon

The peregrine falcon is listed as a federal and state endangered species. (Code of Federal Regulations 1988; Oregon Revised Statues 1987). The Pacific Coast Recovery Plan for the American Peregrine Falcon has been prepared by the United States Fish and Wildlife Service and is currently in the implementation phase (USDI, Fish and Wildlife Service, 1982). There are no documented active or historic ears (nest site) in the district, although one site on National Forest lands is within ten miles of BLM-managed land. A site on private land in the North Umpqua River drainage has been reported in 1993 but not confirmed. Although occasional winter sightings in the district are thought to be migrants, habitat inventories by Oregon Department of Fish and Wildlife in 1987 indicated potential nesting habitat exists at a number of locations. The sites with the highest value rating occurred on BLM-managed and private land along Callahan Ridge and Hill Creek site on BLM-managed land in T. 26 S., R. 2 W., Section 5.

Table 3-20. Suitable Marbled Murrelet Habitat on BLM by Zone

Zone	Total Forested Acres	Suitable Habitat Acres
0-12	0	0
13-25	0	0
25-35	37,129	16,604
36-50	143,579	65,058
Total	180,708	81,662

Peregrine falcon prefer tall cliffs with ledges and potholes that overlook large expanses and are near water (USDI, Fish and Wildlife Service, 1982). Although loss of habitat has influenced the decline of this species, it is thought Dichloro-Diphenye-Tricholorethene (DDT) and related chemicals were primarily responsible for population declines. In addition to maintaining the integrity of nesting cliffs, a number of other techniques including captive breeding, nest site manipulation, and hacking (release of captive raised young) are being utilized in the recovery of this species.

White-Footed Vole

The white-footed vole is a candidate species for possible listing as a threatened or endangered species. The white-footed vole inhabits dense forests of northwestern California and western Oregon and is considered very rare in northwestern Oregon. This species is the rarest member of the vole family in North America, although Maser et al. (1981) believes it is more common than previously thought.

Most specimens of the white-footed vole have been taken along the Oregon Coast, where the species is generally distributed. According to Maser (1981) the range of this species would encompass the northwest quadrant of the Roseburg District, north of Route 138 and west of Interstate 5. Within this area, riparian habitats are preferred, particularly along small streams dominated by alder and salmonberry. Inventories for this species within the district is limited to small mammal trapping conducted by the Pacific Northwest research station's old-growth study team. White-footed voles were trapped at very few of the study team's trap sites.

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There have been no known impacts to populations of special status species animals due to grazing on the Roseburg District. No livestock use is currently authorized in the vicinity of Smith River, the portion of the district closest to and most similar to documented white footed vole sites.

Western Pond Turtle

The western pond turtle, a candidate (Category 2) species, historically occurred throughout the valleys of western Oregon. The pond turtle may use a variety of permanent and intermittent waters, but favor streams, rivers, and small ponds. Although aquatic habitat is most frequently used, pond turtles utilize upland habitats to over winter and deposit eggs. Most egg laying occurs within 600 feet of the streams, however, distances up to 1320 feet have been recorded. Over winter movements vary between 49 and 1574 feet from a stream (Holland, 1992). Low gradient streams and ponds of the interior valleys with large amounts of basking (utilizing sunshine for thermal regulation) habitat are preferred. Much of this habitat in the Roseburg District occurs on private lands along stream courses within the interior valleys.

Western Pond turtles are a slow growing, long lived species which reaches maturity between eight and 14 years. Generally turtles mature at a later age in the northern portions of the range (Holland, 1991).

Western pond turtle populations have declined throughout its' range particularly in the northern and southern most portions. Holland visited 46 sites within the Umpqua River drainage and found turtles present at 58 percent of the sites. The absence of younger age turtles is a common phenomena throughout the turtles' habitat range, indicative of problems in successful reproduction and survival of younger age turtles.

A number of factors have been identified which are believed to have contributed to the decline of this species. Among the most significant factors are destruction of habitat (including large water impoundments), introduction of exotic predators (bullfrog, bass), deliberate shooting or collection, and introduction of exotic turtle species.

Northern Goshawk

The Roseburg District is on the periphery of the normal breeding range for the Northern Goshawk (Marshall, 1992). The goshawk breeds in the Klamath and Cascade Mountains above 2,000 feet, but is not considered a breeding species in the Coast Range. There are only eight recorded sightings of goshawks by district personnel, two of which were suspected nest sites. The sightings have occurred along the southern District boundary in the Klamath and Cascade Providences and one sighting in the North Umpqua River drainage. During migration and non-breeding periods goshawk may occur anywhere in the state. A variety of mature forest types are utilized by goshawks. A high degree of canopy closure is a common characteristic of nesting habitat. Of 74 nest sites located in Oregon all but one were located in dense, mature or old-growth conifer stands (Reynolds,R.T. 1982). Nesting territories typically have more than one nest site. Nests are most often located on moist areas of north slopes, near water and in the larger trees in the stand (Marshall, 1992). Effective management for breeding goshawks requires protection of multiple nest sites and maintenance of adequate foraging habitat within a nesting territory.

Biological Diversity and Ecological Health

Biological diversity refers to the variety of life and its processes. It is primarily characterized in terms of the presence, abundance, and relative dominance of species and by the structural and spatial characteristics of habitats. In this document, the biological diversity of BLM-managed ecosystems are described in terms of the following components: genetic diversity, species diversity, landscape diversity, and ecosystem diversity (including structural and functional diversity). Emphasis is placed on characteristics of the plant community and the habitat it affords. See the wildlife section for an expanded discussion of wildlife populations and the interactions between animals and habitat.

Ecological health, a closely allied concept, is defined in FEMAT as "the state of an ecosystem in which processes and functions are adequate to maintain the diversity of biotic communities commensurate with those initially found there." Ecosystem diversity, expressed as the relative abundance and dominance of biotic elements within stands and landscapes determines whether ecological processes are able to supply the resources and the habitats on which species survival depends.

The level of resiliency and stability in ecosystems has sometimes been termed "forest health". The

discussion of functional diversity includes an estimate of the extent to which BLM ecosystems are stressed and are no longer stable or resilient and exhibit a diminished capacity to meet management objectives.

For most purposes, the best baseline for biological diversity analysis is the range of pre-management or historic conditions over which stand and landscape characteristics and ecological processes fluctuated. That range of natural fluctuation however, is difficult to quantify and is known to have changed over time with changes in climate.

Various attempts have been made to characterize the range of pre-management or historic conditions, including work by Teensma, Rienstra, and Yeiter (1991) and Agee (1991). The most comprehensive attempt for Pacific Northwest forests is the Forest Service Regional Ecosystem Assessment Project completed in June 1993 (USFS, 1993). In as far as possible, that project compared current characteristics of terrestrial and aquatic ecosystems with the estimated characteristics of those ecosystems during the period 1600 to the mid-1900s. The comparisons were broken out by river basin and vegetation series. While the data base for estimation of pre-management conditions only includes Forest Service administered lands, the Regional Ecosystem Assessment Project was used in this chapter where possible, to compare current conditions on BLM-administered lands and across other ownerships with the probable range of historic conditions. Other information, research data, and professional estimates have been used to otherwise make this comparison. Comparisons have generally not been possible for riparian and aquatic condition because of the lack of appropriate inventory data.

During the last 100 years, human activity has dramatically changed the natural environment of the planning area. Forest land has been particularly affected by fire suppression, logging, and silvicultural practices. The most striking changes have occurred within the last 30 to 50 years and include:

a. Widespread changes in forest fragmentation. Fragmentation patterns differ within BLM-managed stands and within the entire managed landscape because of different management approaches on different ownerships.

b. A decrease in the acreage of old-growth, mature, and late seral stands, with a corresponding increase in the acreage of early and mid-seral stands. Early and mid-seral stands resulting from logging operations generally have fewer snags and less structure than found in natural stands.

c. Increases in stand density, fuel loading, fuel continuities, and fire hazard in stands that have not received regeneration harvests. Fire exclusion has led to the development of dense underbrush and has increased the presence, abundance, and dominance of shade tolerant climax species.

d. Damage to the riparian vegetation and associated aquatic habitat in many watersheds.

A number of different forest management approaches have been used on BLM-managed lands beginning in 1918. The result has been a variety of stands with differing amounts of structure and species composition. Approximately 27 percent of the suitable commercial forest land exists in young even-aged stands less than 30 years old. These stands have primarily resulted from clearcut or mortality salvage harvest after wildfires.

Genetic Diversity

Genetic diversity refers to the sum of the genetic material represented by different species within an ecosystem. The level of genetic diversity may be characterized in terms of variation in genetic composition which occurs within stands, between stands, and within a local region. More than 1,000 invertebrate species, each with a distinct set of genetic characteristics, have been identified within a single old-growth stand (Franklin 1988). The number of genes within a species can range from 1,000 in bacteria, to 10,000 in fungi, to 400,000 or more in flowering plants (Wilson 1988).

Principal changes to the genetic diversity of BLM-managed ecosystems over the last 100 years are associated with: 1) the local extirpation of animal species, such as the wolf and grizzly bear, and the loss of the genetic material associated with those species; and 2) the addition of non-native genetic material in exotic plants, animals, and diseases.

Principal risks to genetic diversity include habitat fragmentation, which limits or prevents genetic interchange, and habitat loss with its consequent reductions in wildlife populations or loss of species. Specific impacts of past forest management on genetic diversity are uncertain. However, all silvicultural actions affect genetic composition to some degree (Ledig and Smith 1981).

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Approximately 1,811 acres on the Roseburg district have been planted with genetically selected Douglas-fir to date. The project program does not appear to pose a risk to the species or to long term yield sustainability, since tree breeding programs are designed to prevent excessive narrowing of gene pools.

The genetic diversity of young stands established in recent years varies depending on the number of trees used as seed sources, the number of natural seedlings that have established themselves in the stands, and the compatibility of planted seedlings with the site. The use of seed from specific seed zones and elevations helps to maintain local genetic diversity, assure site adaptability of seedlings, and minimize genetic risk (see Appendix M).

Species Diversity

Species diversity refers to the variety of living organisms found in a distinct habitat. Organisms may include plants, birds, mammals, reptiles, insects, and less visible organisms such as soil mycorrhizal fungi. Maintaining species diversity requires maintaining viable populations of each species. When local populations of a species drop below this level, local extinction of the species becomes more probable (Schafer 1990).

Species diversity varies from place to place and has changed over time. Plant species diversity within and between natural stands depends on differences in site and potential natural vegetation and differences in the intensity, extent, and time since natural disturbance events. Species diversity of managed stands varies depending on time since harvest, potential natural vegetation, and the management regime which was applied.

Table 3-21 displays species composition in mature and old-growth stands.

Table 3-21. Species Composition in Mature and Old-Growth Stands.

Species Composition by Basal Area (Percent)				
Douglas-fir	Pine	Wh.Fir	Other Conifers	Hardwoods
68%	2%	3%	16%	11%

The old-growth stage has more shade tolerant plant species such as Pacific yew, white fir, and western hemlock and tends to be the richest in insect species, lichens, fungi, and micro-flora and fauna. This variety of life is made possible by fine grained patterns of disturbance in the old-growth seral stage and by large trees which support and shelter these organisms with favorable temperature and moisture regimes. Old-growth stands contain the most nonliving organic material and associated organisms.

The species composition of unmanaged, natural forests was shaped by the interaction of evolutionary processes, changes in climatic which occurred over time, and ecological processes such as disturbance and succession (Polunin 1960). In southwestern Oregon, the type and frequency of disturbance plays a major role in determining the natural distribution of plants, largely because of high natural fire frequencies. Long term reduction or elimination of disturbance would change the species composition of forest stands. The current species composition of stands depicted in Table 3-21 reflect, in part, the effects of protection of stands from disturbance by wild fire.

Plant species diversity is partly dependent on the variety of plant associations described in the vegetation section. The acres of the various major forest plant groupings occurring on BLM-administered lands in the district are shown in Table 3-22. Their distribution is shown on the Major Plant Group map in the accompanying packet. Plant species diversity within natural Douglas-fir stands and those under even-aged management varies by stand age. The coniferous species composition of managed forests also differs to some extent from unmanaged forests of the same ages. Unmanaged, natural forests were shaped by ecological processes of wildfire, windthrow, insect attack, and tree disease. Without disturbance in the western hemlock zone, Douglas-fir would be replaced by western hemlock.

Table 3-22. Acres of Major Plant Groups.

Plant Group	Acres
MC-IV-GR	159,782
MC-MB-SA	45,952
D-CE-SA	52,803
D-B-SA	99,181
D-RA-VM	62,077

Native American cultures affected the distribution of plant and animal species through hunting and the use of fire. Early settlers affected animal species diversity through trapping and hunting. Logging and grazing affected those areas to which the pioneers had access, generally the Cascade Mountains and the interior valleys.

The introduction of exotic plants, diseases, and insects has significantly affected species composition in the planning area. Port-Orford cedar root rot could threaten the continued survival of this species.

Ecosystem Diversity

Ecosystem diversity is the biological communities and ecological processes (both kind and number) that occur in different physical settings. Old-growth forests, riparian areas, or upland meadows are examples of ecosystems. Ecosystems can be subdivided into local communities.

Classification of communities into plant associations is incomplete on BLM-administered land, but for purposes of the Resource Management Plan/ Environmental Impact Statement, plant communities with similar characteristics have been aggregated into major plant groupings, discussed previously.

Special habitats provide another component of ecosystem diversity. These include serpentine barrens, bogs, meadows, rock cliffs, and talus slopes (see Vegetation, Special Areas, and Water sections).

Plant and animal species in natural ecosystems vary by seral stage (see Vegetation section). Early seral communities usually have the largest number of higher (vertebrate) animal species and high representations of sun tolerant, pioneer plant species such as grass. As succession progresses, the number of species declines and the composition of species change. In forest communities, species diversity increases again as the old-growth stage is approached, but the species mixture differs from the early and mid-seral stages. The old-growth stage supports shade tolerant plant species and tends to be the richest in insect species, lichens, fungi, and micro-flora and fauna. The large trees support and shelter these organisms with favorable temperature and moisture regimes. There are greater amounts of nonliving organic material.

The old-growth seral stage has a greater structural diversity than even-aged, younger, closed canopy seral stages. For purposes of interpretation of existing forest inventory, BLM has defined old-growth as forestland which is at least ten percent stocked with trees 200 years or older in stands which are ten acres or larger in size. While there is a correlation between habitat and age, the condition of older forests is variable. Douglas-fir forests may develop old-growth characteristics between 150 and 250 years of age (Spies and Franklin 1988).

A preliminary ecological definition of old-growth was developed by U.S. Forest Service researchers (Old-Growth Definition Task Group 1986). Definitions for individual series currently are being prepared. BLM has no specific mature/old-growth inventory showing what stands meet the U.S. Forest Service old-growth definition. However, an inventory has been initiated.

Structure in an ecosystem or community is the relationship of physical size, height, and vertical stratification of vegetation. It relates to ecological processes such as nutrient cycling, nitrogen fixing, forest succession, incorporation of organic matter into soils, and predator-prey relationships.

The most obvious differences between seral stages are differences in stand structure, (e.g., trees, snags, fallen trees), which create habitat for a variety of organisms and influence nutrient cycling and other functional processes. Structures retained from later seral stages to the early seral stage serve as biological legacies. In unmanaged forests, such retention varies between stands.

Structural diversity is lower during the mid and late seral stages of natural stands than during other stages of successional development (Franklin and Dyrness 1973; Long 1977; Franklin et al 1981). Younger managed stands have the lowest structural diversity due to timber harvest which removed most dead trees and down logs. Harvesting in recent decades left these components, but at levels below that occurring after natural disturbance.

Vertical diversity is provided by tree heights and canopy layers (see Table 3-23). Younger stands, particularly those without biological legacies, often have only one canopy layer. Those younger stands which have reached canopy closure have little understory. Table 3-23 summarizes average (quadratic mean) diameter, number of trees per acre greater than 30 inches and number of acres with different levels of canopy closure by seral stage.

The size and frequency of canopy gaps and the degree of canopy closure influence species composition, successional dynamics, nutrient cycling,

Table 3-23. Structural Characteristics by Seral Stage

Seral Stage (or Age Class)	Avg Dia[2] (inches)	Avg TPA[1] Over 30 Inch	Percent of Crown Closure (acres) 10-40	40-70	70-100
Late	9	2	2,100	16,500	18,700
Mature	12	9	8,900	43,100	31,200
Old-Growth	12	16	10,300	82,200	18,100

[1]Trees per acre
[2]Average based on all trees greater than 4.5 feet in height.

and wildlife habitat. Canopy gap formation becomes significant in the mature seral stage and stands begin to develop multiple canopies as reproduction begins in the gaps. Disturbance frequency and severity is the primary determinant of gap formations in an ecotype (Spies, Franklin and Klopsch 1990).

The death and fall of canopy trees determines the structure and dynamics of forest ecosystems. Snags provide habitat for cavity users (see Wildlife section). Dead and down woody material provides habitat for many species including decomposers that are considered critical to the overall health of the forest. Average dead and down material greater than seven inches in diameter is summarized in Table 3-24.

Of all the functional mechanisms responsible for shaping forest communities, disturbance events are particularly significant. These events reset plant succession in entire stands or in patches and prevent succession from continuing to a true climax on most sites. They include wildfire, windthrow, insect attack, and tree disease. Fires have been the predominant events and have played a major role in plant succession. The prehistoric cycle of stand replacing fires which cause high or complete mortality in an overstory stand of trees, probably averaged 150 years in the southern portions of the planning area and 250 years in the northern portions of the planning area. Stand replacing fires, such as those in the southern portions of the planning area, in the middle

Table 3-24. Dead and Down Material for Coniferous Stands by Seral Stage and Downlog Diameter Class*

Diameter Class	Early & Mid		Late		Mature		Old Growth	
	Tons per Acre	Feet per Acre	Tons per Acre	Feet per Acre	Tons per Acre	Feet per Acre	Tons per Acre	Feet per Acre
7-9.9	1.1	347	0.6	176	1.2	349	0.8	224
10-13.9	2.1	324	1.3	199	2.7	406	2.1	307
14-17.9	2.5	214	1.4	128	2.5	205	3.1	255
18-21.9	3.3	169	2.0	111	3.4	172	3.1	164
22-25.9	3.3	112	0.7	24	2.6	88	3.0	106
26-29.9	2.2	57	0.6	17	1.7	46	2.8	68
30-33.9	2.9	58	2.1	41	1.5	31	3.2	62
34-37.9	2.9	45	1.8	27	1.2	17	2.3	33
38+	4.2	36	4.3	38	2.8	25	4.0	33
Total	24.5	1,362	14.9	760	19.5	1,338	24.3	1,252

*Minimum downlog length 8 feet.

of the 19th century, burned as much as 200,000 acres each.

Fire suppression, starting in the 1920s, has progressively reduced the size of wildfires. Fire exclusion has led to development of dense underbrush and increased occurrence of shade tolerant climax species (Stewart 1986). It has also resulted in the encroachment of trees into grassy balds and meadows (Vale 1981). In the last ten years stand replacing wildfires have burned 13,841 acres of BLM-administered land in the Roseburg District.

Landscape Diversity

Landscape diversity is the geography of the size, shape, and connectedness of different ecosystems across a large area. Landscape diversity may be described in terms of the arrangements of stands within a watershed or larger area, or the arrangement of patches within a stand. For example, a landscape interspersed with grasslands, shrublands, meadows, ponds, streams, wetlands, and forests has greater biological diversity than one with a broad expanse of grassland.

Older forest ecosystems in a continuous network of habitat originally occupied a significant, but unknown, portion of southwestern Oregon forestland. It is estimated that old-growth forests occupied at least 50 percent of the original landscape, perhaps less in the more fire prone interior valley and foothills forests (Andrews and Cowlin 1940). The amount of old-growth that originally occupied the Commercial Forest Land in the Douglas-fir region has been estimated to have been 60 to 70 percent (Franklin and Spies 1984). The location of existing mature and old-growth stands are shown on the Major Plant Group Map in the accompanying map section.

Harvesting has reduced the proportion of the forest which exists as later seral stages and fragmented older stands into a series of habitat islands separated by younger or partial cut forests. The remaining natural forest on BLM-administered lands is further fragmented because of the checkerboard pattern of ownership. Clearcuts on BLM-administered lands tend to be spread across the landscape and average ten to 40 acres in size. Partial cut unit size varies but is generally the same average size as clearcuts. Larger areas have on occasion had light partial cuts to accomplish mortality salvage.

The size of old-growth patches and the seral stage of adjacent stands have been shown to affect the quality of habitat which exists within old-growth patches. All smaller patches and those portions of old-growth stands close to the edge of an early seral block are subject to a variety of external influences that substantially reduce their effectiveness as old-growth habitat. These influences include wind (which influences temperature) and predation from species inhabiting adjacent lands. Thus, effective interior old-growth habitat is substantially less than actual old-growth acres (Harris 1984). Most studies identifying the extent of such influences have occurred outside the Pacific Northwest. Harris concludes that edge effects extend approximately 600 feet into old-growth stands from adjacent clear cuts due to changes in environmental parameters such as light, temperature, and relative humidity; and that old-growth must exceed 1,200 feet across and 26 acres in size before interior old-growth habitat begins to be retained with all old-growth characteristics intact. Chen, Franklin, and Spies (1990) indicate that the effect of edge on relative humidity extends over 240 meters (787 feet) into old-growth stands. Other analysts have concluded that effective habitat starts about 400 feet from adjacent clearcuts. The Wilderness Society and the U.S. Forest Service have used that distance in some recent analyses.

The extent of fragmentation of older forest habitat on BLM-administered lands is shown in Table 3-25. Interior habitat shown in that table is habitat at least 400 feet from adjacent lands with forest stands younger than 70 years or private lands. Even many of the largest blocks of old-growth contain little interior habitat due to the Swiss cheese effect created by past clearcut patches in their interior.

These remaining old forest blocks are shown on the Major Plant Group Map in the accompanying map section. Harris (1984) suggests that this habitat fragmentation has substantially reduced the population of forest interior animal species such as fishers, wolverines and lynx, compared to that existing prehistorically, but Lehmkuhl and Ruggiero (1990) found that correlations between fragmentation and the richness and abundance of animal species in Pacific Northwest forest were weak.

Special Areas

Special Areas currently designated on the Roseburg District include Areas of Critical Environmental Concern, Research Natural Areas, Environmental Education Areas, and Outstanding Natural Areas. Areas of Critical Environmental Concern have been

Table 3-25. Existing Older Forest Blocks

Block Size (acres)	Old-Growth (Age 200+) No. of Total Blocks	Old-Growth (Age 200+) No. of Total Acres	Old-Growth and Mature Combined No. of Total Blocks	Old-Growth and Mature Combined No. of Total Acres	Interior Old-Growth Habitat No. of Total Blocks	Interior Old-Growth Habitat No. of Total Acres
20-79	510	20,500	674	27,700	224	9,200
80-299	227	34,800	339	54,500	72	10,900
300-599	72	29,300	99	40,900	8	3,500
600+	20	34,500	41	65,500	4	5,300

designated under the authority of the Federal Land Policy and Management Act of 1976 to protect natural resources, systems, or processes that have been determined to have more than local significance and are in need of special management attention. Research Natural Areas have been designated to protect natural features for the purpose of research and education, Environmental Education Areas to protect natural features for the purpose of education, and Outstanding Natural Areas to protect natural features for the purpose of recreation.

Each designated Special Area received an interdisciplinary review during preparation of the Resource Management Plan to consider potential modifications and to determine if the areas met Area of Critical Environmental Concern qualification criteria of relevance and importance (see Potential Area of Critical Environmental Concern in Glossary for definition of relevance and importance). Existing Research Natural Areas and Outstanding Natural Areas that were not also designated Areas of Critical Environmental Concern had never previously received this type of review. Any existing Research Natural Area or Outstanding Natural Area determined by the interdisciplinary team not to meet Area of Critical Environmental Concern criteria was dropped from further consideration. The results of the interdisciplinary review of existing Special Areas are presented in Table 3-26.

In addition to the existing Special Areas reviewed by district personnel, nine areas were nominated for Area of Critical Environmental Concern designation during the planning process and one special area, the North Bank Habitat Management Area, was designated through a land use plan amendment. Two of the nominations were received early in the planning process and were evaluated by an interdisciplinary team of BLM managers and staff to determine whether their values met Area of Critical Environmental Concern qualification criteria. Both areas were determined eligible for designation and are regarded as potential Area of Critical Environmental Concern in the Resource Management Plan. The remaining seven nominations were received after publication of the Draft Environmental Impact Statement and have not been reviewed by an interdisciplinary team. Area of Critical Environmental Concern qualification criteria for these nominations will be reviewed by an interdisciplinary team after publication of the Record of Decision. Interim management will be provided each of the nominations waiting review to protect the natural features for which the area was nominated and to ensure that there is no loss of future management options. Alternatives for special management will be considered through a Resource Management Plan amendment for each nomination determined to meet Area of Critical Environmental Concern qualification criteria. A detailed management plan will be prepared for nominations that receive Area of Critical Environmental Concern status. All nine nominations are summarized in Table 3-27. The locations of potential (nominations that have received an interdisciplinary review) and existing Area of Critical Environmental Concern are displayed in Map 3-7.

The North Bank Habitat Management Area was acquired by the Roseburg District through a land exchange and designated an Area of Critical Environmental Concern in 1994. This Area of Critical Environmental Concern is 6,221 acres in size and contains habitat for the Columbian White-Tailed Deer, a Federal endangered species, and two federal candidate plant species.

Table 3-26. Existing Special Areas

Special Area	Size (Acres)	Primary Value	Designation Current	Designation Proposed	Potential Modification
Beatty Creek	173	Jeffrey pine communities on serpentine soils at low elevations	RNA	ACEC/RNA	Expand to 331 acres
Brad's Creek	127	Bald eagle & osprey nesting habitat, class II scenic	ACEC	ACEC	Combine with Golden Bar, expand to 947 acres, rename Umpqua River Wildlife Area
Golden Bar	93	Bald eagle & osprey nesting habitat, class II scenic, cultural resources	ACEC	ACEC	Combine with Brad's Creek, expand to 947 acres, rename Umpqua River Wildlife Area
Little River	15	Geologic formations	ONA	None	Remove Special Area Arch status
Myrtle Island	30	Riparian woodland in the Umpqua Valley	RNA	ACEC/RNA	None
North Bank	6221	Columbian White-Tailed Deer Habitat	ACEC	ACEC	None
North Myrtle Creek	240	Mixed conifer forest in the Umpqua Valley	ACEC/RNA	ACEC/RNA	Expand to 472 acres
North Umpqua	1620	High use recreation area	ACEC	ACEC	None
Red Pond	85	Low elevation permanent ponds	EEA	ACEC/RNA	Expand to 134 acres
Tater Hill	170	Active slide associated with successional plant communities	ACEC/RNA	ACEC/RNA	Expand to 280 acres

Cultural and Paleontological Resources

The planning area encompasses lands that fall within the southwestern Oregon Interior Valleys cultural area. Human occupation of the planning area may date back continuously for 11,000 years. A variety of occupation sites represent a wide range of human activities over this time span. These sites range from sedentary/semi-sedentary village sites to ephemeral seasonal residence and resource/activity specific sites. A number of aboriginal trails link the coast, Willamette Valley, Umpqua Valley, and eastern Oregon areas. Evidence of dispersed land use in the form of isolated finds (i.e., fewer than 10 artifacts at one location) occur throughout the planning area.

Sites of aboriginal religious significance also have been identified in the planning area.

There have been 127 prehistoric sites and 36 prehistoric isolated finds documented on BLM-administered land. Eleven prehistoric sites have been determined eligible for listing on the National Register of Historic Places, and one, the Susan Creek Indian Mounds, is listed on the Register.

Historic records for the planning area date to the 1820s with the onset of the fur trade. Settlement was well underway in the 1840s, and confinement of Indians to local reservations was completed in 1857. Historic development of planning area lands included homesteading, mining, grazing, logging, recreation, fire protection, and Federal government actions and activities. Sites representing these historic activities include roads, trails, structures, engineering facilities, early logging sites, and other features and materials.

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Table 3-27. Nominated Areas of Critical Environmental Concern

Special Area	Potential Designation	Size (Acres)	Description	ACEC Eligibility
Ace Williams Mountain	ACEC	TBD[1]	Special status plant habitat	TBD
Bear Gulch	ACEC/RNA	330	Douglas-fir-canyon live oak forest and southwestern live oak forest in the west slope of the Oregon Cascade Province	Yes
Bilger Ridge	ACEC	TBD	Special status plant habitat	TBD
Bushnell Irwin Rocks	ACEC/RNA	958	Oak-madrone-conifer woodland and first to third order stream system in the Umpqua Valley	Yes
Canton Creek	ACEC	TBD	Anadromous fish habitat	TBD
Langell Ridge	ACEC	TBD	Special status plant habitat	TBD
Lee Creek	ACEC/RNA	TBD	Douglas-fir/Jeffrey pine woodland on the West Slope of the Oregon Cascades	
North Myrtle Headwaters	ACEC	TBD	Special Status plant habitat	TBD
Odd Lots	ACEC/ONA	TBD	Outstanding scenic, geologic, wildlife, and botanical values available for recreational use	TBD

[1] TBD: To be determined by an interdisciplinary team after publication of the Record of Decision.
ACEC - Area of Critical Environmental Concern
RNA - Research Natural Area
ONA - Outstanding Natural Area

There are 11 inventoried historic sites located on BLM-administered land. One, the China Ditch, is listed on the National Register of Historic Places.

Three sites with religious significance for Native Americans are known to be located within the planning area. These are the vision quest site at Susan Creek and the sites of two reinterments.

Paleontological sites in the planning area are generally associated with Eocene marine sedimentary formations. These formations are known to produce fossil botanical and marine invertebrate specimens. These formations also have the potential to produce vertebrate fossils, but none are known to have been found within the district on BLM-administered lands. Paleobotanical specimens in the Miocene Little Butte volcanic series are also known within the planning area. An isolated Pleistocene vertebrate specimen has been recovered from the Days Creek area.

Visual Resources

Visual resources are the land, water, vegetation, structures, and other natural features or cultural modifications that make up the scenery of BLM-administered lands. So that visual resource (scenic) values can be considered when planning management activities, BLM-administered lands have been inventoried, evaluated and assigned inventory classes according to their relative worth from a Visual Resource Management point of view. There are four visual resource inventory classes established by BLM manual. Factors of Visual Resource Management classes are: 1) scenic quality, 2) visual sensitivity, and 3) distance zone. Objectives for each class are used to identify management prescriptions that would maintain, enhance or preserve scenic values. These objectives and management direction are described in Chapter 2.

Of all BLM-administered land inventoried in the district, less than one percent is Class I, 21 percent is Class II, five percent is Class III, and 74 percent is Class IV. Acreage of each inventory class are listed in Table 2-1 (Alternative D column), and the classes are delineated on Map 3-8. Much of the Roseburg District has a fragmented land ownership pattern with non-BLM lands dominating the landscape.

In the VRM Inventory the only Class I area on the district is the Myrtle Island Area of Critical Environmental Concern. Class II areas include Interstate 5, Highway 138, Highway 42, Highway 99, Highway 227, Umpqua River Corridor, and some areas around existing recreation sites. Most public roads in rural residential areas such as portions of Highway 99, the Coos Bay Wagon Road, and Smith River Road are Class III in the inventory, and most logging access roads and other seldom seen areas are Class IV.

Wild and Scenic Rivers

BLM manages 8.4 miles out of a total 33.8 miles of the North Umpqua National Wild and Scenic River in cooperation with the Umpqua National Forest, the Oregon Scenic Waterways program, and the Oregon State Marine Board. This river is classified as a recreational river and has five outstandingly remarkable values: fisheries, water quality and quantity, recreation, scenic, and cultural.

Table 3-28 and Map 3-9 show river stretches in the planning area which have been designated by Congress under the Wild and Scenic Rivers Act.

The Nationwide Rivers Inventory identifies three segments which cross or are within a quarter mile of BLM-administered lands in the planning area. Six river segments (Smith River, Cow Creek, South Umpqua River, Canton Creek, Umpqua main stem, and Little River) could have potential for national wild, scenic, or recreational river designation. BLM has applied to each of these river segments, eligibility and classification criteria established in U.S. Department of the Interior-Department of Agriculture guidelines evaluating a corridor extending one-quarter mile on each side of the segment. See Appendix P to reference these guidelines. The status of eligibility determinations for these rivers is shown in Table 3-29. Eligibility studies are available for review at the Roseburg District Office.

Five river segments (Smith River, Cow Creek, South Umpqua River, Canton Creek, and the main stem Umpqua) meet eligibility criteria for designation and thus would be eligible for suitability study based on their free flowing character and outstandingly remarkable values (see Map 3-9). Two of these river segments (Smith River and Canton Creek) are located in areas where BLM-administered lands provide substantial control of the river segment and have been studied in the Resource Management Plan process to determine their suitability for wild and scenic river designation. See Appendix R.

Table 3-28. Designated Wild, Scenic, and Recreational Rivers

River Name	Total River Miles	BLM River Miles			Current BLM Management
		Wild	Scenic	Recreational	
North Umpqua	33.8	0	0	8.4	1/4-mile on either side of the river (approximately 1446 acres) are protected from some surface disturbing activities. Developed facilities: 12.5 miles hiking/riding trails; Susan Ck. Campground with 31 camping sites; Susan Ck. picnic area; Susan Ck. watchable wildlife site; Susan Ck. whitewater launch site; and , Swiftwater day use area. Commercial river use is regulated by permit.

Table 3-29. Rivers With Potential For Wild and Scenic River Designation

	Eligibility[1]	Highest Potential Class[2]	ORV[3]	Total River Miles	Percent BLM[4]
Canton Creek	E	R	F	14	53%
Cow Creek	E	R	F,H,P	26	17%
Little River	NE	R	None	28	10%
Smith River	E	R	F	15.1	40%
South Umpqua	E	R	F,H,P	73	<1%
Umpqua River	E	R	S,R,F,H,P	57	11%

[1]E: Eligible - A river segment is eligible for inclusion in the National Wild & Scenic Rivers System if it is free-flowing and has one or more outstandingly remarkable values.
NE: Not eligible - Not eligible because not free flowing, or not eligible because no outstandingly remarkable values.

[2]W: Wild
S: Scenic
R: Recreational

[3]S: Scenic
R: Recreation
F: Fish
H: Historic
P: Prehistoric
T: Native American Indian Traditional Use
W: Wildlife
ORV: Outstandingly Remarkable Value

[4]This is the percentage of BLM-administered land. Suitability studies will be completed on eligible rivers where BLM has substantial control of the shoreline (i.e., 40 percent BLM-administered lands).

Recreation

The major recreation activities occurring on BLM-administered land in the planning area are camping, picnicking, hiking, horseback riding, mountain biking, whitewater boating, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing, and driving recreation vehicles on and off highways. Some of this activity is concentrated in developed recreation sites, but most is dispersed recreation activity occurring on roads, streams and rivers, and undeveloped forest lands.

All BLM-administered land falls into two recreation management categories - Special Recreation Management Areas and Extensive Recreation Management Areas. Typically, Special Recreation Management Areas are sites or areas requiring substantial recreation investment and management. The Special Recreation Management Area label is applied to various types of areas such as high-use recreation sites, wilderness areas, wild and scenic rivers, and large areas with high recreation values.

The North Umpqua River is the only Special Management Recreation Area in the district; it is 1,620 acres in size and received 137,600 visits in 1989. The Roseburg Extensive Recreation Management Area covers all other lands in the district. This includes 417,748 acres which received 429,000 visits in 1990.

Existing and potential recreation sites are described in Table 3-30 and displayed on Map 3-10. Existing

Table 3-30. Existing and Potential Recreation Sites

Site	Acres	1991 visits	Amenities
Existing Recreation Sites			
Cavitt Creek	80	1,000	8 campsites with adjoining Picnic Area and Scenic waterfall.
Cow Creek Recreational Gold Panning Area	20	***	Picnic area with picnic table and toilet. Gold panning.
Emile	80	***	Industrial campsite approximately 15 miles up Little River. Vault Toilets. (U.S. Forest Service Administered.)
Gunter Wayside	80	***	Day use Wayside and vault toilets.
Lone Rock Boat Launch	6	***	Boat launch on the North Umpqua River up Lone Rock Road. Vault toilet and small picnic site.
Millpond	320	2,050*	12 campsites with an adjoining picnic area on Rock Creek. Pavilion, ballfield, small swimming hole.
Swiftwater	80	10,000*	Day use area, fishing kiosk.
Rock Creek	160	2,200*	18 campsites with adjoining picnic area on Rock Creek.
Scaredman	80	****	9 campsites on Canton Creek
No. Umpqua Trailhead	1	***	Picnic tables and vault toilet. North Umpqua Trail head
			Accessible fishing platform.
Susan Creek	205	6,800*	31 campsites with an adjoining day-use picnic area on the North Umpqua River. Barrier-free nature trail and Watchable Wildlife site. Fishing, showers.
Tyee	24	2,300*	15 campsites with adjoining picnic area and Pavilion.

*Refers to campground visits. No counts available for visits to the day use picnic facilities.
***No figures available.

Site	Acres	Amenities
Potential Recreation Sites		
Brickyard Pond	5	Picnic site, swimming.
Chimney Rock	5	Picnic site, swimming.
Eagleview Recreation Site	5	Camping area on the Umpqua River.
Hubbard Creek Recreation Site	40	Off Highway Vehicle use area development.
Hardscrabble Recreation Site	30	Picnic area with Watchable Wildlife site, and fishing on the Umpqua River.
Iron Mt. Gold Panning Area	5	Picnic site, gold panning, and swimming.
Island Creek	15	Campground and gold panning area.
Lavadoure Boat Ramp	2	Boat launch and parking on South Umpqua River.
Michigan Springs	5	Picnic site, swimming, fishing.
North Umpqua Trail Primitive Campsite	2	Fire rings, composting toilet.
Olalla-Thompson Creek	20	Picnic site, dispersed camping.
Osprey Boat Ramp	5	Picnic area on the Umpqua River, with boat launch and Watchable Wildlife site.
Pickett Bridge Recreation Area	20	Eight campsites, picnic area.
Red Top Pond	5	Four campsites, picnic tables, toilet.
Susan Creek Group Reservation Site	2	Tent camping by group reservation. Water, toilet, raft launch site.
Weaver Road Pond	5	Picnic site, swimming.

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Table 3-31. Existing and Potential Recreation Trails

Existing	Miles	1990 Visits	Other Descriptive Information
Deadline Falls Watchable Wildlife Trail	.1	***	Barrier free trail with Watchable Wildlife site.
Miner-Wolf Watchable Wildlife Trail		***	Watchable Wildlife, Fisheries enhancement project.
North Umpqua Trail	11	2,000	First segment of a 77.5 mi. trail connecting Swiftwater to Pacific Crest Trail.
Susan Creek Campground Trail	.4	4,000	Barrier free trail with Watchable Wildlife site and outdoor theater.
Susan Creek Falls Trail	1	4,000	Accesses Susan Creek Falls and Indian mounds picnic area & parking at trailhead.
Wolf Creek Falls Trail	1.5	2,000	Accesses Wolf Creek Falls.

***No Figures Available.

Potential		
Alexander Butte Trail	1	Would offer vistas of region. Located close to population centers.
Ben Irving Trail	10	Would provide equestrian and mountain bike access in loop around reservoir.
Bushnell-Irwin Rocks Trail	1	Would offer vistas of region. Located close to population centers.
Cougar Creek Trail	.5	Would provide access to primitive recreation site.
Cow Creek Bluffs Trail	3	Would access rock bluffs overlooking Cow Creek.
Deadman Mtn. Trail	10	Would provide trails in the Deadman - Louis Creek Area for hikes, mtn. bikers and equestrians.
Eagleview Trail	.5	Would provide hiking opportunity view of Umpqua River.
Miner-Wolf Creek Watchable Wildlife Trail	.3	Watchable wildlife site along fisheries enhancement project of Wolf Creek.
Red Top Pond Trail	1	Undeveloped recreation site trail.
Salt Creek Trail	4	Would provide foot access through unique serpentine area.
Susan Creek Falls Barrier Free Trail	.5	Would provide barrier-free access to Lower Susan Creek Falls. Tie into existing trail for a loop trail. Interpretive opportunities.
Upper Susan Creek Trail	1	Would provide foot access to Upper Susan Creek Falls.
Wolf Creek Falls Trail extension	2	Would extend off the end of existing Wolf Creek Trail. Provide foot access to upper Falls.

Table 3-32. Potential Special Recreation Management Areas

Site	Acres	Other Descriptive Information
Cow Creek Canyon	1,710	River canyon with scenic vistas and proposed recreation sites, recreational mining, swimming. Proposed Back-Country Byway.
Umpqua River/Loon Lake Road	2,240	River frontage with various developed and proposed recreation sites including camping, day use, watchable wildlife, Back-Country Byway, fishing, hiking, and water activities.

and potential trails are described in Table 3-31 and displayed on Map 3-10. Potential Special Recreation Management Areas are described in Table 3-32.

Recreational use of BLM-managed lands, including all activities occurring within one existing Special Recreation Management Area and one Extensive Recreation Management Area, totaled approximately 566,300 recreation visits in 1990. This use estimate is based on results of the 1988 Statewide Comprehensive Outdoor Recreation Plan, the most recent database available for estimating existing district wide recreational use. The Statewide Comprehensive Outdoor Recreation Plan estimates were prorated to BLM based on percent of forest land administered in the region. Table 3-33 shows total 1990 recreation visits to BLM-administered land for 11 separate use categories.

Hunting visits accounted for eight percent of the total recreation visits. Motorized travel visits including sightseeing and exploring and other land-based visits such as nature study, wildlife observation, outdoor photography, visiting interpretive displays, and picnicking accounted for 17 percent of total visitation. Non-motorized travel visits such as day and overnight hiking/backpacking on trails, bicycling off the road and horseback riding and camping visits (all modes of overnight camping) accounted for another 29 percent. No other use category accounted for more than four percent of total visitation. Other land based visits such as picnicking, viewing wildlife, and nature study accounted for 19 percent.

Off Highway Vehicle use occurs in low to moderate numbers in the district. Use includes 4x4, motorcycle, and all-terrain vehicles. Rugged terrain and dense

Table 3-33. Total 1990 Recreation Visits to BLM-Administered Land

Recreation Use Category	Recreation Visits (Participants)	Percent of Total Visitation
Nonmotorized travel visits	109,500	19.3
Other land based visits	107,000	19.0
Motorized travel visits	94,500	16.7
Fishing visits	62,500	11.0
Off-road use visits	59,000	10.4
Camping visits	52,800	9.3
Hunting visits	44,200	7.8
Other water based visits	20,500	3.6
Boating visits	16,500	2.9
Snowmobiling visits	0	0
Winter sports visits	0	0
Total	566,300	100%

Source: Oregon State Parks Rec. Dept. 1988. (Projected growth of visitations annually is 3.43 percent)

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vegetation make access off existing roads and trails difficult. Access to some public lands can be a problem due to the checkerboard land ownership pattern. Nevertheless, enthusiasts manage to find challenging areas to explore and drive through. The most frequent visited area is Hubbard Creek/ Callahan Ridge. Off Highway Vehicle use also occurs in areas adjacent to each community and on forest access roads and trails throughout the district such as Jim Creek (Little River) and the Canyonville Area.

In the 1983 Management Framework Plan, all public lands in the district were designated as follows: open - 414,245 acres, limited - 0 acres, closed - 9,655 acres.

Within the planning area there are 11 BLM-developed and managed recreation sites; 13.5 miles of developed hiking/horseback riding trail; 756 miles of stream supporting fishable populations of trout and salmon; and 2,250 miles of BLM-controlled roads open to motorized travel.

A recently initiated program in BLM is Back Country Byways. The purpose of the program is to identify and publicize scenic driving opportunities on less traveled roads through BLM-administered lands. The Roseburg District has the Cow Creek Back Country Byway, dedicated by BLM in September, 1993. It includes 41 miles of paved roads, 30 miles are BLM-administered and 15 are county owned. The Cow Creek Back Country Byway is managed by the Roseburg and Medford BLM Districts. Three Back Country Byways are planned for designation in the future. They are:

1. Coos Bay Wagon Road (18 miles)
2. Smith River Road (27 miles)
3. Tyee - Loon Lake (25 miles)

An eight-mile segment of the North Umpqua Highway from Idleyld Park to the BLM, Forest Service boundary was designated a National Scenic Highway in 1992. It is part of the State's Rogue-Umpqua Scenic Byway System.

Although conflicts between recreation uses may occur at times, there are no significant conflicts on BLM-administered lands. Recreation use at any given time and location throughout the district is relatively light in undeveloped areas. However, use can be moderate to heavy in developed sites, particularly on weekends and holidays. The capacity of Extensive Recreation Management Areas and potential Special Recreation Management Areas to handle foreseeable recreation use will not be exceeded for many decades. Recreation use of the North Umpqua River Special Recreation Management Area is high during the spring and summer. An anticipated use increase in this Recreation Management Area over the next decade will increase demand on facilities within the corridor.

In 1992 use of recreation sites was estimated to be 80 percent of capacity on peak use days (Friday and Saturday nights) from July 1 to September 1. At the more popular campgrounds this percentage was higher (Susan Creek - 88 percent, Tyee - 86 percent) and at the lesser used campgrounds the percentage was lower (Rock Creek - 66 percent, Mill Pond - 73 percent, and Cavitt Creek - 79 percent). At all campgrounds weekday use drops off significantly. At the end of the planning period (2002), weekend use of the campgrounds is expected to increase slightly above 80 percent capacity with the largest increase expected at the less frequently used campgrounds.

Recreational Access

An exclusive road easement across private land is required for legal public access to BLM-administered land. In many cases where these easements do not exist, private landowners have not restricted public access, but have to option to do so. The public does not have legal access on 1) BLM roads with non-exclusive easements, and 2) BLM roads built under reciprocal right-of-way agreements.

Legal access means that the public can enter BLM-administered land 1) by vehicle in areas open to motorized use, and 2) by foot.

At present, 60 percent of the roads in the planning area are legally accessible to the public. However, Off Highway Vehicle designations made in the 1993 Management Framework Plan allow motorized access anywhere, anytime throughout 98 percent of the district. This includes extensive open access for cross-country travel, but due to the terrain and dense vegetation, off highway travel is not physically possible in many areas.

Although BLM roads may provide legal access, they are not public roads. Public use of BLM roads open to motorized use must comply with State vehicle codes unless the road or area is specifically designated as an Off Highway Vehicle use area. For example, registered vehicles which are not licensed for the road are not normally allowed on maintained BLM roads, however, they are allowed if the area is specifically designated for such use. The BLM has the responsibility and authority to regulate public access on its road system.

Timber Resources

In 1977 district lands were inventoried for their physical and biological capabilities to support and produce forest products on a sustained yield basis (BLM Handbook 5251-1). This inventory is the Timber Production Capability Classification system. District lands were reinventoried in 1988 using the current Timber Production Capability Classification system. Differences in terminology, structure and district acreage prevents direct comparisons of the inventories. Table 3-34 displays the results of the Timber Production Capability Classification as of October 1, 1988.

The Timber Production Capability Classification is described in Table 3-35.

District forest lands were inventoried in 1978 and 1988 to estimate the volume and age class distribution. Table 3-36 displays a comparison of the volume growing and age class distribution.

The difference in inventoried acres displayed in Table 3-36 is a result of several factors. They are primarily:

Table 3-34. District Timber Production Capability Classification Summary, 1988

	Acres			
	O&C	PD[1]	CBWR	Total
NonForest				
Rockland	3,301	682	681	4,664
Brush	78	0	0	78
Grass	315	73	0	63
Water	996	68	1	1,065
Highway	14,884	422	566	15,872
Utility	598	11	25	634
Agriculture	0	0	0	0
NonForest Unclassified	321	119	0	440
Subtotal	20,493	1,375	1,273	23,141
Nonsuitable Woodland				
Fragile nonsuitable	19,625	1,742	626	21,993
Suitable Woodland				
Low Site	37	0	0	37
Non Commercial Species	148	58	12	218
Nonsuitable CFL (Reforestation Problem)	2,695	101	0	2,796
Subtotal	2,880	159	12	3,051
Suitable Commercial Forest Land				
Non-problem	482	14	1,964	2,460
Fragile suitable	1,610	160	991	2,761
Cat. I - reforestation problem	197,441	7,588	6,329	211,358
Cat. II - reforestation problem	0	0	0	0
Combination reforestation and fragile problem	114,702	7,132	2,794	154,628
Subtotal	344,235	14,894	12,078	371,207
TOTAL	387,233	18,170	13,989	419,392

[1]Acquired Lands are included with the Public Domain (PD) totals.
Source: Acreage estimates are derived from Geographic Information System acres in the Timber Production Capability Classification database.

Table 3-35. Definition of Classifications used in the 1988 Timber Production Capability Classification

NONFOREST LAND - Sites within the forest zone that are not capable of maintaining at least 10 percent stocking of forest trees and those sites which have been converted to nonforest uses. These sites are excluded from the timber production base by definition.

WOODLAND - Woodland is forest land which is not included in the Commercial Forest Land allowable harvest base, and also includes all fragile nonsuitable land, noncommercial forest land, and nonsuitable Commercial Forest Land.

NONSUITABLE WOODLAND - Includes all fragile nonsuitable forest land and sites that are not biologically and/ or environmentally capable of supporting a sustained yield of forest products.

FRAGILE-NONSUITABLE - Sites where future production will be reduced even if special harvest and/or restrictive measures are applied due to inherent site factors such as soil, geologic materials, topography, and groundwater tables.

SUITABLE WOODLAND - Includes all noncommercial forest land and nonsuitable commercial forest land that are biologically capable of supporting a sustained yield of forest products.

LOW SITE - Sites that produce less than 20 cubic feet per acre per year of commercial species.

NON-COMMERCIAL SPECIES - Sites producing forest tree species (hardwoods) that are typically utilized as nonsawtimber products.

NONSUITABLE COMMERCIAL FOREST LAND (REFORESTATION PROBLEM) - Sites that cannot be reforested to meet or exceed minimum stocking levels of commercial species: 1) within 5 years of harvest using artificial regeneration and operational reforestation practices OR 2) within 6-15 years of harvest using natural and/or artificial regeneration. These sites are classified as woodland.

SUITABLE COMMERCIAL FOREST LAND - Commercial Forest Land which is determined to be capable of sustaining long-term timber production.

COMMERCIAL FOREST LAND - All forest land that is capable of yielding at least 20 cubic feet of wood per acre per year of commercial tree species.

NON PROBLEM - Commercial Forest Land that can be stocked to meet or exceed target stocking levels, of commercial species, within 5 years of harvest using standard practices and that is classified nonfragile. Standard practice is one site preparation treatment that provides adequate planting spaces (if needed), and one planting following the regeneration harvest.

FRAGILE-SUITABLE - Sites where forest yield productivity may be reduced due to soil erosion, mass wasting, reduction of nutrient levels, reduction of moisture supplying capacity, and/or rise in groundwater tables.

CATEGORY I Commercial Forest Land - Sites that can be reforested within 5 years of harvest using artificial regeneration and operational reforestation practices OR natural regeneration.

CATEGORY II Commercial Forest Land - Sites that can be reforested within 6 to 15 years of harvest using natural and/or artificial regeneration in all forest types. These sites can have fragile, reforestation, or dual (fragile and reforestation) classifications.

COMBINATION REFORESTATION AND FRAGILE PROBLEM - Commercial Forest Land that is classified as fragile suitable where operational reforestation practices, in addition to standard practices, are necessary to meet or exceed minimum stocking levels of commercial species within 5 years of harvest for Category I lands. The regeneration period for Category II lands is 6-15 years.

in 1978 the acres were derived from the Master Title Plat, while in 1988 they were derived by Geographic Information System; exchanges and acquisitions of land since 1978; construction of roads during the previous decade; and the deduction of acres in the Suitable and Nonsuitable categories of the revised Timber Production Capability Classification.

As shown in Table 3-36 there is approximately the same volume in the 1988 inventory as in the 1978 inventory. Reasons for the similarity include:

- Inclusion of volume less than 40 years old in the 1988 data but not in the 1978 data.
- Inclusion of hardwood volume in 1988 data but not in 1978 data.
- Differences in data analysis techniques between 1988 and 1978.

There are basic differences in the structure of the two inventories that make direct comparisons difficult. The 1977 and 1988 Timber Production Capability Classification partitioned the land base differently. The 1988 Timber Production Capability Classification does not contain categories incorporated in the 1977 version such as limited management, adverse location, or statutory withdrawal classifications. These lands were reclassified in 1988, with the majority being included in the Nonsuitable Woodland, Suitable Woodland, or Category II Commercial Forest Land classifications. There were also differences in the guidelines set out for stocking criteria and the

Table 3-36. Comparison of District Inventory Data

Age Class	GLO[1] Acres 1978	GIS[2] Acres 1988	Cubic Volume(Mcf) 1978	Cubic Volume(Mcf) 1988	Board Foot Vol. (MMbf) 1978	Board Foot Vol. (MMbf) 1988
0	7,403	22,065	0	33	0	0
1-5	25,510	19,393	0	606	0	3
10	40,853	40,315	0	1,376	0	7
20	35,945	29,316	0	11,755	0	59
30	13,852	32,525	22,805	50,132	118	258
40	5,973	13,362	12,950	41,236	68	217
50	7,558	8,201	19,463	34,184	104	183
60	11,319	4,271	33,483	18,152	183	99
70	8,959	5,389	30,162	31,059	168	173
80	10,931	6,211	40,831	34,731	231	197
90	11,741	10,312	47,854	88,411	275	509
100	13,282	9,865	58,885	85,807	343	502
110	16,879	8,276	80,544	57,938	475	344
120	15,852	14,215	80,151	79,847	480	480
130	3,595	15,744	19,293	107,540	116	658
140	3,595	5,677	20,222	35,537	123	218
150	10,545	4,969	62,067	37,537	377	234
160	5,615	2,760	34,170	21,103	215	131
170	6,197	5,788	38,565	44,472	237	281
180	21,947	3,532	144,301	23,804	937	151
190	8,305	5,101	52,991	27,430	327	168
200+	105,214	103,763	801,335	836,071	5,285	5,396
Total	391,070	371,050	1,600,072	1,668,761	10,062	10,268

[1]Unit Resource Analysis 4 Land Base, General Land Office (GLO) acreage estimates with deductions for congressional designation, Timber Production Capability Classification withdrawals, and a reduction for roads.
[2]Forest Operations Inventory, Geographic Information System (GIS) acreage estimates with deductions for non-forest, roads, Suitable Woodlands and non-suitable woodlands.
Appendix BB provides additional information on inventories used.

definitions of standard silvicultural operations for making the Timber Production Capability Classifications. A more detailed description of these differences are contained in Appendix BB.

Table 3-37 displays the volume by ownership and timbershed as reported in "Timber for Oregon's Tomorrow" the 1989 update. Of the 522,000 available BLM acres shown in Table 3-37, the Roseburg District administers approximately 367,500 acres (70 percent). Virtually all of the lands the district administers lie in Douglas County (exception: 320 acres - Jackson County; 280 acres - Lane County). Roseburg District Administration covers 24 percent of available Douglas County lands and 46 percent of all available Federal lands in the county. About 30 percent of the available growing stock in Douglas County is BLM.

The Roseburg Timbershed is comprised of Douglas County.

The data presented in this table cannot be compared directly with Table 3-36 as portions of the Medford, Coos Bay, and Eugene Districts are within the Roseburg timbershed.

Until 1987, Douglas County led the nation in timber harvested. Lane County now leads by a small margin. These harvests can be attributed to county size and forested area, with stands of high volume per acre. The Roseburg District is almost 100 percent within Douglas County.

Table 3-38 displays the volume of timber harvested by county and ownership. As in Table 3-37 the data presented encompasses harvest from more than one district.

Energy and Mineral Resources

Since 1980, mineral activity on BLM-administered lands in the planning area has consisted primarily of rock production for construction and maintenance of BLM and private logging roads and county and state roads and highways. Exploration for locatable minerals has been minimal with only 100 notices and no plans of operation having been filed in the last ten years. Approximately 170 acres of mineral land has been patented over the last ten years. It is not expected that this amount will be exceeded over the next ten years. Leasable mineral exploration consisted of seven notices of intent to conduct geophysical work for oil and gas, and no notices of intent for geothermal exploration. From 1980 to 1985, 12 oil and gas leases covering 17,880 acres were issued. The Roseburg BLM has jurisdiction over oil and gas leasing on Forest Service lands to the crest of the Cascades. No significant activity is expected during the life of this plan. All but one of these leases were relinquished or terminated.

Table 3-37. Forest Area and Growing Stock, by Owner for the Roseburg Timbershed (1989)[1]

Roseburg Timbershed	Forest Land Available (Douglas Co.)	Forest Land Not Available (thousand acres)	Total Forest Land (thousand acres)	Available Growing Stock[2] (million cubic ft)
Public				
National Forest	611	285	896	2,602
Bureau of Land Management[3]	522	77	599	2,206
State and Other	39	9	48	219
Private				
Forest Industry	750	9	750	1,586
Non-industrial	287	0	287	663
Total:	2,209	380	2,580	7,276

[1]Johnson, K. Norman; John Bueter, et al. 1990. Timber for Oregon's Tomorrow - the 1989 Update.
[2]National Forest growing-stock data are based on 9-inch dbh to a 6-inch top for natural stands and 7-inch dbh to a 4-inch top for managed stands. BLM and state data are based on 7-inch dbh to a 4-inch top for all stands. Private data are based on 5-inch dbh to a 4-inch top for all stands.
[3]Includes acres administered by Roseburg, Eugene, Coos Bay, and Medford Districts.

Table 3-38. Volume Harvested by County and Ownership Thousand Board Feet (Scribner Log Scale)[1]

Calendar Year	County	Forest[2] Industry	Other[2] Private	State	BLM[3]	National[4] Forest	Other[2] Public	Total
1977	Douglas	648,805		22,530	299,476	298,334	0	1,269,145
	Lane	329,623		13,636	163,699	602,334	0	1,109,292
	Jackson	116,365		41	83,374	139,392	0	339,172
1978	Douglas	665,617	48,169	27,044	92,070	412,748	25	1,245,673
	Lane	324,304	33,406	7,464	204,587	588,891	0	1,158,652
	Jackson	136,463	13,465	778	96,450	163,891	0	411,047
1979	Douglas	676,384	20,993	17,341	277,803	376,435	415	1,369,371
	Lane	369,380	29,672	1,965	139,571	705,070	0	1,245,658
	Jackson	95,194	7,692	168	114,749	158,311	0	376,114
1980	Douglas	729,556	23,501	13,944	186,545	181,722	488	1,135,756
	Lane	309,605	15,623	17,031	144,031	493,188	0	979,478
	Jackson	87,996	8,525	5	87,417	133,632	0	317,575
1981	Douglas	598,577	19,478	6,779	199,894	170,716	0	995,444
	Lane	315,894	13,256	2,901	118,448	328,373	130	779,002
	Jackson	52,821	7,271	762	65,872	137,236	0	263,962
1982	Douglas	694,122	39,970	18,203	68,431	137,826	85	958,637
	Lane	488,718	21,449	6,632	82,282	347,781	14	946,876
	Jackson	104,368	2,415	0	17,877	62,011	78	186,749
1983	Douglas	677,539	36,411	2,297	217,103	318,592	0	1,251,942
	Lane	444,651	38,141	11,621	120,113	477,354	160	1,092,040
	Jackson	118,726	6,117	11	96,652	173,613	208	395,327
1984	Douglas	646,848	32,880	11,015	261,391	324,498	1,833	1,278,465
	Lane	414,599	33,320	6,550	139,646	594,070	12	1,188,197
	Jackson	112,509	9,286	0	100,945	118,683	0	341,423
1985	Douglas	636,113	35,692	23,779	290,188	327,008	286	1,313,066
	Lane	433,606	46,404	12,762	165,750	626,040	20	1,284,582
	Jackson	189,978	4,441	1,698	81,263	182,683	26	460,089
1986	Douglas	591,435	38,227	31,608	349,410	492,455	50	1,503,185
	Lane	454,691	34,477	6,407	194,221	646,725	537	1,337,058
	Jackson	186,084	3,350	1,077	73,418	142,398	0	406,327
1987	Douglas	471,437	30,854	21,645	378,054	406,283	3,274	1,311,547
	Lane	464,156	46,394	288	183,463	633,954	0	1,328,255
	Jackson	118,893	6,730	3,338	103,921	131,689	0	364,571

[1]Includes volume removed (softwood and hardwood) as logs, poles and pilings but not volume removed from woodcutting operations.
[2]Compiled by Oregon State Department of Revenue.
[3]Compiled by Bureau of Land Management.
[4]Compiled by U.S. Forest Service, Region 6.
Source: Oregon Timber Harvest Reports, Oregon State Department of Forestry

As of May, 1991 there were about 1750 mining claims, 30 active mining notices and no plans of operation on file. One 640 acre oil and gas lease and no geothermal leases are on file. There were seven oil and gas notices of intent but no geothermal notices of intent on file. Average annual rock production from BLM quarries and pits is 440,000 cubic yards per year from approximately 190 active sources. The BLM administers the mineral estate for 423,928 acres of public land and 1,717 acres of split estate (federally owned minerals with non-federally owned surface).

Based upon known occurrences, geological environment/inference, exploration activity, geochemical/geophysical anomalies, etc., there is potential for the occurrence of the following locatable minerals: gold, silver, copper, zinc, chrome, and others. Leasable mineral potential in the planning area includes oil and gas and geothermal resources. An identified or theorized geologic environment (the existence of or potential for source rock and a trapping mechanism), suggests moderate potential for gas. Generally, a low-potential is indicated district wide for geothermal resources as there are no Known Geothermal Resource Areas or thermal springs. A moderate potential is indicated for the Cascade Providence based on quarternary volcanism. Rock suitable for sale as road construction material is available throughout the district but varies significantly in quality.

It is the Bureau's policy to encourage exploration and development of minerals using environmentally sound practices. Table 3-39 summarizes mineral potential for locatable, salable, and leasable minerals, and Map 3-11 displays the areas of potential. Mineral potential, as used in this document, refers to the potential for the occurrence, not the development, of a mineral.

Table 3-40 lists the areas of critical mineral potential in the planning area and their associated minerals.

Socioeconomic Conditions

The Roseburg District is located in southern Oregon and includes lands in Douglas, Lane, and Jackson counties. For the purposes of socioeconomic description the Roseburg District has been equated to Douglas county. Information regarding population, employment, and personal income has been examined to determine the basic structure and scope of the economy in the region. A 1984-1988 baseline has been selected to represent average economic conditions in the region. A summary for the region has been provided, however, detailed information has not been displayed. The selected baseline encompasses a period of national growth that followed the recession of the early 1980s. Douglas county, like many non-metropolitan areas of the state, was slower to show economic growth after the recession, one indicator of the limited economic diversity that still exists today. Additional information regarding recent trends has been included when available to provide a context for current decisions.

Table 3-39. Mineral Potential

Mineral Type	Mineral Potential (Acres) Low	Moderate	High	Total
Locatable	2,405,218.75	221,260.06	61,733.19	2,688,212.00
Salable		Not Classified		
Leasable (Oil and Gas)	1,684,424.72	1,003,784.78	0	2,688,209.50
Leasable (Geothermal)	2,210,627.50	477,430.09	0	2,688,057.59

Table 3-40. Areas of Critical Mineral Potential

Name[1]	Size (Acres)	Mineral(s)
OR 100001	221,258	M = Gold, silver, platinum, chromite, asbestos, serpentine
OR 100002	5,445	H = Gold, silver, nickel
OR 100003	10,511	H = Gold M = Silver
OR 100004	14,506	H = Gold, silver, nickel, chromite, cobalt, serpentine
OR 100005	16,537	H = Gold, silver
OR 100006	120	H = Limestone
OR 100007	44	H = Limestone
OR 100008	132	H = Limestone
OR 100009	38	H = Limestone

[1] = Listed by Geographic Information System polygon number - See Roseburg District Office for specific information.
M = Medium potential.
H = High potential.

Population

During the baseline period population in Douglas county averaged 92,450. The 1990 Census population as reported by Portland State University's Center for Population Research and Census was 94,649, with 58 percent of those persons living in unincorporated areas. Excluding the recessionary period of the early 1980s, Douglas county has shown increasing population since 1980, with 1981, 1982, 1983, and 1990 the only years experiencing population losses. Even with population gains in other years net migration out of the county is estimated at 4,614 between 1980 and 1990. Decreasing population trends often follow decreases in employment opportunities. Employment statistics, discussed in the following section, demonstrate the reduced employment opportunities during the baseline period. Demographic information suggests that 15 percent of Douglas county's population is over 65, this approximates the statewide average of 14 percent.

Employment

Southern Oregon has traditionally been economically dependent upon natural resources. Timber, fisheries, agriculture, and recently tourism provide significant employment in the region. The wood products sector (including paper) is the largest employer in the county, employing an average of 8,240 persons (1984-88). Trade (6,110) and government sectors (6,430) also generated significant employment in the region during the baseline period. In 1989 and 1990 employment in the wood products industry decreased significantly. Between January 1989 and January 1991 the Oregon Employment Division recorded 20 cutbacks or closures in the wood products sector affecting 1,788 jobs in Douglas county. This is over 21 percent of the average (1984-1988) wood products employment in the county. Employment in this economic sector is particularly sensitive to raw material supply and overall economic health. Employment in the wholesale and retail trade industries and in the service sectors increased during the baseline period. Government employment (includes federal, state and local governments, and public education) also increased during the baseline period. Overall employment growth in the region has been slow, suggesting a combination of out-migration from the area and frustrated workers leaving the labor force.

Unemployment rates in the county have generally decreased since 1984. Unemployment in the county peaked at a high of 17.2 percent in 1982 declining to a low of 7.6 percent in 1987. Unemployment rates in Douglas county began a pattern of increases in 1988. This trend has continued through 1990, the last year data was available.

Personal Income

Personal income information is an indicator of wealth in a particular area. This is because income statistics

track both wage and non-wage income sources. Non-wage income sources include transfer payments, interest, dividends, and rent. In Douglas county, where a large portion of residents are retired, this is of particular importance. Retired persons derive income from a variety of sources other than wages. Per capita income in Douglas county averaged 11,658 dollars during the 1984-1988 baseline. Statewide, average per capita income was slightly higher than in the county, average 13,308 dollars. In recent years the trend has been a widening of this gap.

Local Resources

Douglas County has developed an economic plan to support the county's economy thorough policies that encourage the maintenance and expansion of existing industries and to increase the number, variety, and types of products manufactured and services rendered. The objectives also address reducing existing unemployment and creating employment opportunities to promote growth of the county's labor force.

The Coos, Curry, and Douglas County Business Development Corporation was established in 1971 to serve as an overall focal point for economic development throughout the three-county area. The Coos, Curry, and Douglas County Business Development Corporation is usually the lead organization in working with a firm, existing or new to the area, who may be looking for a new site, financing, or both, to do business in the region. Since 1985, three new business have located in the Roseburg area, creating approximately 210 new jobs.

Douglas County Industrial Development Board was set up by the Douglas County Board of Commissioners and has the authority to acquire land for industrial development, either alone on in conjunction with other local governments in the county. This makes Douglas the first county in Oregon to create its own economic development board. To date, the county has budgeted over $2 million for projects, primarily for its industrial facility financing program.

The Umpqua Community College Small Business Development Center is part of a statewide network created by the Oregon Legislature to provide small business owners with training and assistance, consequently decreasing the number of small business failures.

Umpqua Training and Employment, Inc. is a private non-profit corporation formed to administer employment and training programs in Douglas County as a service to the area's new and existing businesses.

The Roseburg District encompasses a primarily rural area of the State. The City of Roseburg is the major population center of the region with an average of 15,977 inhabitants during the 1984-1988 baseline period. Because of the rural nature of the area many specialized products and services are not provided locally and must be purchased outside the region.

The lumber and wood products sector is dependent upon the supply of raw materials. BLM resource management directly effects this sector of the economy. The State of Oregon, using a Desktop Analysis technique, has identified the Roseburg sub-region as highly timber dependent. (Bowling et. al. June 1990.) The following communities were specifically identified: Camas Valley, Canyonville, Days Creek, Dillard, Glide, Myrtle Creek, Oakland, Riddle, Roseburg, Sutherlin, Umpqua, and Winston.

Many of these communities and the region as a whole have recognized this dependence and have commenced efforts to diversify their local economies. Douglas county, through the Oregon Economic Development Department's Regional Strategies program has developed strategies to attract additional tourism to the region. The Bureau of Land Management has not identified specific management actions that may assist the region in achieving their goal.

Another example of local efforts to diversify local economies is centered in the South Umpqua Valley. The communities of Myrtle Creek, Riddle, Canyonville, and Tri-City have developed a strategy to recruit and support new and existing industries. This includes steps to identify potential industrial sites and to target light and advanced manufacturing for location in the region. Through these programs local areas can seek special funding from the State to achieve the identified objectives. Again, the Bureau of Land Management has not identified specific management action that may assist the region in achieving their development goals. (Southern Umpqua Valley Economic Development Committee Action Plan. June 1990.)

BLM Economic Contribution

BLM-administered lands in western Oregon make significant contributions to local economies. Timber harvested from public lands supplies local mills, and commercial and sport fisheries depend upon fish reared in stream reaches managed by BLM. Tourists bring new dollars into local communities, and counties receive payments from BLM in accordance with a variety of current laws. For planning purposes an input-output model (BLM PACT) was developed to facilitate estimation of economic impacts of BLM management on local economies. Models were developed to represent each BLM district and western Oregon as a whole. In the model representing the Roseburg District the portion of Douglas County outside the district was not included.

Timber

The BLM currently manages 367,500 acres of Commercial Forest Land in the Roseburg District. The average annual harvest from this land during 1984-1988 totaled 254,634 mbf, or approximately 27 percent of all harvest from all ownerships in the county. U.S. Forest Service harvests totaled 29 percent of all harvests, and private industrial harvests were 40 percent. The remaining four percent was harvested from State, Other Public, and Non-industrial Private lands. The average annual harvest from BLM-administered lands is estimated to contribute 1,560 jobs in the timber industry and 37.93 million dollars in direct local personal income. Respending effects added 920 jobs in other sectors and 13.60 million dollars in local personal income.

Tourism

As public lands most BLM-administered lands are available for recreational use by the general public. Opportunities exist for site specific and dispersed recreational use. Common activities include hunting, fishing, driving for please, horseback riding, Off Highway Vehicle use, and boating. Community economic impacts occur when visitors from out of the region make purchases in the local economy. These "new" dollars create jobs and enhance personal income. The total level of recreation spending by local residents is assumed not to be directly influenced by the provision of recreation opportunities on BLM-administered lands. BLM estimates that a total of 33,100 annual visits were made to BLM-administered lands in the Roseburg District by non-residents. Among these visitors were 4,200 hunters and 4,700 fishermen. Input-output analysis suggests that spending by these visitors generated 27 direct jobs and 280,000 dollars in local personal income. Respending effects added 12 jobs and 170,000 dollars in local personal income.

Fisheries

BLM manages 192 miles of stream suitable for spawning and rearing of anadromous fish species in the Roseburg District. Most of the fish spawned and reared in BLM-managed streams are caught offshore or on waters accessed through other ownerships. The value of the fisheries provided by BLM can be measured in terms of jobs and personal income generated by the commercial fishing industry, and by local expenditures by sport fishermen. Due to the mobility of anadromous fish, the economic benefits of fish spawned and reared in a specific location may accrue to regions outside the spawning region. An estimated 98.8 thousand pounds of chinook and coho salmon (round weight) or less than one percent of Oregon's total commercial landings of these anadromous species can be attributed to BLM-managed lands in the Roseburg District. An estimated 19,200 ocean and freshwater sport fishing visits can be attributed to BLM-administered lands in the Roseburg District. This estimate was developed independently of recreational fishing visit estimates discussed previously. Input-output analysis estimates statewide employment of 17 direct jobs and 170,000 million dollars of direct personal income is dependent upon the fisheries resource in the district. Statewide respending effects added 11 jobs and 200,000 dollars in personal income.

BLM Payments to County and State Governments

Activities on BLM-administered lands generate income and employment throughout Oregon. In addition, state and local governments receive monies from timber harvest activities and as compensation for taxes foregone due to public ownership of lands. Changes in these payments impact local government employment and the services they provide.

Fifty percent of the total revenue generated by timber sales on Oregon and California Railroad (O&C) lands is distributed to western Oregon counties by a formula based on the original assessed value of O&C

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lands within each county. Average payments to Douglas county (1984-1988) were $15,768,825. Unlike payments to counties from timber sales in the National Forests, which are required to fund schools and roads, the O&C lands payments enter directly into the county general fund and can be spent without restriction. In some counties this is a substantial portion of the general fund.

In 1919 Congress revoked title to 93,000 acres from the Coos Bay Wagon Road Company because of its failure to meet the stipulations of the land grant it had received. Today the lands remaining from the original grant are located in Coos (59,914 acres) and Douglas (14,633 acres) counties. The Roseburg District manages 13,924 acres of Coos Bay Wagon Road land. Local taxing districts where these lands are located receive payments in lieu of taxes. Calculation of payments in lieu of taxes is made on the same basis as property tax and severance tax calculations for privately owned forest land. Table 3-41 displays the average distribution of Coos Bay Wagon Road monies to taxing districts in Douglas county during the baseline period. Approximately 75 percent of payments made are dependent upon the level of harvest.

The counties also receive payments in lieu of taxes from the BLM for a variety of federally managed lands (not O&C or Coos Bay Wagon Road). Along with some BLM Public Domain lands, compensation is paid for National Forests, National Parks, Federal Water Projects, Army Corps of Engineers dredge disposal areas, some National Wildlife Refuges and some military installation. These annual payments of 75 cents per acre, subject to a per capita ceiling, are reduced to a minimum of ten cents per acre when other revenue sharing activities make equivalent payments. In western Oregon each county receives the minimum payment. During the baseline period Douglas county received an average payment of $91,989. These payments are not expected to change under any foreseeable BLM management strategies.

Roseburg District manages 18,427 acres of Public Domain lands. Approximately five percent of the revenues generated by these Public Domain lands

Table 3-41. Average Annual In-lieu Tax Payments On Coos Bay Wagon Road Lands Administered by the Bureau of Land Management in Douglas County 1984-1988[1]

Taxing District	Average Annual Severance Tax[2] Receive (1984-88)	Average Annual Property Tax[3] Received (1984-88)	Average Budget Levy Submitted (1984-88)	Avg. CBWR Payments as a Percent of Average Levy (1984-88)
Douglas County	$4,128	$1,069	$2,823,462	0.184%
Oakland School Dist. 1	$372	$122	$1,760,969	0.028%
Camas Valley School Dist. 21	$15,683	$4,391	$477,575	4.203%
Winston-Dillard School Dist. 116	$32,920	$10,559	$3,923,893	1.108%
Douglas Educational Service Dist.	$3,381	$1,036	$2,751,619	0.163%
Umpqua Community College	$3,451	$1,135	$2,697,679	0.170%
Roseburg School Dist. 4	$0	$9	$12,014,112	0.001%

[1]Payments in-lieu of taxes are made to the county treasurer and distributed to tax districts.
[2]Severance tax is 6.5 percent of the value of the timber harvested.
[3]Assessed value of forest land is a function of the price of second-growth Douglas-fir stumpage over the most recent three-year period.
[4]The Coos Bay Wagon Road (CBWR) lands in the Roseburg School District are not forested with commercial species.
Source: Douglas County Office of management and Finance.

are dispersed through the State to the counties based on total land area of the county. The counties must use these monies to build roads and bridges. During the baseline period average payment to the State was $329,905.

The State of Oregon collects a harvest tax on every thousand board feet of timber harvested in the state to fund forest improvement and protection. Forest research, the activities of the Forest Practices Act, and emergency fire control are funded by the revenues collected. Table 3-42 displays the tax rates during the baseline period and to the present biennium. The purchasers of BLM timber pay this tax.

Community Stability

The previous sections detailed economic indicators for the counties in the district during the baseline period. More recent trends were also discussed. The years following the baseline period to the present included a national recession felt locally. These most recent years may indicate the types of social and economic impacts that could be expected if BLM management plans have an adverse impact to local economies.

Employment losses during 1989, 1990, and 1991 occurred in all sectors of Oregon's economy including electronics, wholesale and retail trade, manufacturing and lumber and wood products. Of these industries BLM management is most likely to impact the lumber and wood products sector. Timber sales from national forests and BLM-managed lands in the district have been substantially lower than historic levels since the baseline period. Harvest levels have also declined since the baseline period.

Impacts of these reduced harvest levels are occurring against a background of existing structural change. Examples of ongoing structural change in the lumber and wood products sector include:

- Decreasing labor intensity.
- Increasing use of smaller diameter logs.
- Increased competition and specialization.
- Expansion of international markets for wood products.
- Increased use of substitute building materials.
- Expanded use of Oriented Strand Board.
- Increased production and use of laminates and engineered wood products.

Lands in the Umpqua National Forests are encompassed within the district boundaries. Roseburg Resources, Weyerhaeuser, International Paper, Seneca Timber, and Lone Rock Timber are among the major industrial forest owners in the area. Roseburg Forest Products also operates mills in Dillard, Riddle, and Dixonville. Timber dependence in the region, as measured by lumber and wood products employment as a percent of total employment in the region, has been cyclical, increasing in 1983, 1986, 1987, 1990, and decreasing in 1984, 1985, 1988, and 1989. As a portion of personal income, lumber and wood products dependence decreased in 1985 then increased until 1989 when personal income derived in the lumber and wood products industry declined significantly. Employment and personal income are measured on a county basis. These measures have shown increases throughout the baseline period and

Table 3-42. Forest Products Harvest Tax Rates (FPHT) Applicable to BLM Timber Purchasers ($/MBF Scribner Long Log)

Period	Forest Practices Act	Forest Research Lab	Emergency Fire Fund	Forest Resources Inst.	Industrial Fire Prev.	Total FPHT Rate
7/1/83-6/30/85	$0.12	$0.23	$0.15	$0.00	$0.00	$0.50
7/1/85-6/30/86	$0.10	$0.21	$0.00	$0.00	$0.00	$0.31
7/1/86-6/30/89	$0.10	$0.21	$0.15	$0.00	$0.00	$0.46
7/1/89-6/30/91	$0.16	$0.21	$0.30	$0.00	$0.00	$0.67
7/1/91-6/30/93	$0.39	$0.30	$0.50	$0.31	$0.14	$1.64

Source: Oregon Department of Revenue. Personal Communication, Rick Schaek. July 1991.

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to the present. Demographic data shows population is becoming more concentrated in the incorporated area of Roseburg. Thus, sources of employment and personal income are also becoming concentrated in these areas. Population in the unincorporated areas of the district has been increasing at a lower rate than Roseburg of the county as a whole. Given this, it is likely that personal income and employment are not increasing in the rural areas of the district and may in fact be decreasing. Communities in these rural areas typically have only one or two large manufacturing employers, usually timber related. Employment options in these communities are severely limited. Options may be further limited in those communities that are located some distance from major trade centers, such as Canyonville, Myrtle Creek, Tri-City, and Yoncalla.

Historic level of BLM payments made to the counties in the district are enumerated in a previous section. Payments are not made on a per capita basis, but displaying them as payments per capita allows useful comparisons to be made between counties and indicates a general level of dependence on BLM payments. During the baseline period payments per capita in Douglas county were $171. County dependence on BLM and other sources of federal timber revenue was assessed in Social Impacts of Alternative Timber Harvest Reductions on Federal Lands in O & C Counties (Lee, et al. 1991). Douglas county was examined in the report. In the fiscal year 1989-1990 budget, BLM payments were approximately 36 percent of the total county budget. The county general fund received 74 percent of its revenues from BLM payments to the county. Federal (BLM & Forest Service) timber revenues were approximately 66 percent of the total county budget.

The counties and communities in the Roseburg district are highly timber dependent. The local county government is also highly dependent upon forest revenues to meet operating expenditures. Current changes in the structure and size of the timber industry are causing substantial economic and social impacts. Social impacts associated with these recent economic dislocations include unemployment, loss of income, and increased needs for social services. Out-migration from particularly distressed areas is occurring.

Rural Interface Areas

Rural Interface Areas are areas where BLM-administered lands are adjacent to or intermingled with privately owned lands. These lands have been zoned by the western Oregon counties for uses which provide for occupancy where the minimum lot size for residential development is 20 acres or less. In this district, Douglas County has designated rural residential zones which permit single-family dwellings on parcels from one to five acres. In the resource oriented zones, except Timberland Resources, minimum allowable lot sizes range down to 20 acres. Douglas County zoning does not define parcels between 6-20 acres in size.

The zones oriented toward resource production promote continued sound management practices of agriculture, or forest resource uses. The general intent of these resource zones is to preserve the land from non-resource use and conflicts. However, the zoning ordinance permits single-family dwellings in most resource zones and provide conditions for land partitioning and residential development of private lands. The ordinances may:

a. Restrict non-resource uses (e.g., no homes unless necessary for management of forest resources, Douglas County zone Timberland Resources);
b. Allow non-resource uses with conditions (e.g., a home placed so it does not interfere with adjacent resource uses);
c. Allow a mixture of resource and non-resource uses.

These provisions are intended to reduce the possibility of conflicts between residential uses and resource management activities.

In some situations residential uses on private land and intensive forest management activities on adjacent or nearby BLM-administered lands have created conflicts. Due to adverse effects on both interests, these conflicts are being addressed in BLM land use planning. To accomplish this the areas where rural residential land use is permitted to occur near BLM-administered lands have been mapped. The Rural Interface Area, Map 3-12, shows the BLM-administered lands in the Rural Interface Area.

Rural Interface Areas include areas of private and BLM-administered land within 1/2-mile of the property or interface line. The 1/2-mile distance was selected as a probable zone of influence. The analysis of impacts in Chapter 4 will also examine a 1/4-mile zone of influence within the Rural Interface Areas. Although problems have occurred where lots are larger than 20 acres, these larger-lot areas will not be analyzed.

Table 3-43. Acres in Rural Interface Areas[1] 4-mile zones of influence

County	BLM land (acres) 1 to 5 acre minimum lot RIA	6 to 20 acre[1] minimum lot RIA
Douglas	8,552	0
Total	8,552	0

Source: Western Oregon Digital Data Base
RIA - Rural Interface Area

Table 3-44. Acres in Rural Interface Areas 1/2-mile zones of influence

County	BLM land (acres) 1 to 5 acre minimum lot RIA	6 to 20 acre[1] minimum lot RIA
Douglas	24,052	0
Total	24,052	0

Source: Western Oregon Digital Data Base
[1] Douglas County zoning does not define parcels between 6-20 acres in size.
RIA - Rural Interface Area.

The amount of BLM-administered land within the zones of influence is summarized in Tables 3-43 and 3-44. Total BLM-administered land in Rural Interface Areas is 8,552 acres within the 1/4-mile zones of influence and 24,052 acres within the 1/2-mile zones of influence.

Rural Interface Areas are found throughout the lower elevations of the district. Most of them are located near population centers and along state or county highways which extend into the valleys of the Coast and Cascade Ranges. Many of the private land areas in Rural Interface Areas are highly desirable for residential use. Rural residential land use is a concern to BLM because it can impede the economic and efficient management of BLM-administered forest lands. Also, some Rural Interface Area residents object to forest management activities on adjacent lands and take actions to stop or change the activity.

BLM's rural neighbors have generally accepted adjacent or nearby forest management activities. As forest management activities have increased in Rural Interface Areas, there has been a corresponding increase of concerns expressed by BLM's rural neighbors. The district has experienced problems including:

- A house too close to a property line to allow safe and efficient timber harvest and reforestation operations.
- A resident taking domestic water from a stream or spring which would be temporarily affected by road building or other resource management operations.
- Neighbors concerned about the potential use of herbicides in a watershed and how they might be impacted.
- Logging road maintenance levels do not meet expectations of neighbors.
- A resident objecting to a clearcut within immediate view of the home.
- Possible health and safety problem due to nearby slash burning.
- Residents opposed to any harvesting of timber close to their homes.
- Neighbors complaining about the noise and dust from a logging operation.
- Families worried about the safety of small children as it relates to log truck traffic.
- A house is inadvertently in trespass as it was unknowingly built on public land.
- Residents concerned about hunting activities adjacent to their homes.
- Denial of access across private property.
- Difficulty protecting both BLM resources and private property with limited fire fighting capability.

These problems and similar ones will undoubtedly increase with time as the rural population increases.

Some of BLM's rural neighbors have objected to proposed management actions, particularly timber sales. When these objections where raised early in project planning, they were given full consideration in developing design features and mitigation measures. When objections were raised late in project planning, they caused costly delays in project implementation. Instead of starting a project as scheduled, BLM employees have had to take unplanned time to re-analyze projects, respond to letters and phone calls, and arrange and/or attend meetings with individuals and the public. With the increasing trend in rural residential development, costly project delays caused by the objections of neighbors could increase in the future.

Fire and Fuels Management

Fire, and other agents of disturbance, e.g., wind, insects, and diseases, have greatly influenced the development of Pacific Northwest forests (Agee 1990, 1991; USDI 1992; Kauffman 1990). Fine-scale disturbances, generally by insects or diseases, cause deaths of single trees or small groups of trees which result in small patches of early-successional vegetation embedded in a larger portion of older forest. Coarse-scale disturbances, such as fire and wind, result in more extensive areas of early-seral vegetation. Many native forest organisms have adapted to these cycles and scales of disturbance and regrowth. Forest ecosystems are dynamic, changing with or without active management.

Fire is the major natural agent of disturbance within the planning area. The distributions, abundance, and dominance of the major plant communities are strongly affected by the frequency, intensity, and extent of wildfire events. Fire has both direct and indirect effects on the forest environment. These effects vary depending on individual forest stand and plant community conditions and composition, as well as fire intensity. Most of the current late-successional and old-growth stands developed from natural regeneration following wildfire events that occurred during the last 200 to 600 years. Some of these fires covered large areas, frequently many thousands of acres. Although these fires were large, they burned in patches of variable intensity and severity, and left many areas of unburned or lightly burned forest. The natural regime of patchy fires that leave an abundance of large dead trees and lesser amounts of scattered live trees, as individuals and in patches, is the basis for silvicultural methods such as retention of green trees as individuals and in patches. Throughout the planning area, natural disturbance patterns have a long history and were sometimes catastrophic. In other areas, disturbances were frequent and of low magnitude, maintaining open forest stands.

The long-term frequency, intensity, and extent of fire events (known as the "fire regime") depend largely on climate and weather patterns. Fire characteristics also depend upon the available fuel which is related to past forest management practices, including the use of prescribed fire and the effectiveness of wildfire suppression (i.e., wildfire exclusion). Smoke emissions from wildfires are also dependent upon stand history and weather conditions.

Interruption of natural fire regimes has a direct effect on ecosystem species composition, and sometimes on species persistence. The near exclusion of natural, low-to-moderate intensity wildfires has resulted in a proliferation of fire-intolerant and shade-tolerant species (e.g., true fir species and hardwoods), which are replacing ponderosa pine and Douglas-fir forest types in the drier climates. Changes in long-term soil productivity, stand structure and function, forest health, and biological diversity are also occurring due to the exclusion of fire. The mortality of trees due to insects and disease makes forests more susceptible to high intensity, stand replacing fires.

Many natural disturbances do not result in complete mortality of stands. For example, recent fires in the western Oregon Cascades killed 25 to 50 percent of trees within the areas burned, leaving 50 to 75 percent of the stands intact (USDA FS 1988, 1989, 1992b). The surviving trees are important elements of the new stand. They provide structural diversity and a potential source of additional large snags during the development of new stands. Furthermore, trees injured by disturbance may develop cavities, deformed crowns, and limbs that are habitat components for a variety of wildlife species.

Large fires and relatively long fire return intervals in moist portions of some river basins resulted in periods during which landscapes contained large areas of relatively unbroken forest cover. In the warmer, drier landscapes, fire is more frequent, less intense, and is an integral part of the internal dynamics of a typical stand (tens to hundreds of acres). In the drier landscapes, fire control and timber harvest have decreased the abundance of some types of old growth, such as ponderosa pine, that are dependent on frequent, low intensity fires. Other types of late-successional forest that are less fire resistant or are less desirable for harvest have become more widely distributed. In these areas, the potential for stand-replacement wildfires has increased, resulting in a higher risk to the stability of current stands reserved for late-successional species.

Natural disturbance is an important process within late-successional forest ecosystems, but humans have altered disturbance regimes. Fire suppression has resulted in significant increases in accumulated fuels within some forests, particularly in the eastern Cascades and in southwestern Oregon (Agee 1990; Deeming 1990; Kauffman 1990). At the same time, these forests may have become much more vulnerable to insects and diseases (Mitchell 1990; Mutch et al. 1993, Wickman 1992). Due to fire

suppression, some forests have become quite dense and multistoried, primarily from the invasion of shade-tolerant species (Tappeiner et al. 1992). Total protection might have been a viable short-term strategy in 1910, but it is not viable in the 1990s.

At a landscape scale and over long periods, stand-replacing wildfires have an important role in resetting successional processes and developing new areas of late-successional forests to replace those lost through succession or disturbance. Most plant communities in the planning area are adapted to fire, although at the natural recurrence of fire is at widely varying intervals. Some species require periodic fire for their persistence, and many additional species are well adapted to periodic burning. Fire can also be used effectively in the restoration and maintenance of wildlife habitat. Some plant species require canopy gaps that may have been historically maintained by fire. Fire reduces understory competition, increases light, provides nitrogen, and stimulates germination of some fire-adapted species. The role of fire in the life history of some species warrants further investigation because fire is necessary for the persistence of some species. Underburning may improve habitat for some fire-adapted species. Site-specific treatments are more appropriate than broader scale treatments because some species with limited distributions are fire intolerant. Without resuming underburning, biological diversity would be diminished by the loss of many native plant species and some plant communities.

The combination and interaction of fire frequency, intensity, and extent that occur in an ecosystem are known as a fire regime. Natural fire regimes vary widely between and across landscapes of the planning area. However, some generalizations can be made to characterize the role of fire in natural ecosystem processes. These descriptions are based on knowledge of pre-European settlement fire regimes derived from historical accounts, early forest management inventories, and various imprints of fire on forest stands (e.g., stand ages and other tree ring data). Natural fires regimes are briefly characterized below.

The fire regimes of Pacific Northwest forests span a wide gradient of variation (Agee 1981). Natural fire regimes ranged from infrequent (hundreds of years) stand replacement fires, to very frequent (several years) low-intensity surface fires that had little effect on the canopy trees. Although fire regimes can be described on the basis of characters of the disturbance itself (Heinselman 1981), or character of the vegetation (Davis et al. 1980), another way is by defining the fire regime on the basis of fire effects, or severity (Agee 1990). The system using fire severity is defined in terms of fire effects on dominant tree species, and works well for application to habitat.

A high severity fire is one that topkills most of the vegetation in the stand (70 to 80 percent plus of the basal area); a moderate severity fire topkills 20 to 70 percent; and a low severity fire topkills less than 20 percent of the basal area. Fire, in a silvicultural sense, tends to thin from below, first taking smaller trees and/or those less fire-resistant (thin-barked, for example). It must be recognized that each regime is defined on the basis of the modal severity but that fires of other severity levels are likely to occur as well. The most complex fire regimes are the moderate ones because of the mix of expected fire severities, while the low and high fire severity regimes are generally more predictable. Management activities over decades, such as successful fire protection, can change low or moderate severity fire regimes to moderate to high severity fire regimes.

In the moist Douglas-fir forests of the Coast Range of Oregon, fire return intervals are long (Fahnestock and Agee 1983). Much larger than average events may have occurred in the past as a result of short-term but extreme changes in climate (USDI 1992). In the moist climates, natural fire return intervals are quite long, often over 500 years. However, even in the moist climates, fire has been an important ecosystem process in particular microclimates, e.g. on long, dry southwest oriented slopes. Patterns of reburns on the Tillamook fire of 1933 at 6-year intervals (1939, 1945, 1951) (Pyne 1982), and at the southern Washington Yacolt burn of 1902 (Gray 1990) are evidence these landscapes will reburn. High surface fire potential during early succession in Douglas-fir forest was identified by Isaac (1940) as a "vicious cycle" of positive feedback, encouraging rhizomatous bracken fern (*Pteridium aquilinum*); this pattern was quantified by Agee and Huff (1987). Given sufficient sources for reignition (e.g., the original Yacolt and Tillamook burns and all reburns are thought to have been human-ignited), the reburn hypothesis is likely to be true in certain areas. However, it is not clear whether reburns were a common event prior to European settlement in the moist portion of the Douglas-fir region. After crown closure, potential surface fire behavior declines, and then gradually increases in the old-growth seral stage (Agee and Huff 1987).

For many years, the pattern of stand replacement fire was a paradigm of fire for west side Douglas-fir forests. Recent work, particularly in the Oregon Cascades in drier western hemlock plant associations, suggests a higher fire frequency and different ecological role for fire in mesic to dry Douglas-fir forest. Morrison and Swanson (1990) suggest a

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natural fire rotation of 95 to 145 years during the last five centuries. The patchiness of at least some of the fires is illustrated by the fire severity maps in Morrison and Swanson (1990). A similar fire regime was noted by Means (1982) on dry Douglas-fir sites in the western Oregon Cascades. Using conservative methods that did not recognize underburns with no resulting regeneration or substantial fire-scarring of trees, Teensma (1987) estimated a natural fire rotation of 100 years during the last five centuries. If fires of moderate severity are removed from the analysis, a stand-replacement mean fire return interval is 130 to 150 years, suggesting that intense fires are a significant part of the natural fire regime in this area, but that fires of lower severity also occur. Other stands of 500 years age or older exist without much evidence of recurrent fire.

Before the advent of fire suppression, fire frequencies in Cascade Mountains of the District were moderate due to the incidence of lightning, which was supplemented by the use of fire by American Indians (Teensma 1987). Fire severity under current forest and climatic conditions is high. The Coast Range, however, experienced infrequent but very large fires, especially in the 1800s and 1900s. As a result, many of the remaining natural forests consist of a mosaic of mature stands and remnant patches of old-growth trees.

Intensive fire suppression efforts in the last 60 years have resulted in significant fuel accumulations across broad landscapes, multiple-canopied stands with thick understories, and shifts in tree and understory species composition. These changes may have made forests more susceptible to large, high severity fires and to epidemic attacks of insects and diseases. Such forests, in their present condition, are also more likely to be catastrophically disturbed because of higher physiological stress, caused by increased tree density, higher fire hazard, and higher horizontal and vertical fuel continuity (USDI, 1992; Agee, 1993).

Past land use and forestry practices have altered the condition of stands and landscapes throughout much of the planning area. Typically, plantations are densely stocked with young Douglas-fir trees which often increase the occurrence of human-caused wildfires, as well as increase the rate of spread and extent of fire and other disturbances across landscapes. The presence of young plantations may increase the risk of loss of intermingled late-successional forests. This is especially true where fire suppression has led to the development of dense understories of shade tolerant species that increase the potential for severe fire impacts in the reserves.

Numerous large and destructive fires have occurred in the past decade. The recent period has been characterized by a trend toward larger fires. A more continuous fuel complex over the landscape is at least partially responsible, fuels have increased within protected stands, and clear-cut stands have exposed slash, not all of which has been fuel treated. In 1987, an extensive lightning storm set off more than 600 fires in southern Oregon, including 19 which reached more than 1,000 acres in size (Helgerson 1988). Fire suppression forces were overwhelmed, and some fires burned for months over rough, semiaccessible terrain. A mosaic of fire severity resulted.

A total fire protection strategy has a fairly low probability of protecting late-successional forest habitat during the next century. There is substantial reason to believe the trend toward large fires will continue, and fire severity will become skewed toward higher severity levels. High severity wildfires have provided conditions that allowed brush and hardwood species to dominate some sites for several decades or longer. Management plans for late-successional and old-growth forests in this province must consider fire management and the stability of forest stands (Agee 1993).

The fire history of the planning area for 1980-1988 is shown in Table 3-45.

One objective of ecosystem analysis and management is to identify disturbance regimes and to manage the landscape within that context. The role of fire management in the maintenance of ecosystems within the planning area is well recognized. Fire management activities consist of wildfire suppression, wildfire hazard reduction, and prescribed fire applications. Fire is used or suppressed in the context of achieving ecosystem management objectives at the landscape level.

Table 3-45. Summary of Acreages Burned in Planning Area by Wildfire from 1980 to 1988

Year	Lightning	Human Caused
Bureau Lands:		
1980	25	7
1981	0	1
1982	4	7
1983	2	0
1984	2	1
1985	9	5
1986	6	3
1987	39	9
1988	13	7
Totals:	100	40
Other Lands:		
1980	23	78
1981	0	52
1982	11	47
1983	11	22
1984	46	61
1985	16	68
1986	4	40
1987	56	68
1988	13	54
Totals:	180	490

Chapter 4
Environmental Consequences

Summary of Major Changes from Chapter 4 of the Draft Resource Management Plan

The Watershed Condition Index analysis has been dropped. The analysis completed for the SEIS has been incoporated by reference.

Introduction

In this chapter, environmental consequences (impacts) of implementing the alternatives described in Chapter 2 are defined and compared to the existing conditions and affected environment described in Chapter 3. A tabular comparison of impacts of the alternatives is shown in the Resource Management Plan/Environmental Impact Statement Summary (Table S-2).

Preliminary analysis, including scoping, indicates that the alternatives would not significantly impact the following: geology, topography, grazing, agriculture, prime and unique farmlands, floodplains, paleontological values, or renewable energy (i.e., wind, hydro, biomass) use. Therefore, these topics are not discussed in this chapter.

Direct, indirect, and cumulative effects are all considered, to the extent identifiable, in each analysis. Direct effects are caused by the action and occur at the same time and place. Direct effects result from activities planned or authorized by the BLM under each alternative. Indirect effects are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Indirect effects generally occur when the public takes advantage of opportunities provided by BLM management. Hunting, fishing, and other recreational activity are examples, as are the effects on socioeconomic conditions. Cumulative effects are those resulting from past, present, and reasonably foreseeable activities on BLM-administered lands and on other lands, both other public and private.

There are three topics that the National Environmental Policy Act requires environmental impact statements to address in relationship to the proposed action, which environmental impact statements often treat as separate topics:

- Relationship between short-term uses and long-term productivity.
- Irreversible or irretrievable commitments of resources.
- Adverse environmental effects which cannot be avoided.

These topics are addressed, where relevant, as part of the discussion of environmental consequences for each component of the environment.

The baseline period to which predicted future effects are compared is normally 1984-1988, the period for which the existing plan was in effect at the start of EIS preparation and for which a wide range of relevant baseline data have been gathered and/or published.

Both short and long-term time frames were considered. Short-term is the period of time during which the plan will be implemented, assumed to be at least ten years. Short-term impacts include those resulting from harvest of timber sold during the ten year period, even though such a harvest may occur two or three years after sale. Long-term is the period beyond ten years. Whenever meaningful analysis depended on specificity provided by the ten year timber management scenario, or for some cumulative effects that are primarily dependent on (forecasting) activities on private lands (e.g., effects on elk), long-term impacts were not analyzed in detail.

Analytical models have been used to assess some effects of the alternatives. These models, like all models of complex biological physical or economic systems necessarily simplify reality. They also are limited by current knowledge, but represent a synthesis of the knowledge of BLM staff and/or outside scientists familiar with the subjects of concern.

Model evaluation involves extensive validation through testing and comparison of predictions with actual outcomes. In that sense, most of the models used are too new to be validated. In fact, such validation of most of these models would take decades. Nonetheless, they provide the most useful available methods, other than analyst intuition, for comparing probable differences in outcomes from implementation of the various plan alternatives. Confidence in their numbers varies but, in all cases, they are more useful for comparison of the relative consequences of alternatives than for precise predictions.

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The application of the models to Alternative C and the Proposed Resource Management Plan (PRMP) are attended by lower levels of confidence than the analyses of other alternatives. This is partly due to the untested nature of many of the prescriptions of these alternatives. The confidence level in all analyses of the effects of the PRMP is also lower because the results of watershed analyses and Adaptive Management Area planning may modify both the rate and location of timber harvests, as well as management prescriptions. Adaptive management, however, will assure that objectives are met.

Alternatives NA and A through E have been re-analyzed within the context of changed U.S. Forest Service (USFS) management direction specified in the SEIS ROD. In order to estimate what future actions are likely to occur on USFS lands and in order to enhance the discussion of cumulative impacts, the analysis has drawn heavily upon the analyses in the Final SEIS and decisions in the SEIS ROD. In addition to analyses of the consequences of the seven land use allocation alternatives fully analyzed, BLM has conducted some sensitivity analyses of the effects of varying management approaches. Sensitivity analysis is a process of identifying opportunity costs associated with differing approaches to sensitive land use allocations and other decisions. It can assist selection of an RMP by examining specific trade offs that could result from making changes in single sensitive elements of an alternative.

Sensitivity analyses of some consequences of several alternatives were conducted during preparation of the Draft RMP/EIS and summarized in Appendix 4-1 of that document. Additional sensitivity analysis of the following, as potential changes in the PRMP, have been made and are summarized in the Timber Resources section of this chapter.

- Excluding all critical spotted owl habitat from planned timber harvest.
- Foregoing some or all proposed intensive timber management practices (genetic tree selection, fertilization, and precommercial thinning/release).

The following assumptions were used as a basis for analysis of impacts:

- Sufficient funding and personnel would be available for implementation of the final decision. (If sufficient funding and personnel are not available, most environmental consequences would be less than predicted, but most effects on socioeconomic conditions would be greater.)
- The Probable Sale Quantity and annual average silvicultural practices for the alternatives would be approximately as shown in Table 4-1.
- Standard design features described in Chapter 2 will be applied as described. They contain many of the mitigating measures that avoid, minimize, reduce, or eliminate potential environmental impacts.
- Local climate patterns of historic record (See Appendix DD for further discussion) and related conditions for plant growth will continue.
- During the ten year life of the plan, approximately 60 miles of new roads would be constructed across BLM-administered lands by private parties under the terms of existing reciprocal right-of-way agreements.
- For analysis of cumulative effects, most private forest lands would be intensively managed with final harvest on commercial economic rotations averaging 50 years.

The Probable Sale Quantity for the PRMP is an estimate of annual average timber sale volume likely to be achieved from lands allocated to planned, sustainable harvest. The use of Probable Sale Quantity, rather than Allowable Sale Quantity recognizes uncertainties in the estimate. Harvest of this approximate volume of timber is considered sustainable over the long term based on the assumptions that the available land base remains fixed, and that funding is sufficient to make planned investments in timely reforestation, plantation maintenance, thinning, genetic selection, forest fertilization, timber sale planning, related forest resource protection, and monitoring.

The Probable Sale Quantity represents neither a minimum level that must be met nor a maximum level that cannot be exceeded. It is an approximation because of the difficulty associated with predicting actual timber sale levels over the next decade, given the complex nature of many of the standards and guidelines. It represents BLM's best assessment of the average amount of timber likely to be awarded annually in the planning area over the life of the plan, following a start up period. The actual sustainable timber sale level attributable to the land use allocations and management direction of the PRMP may deviate by as much as 20 percent from the identified Probable Sale Quantity. The potential variables are discussed in the Timber Resources section of this chapter. As inventory, watershed analysis, and site specific planning proceed in conformance with that management direction, the knowledge gained will permit refinement of the Allowable Sale Quantity to be declared when a plan decision is made. The separable component of the

Table 4-1. Estimated Annual First Decade Levels of Timber Management Activity by Alternative

Activity (acres except as noted)	NA	A	B	C	D	E	PRMP
Regeneration Harvest	5,700	7,400	6,660	3,240	1,890	670	1,190
Woodlands Harvest	0	60	50	10	0	0	0
Probable Sale Quantity (MMCF)	40.5	47.7	44.0	11.2	14.3	3.2	7.0
Probable Sale Quantity (MMBF)	247	315	291	74	92	18	45
Nonchargeable Volume (Other Wood) From Enhancement of Other Resources (MMCF)	4.1	4.8	4.4	1.1	1.4	0.3	0.7
Nonchargeable Volume (Other Wood) From Enhancement of Other Resources (MMBF)	25	31	29	7.5	9.0	2.0	4.5
Road Construction (Miles)	50	50	45	19	19	3.5	6.5
Road Construction (Acres)	273	273	246	104	104	19	35
Commercial Thinning/Density Mgmt.	140/0	170/0	160/0	430/110	100/0	10/0	80/70
Ground-Based Yarding	170	230	220	120	70	20	40
Cable Yarding, No Suspension	1,220	1,520	1,450	700	400	140	250
Cable Yarding, Partial Suspension	3,980	5,140	4,600	2,240	1,340	470	610
Cable/Aerial Yarding, Full Suspension	330	510	390	180	80	40	50
Site Preparation:							
Prescribed Burning	3,000	3,000	3,000	2,430	1,420	5,770	830
Other	400	370	330	160	70	30	60
Release/Pre-Commercial Thinning	4,040	5,700	5,490	4,400	3,280	800	3,900
Brushfield/Hardwood Conversion	0	60	50	40	30	10	15
Planting/Regular Stock	5,230	5,410	4,520	1,940	930	160	290
Planting/Genetically Selected Stock	1,520	3,470	3,470	1,940	1,330	640	1,140
Fertilization	5,560	6,230	4,460	2,170	930	450	1,440
Maintenance/Protection	7,080	4,960	4,460	2,170	930	450	830
Underburning for Maintenance of Stand Structure	0	0	0	500	0	0	150
Pruning	0	0	0	0	0	0	460

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Probable Sale Quantity attributable to lands in key watersheds carries a higher level of uncertainty, due to the greater constraints of Aquatic Conservation Strategy objectives and the requirement to do watershed analysis before activities can take place.

During the first several years, it is unlikely that the annual Probable Sale Quantity will be offered for sale. The PRMP represents a new forest management strategy. It will take time to develop new timber sales that conform to the PRMP.

There may be an additional ten percent nonchargable volume beyond the level of the Probable Sale Quantity from lands that are not part of the timber base. This volume may be a result of activities to meet the objectives of Late-Successional Reserves, Riparian Reserves or other areas with no direct timber volume objective. This volume from unscheduled timber sales are also unlikely to be offered for sale in the first few years of plan implementation.

A ten year representative timber management scenario was developed based on the land use allocations for each alternative except the No Action alternative and the PRMP, and used to assess potential short-term site specific impacts. The scenarios represent the Resource Area staffs' assumptions as to possible locations of timber harvest units and road locations. A total harvest scenario (harvest units and roads) was built for the land that would be available for timber harvest in Alternative A. This scenario was then adjusted to the land available for timber harvest in each other alternative. For the PRMP, the selection of harvest units and development of the scenario was completed through computer modeling.

For Alternatives A through E, random spatial selection of timber harvest units was linked to the TRIM-PLUS Allowable Sale Quantity calculation to determine the ten year scenario that meets management selection criteria to provide the calculated probable sale quantity identified for the alternative. The selected scenarios were evaluated for practicality by Resource Area timber sale planners. Estimates of logging practices and average annual levels of associated activities and intensive management practices for the decade of the plan are displayed in Table 4-1. In borderline cases, the estimates assume the practice which results in greatest impact.

For the PRMP, the tie to a set of representative harvest units was not performed. One reason is that the representative timber harvest units and roads assumed for Alternative A would not be applicable to the PRMP because of its enlarged riparian reserve systems and other changes in the plan. A set of new ten year representative harvest units could be developed to fit the PRMP, except that many of the intermittent streams are not currently mapped in the GIS. Without the full spatial representation of the riparian reserves, the resource area planners would not be able to evaluate the scenario for practicality.

Accordingly, for the PRMP, the acreage by land use allocation, age class and timber type scheduled for harvest in the first decade was randomly depleted in average harvest unit quantities from across the available inventory to estimate the effects of harvest.

Due to unforeseeable events and adjustments made in site specific planning, actual timber sale and management plans will differ from the ten year scenarios. The scenarios provide an analytical tool, however, to help provide more specificity to analysis of impacts of the alternatives. Actions (such as timber sales) implementing the planning decisions will be analyzed before implementation to determine if impacts addressed in the EIS might differ significantly from those predicted based on the ten year scenarios.

Ten year scenarios of expected mineral exploration and development activity have also been developed. They are set forth in Appendix EE.

Analysis of the alternatives is also based on their different levels of planned activities as shown in Table 2-1.

This EIS incorporates by reference the conclusions of the Final SEIS. Specifically incorporated are conclusions about Alternative 9 of the Final SEIS, which is embedded in the PRMP.

Incomplete or Unavailable Information

There is less than complete knowledge about many of the relationships and conditions of wildlife species, forests, the economy, and communities. The ecology, inventory, and management of large forests is a complex and developing discipline. The biology of the specific species prompts questions about population dynamics and habitat relationships. The interaction among resource supply, the economy, and rural communities is also an inexact science.

There is a substantial amount of credible information about the topics of this environmental impact statement; the central relationships and basic data are well established. The best available information was used to evaluate the alternatives. When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete or unavailable information was posed: Is this information "essential to a reasoned choice among alternatives"? (40 CFR 1502.22(a)). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would be unlikely to reverse or nullify understood relationships. Though new information would be welcome, no missing information was considered to be essential to a reasoned choice among the alternatives as they are constituted.

Nonetheless, the precise relationships between the amount and quality of habitat and the future populations of species are far from certain; there is a certain level or risk inherent in the management of forest lands even to standards based on conservative application of those relationships. For example, if the relationship between habitat and population were significantly different from how it now seems, or if management standards were to be broadly misapplied, the population and long-term viability of affected species would be at greater risk than that generally estimated in this document.

All other things being equal, the lesser the information, the greater the risk attributable to incomplete knowledge. That relationship is an impetus for the monitoring and adaptive management that is part of the PRMP, in particular. Should there be new scientific information on change in habitat conditions not projected, there are provisions for changing management of the forest to reflect the new information and the management practices for which it calls. This adaptive management process, which is guided by monitoring, research, and interagency oversight, provides additional assurance of compensating for possible catastrophic changes.

Mitigation

Mitigation is important in the design of the alternatives and implementation of any alternative. In general, mitigation is a measure taken to cause an action to become less harsh or less severe. From the Council of Environmental Quality Regulations (40 Code of Federal Regulations 1508.20), "mitigation" includes:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
5. Compensating for the impact by replacing or providing substitute resources or environments.

In the design of alternatives and throughout the discussion of environmental consequences in this chapter, mitigating measures and Best Management Practices have been incorporated and evaluated. For the actions analyzed in this plan/Environmental Impact Statement, mitigating measures are addressed primarily through land allocations and management practices and standards as described in Chapter 2.

Some examples of such mitigating measures and Best Management Practices built into the design of alternatives and identified in Chapter 2 are:

- Selection of timber harvesting techniques and timing to minimize soil damage.
- Design and timing of prescribed burns to minimize effects on soils, wildlife habitat, and air quality.
- Wildlife tree retention.
- Elk forage seeding.
- Seeding exposed soil after road construction.
- Tilling compacted skid roads.

Effects on Global Climate

There is a large but not unanimous body of scientific opinion that anticipates global warming in the magnitude of several degrees Fahrenheit by the middle of the 21st century. The primary factors leading to this conclusion are substantial increases in atmospheric carbon dioxide, nitrous oxide, methane, and other trace gases attributed to human activity. BLM's land management activities in the planning area would affect primarily the amount of carbon dioxide. Forecasts of global carbon dioxide increases suggest that it may double from the level of present in the year 1900 sometime between the years 2030 and

2080 (Schneider 1989). The plan alternatives, however, would have only a slight effect on atmospheric carbon dioxide levels.

A key factor in assessing the impact of timber harvest and forest regrowth on the amount of carbon in the atmosphere is the amount of carbon stored within the trees of the forest. One analysis shows that forests managed on rotations of less than 100 years would store less than half the amount of carbon stored in old-growth stands (Harmon et al. 1990), leaving more carbon in the atmosphere. Analysis by Harmon et al. indicated that about 42 percent of timber harvested in the northwestern United States enters long-term storage in products, while paper production largely results in the loss of carbon dioxide to the atmosphere. Those who commented on the analysis by Harmon et al. have suggested that some factors relevant to assessing the impact of timber harvest levels in the Pacific Northwest on global climate were apparently not considered in this analysis, so it overstates the effect of timber harvest. These factors include: (1) the slow decomposition of products entering landfills, (2) possible emissions increases if fossil fuels are burned in lieu of wood or wood products, and (3) emissions associated with substitution of alternative construction materials for wood or substitution of wood from virgin forests outside the northwestern U.S.

Harmon et al calculated that the past harvest of five million hectares (12-1/2 million acres) of old-growth in the Pacific northwest accounted for two percent of total carbon released because of land use changes in the last 100 years. The total added by all such land use changes increased atmospheric carbon. By extension, each million acres of old-growth harvested adds 0.04 percent to the 825 billion tons of carbon currently in the atmosphere.

Taken to the level of RMP/EIS analysis, each 10,000 acres of old-growth that would be harvested (assumes clearcutting) would add 0.0004 percent to total atmospheric carbon. The Forest Service, in their 1992 Northern Spotted Owl EIS, said their Preferred Alternative would harvest 330,000 acres of old-growth in Oregon and Washington in the first decade. The SEIS ROD probably reduced that by more than half. BLM's Proposed Resource Management Plans would harvest the equivalent of as much as 11,000 acres of old-growth in the first decade. 180,000 acres of such harvesting would add .0072% to atmospheric carbon or about 60 million tons of carbon dioxide.

Average annual tons of slash burned in western Oregon in 1987-1989, after revision of tonnage reporting procedures, was 2,163,000. The State says emissions have been reduced by 42 percent since the baseline period. Their goal is a 50 percent reduction by the year 2000. The 2,163,000 tons is assumed to reflect the 42 percent reduction. A further reduction to 50 percent below baseline would be a 14 percent reduction below 1987-1989. That implies a maximum tonnage burned annually of 1,860,000 by 2000. The assumed tonnage of slash burned annually in western Oregon for estimation of carbon dioxide injected into the atmosphere, is:

1994-1998 - 2,163,000 tons
1999-2003 - 1,860,000 tons

The assumed maximum tonnage for the ten year life of the plan, therefore, is about 20 million tons.

The state of Washington has not yet calculated its baseline but their goals are a 20 percent emission reduction by 1994, and 50 percent by 2000. Considering historic logging patterns, tonnage burned in western Washington should be similar to or less than for western Oregon. The total 1994-2003 decadal tonnage burned in western Oregon and Washington is estimated at not more than 40 million tons.

The cumulative effects of BLM activities under the PRMP and similar activities proposed or anticipated on other forestlands in western Oregon and Washington for the expected ten year life of the RMP, would add an estimated 100 million tons of carbon dioxide to the world's atmosphere, increasing carbon dioxide to the world's atmosphere, increasing carbon there by .01 percent. This includes 60 million tons from old-growth timber harvest indicated by PRMPs for BLM western Oregon districts and by the U.S. Forest Service under the SEIS ROD, and as much as 40 million tons from prescribed forest management burning by all landowners as controlled by the ceilings established in the Oregon Smoke Management Plan and the Washington State Smoke Management Plan. The effect on global climate would be slight. Total increases in atmospheric carbon dioxide from all worldwide sources, by comparison, are occurring at a rate of almost one-half percent annually (Trexler, 1991). For further discussion on Analytical Assumptions about Global Climate Change see Appendix DD.

Effects on Air Quality

Major sources of air pollutants associated with BLM resource management activities are smoke from

prescribed burning, application of herbicides used to control unwanted vegetation, and dust from use of unsurfaced roads, road construction, and road maintenance. The effects associated with herbicide use can be found in the Final EIS for Western Oregon-Management of Competing Vegetation to which this RMP/EIS is tiered.

Dust from new road construction and maintenance of older unpaved roads normally settles within a short distance from the point of origin. It has a negligible effect away from the construction and maintenance sites. Dust associated with road use also has negligible effect away from unpaved roads. Localized effects from road dust would be felt by residents within the Rural Interface Area for all alternatives. The major adverse effect would be local and during the summer months when dust is produced from both public and administrative use of unpaved roads.

Prescribed burning is the only resource management activity proposed under any alternative that could have a notable adverse effect on local air quality. The effect of smoke from prescribed burning would either reduce visibility within a project area or under adverse meteorological conditions could concentrate the smoke around the project site. Under all alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan. The focus of the effects by alternatives is on PM 10 (Particulate Matter Smaller Than 10 Micrometers) because these emissions from prescribed fire are the criteria pollutants that could have the greatest impact on nonattainment areas and rural residents. In addition to wildland prescribed fire, typical sources of PM10 include industrial processes, woodstoves, roads, agricultural practices, and wildfires.

Projected Emissions

Historically, annual slash treatment levels have varied between 30 and 70 percent of the total harvested acres. Major limitations have been air quality restrictions and prescribed fire prescription parameters. Estimates of the expected annual acreage of prescribed fire use were calculated for each of the alternatives (see Table 4-1). Broad assumptions regarding the ecological need for prescribed burning, the hazard reduction that might be necessary for risk management, and the amount of prescribed burning necessary for site preparation and other silvicultural treatments were made at this planning level. These estimates are very generalized because many assumptions about the level of prescribed fire use for each land allocation within the District cannot be validated until watershed analysis, Late-Successional Reserve assessments, and Adaptive Management Area plans are completed. Species mitigation measures (including habitat enhancement) within the matrix may sometimes increase the use of prescribed fire on a site specific basis, but are generally expected to reduce the use of fire. Thus, air quality analyses at more site specific planning levels, such as the project level, are critical in determining the actual amount of prescribed fire that may be needed on the landscape.

The amount and type of prescribed burning projected under Alternatives C and the PRMP represents a shift in emphasis compared to historical uses of prescribed fire. In the past decade, the majority of prescribed burning has consisted of broadcast burning of logging slash for site preparation and management of competing vegetation. Some of this burning simultaneously contributed to fuels hazard reduction. These historical uses of prescribed fire are maintained and emphasized in Alternatives NA, A, and B. Use of broadcast burning to meet silvicultural objectives would be a part of all alternatives, while Alternatives C and the PRMP use a combination of under-canopy and broadcast burning to meet the fuel treatment objectives.

In the PRMP, prescribed burning emphasizes ecosystem processes restoration, habitat restoration and maintenance, and hazard reduction. In this alternative much of the proposed burning would be underburning, in both natural and managed stands. Burning for hazard reduction and site preparation may frequently take place in stands with many more trees retained after harvest than in the recent past, necessitating changes in prescribed fire techniques. Burning piles of slash after harvest, or for hazard reduction, would be done during the most favorable emission dispersion conditions. This continues a recent trend in fuels management leading to further emission reductions as well as reduced impacts. The shift in emphasis from broadcast burning to underburning has some inherent smoke management risks. Large areas may burn in mosaics with varying fire intensity and severity. While this mimics natural underburning, there are risks associated with retaining coarse woody debris; the likelihood for reburning is increased, as is the possibility for a prescribed burn to escape the planned burn area. Consequently, the potential for additional, unanticipated emissions is also increased. Furthermore, costs associated with the need for rapid extinguishment of smoldering fuels may be high.

Environmental Consequences

A majority of the prescribed fire use would be scheduled primarily during the period starting in March and ending in May. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content which reduces the amount of material actually burned. Broadcast and underburning would also be planned during the spring to reduce damage to the site from high intensity burning and to facilitate control of the units being burned. Control of prescribed fire becomes increasingly more difficult after May.

It is anticipated that by prescribed burning under advantageous weather conditions, subsequent wildfire emissions may be reduced due to a decreased amount of available fuel and a lowered risk of large scale wildfire. The local impacts to residents in rural communities, nonattainment areas, and Class I areas may be reduced through the use of an active fuels management program that may include prescribed fire. Extensive wildfires frequently occur after periods of drought, thus fuel consumption may be very high. Wildfires may allow smoke to enter Designated Areas as well as nonattainment areas, while prescribed fires are specifically designed and conducted to minimize both their emissions and impacts.

This air quality analysis focuses primarily on the impacts of particulate matter from prescribed burning because of the large quantities emitted from fires, the potential contribution of PM10 from prescribed and wildfires to concentrations above the PM10 standard, the major reduction of visibility caused by PM10, and the role PM10 plays as a carrier of other toxic pollutants.

Emissions by Alternatives

Under all alternatives, smoke emissions from BLM burning would be less than the 1984-1988 average historic emission level. The 1976 to 1979 baseline is used to measure District progress towards the 50 percent reduction goal for total suspended solids emissions from forestry burning for all of western Oregon by the year 2000 (see Chapter 3, Air Quality for further discussion).

Alternative C will have the greatest potential impact on air quality, with each proposing to emit roughly 90 percent of the historic PM10 levels from prescribed burning (1984-1988). Alternatives E and D will have the least potential impact on air quality, with projected PM10 emissions from prescribed burning of approximately 12 to 35 percent of historic levels. The remainder of the alternatives are projected to emit roughly 65 percent of historic PM10 levels from prescribed fire use. For a description of the techniques used to estimate emissions in the PRMP, see the Air Quality Analysis in the FSEIS.

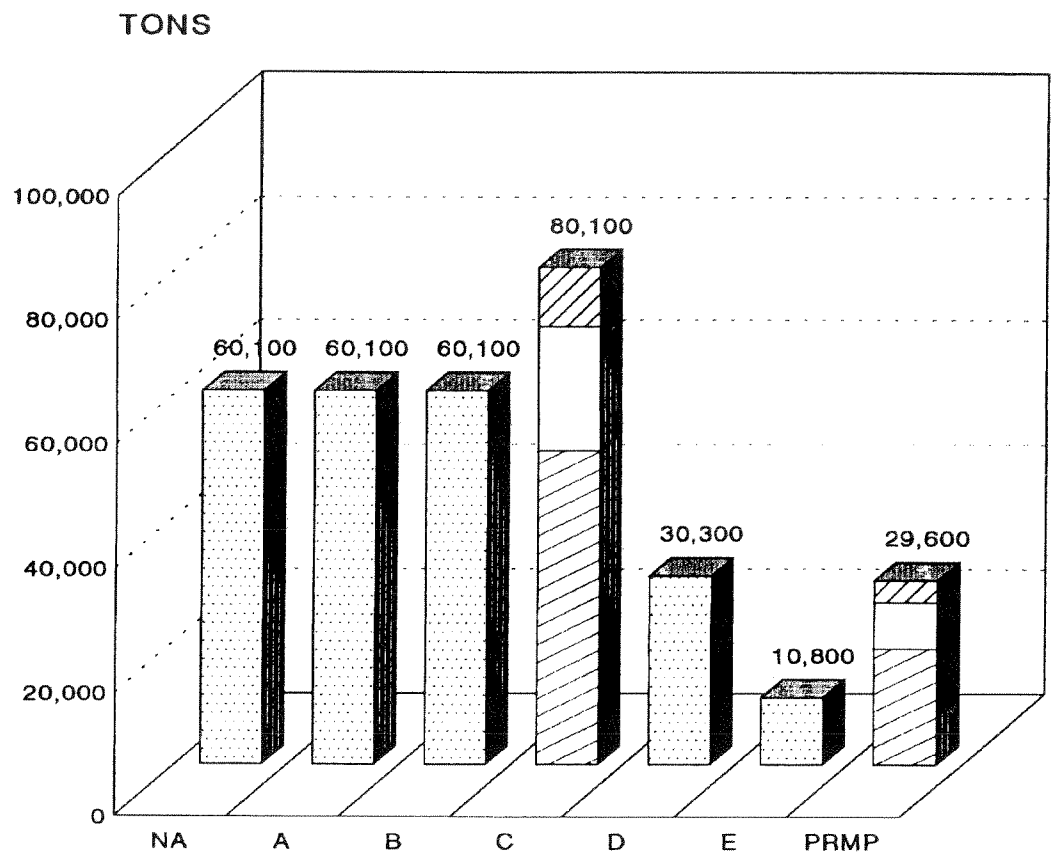
Oregon has an established emission reduction goals for Total Suspended Particulate emissions from prescribed burning. The goal calls for a 50 percent reduction in these emissions by the year 2000. To obtain some indication of how future burning may impact emission reduction goals, the emissions estimates for alternatives were compared the Oregon Total Suspended Particulate baseline. It may be necessary to reduce the fuels consumption identified in Figure 4-1 for Alternatives NA, A, and B by approximately 15 percent and for Alternatives C by approximately 35 percent in order to meet the 50 percent reduction by the year 2000. For Alternatives D, E, and the PRMP, projected emissions for the entire planning area are well below the baseline value for historic burning. Therefore, it appears that fire use in the future will not compromise the ability of the State to reach prescribed burning emission reduction goals.

Prescribed burning under all alternatives is not expected to affect visibility within Crater Lake and Class I areas and Class II areas with the potential of becoming Class I areas within the Roseburg District during the visibility protection period (July 1 to September 15), because prescribed burning would not be conducted in the planning area during this period. These areas are shown on Map 3-2.

Prescribed burning emissions, under all alternatives, is not expected to affect annual PM10 attainment within the Eugene/Springfield, Grants Pass, Klamath Falls, and Medford nonattainment areas (see Map 3-2 and Chapter 3 for discussion). Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration.

The greatest potential for smoke intrusions into the nonattainment areas would come from underburning activities proposed under Alternatives C and the PRMP. Alternatives A and the NA would have less potential because most of the burning would be accomplished through broadcast burning, alternative treatments (hand pile and manual treatment), and the no treatment options. Even though the risk of an intrusion is greater during underburning, the severity is less because the level of emissions and the amount of fuel burned is reduced compared with broadcast and pile burning.

Fig 4-1. ANNUAL PRESCRIBED FIRE FUELS CONSUMPTION BY ALTERNATIVE
Roseburg District Bureau of Land Management



	NA	A	B	C	D	E	PRMP
ECOSYSTEM	0	0	0	9,600	0	0	3,500
BROADCAST	60,100	60,100	60,100	0	30,300	10,800	0
PILES	0	0	0	20,000	0	0	7,400
UNDERBURN	0	0	0	50,500	0	0	18,700
TOTAL	60,100	60,100	60,100	80,100	30,300	10,800	29,600

ALTERNATIVE

UNDERBURN PILES BROADCAST ECOSYSTEM

Each type of prescribed fire (ie. pile, broadcast, underburn, and ecosystem burn) has a different compsumption rate. The total tons consumed is derived from the consumption rate (tons of biomass comsumed per acre) multiplied by the acres involved in the type of treatment.

The No Action Alternative (NA) comsumption rate is equal to the 1984-88 period. It represents the period when Oregon had realized the largest reduction in total emissions form the 1976-79 levels referenced in Chapter 3.

Figure 4-1. *Annual Prescribed Fire Fuels Consumption by Alternative*

Underburning emissions would average between approximately 30 and 35 tons for each acre burned while emissions from broadcast and pile burning (both hand and tractor) would average between approximately 20 and 25 tons. The difference in emissions is due to the higher burning intensities needed for broadcast burning and the increase in burning efficiency when material is piled and burned. In addition, further reductions in level of emissions from underburning could be accomplished by rapid mop up of the burned area immediately after ignition. Smoldering can be responsible for up to 90 percent of the total PM10 emissions produced.

Total smoke emissions and a greater chance for intrusions from prescribed burning would be the highest under Alternatives A, B, and the NA and lowest under Alternative E when compared with the base period. The amount of underburning would increase for Alternatives B, C, D, E, and the PRMP compared to the base period; while total emissions would be less, the potential of risk smoke intrusions may increase.

Prohibition of prescribed burning in the Rural Interface Areas under Alternatives D and E would reduce short-term adverse visibility effects and the risk of smoke intrusions into adjacent rural areas. However, there would be an accumulation of fuel, and resultant increased risk of stand replacement wildfire, which would have the potential to affect both wildfire emissions as well as to inflict property and resource damage.

Conclusions

Current avoidance strategies for prescribed fire assume that smoke can be lifted from the project site and dispersed and diluted by transport winds. However, underburning (as proposed under Alternatives C and the PRMP) requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of nonattainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas away from nonattainment areas could continue to occur during prescribed burning operations.

Alternatives C is projected to result in the highest total PM10 smoke emissions as well as greater chance for intrusions from prescribed burning. Alternative E would produce the lowest level of emissions and least risk of smoke intrusions. Alternatives C and the PRMP would increase the amount of underburning compared to the base period. While emissions would be less, the risk of these lighter intrusion would increase under these alternatives.

Effects on Soils

Introduction

Long-term soil productivity is the capability of soil to sustain inherent, natural growth potential of plants and plant communities over time. Most forest uses ultimately depend on a productive soil resource. Maintenance of long-term soil productivity is widely recognized as a basic requirement of forest management. The extent to which long-term soil productivity is affected by management activities is not precisely known because investigations of these effects have only recently begun. However, it is known that forest management practices have the potential to reduce natural productivity if certain operating guidelines are not followed. Implementation of the management prescriptions (Chapter 2) and in Appendix J would prevent unacceptable degradation of the soil resource. Monitoring and incorporating the latest information will determine whether the prescriptions are effective and are being correctly applied.

According to the Geological Society of America's report in Impacts and Management on Off Road Vehicles (1977):

> "Soils are naturally stabilized by the combined effects of soil structure and plant cover. Their sensitivity to vehicles is highly variable, but all Off Highway Vehicle sites show that the factors contributing to natural stability are damaged by vehicle use. Even the weight of a standing vehicle compacts the soil and alters its structure. In motion, a vehicle not only compacts the soil but imparts shearing stress by which soil particles slide over one another, closing some voids between particles and enlarging others. The effects are a loss of soil stability and a reduced capacity of the soil to restore its natural barriers to erosion.
>
> A motorcycle compacts soil, on the average, across a track about five inches wide. Thus, a single motorcycle compacts the soil of one acre in traveling twenty miles. Tracks made by four wheel vehicles are typically eighteen and one half inches wide and, accordingly, disturb one

acre in six miles of travel. The degree of compaction varies with the nature and wetness of the soil, the character of terrain, and the frequency of the vehicle impact.

Compaction reduces the capacity of the soil to absorb water, and the water that remains is held more firmly. Hence, even the reduced amount of water is less available to plants and animals.

Disturbance of soil by Off Highway Vehicles facilitates the process of erosion. The erosion is of two kinds: (1) direct mechanical abrasion by the vehicles themselves; and, (2) accelerated removal of soil by natural agents, mainly wind and water.

Increased runoff (a reduced capacity to absorb rainfall) and associated loss of soil by erosion are always evident in Off Highway Vehicle areas."

Common to Alternatives D, E and PA, limiting and closing the majority of the District to Off Highway Vehicle use would reduce direct impacts to most soil resources. (See Table 2-1 for acres in each alternative). Travel in limited areas would be restricted to improved, existing roads and trails. These roads would experience some degree of erosion, especially on slopes exceeding ten percent and where soils are highly susceptible to erosion regardless of slope.

In the Hubbard Creek area (11,681 acres), soil impacts would occur in higher intensity since the area would be managed for recreational motorized use. Use would be limited to existing roads and trails.

Closing 517 roads to the general public seasonally or year-round and 2,166 acres to motorized use would reduce or eliminate erosion caused by Off Highway Vehicles. In closed areas where prior existing Off Highway Vehicle uses occurred, impacts would be reduced by natural rehabilitation or Best Management Practices.

Under Alternatives A, B, C, D, and the No Action Alternative, the majority of District would remain open to Off Highway Vehicle use and would be susceptible to negative impacts created by motorized vehicles, however, significant impacts would probably not occur due to the rugged and heavily vegetated forest settings which preclude indiscriminate Off Highway Vehicle use off of roads and trails.

Both soil and nonsoil factors influence soil productivity. Nonsoil factors, such as climate and geology, are not influenced by forest management activities. Soil factors which can be modified by management activities are soil moisture, soil aeration, organic matter and nutrient availability, and soil biology. The district's soils differ in their degree of sensitivity to disturbances. Determining the suitability of specific soils for management practices is an important first step in preventing or minimizing soils related adverse impacts.

The Timber Productivity Capability Classification inventory identifies fragile sites that are judged to be incapable of supporting a sustained yield of forest products (fragile, nonsuitable woodland classification). No planned timber harvest would take place on these lands under any of the alternatives. Also identified are sites that are subject to unacceptable soil productivity loss as a result of management activities unless special restrictive or mitigation measures are used to protect them (fragile suitable, restricted classification). Table 4-2 lists acres of fragile classifications harvested by alternative.

There is very little difference among alternatives in acreage of the Timber Production Capability Classification, fragile, nonsuitable woodland classification harvested because this is not part of the timber base in any alternative. Alternative A would harvest the most acres of soils classified as fragile suitable, restricted. Alternative E would harvest the least acreage in the soils classified as fragile

Table 4-2. Acres of Timber Productivity Capability Classification Fragile Suitable Restricted Forest Lands Harvested by Alternative.[1]

Alternative:	NA	A	B	C	D	E	PRMP
Acres:	21,800	28,300	25,500	12,400	7,200	1,100	4,500

[1]The acreage of fragile suitable lands to be harvested were derived by multiplying the percentage of fragile lands in the timber base by the proposed acreage to be harvested by alternative.

because no fragile gradient areas would be subject to planned harvest under this alternative.

Forest management practices (including road construction), mining, recreation, and Off Highway Vehicle use may affect soil properties and productivity. Some kinds and degrees of disturbances created by forest management practices are considered acceptable while others are detrimental to long-term soil productivity. The extent of soil disturbance depends on numerous factors. Soil type and condition, harvest method, site preparation method, topography, complete implementation of planned practices and mitigation measures, and skills of individual equipment operators will contribute to the degree of disturbance and resultant effects. Detrimental impacts can be avoided, minimized, or ameliorated, and long-term productivity can be maintained if adequate soil management practices are planned and implemented. The most common types of disturbances affecting soils and associated long-term productivity are displacement/compaction, erosion (surface erosion and mass wasting), alteration of nutrient status and changes in soil biology. A summary of effects of the alternatives on these three disturbance types and on long-term soil productivity are discussed in this section. Appendix FF contains more detail and discussion on each of these disturbance types.

Impacts to Long Term Productivity

Adverse effects on long-term soil productivity should be somewhat similar and minimal for all alternatives with successful implementation of Best Management Practices (Appendix J), Management Action/Direction described for the PRMP, and practices listed in "Management Direction Common to Alternatives NA, A, B, C, D, and E" (Chapter 2). The major variable between alternatives is the amount of acres affected by management activities. Some researchers suggest that productivity, even on Suitable Commercial Forest Land sites may not be sustainable over the long term under an intensive management regime such as that proposed for Alternatives No Action, A, B, and the intensively managed forest acres under Alternative D and E. Soil fertility may be diminished over time by repeated cycles of harvest, site preparation, and control of competing vegetation (Perry and Maghembe 1989). Alternative C and the PRMP would have the least long term adverse impacts to productivity due to the less intensive forest management practices. Under these alternatives, less biomass is removed from the site through retention of conifers, hardwoods, snags, and down woody material. In addition, Alternative C and the PRMP would generally use less intense prescribed fire under the shelterwood or retention prescription, less vegetation control, and longer rotations. It is assumed that timber harvest would occur proportionally on all soil types regardless of alternative, except Alternative E which proposes removing areas classified as "fragile gradient, restricted" from the timber producing land base. A major difference between alternatives is the total acres harvested and the acres of fragile sites which will be included.

Alternative A, with the most acres of harvest and site preparation, would have the most acres requiring implementation of management practices that would maintain long-term productivity; Alternative E would require implementation on the least amount of acres (see Table 4-1). Monitoring for this district during the past five years indicates that standards for soil productivity were met on approximately 80 percent of the units sampled. At times standards were not met because of prescribed fire intensity and soil compaction. If this trend continues, Alternative A would have the greatest risk of potential impact on soil productivity due to operational difficulty in implementing practices necessary to maintain that productivity. Conversely, Alternative E would have the least risk of reducing long term productivity. Although management prescriptions and mitigation and amelioration measures have been designed to keep the extent and duration of adverse effects on soils within acceptable levels, the adverse effects cannot be completely eliminated. The construction of rocked and/or excavated roads, quarries, developed recreation sites, and water impoundments are irreversible or irretrievable commitments of the soil resource because of the long time needed to revert to natural conditions.

Compaction/ Displacement

Research literature reports data for growth effects created by detrimental soil compaction and displacement as a combined effect. The growth effect of each is not separable. Detrimental soil compaction is assumed to occur at depths greater than two inches and is evidenced by an increase in soil density of 15 or more percent (U.S. Forest Service standard in Forest Service Manual Supplement 45, Section 2520.4) over the undisturbed level. Soil compaction

can occur on all soils. The majority of increase in density occurs after the first machine pass when soils are wet and after the first three to five passes when soils are relatively dry (Froehlich and McNabb, 1983; Steinbrenner, 1955). Wert and Thomas (1981) reported Douglas-fir growth loss of 43 percent on ground based yarding skid trails and immediately adjacent (three meters) areas that were 32 years old. Vanderheyden (1980) found no apparent compaction recovery after 38 years on a variety of soil textures in the Western Cascades of Oregon. Dyrness (1967) and Ruth (1967) reported soil disturbance created by highlead and skyline cable yarding, but tree growth impacts from cable yarding are inconclusive.

Timber harvest and site preparation methods together with soil conditions during operation influence the degree of soil compaction and displacement. Analysis in the ten year scenario indicates that in all of the alternatives, the majority of the district would be harvested with a cable system with at least one-end suspension. Cable systems with full suspension or no suspension, ground based systems, and/or aerial systems would be used on the remaining areas. A spatially explicit ten year scenario has not been done for the No Action or PRMP alternatives, however, information concerning logging systems may be extrapolated from the other alternatives. There may be an increase in aerial yarding in the PRMP due to the constraint of no net increase in roads in key watersheds and to protect Riparian Reserves. Mechanical site preparation would be scheduled for a high of approximately 2300 acres per year for Alternative A to a low of approximately 200 acres per year for Alternative E.

Yarding and site preparation methods would be determined on a unit by unit basis. On slopes exceeding 35 percent, adverse impacts to soils would be reduced or avoided by the use of cable yarding systems. On those sites where ground based yarding and/or mechanical site preparation are used, implementation and amelioration practices would have insignificant (less than one percent) growth loss effect. When ground based yarding and mechanical site preparation are used on the same site, the combined growth loss due to compaction/ displacement would be less than one percent. Since all management practices would be planned and implemented to avoid detrimental compaction/ displacement for all alternatives, there would be insignificant (less than one percent) adverse growth impacts for any of the alternatives. However, alternatives with more acres of ground based yarding and mechanical site preparation (see Table 4-1) have a greater potential to create adverse impacts from compaction/displacement.

Differences in the number of acres harvested and/or site prepared with ground based equipment among the alternatives are the most direct indicator of potential compaction and associated adverse growth impacts. The most acres (2300 per year) of ground based yarding and mechanical site preparation would occur in Alternative A and decline to a low of 200 per year acres under Alternative E (see Table 4-1).

Erosion and Mass Wasting (Landsliding)

Soil is an anchoring medium for plants and a reservoir of readily available water and nutrients for plant growth. Natural surface erosion rates in undisturbed forested areas of Western Oregon are very low. Overland flow of water is rare due to the usually thick protective cover of vegetation, duff and litter, and the high infiltration rate of the soils.

In general, any soil loss is considered to have a negative effect on long term soil productivity as soil nutrients, water supplying capacity, rooting depth, and lateral rooting are reduced. Alternative C and the PRMP which propose the retention of live conifers and hardwoods along with extended rotations, compared to Alternatives No Action, A, B, D, and E, on all harvest units would have the least long term negative impact to soil nutrients, water supplying capacity, rooting depth, and lateral rooting. No conclusive productivity analysis is possible due to lack of data relating surface erosion to forest soil productivity. Topsoil removal will negatively affect productivity.

Forest management activities can accelerate surface erosion processes by creating more exposed and/or compacted soil. Compacted soils cannot absorb water fast enough during heavy rains to prevent runoff. Overland flow of water can cause rills and gullies. Eroded soil may move only a short distance and be redeposited 'on-site,' with minimal effect on long-term soil productivity. If the erosive force is great enough, it may be carried 'off-site' and into streams as sediment.

Forest management activities that are more likely to cause the most soil disturbance, and thus create the greatest potential for increased erosion, are road and landing construction, log yarding, machine piling and scarification, and broadcast burning. However, Management Action/Direction for the alternatives and Best Management Practices (Appendix J) provide practices which would prevent or minimize

compaction and bare soil exposure and related erosion.

Landslides (natural and human caused) affect less than two percent of the district's land base, but may cause off-site effects. They can have significant impacts on water quality, fish habitat, and long-term productivity. Timber Production Capability Classification fragile classifications have identified areas having soils prone to landsliding or surface erosion. Alternatives which have more site disturbing activities, including timber harvest on areas classified in the Timber Production Capability Classification as fragile, slope gradient and fragile, and mass movement potential sites (see Table 4-2) have more potential for increasing the natural rate of mass failures.

There would be a higher potential (on a per acre basis) for erosion and mass wasting under Alternatives No Action, A, B, and on the intensively managed forest acres under Alternative D and E. Alternative C and the PRMP would have the least potential (on a per acre basis) for erosion and mass wasting because of the retention of live trees on harvest units. On a cumulative basis, the 6,700 acres per decade that would be harvested under Alternative E would have the least total impact and the 74,000 acres per decade that would be harvested under Alternative A would have the most impact. The increased soil stability under Alternative C and the PRMP compared to clearcuts under No Action, A, B, D, and E would vary with the number of trees retained per acre on harvest units. The minimum number of trees retained under Alternative C is approximately 12 to 15 trees per acre, while the minimum number of trees retained under the PRMP is approximately six to eight trees per acre. Table 4-1 summarizes acres of surface disturbing activities by alternative.

Nutrient Status and Soil Biology

Because of the interdependence between above ground organic matter supplies and soil nutrient cycling and availability, management of the surface organic material can strongly influence soil productivity. Decaying plant components, including large downed woody debris, produce an organic layer on the soil surface which decomposes into soil organic matter. This provides plant nutrients, a supply of energy to soil microorganisms, and a medium for water storage. Soil microorganism activity has been directly linked to soil productivity (Harvey et al., 1979). Nitrogen is a limiting growth nutrient in many Pacific Northwest sites, and the surface organic layer (duff) is a primary source of nitrogen for tree growth.

Harvest intensities that remove the most organic material from a site have the most potential for decreasing long-term soil productivity. Similarly, high intensities of site preparation (eg. high intensity, long duration fire, "clean" mechanical piling) potentially have the greatest impact. The potential for long-term soil productivity impacts would be greatest when harvesting and/or site preparation activities are most frequent. Harvesting and site preparation activities would be most frequent under Alternatives No Action, A, B, and the intensively managed forest acres under Alternatives D and E. These alternatives were modeled with an approximate minimum harvest age of 40 years. Alternative C and the PRMP would have the least frequent harvest and site preparation activities. Alternative C would use a 150 year rotation with a minimum harvest age of 60 on previously clearcut stands. The PRMP would use a 150 year rotation in Connectivity/Diversity Blocks and would use a cumulative mean annual increment of 80 to 110 year rotation in the General Forest Management Area. Connectivity/Diversity Blocks and the General Forest Management Area would have a minimum harvest age of 60 years. Intensities of harvesting and site preparation activities are designed to avoid or minimize soil damage (see Management Action/ Direction for the alternatives and Best Management Practices, Appendix J). Prescribed burning would be avoided on highly sensitive (category 1) soils, in most instances. On other soils, burn prescriptions would be designed to protect beneficial soil properties and result in moderate and low intensity burns (see Chapter 2). If this protection does not occur, long-term soil productivity may be decreased. Differences in management practices used and acres harvested and site prepared between alternatives are the most direct indicator of relative risk to soil productivity decreases due to organic matter reduction (see Table 4-1 and Appendix FF). Practices that would have the greatest potential for impacts (on a per acre basis) would be Alternatives No Action, A, B, D, and E which do not provide for the long term retention of down woody material or the retention of hardwoods on intensively managed forest acres. Alternative C and the PRMP would have the least risk of nutrient status and soil productivity decreases due to loss of organic matter because of the forest management practices proposed under those alternatives compared to Alternatives No Action, A, B, D, and E. The forest practices that would help retain long term site productivity under Alternatives C and the PRMP would be the retention of snags and down woody material, and the retention of large conifers and

hardwoods on all harvest units. On a cumulative basis, Alternatives No Action, A, and B would have the highest potential for adverse impacts while Alternatives C, D, E, and the PRMP would have the least potential for adverse cumulative impacts to soil productivity. However, if proper soil management practices are utilized as planned, soil organic matter and related long-term soil productivity would be insignificantly affected in all alternatives. Adverse impacts to soil productivity from activities such as mining and recreation have generally been of an isolated and insignificant nature. These activities are expected to continue at this level under all alternatives.

Differences between alternatives in the amount of land fertilized depend on the amount of land allocated for timber production. Generally, all well stocked stands in the intensive timber base would be planned for fertilization. Fertilization may be used under Alternative C and the PRMP's Connectivity/Diversity Blocks to hasten acquisition of old-growth character in a stand. Fertilization may be used to enhance growth on well managed sites or to help restore growth on sites where practices have reduced productivity by significantly reducing nutrient status. However, fertilization is not a substitute for replacing organic material that has been removed from a site through timber harvest, site preparation or other means.

Effects on Water Resources

Introduction

The analysis of impacts of the Proposed Resource Management Plan incorporates by reference the analyses and conclusions in the Final SEIS regarding water quality. The following discussion and conclusions are summarized from the Final SEIS.

The effects on water quality under the alternatives vary depending on the acreage and distribution of the various land use allocations and the type and location of land disturbing activities occurring under the alternatives. The most significant factors related to potential water quality effects for each alternative are the Riparian Reserves scenarios or Riparian Management Areas, the level and location of road building, and the amount and method of timber harvest permitted.

Alternative 9 of the Final SEIS was essentially adopted in the SEIS ROD which in turn has been incorporated into the Proposed Resource Management Plan.

The Final SEIS concluded that Alternative 9 along with other Final SEIS alternatives with the same Riparian Reserve scenario would have the least adverse effects on water quality. Based on the Riparian Reserves and other components of the Aquatic Conservation Strategy, Alternative 9 (and thus the PRMP) would be expected to maintain or improve water quality. Watershed recovery would have the greatest potential of occurring under this and other Final SEIS alternatives with the same Riparian Reserves scenario.

Cumulative effects differ among the RMP alternatives primarily as a function of the alternatives' proposed level of land disturbance and Aquatic Conservation Strategy adoption. The broad scale application of the Aquatic Conservation Strategy in the PRMP will significantly reduce the potential of adverse cumulative effects to water quality, compared to the other RMP alternatives. Cumulative effects will be further addressed in subsequent analyses during watershed analysis and/or landscape analysis and project level Environmental Assessment.

Impacts and Evaluation

Forest management activities attributable to management alternatives that have been outlined in Chapter 2 would have a varying potential to impact the water resources since all alternatives entail varying soil and vegetation disturbance (Appendix X) Impacts that would be of greatest concern are those that would adversely affect beneficial uses, especially domestic water use, salmonids, and other aquatic species. The BLM is required by the National Environmental Policy Act 1977) to analyze all impacts upon water resources which includes direct, indirect, and cumulative effects in the short term (ten years) and long term (200 years).
BLM-administered land is intermingled with other ownership in a checkerboard pattern or one even more fragmented (See Map 1-2). Analysis of impacts to water resources necessarily considers effects of all activities in a watershed regardless of ownership, as all are connected within the drainage system. Therefore, analysis of impacts from activities only on BLM-administered land would have little meaning and would not meet the requirements of the National Environmental Policy Act.

Direct effects of proposed alternative action would be those effects that occur close in time and place to the action. Sedimentation is one example that is associated with most ground disturbing activities.

Indirect effects of proposed alternative action would be those effects that occur later in time and off site from the action. Pool filling and reducing fishery habitat from accelerated sedimentation in the watershed is an example.

Cumulative impacts to rivers and streams in Western Oregon tend to be the averaging of all impacts within the watershed rather than the sum of all impacts within the watershed. This is due to the fact that the flow (quantity of water) increases downstream thereby diluting impacts. Impacts to lakes and small impoundments tend to be additive because the water quantity usually remains relatively constant and site specific. Cumulative impacts over time involve the compounded effects of past, present, and reasonably foreseeable future actions. The overall net cumulative impact across both time and space is a complex process.

The intensity and duration of impacts on water resources in a watershed vary in relation to a watershed's sensitivity. In this section, water resource impacts are discussed in terms of overall acres disturbed, stream channel condition, large woody debris, condition of the uplands, water quality, and general watershed condition. These impacts would vary by alternative and when possible consider reasonably foreseeable actions on non-BLM-managed lands. The degree of impact on water resources would be in relation to the existing conditions discussed in Chapter 3; "Affected Environment".

A relative Watershed Condition Index was used in the Draft RMP/EIS to evaluate the alternatives by comparing the potential overall change in Analytical Watershed's to the current condition. The Watershed Condition Index has been dropped as an analytical tool. Among the reasons for dropping Watershed Condition Index are: 1) the information upon which the Draft RMP/EIS Watershed Condition Index analysis was calculated is out of date due to significant logging activities on private and industrial lands, 2) it will be difficult to update and forecast land disturbing activities on BLM administered lands, due to soft projections of potential sale quantities in the ten year timber management scenario for the PRMP, and 3) it was felt that requirements for watershed analysis in the SEIS ROD would ultimately provide a more revealing assessment of current watershed condition and provide the foundation for appropriate resource management decisions.

Effects Common to all Alternatives

Groundwater quality and quantity would not be expected to be affected by any of the alternatives or management practices described in Chapter 2. The relatively deep soils would effectively filter any potential pollutants from entering the groundwater in both the Coast Range and Cascades mountains. Activities that significantly decrease soil infiltration, such as road construction, would site specifically alter the amount and/or location of water reaching the groundwater and surface water. However, changes in ground water quantity would be far too small to measure under all alternatives.

Annual water yield would not be expected to change under any of the alternatives. Research studies on streamflow in western Oregon, not including dominant fog drip areas, have concluded that annual water yield response to sustained timber harvest in larger watersheds similar to the Analytical Watersheds is less than the accuracy of streamflow measurements (Harr, Fredrikson and Rothacher, 1979; Harr, 1976). However, as a part of water yield, potential winter peak flow increases can be in response to compaction in the watershed or canopy removal in the transient snow zone and are discussed later in this section.

Water temperature is directly affected by solar radiation reaching the small forest streams. Riparian vegetation prevents increases in water temperature by providing the effective shade (Brown, 1980; Brown et al,1971). One of the objectives of the Riparian Management Areas (in Alternatives NA, A, B, C, D, and E) and Riparian Reserves (in the Proposed RMP) is to provide effective shade. Since all the alternatives would include retention of adjacent stream shade on third order and larger streams, direct effect on water temperature for these stream orders would not be expected to vary between the alternatives. However, water quality and other riparian functions such as large woody debris, aquatic habitat, and wildlife habitat would have different criteria and require separate evaluation.

All alternatives would have a similar affect on other water quality constituents such as pH, dissolved oxygen, and nutrients. While seasonal streamflow would show variations in these constituents,

significant trends have not been historically observed when riparian dependent resources are addressed. However, sediment and turbidity would vary by the amount, type and location of land disturbing activities that are identified under each alternative and is discussed later.

There would be no difference in mining related impacts between alternatives.

Overall Effects of the Alternatives

Since all alternatives would potentially affect water through soil and vegetation disturbing actives such as timber harvesting, road building, log hauling, and Off Highway Vehicle use, the proposed amount and intensity of forest management activities were used as an indicator of the risk of direct and indirect water impacts. Streams which presently show evidence of degradation (eg; pools filling with sediment or channels becoming more abraded and wider), would be most sensitive and at higher future risk depending on the proposed action. Alternatives NA, A, and B would harvest more acres of timber and build more miles of road. The potential effect of these three alternatives would be most noticeable on the subanalytical watershed level because of the ownership pattern. Specific areas on the district would include portions of Middle Fork Coquille Analytical Watershed (shared with Coos Bay BLM District); Coffee Creek and Stouts Creek in Upper South Umpqua Analytical Watershed; Canyon Creek in Lower South Umpqua Analytical Watershed; Pass Creek in Canton Creek Analytical Watershed; Middle Creek in Cow Creek Analytical Watershed; and Wolf Creek in Upper Umpqua Frontal Analytical Watershed. Stouts and Canyon watersheds are examples of recently impacted areas as a result of the 1987 wild fires and related salvage harvesting. The impacted streams in these watersheds are in the early sensitive stages of recovery.

The remaining four alternatives would form two response groups. Alternative C and D would rank in a middle group because of the reduced level of land disturbing activities. However, Alternative E and PRMP would have the lowest risk of direct and indirect water impacts for the same reason. Alternative E and PRMP also provide for varying levels of timber harvest intensity under different land allocations and designations (see Chapter 2 - Timber). In addition, the Riparian Reserve scenario and other components of the Aquatic Conservation Strategy under the PRMP would be expected to provide far greater protection from direct and indirect adverse impacts on the water. The PRMP would provide the greater overall riparian protection. This protection would be especially noticeable for the intermittent streams where sediment routing and adjacent ground stability would be critical.

Water needed for forest management uses would differ under the alternatives. Alternatives NA, A, and B would require more water use for road construction, logging slash treatment, and other forest management uses. Again, Alternatives C and D would be in a middle response group and Alternatives E and PRMP would have the lowest demand for water use. In order to meet the need for water, BLM would be required to file for a water right per new site under the Oregon Water Resources appropriative process which requires examination and recording fees. Therefore, water use costs to implement an alternative would potentially be greatest under Alternatives NA, A, and B. With new instream water rights for fisheries in many of the larger streams on the district and the growing demand for domestic water use, water would not always be available in those streams for forest management. Therefore, the alternatives with the greatest potential water use would be forced to find other costly ways to meet this need.

Indirect sediment impacts to two county reservoirs (Platt I and Ben Irving) downstream of BLM-administered lands would most likely occur from existing erosional sites and/or new ground disturbing activities. The intensity of proposed forest management, especially new road construction, under each alternative would be an indicator of potential sediment impacts. Alternatives NA, A, and B would have the highest risk and Alternatives E and PRMP the lowest.

Impacts to Stream Channel Condition

The stream channel condition was evaluated by potential alternative affect on riparian vegetation and peak flow increases. Large woody debris is also a critical factor but is discussed later in this section. Since comprehensive channel condition information is unavailable, professional judgement and limited field observations were used to determine overall channel response.

The riparian vegetation was evaluated on riparian protection and the potential vegetative recovery by alternative. Alternatives C, D, E, and PRMP would

have a greater potential for net long term (200 years) improvement which would eventually affect stream channel condition and fish habitat where channel impacts have occurred at the analytical watershed level. However, the analytical watersheds with limited BLM-administered lands would have the lowest potential to respond to alternative implementation. These watershed exceptions are Calapooya, Lower North Umpqua, and South Umpqua/Roseburg. In these analytical watersheds, the value of BLM riparian areas are focused on site specific physical and biological channel needs instead of the watershed level. Alternatives NA, A, and B would not provide the same potential for net long term channel improvement. For the short term (ten years), there is not enough time for recovery processes to respond to address channel impacts (e.g.; channel widening) and aquatic population changes. However, the PRMP would provide the best short term opportunity to restore some elements of watershed and channel condition as a component of the Aquatic Conservation Strategy.

Increases in magnitude and frequency of peak flows would be an cumulative effect that causes channel erosion and increase sedimentation. Research has shown that peak flow increases can be in response to soil compaction by reducing storm infiltration and increasing runoff in small watersheds (Harr, 1979). The removal of forest canopy in the transient snow zone (2,000 to 5,000 feet elevation for the Roseburg District) has also been connected to peak flow increases (Harr, 1981; Berris and Harr, 1983; Harr, 1986). Snow accumulation in harvest areas, where the forest canopy has been reduced to less than 70 percent, is available in varying amounts of snowmelt that is driven by warm rain storms. This additional moisture enters the soil and moves to the channels as additional flood flow. Although the snowmelt mechanism is not completely understood, the evaluation of a watershed susceptibility to rain-on-snow storms would determine the hydrologic condition and potential risk of peak flow increases. The intensity of forest management activities under each alternative would indicate the risk of cumulative peak flow increase which would affect channel stability, fishery and aquatic habitat, and road related facilities when implementing each alternative.

The risk of potential impacts on channel condition from peak flow increases would vary between the alternatives. Alternatives E and the PRMP would have the lowest risk. Under the PRMP, the objectives of the Late-Successional Reserves land allocation would further reduce the risk in certain subanalytical watersheds because of the emphasis on protection and enhancement of old-growth forest ecosystem condition. Alternative C would be expected to have less risk than the remaining alternatives because of the partial harvesting with larger basal area retention. Alternative D would allow for a range of management which would lessen the potential peak flow increases in certain subanalytical watersheds. Such offsetting strategies include no planned timber harvest in Habitat Conservation Areas. In the long term, Alternatives E and PRMP would allow subanalytical watersheds that are currently at a reduced level of hydrologic condition and either exhibiting peak flow impacts in the channels or at risk the best opportunity to recover. Alternatives NA, A, and B would have higher risks of increasing the magnitude and frequency of peak flows and would not encourage recovery of existing conditions.

Three example subanalytical watersheds in the transient snow zone that have reduced hydrologic condition and are showing signs of cumulative channel impacts are East Fork Rock Creek (in Rock Creek Analytical Watershed) and the Middle and West Forks of Deadman Creek (in Upper South Umpqua Analytical Watershed). The lower reach of East Fork of Rock Creek is aggrading and becoming a riffle and abraded system controlled by shifting gravel bars. Annual winter floods are no longer contained within the stream banks. In the lower reaches of Middle and West forks of Deadman creeks, fine sediments are depositing in the faster water with an increasing distribution downstream. For each of these subanalytical watersheds, continued current harvesting levels associated with Alternatives NA, A, and B would not encourage watershed or channel recovery.

Impacts to Large Woody Debris

Large woody debris in the future would be directly affected by the condition of the riparian vegetation which would be determined by each alternative. The amount and effectiveness of future large woody debris from riparian areas under the various alternatives would correlate to the long term proper function of streams and rivers and to the overall condition of fish habitat.

The successful implementation of the Riparian Management Areas or Riparian Reserves, would prevent any significant short term changes over the present in BLM-managed streams that are third order and larger under all alternatives. Where large woody debris has been removed by past practices, natural or accelerated debris torrents, or natural

decomposition, future recruitment from the proposed riparian areas would eventually (long term) contribute to the channel. The retention of existing large woody debris would continue to directly address channel erosion, sediment storage, and aquatic habitat while indirectly and cumulatively addressing flow regulation including flood routing efficiency and the maintenance of low flows.

The long term indirect and cumulative effect of decreasing future large woody debris in first order intermittent streams in all Analytical Watershed's would occur under Alternatives NA, A, B, and D. This potential future loss would not be as great under Alternatives C. Alternative C would retain various numbers of trees per acre as the future source of large woody debris. Alternatives E and PRMP would establish no harvest riparian areas on first order streams. A similar long term effect on second order intermittent streams would be expected for Alternative D because of the addition of no harvest riparian areas. On the Analytical Watershed level, current legal requirements afford less riparian protection to first and second order streams then Alternatives D, E, and PRMP which would affect the cumulative function of large woody debris. This factor becomes more noticeable where BLM administers a small percentage of a watershed.

Impacts to the Upland Condition

Maintenance and improvement of upland conditions would take place as Best Management Practices become refined through increased awareness of hazards (eg; compaction or landslides) and control methods are improved. Deferral of harvesting activities because of potential watershed cumulative impacts would prevent significant impacts associated with peak runoff events.

Under Alternatives E and PRMP overall upslope conditions in Analytical Watershed's would be least impacted compared to Alternatives NA, A, and B. Watershed analysis as part of the Aquatic Conservation Strategy under the PRMP would best address the upland condition on a watershed level and identify concerns and potential activities that would maintain or improve the overall land condition. Alternatives C and D would group in the middle. The upland portions of Analytical Watershed's within Habitat Conservation Areas in Alternative D would improve over the long term. Leaving trees in harvest units under the high retention prescription of Alternative C (see Chapter 2) would also reduce the overall impact.

Impacts to Water Quality

Water quality parameters that are most commonly associated with forest management are stream temperature, instream structure or large woody debris, and sediment (see Chapter 3 - Existing Water Quality Conditions). Temperature and large woody debris have been previously discussed in this section. The 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution by Oregon Department of Environmental Quality identified one or more streams in each Analytical Watershed with moderate sediment problems and three Analytical Watersheds with at least one stream each in the severe category. Stream sedimentation is associated with ground disturbing activities (eg; timber harvest, roads, log haul, and Off Highway Vehicle use) and peak flows. Alternatives NA, A, and B would have the highest potential risk of increased stream sediment. The increased risk would be a result of acres of disturbance and potential peak flow increases. The amount of disturbance would provide a sediment source while peak flow increases would increase channel scour. The varying harvest intensities between Alternatives C and D would have differing effects on the availability of sediment from ground disturbance and potential peak flow increases (see previous peak flow discussion). The potential risk of producing sediment would be higher under Alternative D than Alternative C. Alternative E and PRMP would have the lowest potential risk.

Impacts to Overall Watershed Condition

The alternatives appear to fall into three general categories in the preceding water resource discussion. Alternatives NA, A, and, B would have the greatest potential of effecting water resources by harvesting more acres and building more miles of road, harvesting on a shorter rotation and not allowing vegetative recovery to occur over as much land base as other alternatives, risking higher peak flow increases, decreasing available future large woody debris in first and second order channels, and risking higher sedimentation increases. Alternatives C, and D would group in the middle gaining the benefit of different timber management strategies and reserve areas. Alternative E and PRMP would have the least impact on water resources by disturbing

less acres and providing riparian areas on all stream orders.

Effects on Biological Diversity and Ecological Health

To attempt to address the ultimate question of how well the alternatives would help to maintain viable populations of native species in functional habitats, this section discusses the following focal components to biological diversity: species diversity, genetic diversity, ecosystem diversity, and landscape diversity. Primary activities affecting biological diversity on BLM-administered lands would be timber harvest and reforestation practices. Analysis of impacts on these elements is uncertain, as biological diversity has not been intensively researched. Thus, a number of indicators of diversity have been selected for analysis.

Although the baseline for assessment of impacts is the existing situation, biological diversity is best analyzed in the context of the model provided by nature. Using the model provided by nature is not possible since human activities have been affecting the ecosystems of western Oregon for thousands of years, and have substantially affected the ecosystems in the last 140 years, as described in Chapter 3. Tables 4-3 and 4-4 show the retention and improvement of biological diversity for both short and long term.

Effects on species diversity would occur mostly on lands allocated to timber production. Management of lands allocated to timber production would emphasize growth of commercial conifers, except in Alternative C and in Connectivity/Diversity Blocks under the PRMP. Artificial reforestation in other alternatives would be primarily with Douglas-fir. Subsequent vegetation management would suppress competing vegetation (e.g., grass, shrubs, and forbs) to favor Douglas-fir. After an initial drop following harvest of old-growth stands, plant species diversity increases, peaking between 15 and 20 years. This early high diversity is short lived in most managed as well as natural stands. After the tree canopy closes, plant species diversity declines to its lowest level before slowly recovering again (Schoemaker and McKee 1988). Bruce et al. (1985) show that the early seral stage provides feeding habitat for the most animal species, while mature and old-growth forests provide nesting habitat for the most species.

Analysis of BLM's forest inventory data indicates that timber management actions would not substantially diminish the high level of diversity in the cutover stands, but it would accelerate succession in all alternatives except Alternative C and in the Connectivity/Diversity Blocks under the PRMP, shortening the length of time in the early seral stage when this high level of diversity prevails. The inventory data further indicates that, as the conifer stands reach closed canopy condition, the abundance (number of trees) of other tree species in the canopy would typically be less than in the original stands, but the composition of tree species would usually be the same. Diversity of shrubs, forbs and grasses would decline. This lower species abundance would occur to varying degrees in all alternatives, but would be less under Alternative C and the PRMP where reforestation would include a diversity of species, and management would encourage species diversity. In the long term, Alternatives E, D, and PRMP would have the least acres in both the early seral stage and closed canopy conditions, while Alternatives No Action, A, and B would have the most in early seral stages and the least in older forest canopy conditions.

Although the existing plant communities are adapted to the occurrence of fire in the natural system, prescribed (slash) burning after logging would affect both the structure and composition of upland vegetation communities (Halpern 1987). Burning would reduce the amount of coarse woody debris, kill or destroy some retained trees, suppress the growth of most residual vegetation, and promote the growth of certain nonnative invader species as compared to unburned stands. General recovery would occur over time. The rate of recovery would be highly variable depending on the method of timber harvest, intensity of burn, and the composition of the original vegetation. Impacts of burning after logging would be most often limited to the short term. Figures 4-2 and 4-3 show the relative abundance of seral stages for the short and long term by alternative.

Wildlife species diversity is greatest when the forest is dominated by a mix of old-growth/mature and early successional stages. A patchwork of this mix, if it includes some large, older forest patches, favors species adapted to both seral stage extremes and species adapted to the ecotones (edges) that occur between the extremes (Logan et al. 1985). Species diversity is least where the mid and late seral stages of regulated forests dominate the landscape (Long 1977), and canopy closure is greatest. Appendix KK

Table 4-3. Comparison of Alternatives, Retention and Improvement of Biological Diversity, Short Term (10 years).

	Alternatives						
Aspect of Biological Diversity	NA	A	B	C	D	E	PRMP
Genetic Diversity	0	0	0	0	0	0	0
Special Status Animals	-	-	-	-	-	+	0
Special Status Plants	-	-	-	-	0	0	0
Special Habitats (talus, meadows)	-	-	-	0	0	0	0
Hardwoods	-	-	-	0	-	0	-
Riparian Zones	-	-	0	0	0	0	0
Research Natural Areas	-	-	-	0	0	0	-
Older Forest (Open Canopy)	-	-	-	-	-	0	-
Early Seral Stage	+	+	+	+	+	-	+
Snags/Wildlife Trees	-	-	-	-	-	+	-
Dead and Down Material	-	-	-	-	-	+	-
Fragmentation of Older Forest	-	-	-	0	0	0	0

+ improving; 0 maintaining; - declining

Table 4-4. Comparison of Alternatives, Retention and Improvement of Biological Diversity, Long-Term (100 years).

	Alternatives						
Aspect of Biological Diversity	NA	A	B	C	D	E	PRMP
Genetic Diversity	0	0	0	0	0	0	0
Special Status Animals	-	-	-	-	-	+	+
Special Status Plants	-	-	-	-	0	0	0
Special Habitats (talus, meadows)	-	-	-	0	0	0	0
Hardwoods	-	-	-	0	-	0	0
Riparian Zones	-	-	0	0	0	+	+
Research Natural Areas	-	-	-	0	0	0	-
Older Forest (Open Canopy)	-	-	-	-	-	+	+
Early Seral Stage	+	+	+	-	-	-	-
Snags/Wildlife Trees	-	-	-	+	+	+	+
Dead and Down Material	-	-	-	+	+	+	+
Fragmentation of Older Forest	-	-	-	+	+	+	+

+ improving; 0 maintaining; - declining

Figure 4-2. Relative Abundance of Seral Stages
Short Term (10 years) by Alternative

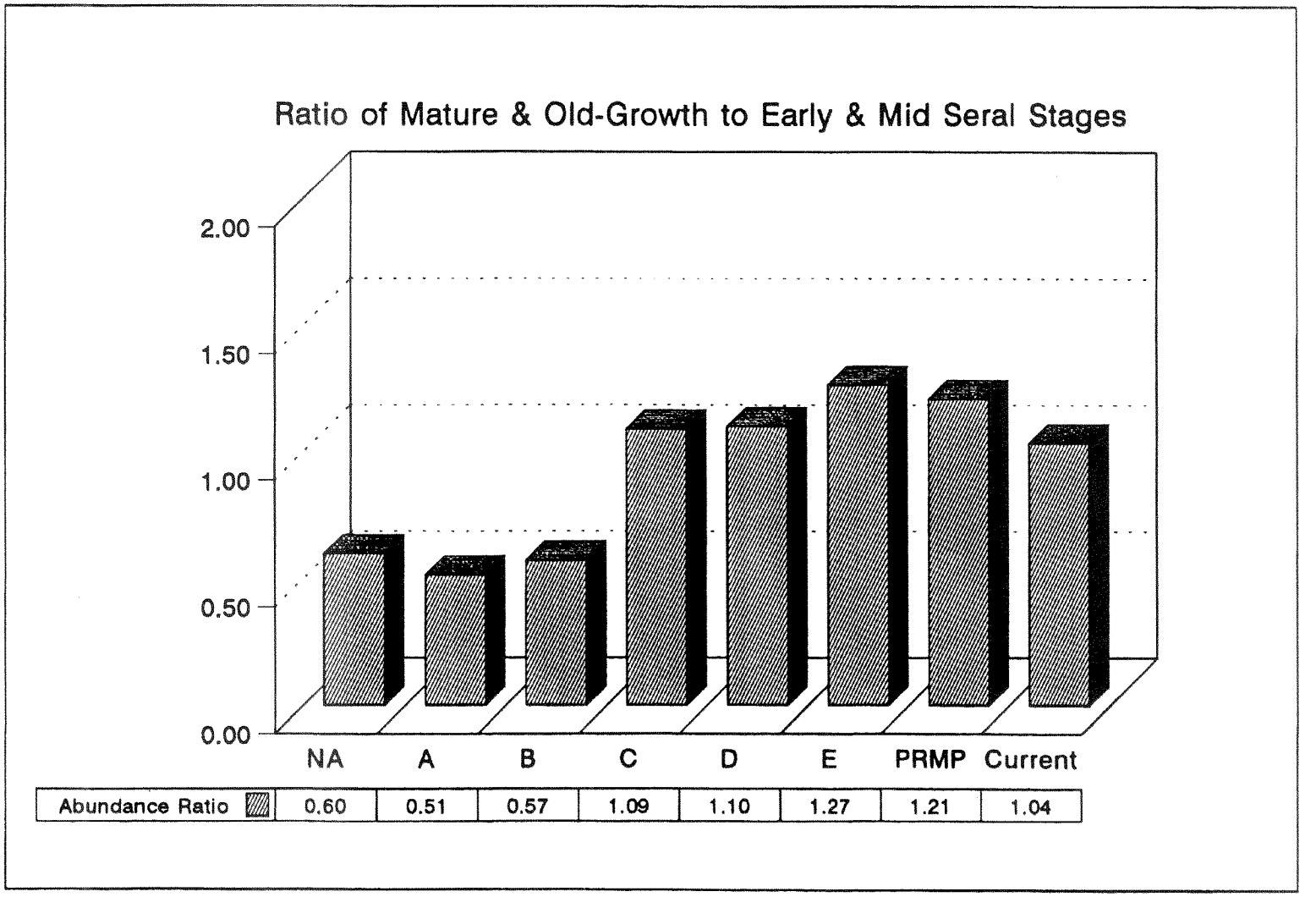


Figure 4-2. Relative Abundance of Seral Stages Short Term (10 years) by Alternative

Figure 4-3. Relative Abundance of Seral Stages
Long Term (100 years) by Alternative

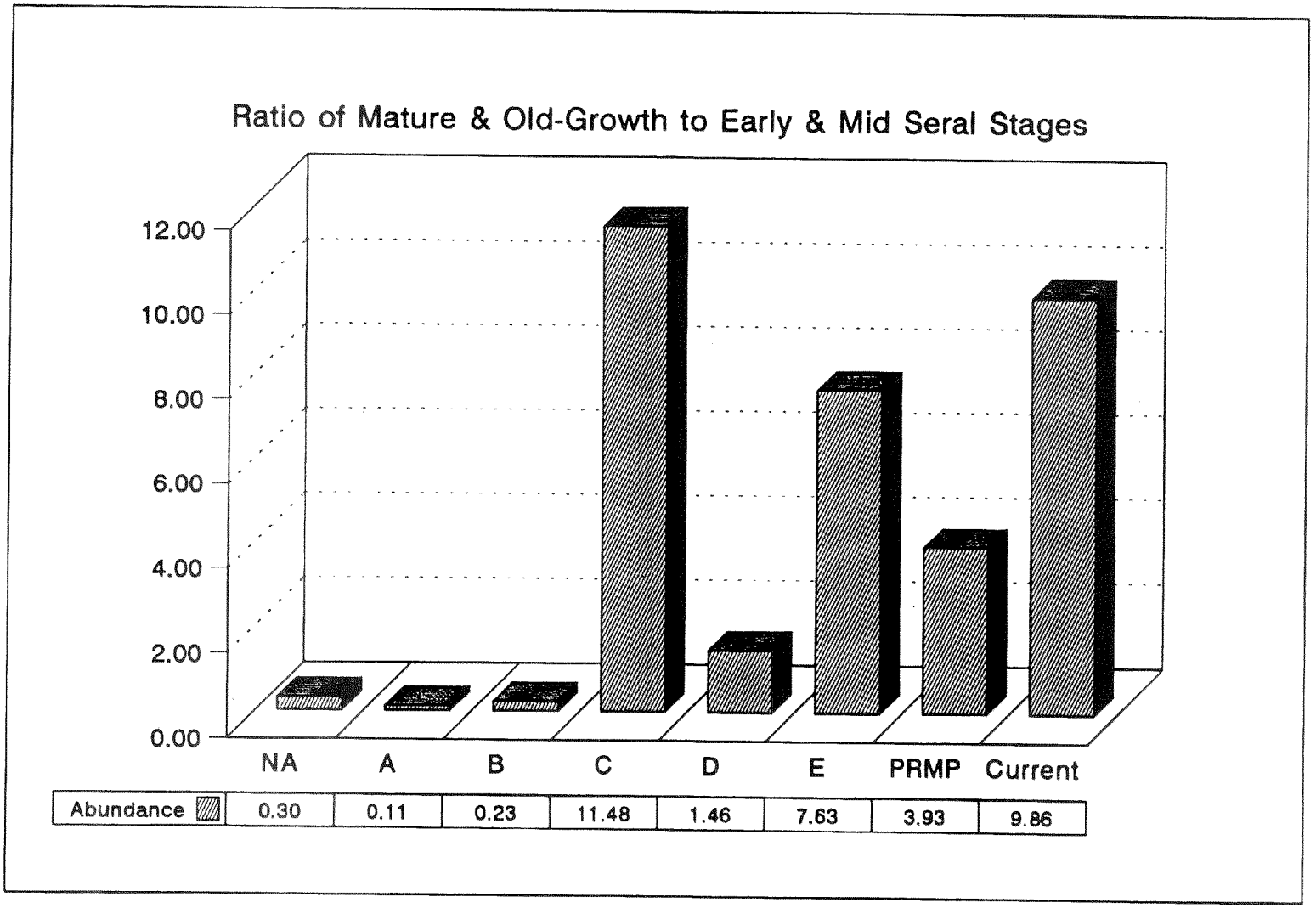
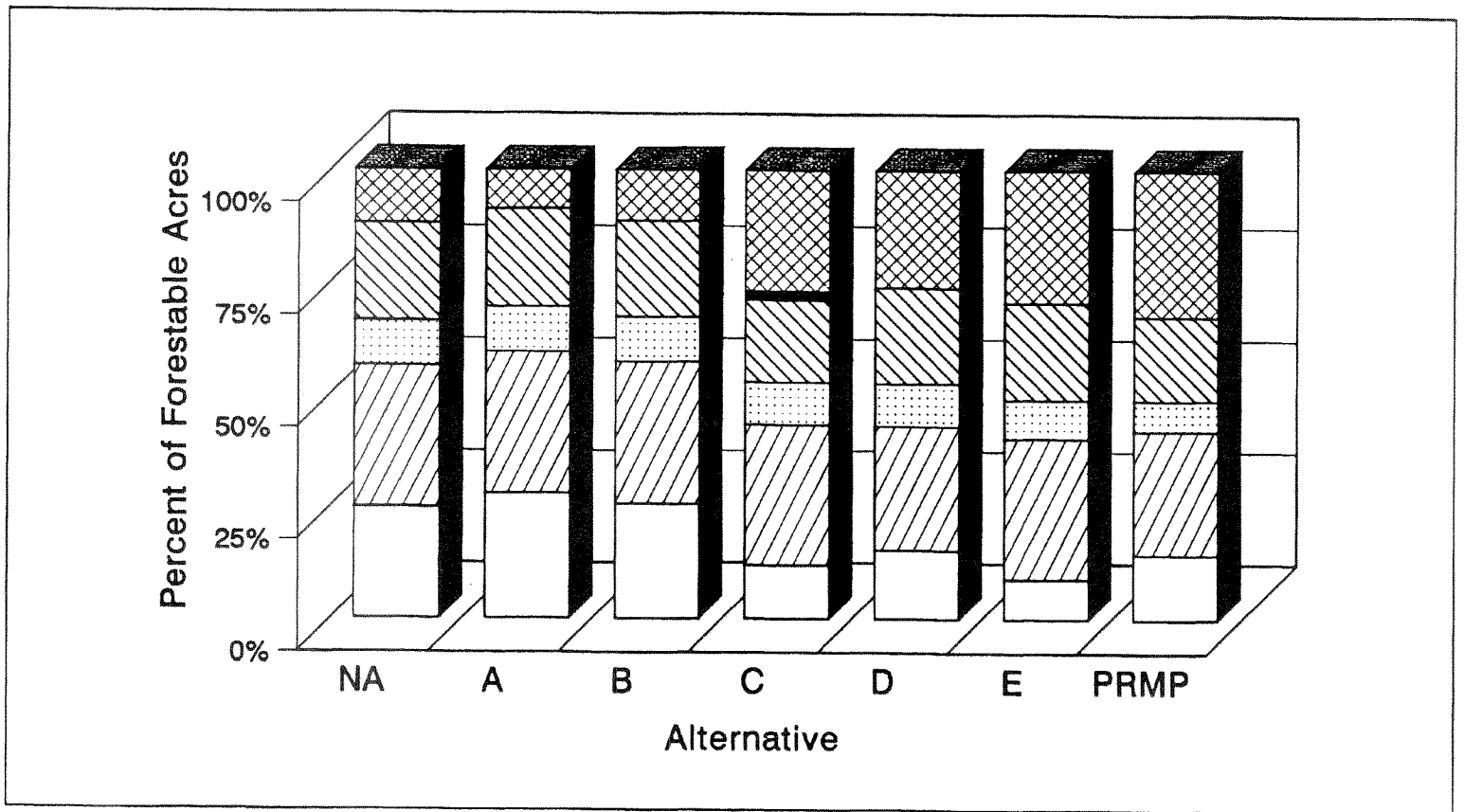


Figure 4-3. Relative Abundance of Seral Stages LongTerm (100 years) by Alternative

Figure 4-4. Forest Seral Stages and Canopy Condition
Short Term (10 years) by Alternative



Early (Open) | Mid (Closed) | Late (Closed) | Mature (Closed) | Mature (Open) | Old-Growth (Open)

Mature "Open Canopy" represents high retention regeneration harvest.

Early	Mid	Late	Mature	Old-Growth
(0-10)	(20-40)	(50-90)	(100-190)	(200+)

Figure 4-4. Forest Seral Stages and Canopy Condition — Short Term (10 years) by Alternative

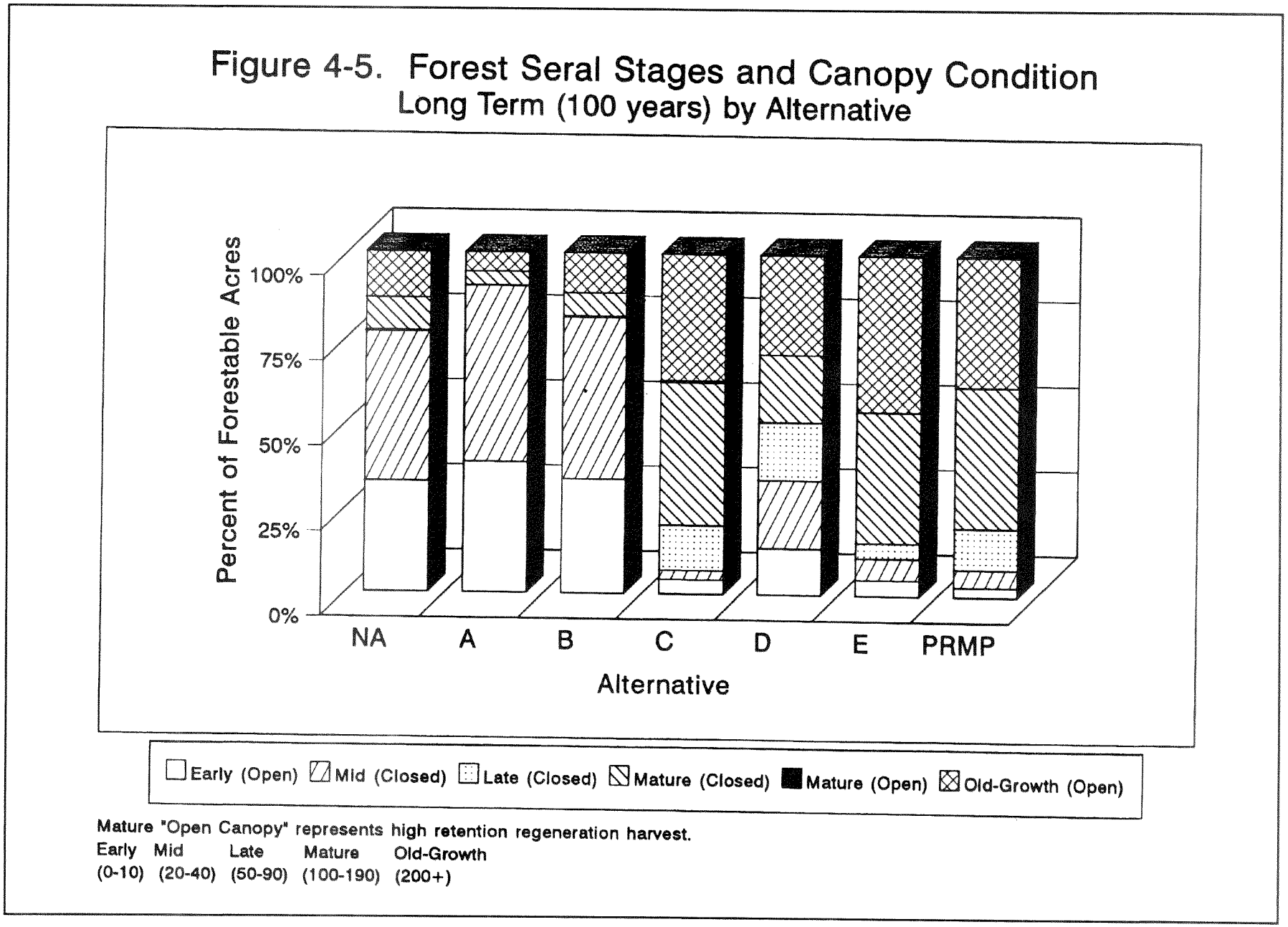


Figure 4-5. Forest Seral Stages and Canopy Condition — LongTerm (100 years) by Alternative

displays seral stages by Probable Sale Quantity base allocation; current, short term, and long term for alternatives.

Species occupying different successional stages tend to differ in certain life history characteristics in ways related to habitat mix. In the Pacific Northwest, natural disturbances that created large expanses of early-successional habitat were relatively infrequent, hence most animal species of forests are adapted to a landscape dominated by old-growth and punctuated by early successional islands of varying size. Because of this pattern, species that specialize in early successional habitats tended to evolve certain characteristics that allowed them to survive in these rather fleeting environments, including: rapid population growth, wide dispersal capacity, and relative flexibility in habitat requirements. Old-growth related species, adapted to a more dependable habitat, tend to be specialists that often have relatively slow population growth rates and poor dispersal capabilities (Crow 1990).

In even aged stands the younger and older forest age classes provide the greatest species diversity, while the intermediate age classes (mid and late seral stage 20 - 100 years old) which typically have closed canopies are far less diverse (Long 1977, Shoemaker and McKee 1988 and Bruce et al. 1985). The comparative indicators of species diversity thus would be the acreage of early, mature and old-growth stages for each alternative. Alternatives that maintain or increase older forest habitats would, however, benefit species diversity more than those that maintain or increase the early seral stage. The habitat generalists that adapt to the early seral stage would be expected to survive at viable levels despite habitat losses. Leaving a legacy of living and dead standing trees in the PRMP and Alternative C would increase the species diversity observed in the intermediate age classes as compared to the other alternatives. Figures 4-4 and 4-5 projects short-term and long-term acres by seral stage and open vs. closed canopy for each alternative.

Models of vertebrate species response to habitat fragmentation show that species diversity will begin to decline when 50 to 75 percent of the landscape is cutover within a period not providing for the return of late successional forest (Lehmkuhl et al. 1991). Lehmkuhl and Ruggiero (1991) developed a vulnerability analysis of 93 species associated with late successional coniferous forests of the region. Eighty percent of the species fell into the moderately high and high risk categories.

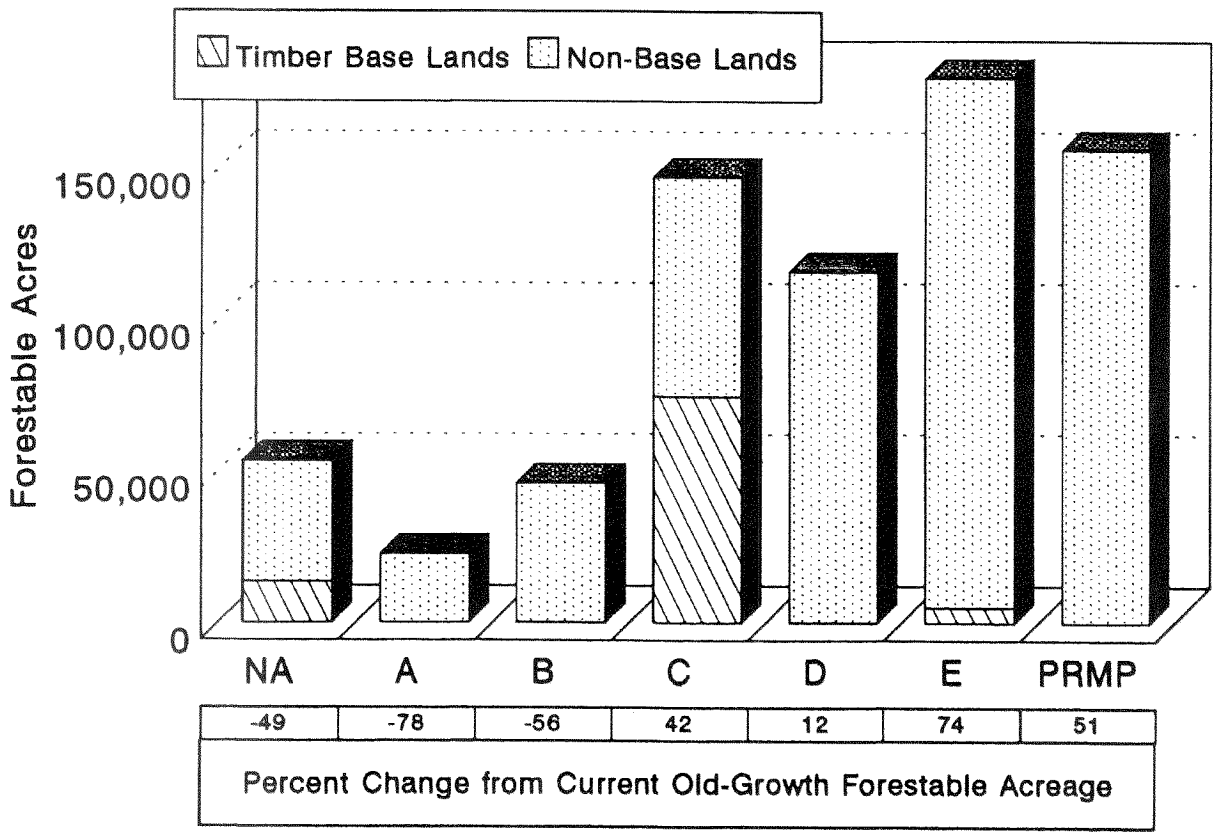
Projection of the recent wildfire record noted in Chapter 3 indicates that 2.4 percent of BLM-administered mature and old-growth forest stands could burn in stand replacing fires in the next 100 years. Such reductions have been applied to the acreage of older forest stands projected to exist by then, and a net figure is shown in Figure 4-6 and Table 4-5, which project acres by seral stage under each alternative. Land tenure adjustments to benefit biological diversity under Alternative C would be expected to increase the acres of BLM-administered mature closed canopy forest, particularly in the long term.

Table 4-5. Acres of Stands in the Commercial Forest Landscape Expected to Attain Old-Growth Structural Characteristics within 100 Years*

Alternative	Acres of Stands Meeting Old-Growth Definitions Lands Available for Timber Production	Lands Not Available for Timber Production	Total
NA	0	39,900	53,300
A	0	22,500	22,500
B	0	45,800	45,800
C	74,600	72,400	147,000
D	0	115,800	115,800
E	5,000	174,900	175,400
PRMP	0	156,300	156,300

*Old-Growth defined as either unmanaged stands older than 195 years, or managed stands which meet the definition in USFS PNW 447.

Figure 4-6. Acreage Expected to Attain Old-Growth Structural Charactistics Within 100 Years by Alternative and Timber Production Status



Old-Growth defined as either unmanaged stands 196+ years of age or managed stands which meet definition in USFS PNW Research Note 447.

Figure 4-6. Acreage Expected to Attain Old-Growth Structural Charactistics — Within 100 Years by Alternative and Timber Production Status

As used in these figures, old-growth is defined as stands which are at least ten percent stocked with trees 200 years or older. For analytical purposes, it is assumed that Alternative C management prescriptions providing for 35+ percent retention at regeneration harvest would allow stands to retain or attain old-growth characteristics (as defined by the Old-Growth Definition Task Group) as soon as they would have attained them without timber harvest. Those regeneration prescriptions under Alternative C that provide for 15 to 20 percent retention at regeneration harvest are assumed to remove a stand from old-growth condition and not attain or regain such condition for 100 to 120 years. Prescriptions for regeneration harvests in Connectivity/Diversity Blocks under the PRMP would remove a stand from old-growth condition and not regain such condition for 100 to 120 years. It is assumed that 25 to 33 percent of the stands managed under prescriptions providing for 15 to 20 percent retention in Alternative C and prescriptions in Connectivity/Diversity Blocks under the PRMP would be in old-growth condition in the long term.

A particularly scarce habitat component is low elevation (below 1500 feet) old-growth forest. Currently, there are 34,628 acres of such forest stands on BLM-administered lands. This would decline under all alternatives except Alternative E, where it is expected to increase in the long term. The decline of low elevation old-growth would be greatest under Alternatives A, No Action, then B, followed by the PRMP, and Alternatives D and C. The differences between the PRMP, Alternative D, and Alternative C would be negligible.

Most forest lands intermingled with BLM-administered lands in the checkerboard ownership pattern of the planning area are privately owned, with a substantial portion owned by wood products companies. Most of these lands have been, and are expected to continue to be, managed intensively for timber production. Little mature and old-growth forest will remain on these lands, so such forests on BLM-administered lands and national forest lands would provide essentially all that remains in the planning area. Recent estimates of old-growth forest remaining on national forest lands in western Oregon, by the Forest Service and the Wilderness Society, have identified about 1.9 million acres of such lands. Added to the approximately 400,000 acres of old-growth stands on BLM-administered lands in the region, this represents 15 percent of all western Oregon forest lands. In contrast, it has been estimated that prior to white settlement, 60 to 70 percent (the amount was not static but fluctuated) of western Oregon and Washington forests were old-growth (Franklin and Spies, 1984).

Although the Forest Service has not yet calculated the acreage of old-growth stands on National Forests in western Oregon that would be retained under the SEIS ROD comparison of analyses in the SEIS and in the Forest Service's 1992 spotted owl EIS suggests that it would be approximately 1.5 million acres. BLM's six proposed RMPs for western Oregon would provide for the retention of approximately 288,000 acres of old-growth, which would result in a cumulative total approaching 1.8 million acres. As existing younger stands age and develop old-growth characteristics, BLM-administered lands in western Oregon are expected to support 718,000 acres of old-growth stands after 100 years. These figures make allowance for anticipated losses due to catastrophic events.

Chapter 3&4 of the Final SEIS provides discussion and analysis of late-succcessional and old-growth ecosystems on a regional basis. This discussion is valid in relation to the PRMP since the PRMP incorporates the SEIS ROD strategy.

The relatively short harvest rotation on many private forest lands means that a substantial portion of them, at any given time, would be in the early seral stage, with most of the remainder in the mid seral stage. In a cumulative sense, these two seral stages would dominate throughout the future on the sum of all ownerships in the planning area.

The proposed harvest of 10,700 acres of old-growth stands including 4,300 acres of old-growth in the Roseburg District during the first decade in the PRMP in western Oregon, would cause an unavoidable adverse reduction in biological diversity, and an essentially irreversible and irretrievable commitment of resources in the General Forest Management Area and at least for the 100 to 120 years it would take to recreate those stands in the Connectivity/Diversity Blocks.

Genetic diversity of Douglas-fir and other commercial species planted in areas artificially reforested would be similar to that of natural stands but could increase due to the introduction of stock from a diversity of similar locations outside each immediate harvest area, although a countervailing decrease could occur due to the competitive disadvantage and consequent suppression of natural seedlings of those species. Planning area wide, the range of genetic traits of these species would be similar to today's range, but the frequency of genes and genetypes would be altered. Appendix M contains a discussion of BLM's

tree improvement program and genetic diversity. Although studies of impacts of silvicultural practices on the genetic diversity of commercial tree species have provided conflicting results, one long term study of Jeffery pine in California showed clear effects of some practices on genetic composition of the stands studied (Millar et al. 1990). No qualitative judgement about those changes was made.

Forest management activities including silvicultural practices can also lead to genetic change, most obviously by exclusion of some species (Franklin et al. 1981). Less obvious changes can entail loss of specific genes or alleles due, for example, to substantial reduction in the populations of some species such as noted earlier in this discussion. The changes in genetic diversity that are independent of species diversity are not expected to affect the survivability of any species. Intensive forest management practices in Alternatives No Action, A, and B, however could lead to isolation of some populations of a number of species as a result of habitat loss, reducing their genetic diversity in the long term.

An important aspect of ecosystem diversity is the variety of special habitats (talus slopes, ponds, bogs, meadows, serpentine barrens) that exist on BLM-administered lands in the planning area. These habitats would be most protected under Alternatives C, D, E, and the PRMP, by buffering them from timber management activities. Under the other alternatives, special habitats (especially habitats less than one acre) would be vulnerable to incidental disturbance from activities on adjacent lands.

The 1,100 acres of hardwood stands on BLM-administered lands provide another important element of ecosystem diversity. This acreage would, with minor exceptions, remain intact under Alternative E, but would be reduced by conversion of some lands (those considered to be conifer sites) to conifer production under the other alternatives. Such conversion would merely return conifers to lands previously converted to hardwoods as a result of logging followed by poor reforestation, but would nonetheless change habitat, reducing and changing species diversity in those areas. The reductions in hardwood acres by alternative are as follows: Alt. A: 465 acres, Alt. B: 400 acres, Alt. C: 270 acres, Alt. D: 180 acres, Alt. E: 0 acres, PRMP: 150 acres.

Intensive timber management practices on a portion of the lands in all alternatives except Alternative C and the PRMP would reduce the hardwood component of the conifer stands on those lands, diminishing biological diversity. Hardwood composition of conifer stands managed for timber production would be less than that found in the current unmanaged older stands under all alternatives. The low retention prescription of Alternative C and the Connectivity/Diversity Blocks prescription of the PRMP would approximate or exceed current average hardwood composition.

Riparian zone condition and Research Natural Area protection, are discussed in the subsequent sections, Effects on Riparian Zones and Effects on Special Areas. The effects of the alternatives on these indicators of biological diversity are summarized in Tables 4-3 and 4-4.

Although older forest stands have much greater structural diversity than the young stands that are the result of recent timber management, young stands resulting from the timber harvest practices proposed in all alternatives would have more structural diversity than stands resulting from timber harvest in the 1960s, 1970s, and 1980s, due to retention of down logs and some wildlife trees. This diversity would, however, still be less than that provided by the older natural stands. Management under Alternative C and the Connectivity/Diversity Blocks under the PRMP would emphasize retention of structural diversity and over time could increase it. Effects on one specific component of structural diversity - snags/wildlife trees - are discussed in the subsequent section on Wildlife. These effects are summarized in Tables 4-3 and 4-4.

Assessment of impacts on the amount of dead and down woody material involved calculation of an index to rate the quality of habitat required by down log dependent species.

The benchmark used in this analysis was the average of 23 tons per acre of Large Woody Debris found in old-growth stands. The material found in other stand conditions was then estimated as a percentage of this level. Indices calculated for the existing condition and for each alternative are shown in Table 4-6.

During the next decade, as a result of continued harvesting on some lands, the amount of dead and down woody material would decline under Alternatives No Action, A and B, and on those lands of Alternatives D allocated for intensive forest management, it would remain the same under Alternative E, and it would increase under Alternative C and the PRMP. In the long term the trend would be similar, except under Alternatives D and E, where recruitment of such material in currently young stands excluded from timber harvest would more than offset losses due to logging activity.

Table 4-6. Indices of Dead and Down Woody Material by Alternative, Short Term (10 years).

Existing Condition	NA	A	B	C	D	E	PRMP
1.03	1.00	1.00	1.00	1.07	1.02	1.03	1.04

Since large dead and down woody material decays only very slowly and all alternatives would leave some such material in harvested areas, only small short-term differences among the alternatives are expected in the amount of such material remaining. In the long term, however, those lands planned for clearcut harvest at relatively short intervals would not regrow trees of large enough size to contribute large down woody material. Thus, within 100 years, such material would largely disappear from the lands managed in that way. This loss would be greatest under Alternative A and least under Alternative E. No lands would be managed so as to reduce the amount of such material under Alternative C and the PRMP.

Cumulative effects of the alternatives and actions on other lands in the planning area are expected to reduce the aggregate amount of dead and down woody material. Most private timber companies use intensive management practices and manage on short rotations, which reduce the amount of such material.

Forest management practices can alter natural function. In addition to timber harvest which may cause loss of seral stages and structure and/or affect canopy opening (thus altering predator-prey relationships), fire suppression and vegetation control can alter natural functional relationships. These effects would be least under Alternative C, D, E, and the PRMP, but vary among them. Fire suppression, for example, would have the least effect under Alternative C, while timber harvest and vegetation management would have the least effect under Alternative E.

A significant aspect of landscape diversity is fragmentation of mature and old-growth forest stands. Of concern are both the size of remnant patches and their isolation or spatial arrangement. Alternatives NA, A, and B would, in the long term, result in small fragments of mature and old-growth forest stands with relatively large distances between them. Under these alternatives, connectivity would be poor. Alternative C would provide a less fragmented landscape and relatively good connectivity in the long term. Alternative D would provide large blocks of unfragmented old-growth through a system of Habitat Conservation Areas and connectivity would be provided through the application of the 50-11-40 rule. Alternative E would provide large blocks of unfragmented old-growth stands. However, spatial arrangement across the landscape would not be as good as Alternative D and the PRMP. Connectivity under Alternative E would vary with the distances between old-growth blocks. The PRMP would provide the best combination of spatially well arranged, large, old-growth blocks with strong connectivity of all alternatives in the long term.

The SEIS assessed the effects of alternatives on ecosystem quantity and quality (abundance and diversity, processes and functions, and connectivity); global change; aquatic ecosystems; air quality; risk of large scale distrurbances by fire, wind, insects, and disease; water quality; and long term soil productivity. These analyses in part reflect ecological health considerations fo the entire forest ecosystem in the range of the northern spotted owl. SEIS conclusions relative to these analyses are briefly summarized as follows.

> During the next 100 years, Alternative 9 may not produce an outcome in which the quality and quantity of the overall late-successional ecosystem would be at least as high as the hypothesized long term average condition. The SEIS concluded that a longer time period may be necessary for this change to occur.
>
> The primary global effect under Alternative 9 relates to the quantity of carbon dioxide released to the atmosphere. However, Alternative 9 is expected to result in only a very slight increase in global atmospheric carbon dioxide levels.
>
> Alternative 9 is expected to reverse the trend of degredation of aquatic ecosystems on federal lands. This includes recovery of riparian, aquatic, and watershed processes in all watersheds.

Alternative 9 is expected to have moderately high potential impact on air quality resulting from prescribed burning.

Alternative is expected to have the highest risk of large scale wildfires within the dry and intermediate provinces and least for the moist provinces. However, this risk can be reduced by vegetation modification such as proactive fire and fuels management including thinning and prescribed fire. Vegetation modification can also reduce the risk of large scale disturbance caused by wind, insects and disease.

Alternative 9 is expected to have low impacts on water quality.

Alternative 9 is expected to have moderate impacts on long term soil productivity relative to the expected level of soil disturbance.

Overall, Alternative 9 as described in the SEIS ROD has been incorporated into the PRMP. This Proposed Resource Management Plan/Final Environmental Impact Statement incorporates by reference the conclusions of the SEIS.

Effects on Vegetation

Impacts on vegetation would be caused primarily by forest management and recreation activities. This section addresses the impacts to upland vascular vegetation. Additional effects on vegetation are discussed in the Riparian and Biological Diversity sections of this chapter. The latter section discusses effects on the structure, composition and fragmentation of the forest. Effects on special status species are addressed in a subsequent section of this chapter. Impacts to lichens, fungi, and bryophytes are discussed in the SEIS. Management for these species is provided in the standards and guidelines for the SEIS ROD.

The impact of Off Highway Vehicle use on vegetation is intensity dependent. The greater the use (quantity) of Off Highway Vehicles, the greater the impact to vegetative resources.

In the PRMP, vegetation within areas designated limited to Off Highway Vehicle use, (423,422 acres) would be unimpacted by Off Highway Vehicles since travel would be restricted to existing roads and trails. Vegetation within areas designated closed to motorized travel (2,166 acres) would not be affected by Off Highway Vehicles.

Under Alternatives A, B, C, D, and NA, the majority of the District would remain open to Off Highway Vehicle use. See Table 2-1. More acreage for motorized opportunities would exist but would not always be feasible due to the steep topography and forest vegetation which precludes most cross country travel.

Common to all alternatives, Areas closed to Off Highway Vehicle use include 53 progeny test sites (655 acres) and six Areas of Critical Environmental Concern/Research Natural Areas (Research Natural Areas totaling 1,419 acres. There would be no irreversible or irretrievable commitment of vegetative resources in areas open to Off Highway Vehicle travel.

Under Alternatives No Action, A, B, and C, the BLM-administered forest lands would continue to be primarily a patchwork of even aged stands of various ages, with the acreage in mature and old-growth stands substantially declining in Alternatives No Action, A, and B. Under Alternatives D, E, and the PRMP, some of the lands would continue to be characterized by this patchwork, but in the long term many areas would remain intact, aging to or toward old-growth condition, altered only by natural disturbances such as wildfires, windstorms, and insect or disease infestations. Under the PRMP and Alternative C, the forest condition would be the most complex. Many lands would age to old-growth condition in the long-term, but some of those lands would contain small patches of younger forest; other lands would resemble a patchwork of even aged stands of various ages, but with a legacy of standing live and dead trees left from stands that existed prior to logging.

Figures 4-4 and 4-5 (in the preceding Biological Diversity section) compare the percentage of coniferous forest that would occur in each of five seral stages, by alternative, at the end of 10 and 100 years (short and long term).

The use of vegetation management practices, including herbicide application, would suppress but not eradicate target vegetation. Other forest management practices, such as thinning and fertilization would affect growth rates, particularly of Douglas-fir, and the rate of ecological succession.

Some smaller vegetative communities that occur within special habitats (serpentine barrens, bogs, meadows, rock cliffs, and talus slopes) would be

protected to varying degrees from direct impacts and from external influences by buffers under the PRMP and Alternatives C, D, and E. The widest and most effective buffers (100 to 300 feet) would be maintained in Alternatives D and E protecting special habitats from direct and indirect impacts. The PRMP and Alternative C (with 100 to 200 ft. buffers) would protect special habitats from direct impacts but would make them vulnerable to indirect impacts in some cases depending on their location and factors such as slope and topographic position. In Alternatives No Action, A, and B, such buffers would not normally be maintained and the vegetation communities in special habitats would be vulnerable to incidental disturbance from activities on adjacent lands. Impacts from road construction would be permitted in all alternatives when construction outside a special habitat area would result in greater impacts to other resources. Vegetative communities in special habitats could be adversely impacted by mineral exploration and development activity under all alternatives by altering species composition or completely eliminating the vegetative community (eg. quarry development).

None of the alternatives would substantially affect aquatic vegetation, since wetlands and Riparian Management Areas are protected except for mining activities, under all alternatives. The Riparian Reserves of the PRMP provide the most protection of aquatic vegetation of all the alternatives.

This EIS also incorporates by reference the conclusions of the SEIS. Specifically incorporated are conclusions in Appendix J2 of the Final SEIS regarding its Alternative 9 (which is imbedded in the PRMP) regarding bryophytes, fungi, lichens, and vascular plants. In summary, the SEIS concluded that Alternative 9 would have the following consequences:

Bryophytes - Alternative 9 affords fairly high protection to bryophytes. After application of mitigation, only three species remained of concern, and no SEIS alternative would remove those concerns.

Fungi - Mitigation measures added to Alternative 9 alleviate original concerns about many fungus species, but some risk of species extirpation remains, particulary for 147 rare and endemic species (most of which are not believed to occur on BLM-administered lands in the Roseburg District). This would be particularly true for 14 species for which cummulative effects remain a concern.

Lichens - Mitigation measures added to Alternative 9 do not remove, but do substantially reduce, the risk of extirpation of lichen species, particularly for the 57 rare and endemic species (most of which are not believed to occur on BLM-administered lands in the Roseburg District). Some risk also may remain due to cummulative effects.

Vascular Plants - Alternative 9, as mitigated, raises concerns about only five species, one (Cypripedium faculatum) of which is believed to occur on BLM-administered lands in the Roseburg District.

Nonnative species are established throughout the district. Their frequency of occurrence would be expected to increase in all alternatives as previously uncut mature and old-growth forests are converted to younger stands and nonnative grasses are used to stabilize soils. Significant increases in noxious weeds (see glossary) in the long term would not be expected in any of the alternatives due to implementation of the intensive control efforts detailed in the Noxious Weed Environmental Impact Statement (BLM 1985, BLM 1987).

Vegetation could be altered once land left public ownership as a result of land tenure adjustments. Current private land uses in the planning area are primarily farming, timber production, livestock ranching, and recreation. If transferred to private ownership, BLM-administered lands would be expected to be converted or used to their highest productive potential; for example, farming, improved pasture, rural homesite, etc. Use would be restricted by state laws and local regulations and land use ordinances.

Effects on Riparian Zones

In this analysis of impacts, riparian condition class is related to tree size in the Riparian Management Area or Riparian Reserve, related factors, and width of Riparian Management Area or Riparian Reserves. Further discussion of Riparian Management Areas and Riparian Reserves may be found in the Water Resources, Fish, and Wildlife sections of this chapter. In the Riparian and Fish sections of this chapter, 200 years is used for long term analysis.

Existing mining laws allow mining activities in Riparian Management Areas and Riparian Reserves that could have adverse impacts under all alternatives. These laws require that mitigating measures be taken for any adverse impacts associated with mining. Roads exist along many

streams and adversely impact riparian and stream conditions through canopy removal, soil compaction, erosion and sediment deposition, and culvert placement. New roads would no longer be built in valley bottom riparian areas. See Table 4-1 for miles of roads that would be constructed under the alternatives. New roads would mostly be higher in the watersheds crossing steeper side slopes, and smaller first and second order streams. There would be minor short and long term impacts associated with this construction (canopy removal, soil compaction, erosion) that would have minimal adverse impacts on small riparian areas. There would be a potential for adverse impacts to riparian zones due to the risk of road failures in these steeper areas. Impacts to riparian areas from recreational activities would be insignificant both in the short and long term across the district. Although minimal, there would be adverse impacts from campground use, campground construction, increased boating, boat ramp construction, and Off Highway Vehicle use which would include soil compaction, canopy removal, erosion, streambank degradation, stream sedimentation, and wildlife disturbance.

According to a report on the Impacts and Management of Off Road Vehicles by the Geological Society of America;

> "Off Highway Vehicles have adverse effects on soil moisture and water quality. The amount of water available at an Off Highway Vehicle site is reduced by increased runoff that results from removal of plant cover, soil compaction, and growth of gullies."

Under Alternatives A, B, C, D, and the No Action Alternative, a majority of the district would be open to Off Highway Vehicle use, therefore, the potential to adversely affect watersheds throughout various location of the district would occur. Impacts would include soil compaction, vegetation removal, and disruption and rearrangement or protective surface cover. Wind and water erosion could contribute to further erosion in watershed areas. In the PRMP, watershed conditions will not be adversely impacted by Off Highway Vehicles in limited areas (423,422 acres) since motorized vehicles will be restricted to existing roads and trails.

On BLM-administered lands, all alternatives except No Action and A provide for the adequate protection of wet meadows, wetlands, ponds, and lakes except from mining activity. A riparian zone can be in optimal condition based on riparian tree size, but still not be in a functionally optimal condition. The width of a riparian protection area determines the potential amount of Large Woody Debris in a stream channel. A 94 foot retained width on each side is capable of providing most of the necessary Large Woody Debris (Murphy and Koski, 1989), and a retained width of 164 feet on each side is capable of providing an optimum amount of Large Woody Debris (Van Sickle and Gregory). Within old-growth conifer forests, 98 percent of the Large Woody Debris comes from within 150 feet of the stream (McDade et al. 1990). Logging impacts to aquatic benthic invertebrates were detected in streams with buffer widths of less than approximately 30 meters (98 feet) (Erman et al. 1977). Riparian Management Areas or Riparian Reserves of less than approximately 95 feet are considered inadequate for proper riparian function, and Riparian Management Areas or Riparian Reserves smaller than 150 feet are considered to be functioning less than optimally.

The effects of the alternatives on existing stream riparian zone conditions would vary depending upon the width of Riparian Management Areas or Riparian Reserves and the amount of vegetative disturbance occurring in those areas. Riparian Management Area width under Alternatives No Action and A would not provide sufficient natural input of Large Woody Debris to streams. An overall improvement to riparian protection is expected with additional protection provided to the important small first and second order drainages that were unprotected under the No Action Alternative. Under Alternatives A through E, Riparian Management Areas averaging 75 feet (minimum 50 feet) would be established on each side of first and second order perennial streams, as well as a 25 foot brush, and hardwood vegetative strip on each side of intermittent streams. Under the PRMP, Riparian Reserves the height of one site potential tree or 100 feet slope distance whichever is greatest would be established on each side of intermittent streams, the height of one site potential tree or 150 feet slope distance, whichever is greatest on each side of permanently flowing nonfish bearing streams; and two site potential tree heights or 300 feet slope distance whichever is greatest on fish bearing streams.

At the end of the long term (200 years) conditions would not be fully recovered due to existing roads in the riparian (approximately 15 percent) and landslides, fires, etc. that would affect riparian zones.

Alternative A would have 16,886 acres in Riparian Management Areas for third order and larger streams. This is less than all other alternatives. Alternative A would have the highest amount of site disturbing activities including timber harvest and road construction along with the expected accompanying

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sedimentation. Cumulative impacts would be greatest under Alternative A. Narrow Riparian Management Area widths under Alternative A would not provide sufficient Large Woody Debris and standing snags for riparian dependent wildlife, or thermal microhabitat protection for riparian dependent species under Alternative A. At the end of the short term, conditions within the protected zone would remain the same or improve slightly compared to present for all streams due to the protection offered first and second order streams. Perennial streams would recieve Riparian Management Area widths less than 95 feet. First and second order intermittent streams would receive a 25 foot protective brush strip with timber harvest occurring throughout their drainage.

Alternative B would have 18,220 acres in Riparian Management Areas for third order and larger streams which is more than Alternative No Action and A, but less than Alternative C, D, E, and the PRMP. Cumulative impacts would be higher than Alternatives C, D, E, and the PRMP. Riparian Management Area widths in most cases would provide most but not the optimum number of snags and down wood necessary to maintain the riparian ecosystem. At the end of the short term, as compared to present, conditions within the protected riparian zone would improve slightly for all streams with the added protection to first and second order streams. First through fourth order perennial Riparian Management Areas are expected to function less than optimum because of inadequate Riparian Management Area widths.

Alternative C would have 29,308 acres in Riparian Management Areas for third order and larger streams. Considerably more riparian protection is afforded under this alternative than Alternatives No Action, A, and B. Road construction is one-third of that under Alternatives No Action, A, and B. Silvicultural prescriptions would provide for retention of live trees on all harvest units which would slightly lessen the intensity of peak flows within watersheds. At the end of the short term, conditions within the protected riparian zone would improve for all streams. First and second order perennial riparian zones would have insufficent Riparian Management Area widths for proper function. The recovered period is longer under Alternatives C and the PRMP Connectivity/Diversity Blocks than No Action, A, B, D, and E because of an extended rotation. Most of the needed large wood input for proper stream function would occur in first through fourth order perennial streams, and optimum amount would be available for fifth order and larger streams.

Alternative D would have 52,282 acres in Riparian Management Areas for third order and larger streams. Although the timber harvest level under this alternative is higher than Alternative C (see Table 2-1), site disturbing activities are generally less than Alternatives No Action, A, B, and C. Second order intermittent streams would receive Riparian Management Area protection of 60 feet on each side. At the end of the short term, riparian conditions would improve for all streams more than Alternatives No Action, A, B, and C, due to the added protection to second order intermittent streams. First and second order perennial and second order intermittent riparian zones would not function properly because of the narrow widths.

Alternative E would have 61,764 acres in Riparian Management Areas for third order and larger streams, the largest of all alternatives except the PRMP. Site disturbing activities, including timber harvest and road construction would be the lowest compared to all other alternatives. First order intermittent streams would receive Riparian Management Area protection under this alternative. At the end of the short term, riparian conditions for all streams would improve the most compared to all other alternatives except the PRMP.

The PRMP has 47,760 acres in Riparian Reserves for third order and larger streams. Under the PRMP all fish bearing streams, receive a Riparian Reserve of two site potential trees or 300 feet slope distance, whichever is greatest, on each side. At the end of the short term, conditions within the protected riparian zone would improve for all streams. Cumulative impacts in Late-Successional Reserves would be minimal. The PRMP will provide the greatest protection and opportunity to improve riparian areas through the Aquatic Conservation Strategy including Riparian Reserves, key watersheds, watershed analysis, and watershed restoration.

Overall, the adverse impacts to riparian zones associated with management would vary from the most to the least under the alternatives in the following order; No Action, A, B, C, D, E, and the PRMP.

Effects on Wildlife

Habitat indices were calculated for some priority habitats and species for the existing condition and alternatives by use of habitat models (USDI, BLM 1991c). Several of these models have received wide

professional acceptance; for example, elk (Wisdom et al. 1986) and cavity dwellers (Marcot 1991; Neitro et al. 1985). Others were derived by BLM biologists and planners specifically for this and other western Oregon BLM EISs. The analysis of wildlife effects is based in part on the analysis in the SEIS where applicable. Indices derived under the various models predict such factors as the amount, quality, and distribution of habitat. The assumptions and analytical approaches for each wildlife habitat model are found in Appendix GG. In cases where habitat models were unavailable or were not derived, analysis of impacts was based on literature references or personal communications with experts.

Impacts on Habitat

Forest management activities affect wildlife primarily by modifying habitat. Thomas (1979) and Brown (1985) indicated that certain wildlife species are associated with forests of a particular age class and structure. The close affinity of wildlife for specific habitat conditions underscores the importance of analyzing impacts of forest management activities on habitat composition.

The assessment of impacts on habitat is based on the expected availability of conifer, special and riparian habitats under each alternative in relation to the existing condition. The impacts of road construction and access on all habitat are also analyzed. Also related to effects on wildlife, and discussed in previous and subsequent sections are effects on vegetation and biological diversity (including discussions of dead and downed wood and hardwoods). Effects on special status and SEIS special attention species are addressed in the Special Status and SEIS Special Attention Species section of this chapter.

Conifer

Conifer forests comprise the dominant habitat (97 percent) of BLM-administered land in the planning area. Habitat composition under the various alternatives is displayed in the discussions of Effects on Vegetation and Biological Diversity.

Maintenance of existing older stands would continue to some extent under all alternatives. The PRMP will protect approximately 75 percent of all mature and old-growth stands under late-successional reserves, riparian reserves, and administrative withdrawals. Regeneration harvests in the matrix will result in the loss of older forest habitat during the first decade. This will be offset by stands within the ninety year age class occurring within the various reserves moving into the 100+ conditions. The net result will be a shift to late-successional and other reserves rather than changes in total acres of any one successional stage. During the second five decades the distribution of older forest will continue to shift and the total number of stands 100+ years in age will also increase. The abundance of species preferring early seral stages would likely be reduced under Alternatives D, E, and the PRMP in the long term due to less timber harvest. However, additional early successional habitat will continue to be created through logging and other management activity on nonfederal land to reduce this effect. Alternative C with its emphasis on density management harvesting would result in mixtures of openings and residual tree cover in specified areas of the district. The effects on wildlife from density management thinnings are likely to be both beneficial and adverse, depending on the species. Species which use several forest seral stages and occupy home ranges of several hundred to several thousand acres will benefit from the mixed BLM/private ownership pattern. Private forest lands will continue to provide early forest seral stages intermingled with generally older forests on BLM-administered lands.

In the long term, Alternative C would likely provide moderate levels of old-growth species and species preferring early seral stages compared to the existing situation; Alternatives NA, A and B would provide higher levels of early successional species and lower levels of old-growth associated species; and Alternatives D, E, and the PRMP would provide higher levels of old-growth associated species and lower levels of early successional associated species. Moderate abundance levels of species anticipated under Alternative C compared to the existing situation would result from management for older forest habitat elements interspersed among some younger forest stages.

Cumulative effects from activities on BLM-administered land and actions on other lands (i.e., private and other public lands) would be detrimental to older forest habitat and species requiring mature and old-growth habitats under Alternatives NA, A, and B. Reductions in mature and old-growth habitat would be an unavoidable adverse impact. Widespread clearcutting on private lands in conjunction with harvest rates on public lands has created an age class distribution dominated by younger age classes throughout western Oregon (ODF 1990). This cumulative effect and the probability that such timber harvest practices would

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continue on most private lands magnify the importance of mature and old-growth habitat on public land as a relatively scarce regional habitat. Cumulative effects from adoption of Alternatives C through E and the PRMP would be less detrimental to older-forest habitat because of increased protection on BLM-administered lands. Alternatives D and the PRMP would lead to more mature and old-growth habitat than currently exists on BLM-administered lands. The PRMP and Alternative C will provide a legacy of older forest components such as large green trees, snags and large woody debris within harvest units. Although Alternative E provides protection of more mature and old-growth forest, the PRMP provides for large late-successional forest blocks as well as reserves across all land allocations.

Special Habitats

The primary resource feature in special habitats (meadows, rock cliffs, talus slopes, etc.) would be protected under each alternative. Intact forest buffers do not exist around some of these habitats. Alternatives NA, A, and B do not afford buffer protection for special habitats, whereas protected buffer areas under Alternatives C through E would range from 100-300 feet. The PRMP provides protection for special habitats based on interdisciplinary review and determination of relevant values for protection or management on a case-by-case basis (see Chapter 2 Special Status and SEIS Special Attention Species). This level of protection is equivalent to Alternative C. Of particular importance in these determinations will be the habitat of species for which the SEIS ROD provides protection buffers. In addition, the PRMP, which tiers to the management direction adopted in the SEIS record of decision, includes survey and manage and protection buffer provisions that would benefit special habitats. Many rare or geographically restricted species are associated with these habitats. The SEIS discussed the importance of special habitats (e.g., rock outcrops, bogs, and wetlands) to rare and local plants; and the importance of springs or seeps to rare and/or endemic mollusks. Studies in the Salem District determined that removal of tree cover along edges of small meadows reduced bird density and caused changes in bird species composition (Monthey 1983). Special habitats on adjacent Forest Service lands would be protected the same as BLM lands, but little protection is anticipated on private lands.

Riparian

Riparian habitat functions as a special habitat feature for many wildlife species. Riparian habitat conditions for wildlife would generally improve under all alternatives in the short term because of increasing maturity of riparian vegetation. However, the amount of riparian habitat protected would vary by alternative. Progressive increases in protected riparian habitat would occur from Alternatives NA through the PRMP (see Table 2-1). Thus, wildlife species that prefer or are dependent on riparian habitat would be expected to increase in the long term under Alternatives C through E and the PRMP compared to Alternatives NA, A, and B. Riparian habitat adjacent to wetlands would not be protected under Alternatives NA, A, and B. However, these areas would be protected under Alternatives C through E and the PRMP by 100-300 foot buffers. See Effects on Riparian Zones section for additional details. Cumulative effects would follow a similar pattern for the various alternatives.

General Habitat

Roads have major impacts on wildlife habitat by direct elimination of vegetation within rights-of-way (BLM roads and roads constructed under reciprocal rights-of-way agreements), and by disturbance of wildlife caused by increased human access. Big game species are especially vulnerable to these road impacts (Brown 1985). Road construction resulting from timber management under Alternative C would have the greatest adverse effect on wildlife habitat; Alternatives NA, A, and B would have intermediate effects; and Alternatives D, E, and the PRMP would have the least effects. Wildlife populations that benefit from less human disturbance and the overall quality of habitat would likely increase under Alternatives D, E, and the PRMP. Cumulative effects caused from activities on BLM-administered lands and other lands would be detrimental to wildlife because of high road densities estimated to occur on the latter lands (especially on nonfederal lands). Under the PRMP, the miles of roads needed for management of federal lands within the Late-Successional Reserves would decline. In addition, under the PRMP, roads will be reduced in Key Watersheds or as a minimum there will be no net increase.

The noise and human activity associated with Off Highway Vehicle use can impact wildlife populations. Some of the more significant effects include displacement of wildlife from preferred habitats,

increased stress, destruction of food, and cover. Wildlife displaced from preferred habitats are subject to increased energy expenditures and increased predation. Ground nesting birds, small mammals, and other low mobility wildlife species (reptiles and amphibians) may suffer direct mortality from Off Highway Vehicle use. Wildlife are frequently susceptible to disturbance during fawning, calving, or nesting seasons and during winter periods when animals are under greater stress and body reserves are reduced. The significance of impacts Off Highway Vehicle use would have on wildlife populations and habitat varies by alternative according to the number of acres open, limited, or closed to motorized use.

Alternatives A, B, C, D, and No Action provide the largest amount of acres open to Off Highway Vehicle use and would have the highest potential for negative impact on wildlife populations and habitat.

Alternative E and the PRMP will promote wildlife populations and habitat from indiscriminate Off Highway Vehicle impacts through limitations and closures to motorized vehicles.

Impacts on Priority Species

Elk

Assessment of impacts to elk habitat on BLM-administered land was based on a modification of the elk habitat effectiveness model developed by Wisdom et al. (1986) (see Appendix GG). Indices are on a scale of 0 to 1.0 with 1.0 representing optimal. The Wisdom Model was modified by dropping the spacing index and by presenting values for each index rather than producing a composite score for all indices. This modification was agreed to by the Oregon Department of Fish and Wildlife. Because the model has not been validated, its predictive capability is uncertain.

Although specific management practices have been identified under each alternative, the timber harvest prescriptions and associated roading would have the most effects or impacts.

The current road densities in all elk management areas result in indexes which fall short of the Oregon Department of Fish and Wildlife recommended criteria of .50. The current road indices by elk management areas and the predicted short term trend are shown in Table 4-7. In the short term Alternatives No Action, A, and B would result in a continual decline in the index as road densities increase. Under Alternative B, two units are an exception to this trend as road closures on existing roads and restrictions on new roads remaining open would minimize increases in road densities. Alternatives C, D, E, and the PRMP would vary by elk management unit and reflect road closures for recreation and elk management and timber harvest emphasis by alternative. The elk management areas containing Late-Successional Reserves, restoration and retention blocks, or Habitat Conservation Areas would have few new roads resulting in a stable or improving condition. Under the PRMP, the location of Late-Successional Reserves, Key Watersheds, and specific road closures for elk were the primary factors influencing the predicted changes.

The cover index reflects the quality of cover habitat and not the quantity. Optimal cover is rated most effective (a value of 1.0) while hiding cover (0.1) is least effective. The higher the index, the more optimal and thermal cover exists in relation to hiding cover. Current cover indexes are presented in Table 4-8. The Oregon Department of Fish and Wildlife criteria recommends an index of .40 or higher. Alternatives No Action, A, and B would reduce optimal and thermal cover across the landscape resulting in declining cover conditions and indices. Cover indices would improve or remain constant in elk areas containing restoration and retention blocks and in areas managed under the high retention silvicultural prescription of Alternative C. Elk management areas containing Habitat Conservation Areas would improve as the forest aged while elk management areas not containing Habitat Conservation Areas would see optimal cover lost with eventual increases in hiding cover. Management within the Late-Successional Reserves would result in an improving index. Alternative E would result in improved cover across the district as the majority of forest stands moved toward old-growth conditions. The PRMP will ultimately result in similar levels of optimal cover habitat as Alternative E, although the distribution will be blocked more in Late-Successional Reserves. The wider Riparian Reserves extending into first and second order streams will provide secure travel corridors as well as optimal cover. On BLM-administered lands, the overall pattern would be for cover and road density condition to improve in a similar manner while forage indices would respond contrarily. Cumulative effects of combining activities on BLM-administered lands would result in improvement in elk habitat and numbers for those alternatives favoring improved cover and reduced road densities. Forage areas and hiding cover would be available on private lands, therefore high cover

Table 4-7. Assessments of Short-Term Impacts on Elk Habitat in the Planning Area, Road Indices

Elk Management Areas	Existing Condition		Predicted Change After Ten Years By Alternative[1]						
	Rd Den[2]	HE_r	NA	A	B	C	D	E	PRMP
CEEL 01 Gunter	3.9	.27	-	-	-	0	0	0	+
CEEL 02 Smith River*	3.6	.31	-	-	-	0	0	0	+
CEEL 03 Tom Folley*	3.8	.29	-	-	-	0	0	0	0
CEEL 04 Green Ridge	4.0	.26	-	-	-	-	-	0	0
CEEL 05 Yellow Butte*	4.2	.25	-	-	-	-	-	0	+
CEEL 06 Tyee*	3.7	.30	-	-	+	+	+	+	+
CEEL 07 Ben More	4.4	.22	-	-	-	-	-	0	-
CEEL 08 Tyee Mtn.*	4.8	.17	-	-	-	-	-	0	0
CEEL 09 Camp Cr.*	3.7	.30	-	-	+	+	+	+	0
CEEL 10 Middle Mtn.*	5.7	.08	-	-	-	+	+	+	0
CEEL 11 Canton*	4.8	.18	-	-	-	+	+	+	+
CEEL 12 Rock*	4.1	.25	-	-	-	0	0	0	-
CEEL 13 Little River	4.0	.27	-	-	-	0	0	0	-
CEEL 14 Myrtle Cr.	4.1	.25	-	-	-	-	-	0	-
CEEL 15 Deadman Mtn.	3.9	.27	-	-	-	+	+	+	+
CEEL 16 Camas Valley*	4.7	.19	-	-	-	-	-	0	0
CEEL 17 W.F. Cow Cr.*	4.7	.19	-	-	-	0	0	0	0
CEEL 18 Twelve Mile*	5.3	.13	-	-	-	0	0	0	0
CEEL 19 Middle Cr.*	5.3	.12	-	-	-	0	0	0	+
CEEL 20 Hyde Ridge*	4.2	.25	-	-	-	+	+	+	+
CEEL 21 Green Butte*	3.8	.28	-	-	-	+	+	+	+
	Avg.	.23							

* = A significant portion of the management area has been designated as LSR
[1] Ratings for road density (HE_r), cover (HE_r) and forge (HE_f) ratios based on projected increases or decreases from existing condition. (See Appendix 4-7.)
- = Declining condition relative to existing condition.
0 = No change.
+ = Improving condition.
[2] Calculated for BLM and non-BLM-administered lands within elk management areas with greater than 25 percent BLM-administered land.

indexes and lower road densities on BLM-administered lands would be complementary for overall management of elk populations.

The forage index is a measure of the quality of forage habitat and not an indicator of quantity. All regeneration harvest units are considered foraging habitat for the first 20 years. Lands allocated for timber production under each alternative would have a positive effect on the forage index. Regeneration harvest combined with slash burning would result in higher indices than currently exist (see Table 4-9). Under Alternatives No Action, A, B, D, E, and the General Forest Management Area in the PRMP where timber harvest occurs, the emphasis would be on timber production. This emphasis would limit forage seeding and fertilization on drier sites where vegetative competition is more likely to effect tree seedling survival. Alternatives No Action, A, and B would provide the highest forage indices over the greatest area. Forage indices would also improve on lands allocated for intensive timber management under Alternatives D, E, and the PRMP. Green tree retention prescriptions under Alternatives C and the PRMP would result in lower indices as broadcast burning of logging slash would occur less frequently. In the long term, the greater emphasis an alternative places on old-growth management, the lower the forage habitat and forage index.

Table 4-8. Assessments of Short-Term Impacts on Elk Habitat in the Planning Area, Cover Indices

Elk Management Areas	Existing Condition	Predicted Change After Ten Years By Alternative[1]						
	HE_C[3]	NA	A	B	C	D	E	PRMP
CEEL 01 Gunter	.31	-	-	-	0	+	+	+
CEEL 02 Smith River	.26	-	-	-	+	+	+	+
CEEL 03 Tom Folley	.37	-	-	-	0	+	+	+
CEEL 04 Green Ridge	.29	-	-	-	-	-	+	+
CEEL 05 Yellow Butte	.31	-	-	-	0	-	+	+
CEEL 06 Tyee	.41	-	-	-	+	+	+	+
CEEL 07 Ben More	.45	-	-	-	-	-	+	-
CEEL 08 Tyee Mtn.	.29	-	-	-	0	-	+	-
CEEL 09 Camp Cr.	.24	-	-	-	0	+	+	+
CEEL 10 Middle Mtn.	.56	-	-	-	0	-	+	0
CEEL 11 Canton Cr.	.31	-	-	-	0	+	+	+
CEEL 12 Rock Cr.	.32	-	-	-	0	-	+	-
CEEL 13 Little River	.44	-	-	-	0	-	+	-
CEEL 14 Myrtle Cr.	.29	-	-	-	-	-	+	-
CEEL 15 Deadman Mtn.	.44	-	-	-	0	-	+	-
CEEL 16 Camas Valley	.24	-	-	-	-	-	+	+
CEEL 17 W.F. Cow Cr.	.30	-	-	-	0	+	+	+
CEEL 18 Twelve Mile	.38	-	-	-	0	+	+	+
CEEL 19 Middle Cr.	.27	-	-	-	0	+	+	+
CEEL 20 Hyde Ridge	.25	-	-	-	0	+	+	+
CEEL 21 Green Butte	.33	-	-	-	0	+	+	+
Avg.	.33							

1 Ratings for road density (HE_r), cover (HE_c) and forage (HE_f) ratios based on projected increases or decreases from existing condition. (See Appendix 4-7.)
- = Declining condition relative to existing condition.
0 = No change.
+ = Improving condition.
2 Calculated for BLM and non-BLM-administered lands within elk management areas with greater than 25 percent BLM ownership.
3 Calculated only for BLM-administered lands.

Alternatives C, D, E, and the PRMP for those elk management areas containing constraints or deferral of timber harvest would provide the most effective short term and long term elk habitat management. For the short term, under the PRMP 142,000 acres would improve in overall quality as elk habitat, while 88,000 acres would decline in overall quality as cover and road density indices decline. The remaining forest land would remain at its current level as elk habitat.

Cumulative effects of combined activities on BLM-administered lands and actions on other lands in the planning area are expected to result in a decline in elk habitat quality and in numbers of elk under Alternatives No Action, A, and B. This expected decline is due to anticipated high levels of road construction and lower levels of thermal and optimal cover. An improvement in habitat quality and elk numbers is anticipated under Alternative E despite less than optimal conditions on private lands. Elk management areas that coincide with areas allocated for old-growth management or as a Late-Successional Reserve under Alternatives C, D, and the PRMP would improve. Elk habitat on private lands primarily consists of younger seral stages which provide abundant forage and currently increasing amounts of thermal cover, but very limited amounts of optimal cover. In addition, road densities are often high on private lands, and clearcuts are

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Table 4-9. Assessments of Short-Term Impacts on Elk Habitat in the Planning Area, Forage Indices

Elk Management Areas	Existing Condition	Predicted Change After Ten Years By Alternative[1]						
	HE_f [3]	NA	A	B	C	D	E	PRMP
CEEL 01 Gunter	.21	+	+	+	0	-	-	-
CEEL 02 Smith River	.19	+	+	+	-	-	-	-
CEEL 03 Tom Folley	.24	+	+	+	0	-	-	-
CEEL 04 Green Ridge	.21	+	+	+	0	+	-	-
CEEL 05 Yellow Butte	.24	+	+	+	-	+	-	-
CEEL 06 Tyee	.21	+	+	+	-	-	-	-
CEEL 07 Ben More	.19	+	+	+	+	+	-	+
CEEL 08 Tyee Mtn.	.22	+	+	+	0	+	-	+
CEEL 09 Camp Cr.	.23	+	+	+	-	-	-	-
CEEL 10 Middle Mtn.	.32	+	+	+	-	+	-	-
CEEL 11 Canton Cr.	.24	+	+	+	-	-	-	-
CEEL 12 Rock Cr.	.21	+	+	+	0	+	-	+
CEEL 13 Little River	.21	+	+	+	0	+	-	+
CEEL 14 Myrtle Cr.	.25	+	+	+	+	+	-	+
CEEL 15 Deadman Mtn.	.26	+	+	+	-	+	-	+
CEEL 16 Camas Valley	.19	+	+	+	0	+	-	-
CEEL 17 W.F. Cow Cr.	.24	+	+	+	-	-	-	-
CEEL 18 Twelve Mile	.20	+	+	+	-	-	-	-
CEEL 19 Middle Cr.	.32	+	+	+	-	-	-	-
CEEL 20 Hyde Ridge	.23	+	+	+	-	-	-	-
CEEL 21 Green Butte	.32	+	+	+	-	-	-	-
Avg.	.24							

1 Ratings for road density (HE_r), cover (HE_c) and forage (HE_f) ratios based on projected increases or decreases from existing condition. (See Appendix 4-7.)
- = Declining condition relative to existing condition.
0 = No change.
+ = Improving condition.
2 Calculated for BLM and non-BLM-administered lands within elk management areas with greater than 25 percent BLM ownership.
3 Calculated only for BLM-administered lands.

usually large, resulting in reduced availability of forage/cover edge habitat. Forage habitat would likely be available for elk using cover on BLM-administered lands under all alternatives because of intensive timber harvest on adjacent private lands.

Dominant Woodpeckers

Within the planning area, dominant woodpeckers include the Hairy, Downy, and Pileated woodpeckers, the Northern Flicker, and the Red-breasted sapsucker. All depend on excavating nest cavities in dead or live trees with dead tops or branches. The Downy and Pileated woodpeckers require these nest snags to be located within forested stands. The other species may nest in snags in more open habitats.

Impacts to these species under the alternatives would depend on the number, size, and condition of the retained snags and trees, the changes in these snags over time, and the habitat conditions in which they occur. The presence of snags to satisfy woodpecker requirements is also an indicator of the suitability of habitat for other cavity dependent species. Species of special interest within this group include the western bluebird, purple martin, northern flying squirrel, and several bat species. The target population levels for the common alternatives are based on the density of snags available after a

management action compared with the number of snags needed to provide for optimum population levels. If three snags per acre are required for optimum number of a species, a target of 60 percent of optimum population levels would correlate to 1.8 snags per acre.

Two levels of analysis were conducted to examine the impacts of the alternatives. First, the number of snags available within stands were modeled over time as the result of various timber harvest regimes. Snag numbers were developed using procedures suggested by Nietro (Brown, 1985) and modeled in the Marcot Snag Simulator model. Second, the age class distributions were examined in light of the number of snags available over time, to estimate the habitat potential on a landscape basis.

Under all alternatives, lands not allocated to intensive timber management would be managed to retain adequate numbers of snags to provide for 100 percent of optimum populations over the long term.

On the lands allocated to timber production in Alternatives No Action, A, and B, only unmerchantable trees and snags where feasible would be retained in regeneration harvest units. For analysis purposes and based on results under the current plan, no snags would be retained under these alternatives but green cull trees would be retained.

Alternative No Action, A, and B would provide essentially no habitat for the dominant woodpeckers following regeneration harvest. Over a 60 year rotation cycle, only during the last decade would suppression mortality created snags become available. The snags would be of a diameter size class suitable for downy woodpeckers (11+ inches dbh) but few would meet the requirements of the other woodpeckers. In the short-term, harvest of older forest would result in a continued decline in habitat for the dominant woodpeckers. Lands allocated to timber production under Alternatives D and E would initially function better for dominant woodpeckers as existing snags would be retained on harvest units. Habitat would be provided for woodpeckers utilizing open areas (northern flicker, downy woodpecker, and red-breasted sapsucker) through the first rotation but habitat on succeeding harvest rotations would be similar to Alternatives No Action, A, and B. The rotation cycle would not provide for trees of a diameter class to meet the requirements of most woodpeckers. In the short-term the factor with the greatest effects or impacts to dominant woodpeckers is the number of acres harvested in the mature and old-growth age classes.

Lands managed under the low retention prescription in Alternative C and in the Connectivity/Diversity Blocks under the PRMP are similar in their impact on dominant woodpeckers. Between 60 and 70 years following harvest, suppression mortality would result in adequate snag recruitment to provide habitat at 60 percent or greater of optimum for low retention prescriptions under Alternative C, and Connectivity/ Diversity Blocks and Late-Successional Reserves under the PRMP. Lands managed under the high retention prescription in Alternative C would not drop as far below optimum population levels as those lands under the low retention prescription in Alternative C because greater green tree retention in high retention areas would provide a source for a greater numbers of large snags. Alternatives C would maintain dominant woodpecker habitat generally above 60 percent of optimal once the regenerated stands reach 60 to 70 years of age. Initially snags retained on harvest units would be available but as these trees are lost, conditions would fall below the 60 percent of optimum. Under the high and low retention prescriptions in Alternative C, areas would be at the 50 percent and 40 percent levels respectively ten years after harvest. These levels would decline until approximately 60 to 70 years after harvest when snag recruitment from suppression mortality of suitable diameter snags would occur. The Connectivity/Diversity Blocks under the PRMP would be similar to lands managed under the low retention prescription in Alternative C. **The General Forest Management Area under the PRMP would provide approximately 40 percent of optimal conditions for the first decade following regeneration harvest. The standard requires 1.2 existing snags and six to eight green trees per acre retained on harvest units.**

On a landscape basis each alternative has been evaluated based on the number and size of snags available by management prescription over time and the forest age class distribution at ten and 100 years. The results of the analysis for BLM lands within the planning area are shown in Table 4-10. The result are most significant when comparing the relative impacts of the alternatives to each other. The abundance of snags is just one factor affecting woodpecker populations. It has been used in this analysis to indicate the relative effects on woodpecker habitat and populations.

In the short-term Alternatives A, B, and No Action would result in a decline in the percent of optimum rating. Alternatives C, D, E, and the PRMP would not change significantly. Within the Roseburg District there are very few forest stands of a size and age that will develop woodpecker habitat over the next decade. Since Alternatives C, D, and E retain existing

Table 4-10. Percent of Optimum Woodpecker Population on BLM-Administered Lands Within the Roseburg District.* Alternatives

Year	A	B	C	D	E	PRMP
10	35	38	55	54	57	54
100	15	24	71	74	90	87

* Existing Condition = 54 percent of optimum

snags, little change is reflected in the first decade. Only Alternatives A, B, and No Action (No Action is considered to be very similar to B) would significantly decline in the short-term.

In the long-term Alternatives A, B, and No Action would reduce population levels below the 40 percent level. Lands allocated to timber production would provide almost no habitat while forest lands withdrawn from timber production would function at 100 percent of optimum.

In the long-term, on a landscape level, Alternatives C, D, E, and the PRMP would provide for populations above the 60 percent of optimum level. Over time conditions on past harvest units would improve, resulting in an overall increase in the percent of optimum populations above current estimates. Alternative E with the fewest acres allocated to timber production would function at the highest percent of optimum in the long-term.

The cumulative effects on dominant woodpeckers would be a combination of populations on BLM-administered lands and private forest land. Current forest practice regulations on private lands require that a minimum of two snags or green trees (one conifer) per acre be retained. This level of snag and green tree retention along with generally shorter harvest rotations will result in the majority of woodpecker nesting habitat occurring on BLM-administered lands. Management at 40 percent of optimum on harvest units and 100 percent on forest lands not in the timber base will result in a long-term population at 87 percent of optimum on BLM-administered lands. On the typical BLM/private checkerboard ownership pattern, the percent of optimum will be much lower.

There are over 50 species in the planning area which require tree cavities. The cavities for these animals are for the most part created by woodpeckers. The impact for these cavity dependant species parallels that of the dominant woodpecker.

Impacts on Other Species

Osprey

The majority of occupied osprey nesting and foraging habitat on major rivers would be protected under all alternatives by bald eagle management requirements. Management of riparian areas under Alternatives B, C, D, E, and the PRMP would provide protection in relation to Riparian Management Area width provided for under each alternative to smaller streams and water bodies. Alternative E would provide the greatest level of protection by protecting all nesting habitat within 1/4-mile of both major and intermediate size streams. The PRMP protects current nest sites. Potential nest sites would be provided protection through bald eagle habitat management and management of riparian areas. In the short and long term, osprey populations would be expected to remain stable or increase under all alternatives except Alternative A. Alternatives C, D, E, and the PRMP would provide the habitat for osprey populations to increase. Osprey have responded positively to the installation of artificial nesting structures (Witt 1990) and would be expected to benefit from this type of practice under all alternatives. Approximately ten percent of the ospreys along the Umpqua river nest in upland areas (Joseph Witt pers. cmm., April 19, 1991). Potential nesting habitat in these situations would be least impacted under Alternatives C, D, E, and the PRMP. The general effect of each alternative on osprey as well as other species is displayed in Table 4-11.

Golden Eagle

The abundance of golden eagles in western Oregon appears to be related to both the availability of oak woodland, grassland, and early forest seral stages as foraging sites, and mature and old-growth timber as nesting habitat. The golden eagle is a fairly adaptable species and apparently can nest in small blocks of appropriate habitat (Robert Anderson, pers. comm., 1989). In the short and long term, Alternatives C, D, E, and the PRMP would likely result in maintenance of current levels of golden eagles. Foraging sites would likely be available on adjacent private lands under all alternatives. Alternatives No Action, A, and

Table 4-11. Estimated Effects of Alternatives on Other Wildlife Species

Species	Short Term/Long Term	NA	A	B	C	D	E	PRMP
Osprey	ST,LT	0	-	0	+	+	+	+
Golden eagle	ST,LT	-	-	-	+	+	+	+
Black-tailed deer	ST	-	-	-	0	+	+	+
	LT	-	-	-	+	+	+	-
Mountain Lion	ST,LT	-	-	-	+	+	+	+
Wild Turkey	ST	0	0	0	+	+	+	+
	LT	-	-	-	+	+	+	+
Black Bear	ST,LT	-	-	-	+	+	+	+

+ = improvement 0 = no change - = decline

B would likely result in decreased abundance due to elimination of nest trees/sites on the valley edges and across much of the landscape. Alternatives C, D, E, and the PRMP would all provide for the retention of significant blocks of mature and old-growth habitat, retention of wildlife trees on harvest units and the protection of known nest sites.

Great Blue Heron

Great blue heron abundance is related to the availability of suitable nesting habitat in riparian and adjacent mature and old-growth forest. In the short term and long term numbers of great blue heron are expected to remain stable or increase under all Alternatives except A. Habitat protection would be provided by Riparian Management Areas or Riparian Reserves and managing bald eagle habitat. Greater protection is provided to nesting and foraging areas as the width of Riparian Management Areas increase by alternative. Compliance with the Pacific Bald Eagle Recovery Plan and bald eagle management guidelines under all alternatives provides protection on lands along the major rivers. Riparian habitat and existing heron rookeries on private land receive some protection under Oregon Forest Practices Act rules, although less than would be provided on BLM-administered lands under Alternatives C, D, E, and the PRMP.

Neotropical Migrant Birds

There has been increasing concern in recent years concerning the apparent widespread population declines of bird species which migrate between North America and Central or South America. The cause of the declines are unknown, but possible reasons include habitat loss on the breeding or winter ranges, pesticide use or other factors.

There are over 30 species of neotropical birds nesting within the study area that winter primarily in Central or South America. Many have varied habitat needs which makes it difficult to assess impacts on this group. The majority of neotropical species utilize mature and old-growth forest but many also utilize habitat edges and open areas for feeding. Riparian areas are also a preferred habitat for many neotropical birds.

Alternatives C, D, E, and the PRMP which retain significant amounts of mature and old-growth forest habitat interspersed with younger more open forest types would benefit the greatest number of neotropical birds. Alternatives No Action, A, and B, which retain the least amount of mature forest, would favor the fewest neotropical species. Hermit warblers, swainson thrush, veery, and several vireos generally are confined to older forest types and would benefit the most from large blocks of mature forest.

Neotropical migrants which nest primarily in the Pacific Northwest are of greater concern since they would be effected the most by habitat conditions within the planning area. The Vaux swift, rufus hummingbird, and hermit, Townsend's and Mac Gillivray's warblers fall in this category. Other than the hermit warbler, these birds utilize both mature and young seral stages. Of particular concern with

this group of species is the cumulative effects of the alternatives in conjunction with the large scale habitat changes created by federal and private timber harvest, and land development in the Pacific Northwest, along with habitat loss and pesticide use on the wintering grounds. It is quite likely that several of these species have experienced substantial population declines in the past few decades and are more vulnerable to future habitat changes. Long-term monitoring and inventories are lacking in the western United States. However, no major declines have been conclusively documented.

Black-tailed Deer

Densities of black-tailed deer are currently high in the district, and habitat conditions are not expected to change significantly during the next decade. Thus, in the short term the abundance of black-tailed deer would be roughly comparable under all alternatives. Changes in cover as discussed under elk would occur. At some point loss of optimum cover would affect deer populations. At what point and to what degree the loss of optimum cover would affect deer is not known, however, it is likely that the higher the elevation, the greater the impact. In the long term, black-tailed deer numbers are expected to fluctuate in response to the "boom-and-bust" phenomenon of forage levels resulting from even aged management of timberlands in western Oregon (Brown 1985). This phenomenon is characterized by an initial high abundance of forage in response to overstory canopy removal, followed by low production of forage due to increasing shade as the overstory canopy becomes re-established.

Deer populations tend to increase during periods of high browse availability only to crash when forage is scarce. In the long term, Alternatives No Action, A, and B would maintain fluctuating populations of black-tailed deer. Alternatives C (restoration and retention blocks and high retention prescription areas), D (Habitat Conservation Areas 1, 2, and 3), and E would provide greater stability of black-tailed deer populations (although at a lower level than Alternatives No Action, A, and B) by reducing the amount of clearcutting on BLM and by increasing the availability of mature and old-growth cover. Adequate amounts of forage should be available under all alternatives, because of intensive forest management on intermixed private lands. Management practices identified for elk would also benefit deer. The PRMP impact on numbers of black-tailed deer would depend on the management allocation of the lands within the matrix. The mix of Riparian Reserves, Connectivity/ Diversity Blocks, and early seral stages resulting from regeneration harvest may well provide the most desirable conditions for deer on BLM lands. Late-Successional Reserves under the PRMP would sustain relatively stable populations, but long-term reduced populations on BLM lands.

Cumulative effects of Alternatives No Action, A, and B on BLM-administered land and actions on other lands in the planning area would likely perpetuate the "boom-and-bust" phenomenon because many private lands are currently managed under short rotations. These short rotations are expected to continue in the future as companies respond to market demand. Cumulatively, more stable deer populations would be anticipated under Alternatives C, D, E, and the PRMP. This is particularly true on those lands for each alternative which would provide cover habitat intermingled with private lands.

Black Bear

Black bears are omnivores and forage heavily on fruits, green forage, and tree cambium. Such foods tend to be more prevalent in younger seral stages. However, Noble et al. (1990) recently pointed out that since black bears use large rootwads as den sites, they should also benefit from areas of mature forests. The authors further stated that policies which protect snags and dead and downed woody material should improve bear habitat. Thus, moderate to high populations of bear would be anticipated in areas with a good mixture of younger seral stages for food and mature stands for denning habitat. The level of human disturbance as related to open roads is also important in determining the suitability of habitat for black bear. Thus, impacts to black bear habitat are very similar to those of Roosevelt elk.

Cumulatively, Alternatives No Action, A, and B would degrade black bear habitat as old-growth forest is depleted and roads increased on private and BLM-administered lands. Alternative E and the PRMP would most effectively blend cover and den sites on BLM-administered lands with forage areas on private. Alternatives C, D (Habitat Conservation Areas 1, 2, and 3) would effectively blend habitat similar to Alternative E on lands not allocated to intensive timber management. Alternatives C and the PRMP which retain large numbers of green trees in harvest units would have less adverse impact on black bear populations than Alternatives No Action, A, and B that retain few wildlife trees in harvest units. Retained green trees, snags, and large woody debris in harvest units would provide a source of large down logs as future den sites.

Cougar

Cougar numbers are apparently dependent upon the abundance of deer since deer are their major food source. Therefore, alternatives which benefit black-tailed deer habitat should at least maintain or increase cougar numbers in western Oregon 1987). Cougar, being a shy animal, are also sensitive to roads. Thus overall impacts on cougar would not only parallel those of black-tailed deer but also Roosevelt elk and black bear. In the short-term, cougar populations are expected to remain comparable to existing levels and disturbance would increase with additional roading. In the long term, Alternatives No Action, A, and B would be expected to reduce current cougar populations because deer populations would vary widely over time in response to variable forage levels. Alternatives C, D, and E would provide progressive stability of deer numbers and would support more stable (although at times lower) levels of cougar. The PRMP would effect numbers of cougars differently depending on land use allocation. The large Late-Successional Reserves would provide greater security while increased roads and fluctuating prey populations in the General Forest Management Area and connectivity areas would be less desirable habitat in the short and long term.

Amphibians

The abundance and diversity of amphibians is related to the availability of stable, undisturbed riparian zones along streams and ponds as well as talus and dead and downed woody debris which help retain moisture. Water quality is also an important factor. The limiting factor for many amphibian species is the availability of free water and moist substrates on land for breeding (Nussbaum et al. 1983). The quality and quantity of riparian zones under the various alternatives are major determinants in the quality of habitat for amphibians.

In the short term, less amphibian habitat would be impacted under Alternatives C, D, E, and the PRMP compared to No Action, A, and B due to fewer acres impacted by timber harvest, increased protection and improved condition of riparian habitats (see Riparian section of this chapter), greater protection of special habitats, and greater amounts of dead and down logs. In addition, Alternatives C, D, E, and the PRMP would provide greater protection of upslope habitat than other alternatives, thus Alternatives C, D, E, and the PRMP would protect more of the small, headwater streams important to species such as the Olympic salamander and tailed frog (Ibid). Many of the amphibians are dependent on special habitat sites such as bogs, small ponds, and meadows. Alternatives C, D, E, and PRMP provide the greatest protection for these areas including a buffer to maintain ecological conditions of the site. Alternative E and the PRMP in particular would provide the best distribution of this habitat with no additional losses.

Management of Late-Successional Reserves under the PRMP would improve habitat for amphibians particularly those utilizing both riparian and upland old-growth forest. Amphibian habitat within connectivity areas would decline in the short term as existing mature and old-growth stands are harvested. The decline should be slight, given that only approximately one-fifteenth of the area would be harvested during a decade and the system of extensive Riparian Reserves. In the long term, retention of large down woody material and 12 to 16 green trees per acre in harvest units would provide a greater array and legacy of old-growth forest components. Stands in the Connectivity/Diversity Blocks would recover old-growth character about 100 to 120 years after regeneration harvest. In the long term, 25 to 30 percent of the landscape within Connectivity/Diversity Blocks would consist of spatially well distributed old-growth stands. In the short term, amphibian upland habitat within the General Forest Management Area would be degraded. In the long term, the General Forest Management Area would provide old-growth legacies but would not provide old-growth character stands. Amphibians dependent on old-growth forest habitat will decline on specific sites, but will persist on a landscape basis in reserves.

Cumulative effects of the alternatives which provide the largest Riparian Management Areas and greatest amount of old-growth would likely maintain or improve the condition for amphibians in the long term. Species particularly sensitive to water quality degradation (eg. tailed frog) will benefit from reduced roading in large Late-Successional Reserves and Key Watersheds. As habitat on private land improves as a result of Oregon Forest Practices Act rules, improvement in overall habitat within watersheds should also occur.

Effects on Fish

Management of vegetation in a drainage basin primarily determines the quality of the fish habitat. Vegetation controls the movement of water through the basin, maintains water quality, stabilizes upslope and channel areas, and provides structural material for the stream channel. The headwater 1st and 2nd

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order streams, which account for 70 percent of the total stream miles in the district, are the most geologically active part of the stream system and are important in determining downstream water quality. Timber management activities that change the forest successional age have both a short and long-term impact on the aquatic system.

Initial harvesting of timber in a basin usually has little or no impact on fish production potential in the basin. As a greater percentage of the basin is harvested within a relatively short period of time, fish habitat may decline, sometimes quite rapidly, with impacts cumulative and extending downstream due to changes in hydrology, reduced water quality, and loss of large woody material. Retention of riparian communities and the use of Best Management Practices for constructing roads and landings and protecting potentially unstable areas, may prevent most potential habitat losses.

Large woody debris provided by the riparian area appears to be the most important single component controlling fish habitat conditions and salmonid populations (Bisson et al., 1987; Brown, 1985). Partial or total removal of large woody debris sources usually creates a reduction in the number and quality of pools, off channel habitat, and gravels used by fish and other aquatic species (Andrus et al., 1988; Bilby and Ward, 1989; Crispin et al., in press; Heifetz et al., 1986; House and Crispin, 1990; House et al., 1989; House and Boehne, 1987; House and Suther, 1991). The input of large woody debris is a major link between terrestrial and aquatic ecosystems (Lienkaemper and Swanson, 1987). A basic assumption in evaluating the quality of riparian vegetation is that mature riparian zones dominated by large conifers maintain or enhance stream channel conditions. Downed large trees provide instream habitat for fish by creating pools and backwater areas, and retaining gravel deposits. They also improve water quality by trapping sediments, stabilizing stream channels, and slowing high flows.

Sedell et al., (1988) showed that the number of downed trees and pieces of large woody debris varied with stand age of riparian zones. Streams flowing through young growth forests and recently harvested areas contained from one-fifth to one-twentieth the number of large woody debris pieces found in streams in mature forests. The width of a riparian protection area determines the potential amount of large woody debris in a channel. A 94 foot width is capable of providing most of the necessary large woody debris (Murphy and Koski, 1989). A 164 foot width is capable of providing an optimum amount of large woody debris (Van Sickle and Gregory. 1990).

Overall fish habitat conditions are currently improving in stream segments with adjacent BLM-administered lands. This trend is expected to continue in the short term for all alternatives, but the rate of improvement will be slow because most riparian areas are in early successional stages and are dominated by deciduous trees. Full recovery of fish habitat potential depends on a substantial conversion of riparian vegetation to conifers and the maturation of these conifers to mature size large enough to remain stable in the stream channel over time.

For the streams included in a particular alternative recovery depends on the width of the Riparian Management Areas or Riparian Reserves. The length of time needed for recovery varies by the type of existing vegetation. The normal succession is a gradual change from shrubs, hardwoods, and young conifers to large conifers. Active management of riparian areas can accelerate the process of riparian recovery to stands predominantly large conifers. These large trees would provide most of the large woody debris required for achieving optimum stream conditions.

Under all alternatives, stream improvement and riparian conversion projects are proposed that would speed the recovery of the productive potential in the improved streams. Monitoring of existing habitat improvements show they can provide optimum habitat equivalent to unaltered streams. The projects would be undertaken only to address existing problems in the short term and would not be a substitute for restoring and maintaining stream channels and riparian areas through natural processes. Natural habitat has a much greater longevity than projects that last an average of ten years.

The PRMP, which incorporates the Aquatic Conservation Strategy objectives of the SEIS ROD, provides the greatest protection of aquatic habitat. Compared to most other alternatives, the PRMP provides wider Riparian Reserves and more protective measures for perennial and intermittent streams. Although watershed analysis can result in reduced Riparian Reserve widths for intermittent streams (dependent on an analysis of existing conditions in watersheds), this would only take place if the best information available shows that aquatic habitat values can be maintained with reduced riparian reserve widths. By including greater protection of intermittent streams, the PRMP will provide for greater overall watershed protection of

upslope, riparian, and downstream areas than in other alternatives. This will help stabilize hydrologic function, water quality and, in time, large woody debris recruitment within the drainage. This is important because the cumulative effects of management actions on fish habitat over entire watersheds may be more critical than effects on any single component of fish habitat. Because of the uncertainty of funding for watershed restoration and the activities on nonpublic lands, it is not possible to estimate how much the production potential will increase through watershed restoration.

In the long term, aquatic habitat will continue to recover under all alternatives except A. Based on comparisons with the SEIS, recovery will occur more rapidly under the PRMP than under the other alternatives due to greater upslope reserves and wider riparian reserves, particularly in headwater streams. Even with changes in land management practices and comprehensive restoration, it is possible no option will completely recover all aquatic systems within the next 100 years.

The productive capability for fish is directly correlated with the quality of habitat. As habitat improves, the productive potential of the habitat for fish also improves. The actual production of fish from streams on public lands is strongly influenced by actions outside the planning area, and is currently well below the potential. Habitat recovery depends on regrowth of conifers in and adjacent to the riparian area to mature age classes so large conifer trees are available to fall into the stream and create fish habitat. Because of the length of time needed for riparian vegetation recovery, natural recovery, which relies on creation of large conifer trees to produce large woody debris, will produce little change in the first decade. The potential productivity is similar for all alternatives in the short term, and is constant for Alternative A in the long-term. Productivity potential in third order and larger streams will increase for Alternatives NA, B, C, D, E, and the PRMP. The PRMP analysis of effects incorporates by reference the conclusions of the SEIS. Specifically incorporated are conclusions about Alternative 9 of the SEIS. Refer to the Special Status and SEIS Special Attention Species section of this chapter.

Cumulative effects in regard to management of riparian habitat on private lands depend in part on guidelines of the Oregon Forest Practices Act. This act requires less retention of riparian vegetation and downed logs than is proposed under most alternatives on BLM-administered lands, particularly in smaller streams. As is the situation on public lands, large trees and large woody debris are largely absent from streams and may not be replaced in the future. Therefore, a major cumulative effect of timber management in individual watersheds, especially those with large private holdings, may be an overall reduced level of large woody debris and habitat for priority fish species over the long term.

Because they are guided by the Aquatic Conservation Strategy, anticipated leasable mineral activities are not expected to impact aquatic habitat. Potential mining development may damage riparian areas and aquatic habitat through increased siltation, degraded water quality, disturbance of spawning gravels, a decrease in substrate stability, increased scouring, and filling of pools.

Withdrawal of most streams in the district from potential hydropower development by the Northwest Power Planning Council will allow continued migration and spawning by anadromous salmonids.

Under all Alternatives except A and B, land tenure adjustments described in Chapter 2 will permit increased control over important riparian and aquatic habitat and increase the ability of the District to develop and implement aquatic habitat rehabilitation projects for anadromous and resident fish species.

Poaching of salmon and steelhead, particularly summer run chinook, steelhead, and fall chinook, has been a major problem in some accessible areas. Closure of roads in riparian areas will reduce the threat to these fish. Increased recreational development in some areas will increase access to spawning areas and the probability of disturbance and poaching of spawning fish. In most areas, recreation development will not have negative impacts on fish and will enhance fishing opportunities for resident and anadromous salmonids and other game species.

This EIS incorporates by reference the conclusions of the Final SEIS. Specifically incorporated are conclusions about Alternative 9 of the SEIS, which is imbedded in the PRMP. In summary, the SEIS assessed impacts of its alternatives on coho salmon, fall and spring chinook salmon, summer and winter steelhead trout, sea-run cutthroat trout, and resident rainbow and cutthroat trout. The SEIS concluded that Alternative 9 would result in a strong likelihood of providing sufficient aquatic habitat to support stable, well distributed populations of these races/species/ groups.

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Effects on Special Status/SEIS Special Attention Species Habitat

Introduction

Special status plant and animal species within the Roseburg District are listed and described in Chapter 3. SEIS special attention species are listed in Appendix T and some are described in Chapter 3.

Common to all alternatives is the requirement to protect federally listed and proposed species as legally required under the Endangered Species Act. Under all alternatives, requirements of species and their habitat would be considered and actions to reduce threats and promote viability of the species would be implemented. This could result in increased abundance, distribution, and health of some populations. Management of other special status species differs under each alternative. This is based on such factors as the administrative category (i.e., federal candidate, bureau sensitive, bureau assessment or state-listed) of the species and the occurrence of these species on commercial or noncommercial forestland, and on O&C or public domain lands. Many special status species occur in special habitats such as wetlands, talus, dry meadows or in riparian zones. The degree of protection afforded these habitats would vary under each alternative. Species closely associated with late-successional and old-growth forests were identified and analyzed in the SEIS.

Special Status Plants

Effects on special status plants and their habitats could result from a variety of activities which take place in the planning area in conjunction with management of other resources. Known populations of these plants are generally small in size and scattered. Activities which pose the greatest threat are associated with forest management, mineral development, and recreational development and activities. Forest management could alter or destroy habitats and populations through such activities as timber removal, precommercial thinning, mortality salvage, vegetation control, fertilization, road construction and development of rock quarries. However, some shade intolerant species could benefit from forest management activities which open the canopy and increase light on the forest floor. Mineral development could destroy plants and alter habitats by activities such as mineral exploration, mineral removal, road construction and assessment work. Recreational development and associated activities in areas that contain special status plants, pose threats through development of roads, parking areas, interpretive facilities, campgrounds, hiking trails, and horse trails; and by activities such as dispersed camping, trampling, Off Highway Vehicle use, and vandalism. However, interpretive facilities could increase public awareness and sensitivity to native vegetation and ecosystems resulting in less damage to special status species and/or their habitat. Finally, the introduction of noxious weeds and other nonnative vegetation by human activities results in competition with native species for space and nutrients often to the detriment of the latter species.

There are presently no federally listed/proposed plant species in the Roseburg District
Alternatives C through E and the PRMP, generally in order of increasing protection, would enhance the quantity or quality of riparian and special habitats. This would result from additional protection provided from widening of buffer zones and by increasing amounts of land allocated as old-growth reserves.

Under the No Action Alternative and the PRMP, all categories of special status plant species would be protected except assessment species. A total of four assessment species that are presently known to occur on 68 acres not reserved or protected would be subject to impact. One assessment species would receive partial protection in the No Action and PRMP alternatives because they occur in areas protected under other authorities.

Under Alternative A, harvest of timber stands and other activities associated with timber production may adversely impact the quality and quantity of habitats of all categories of special status plants except those which are officially listed and have critical habitat designated or a recovery plan in place. Special status plants that occur in special habitats such as serpentine barrens, and not on Commercial Forest Lands would still be vulnerable to direct and indirect impacts from adjacent timber management, road building and other management activities. Under Alternative A, a total of ten special plant status species presently known to occur on 265 acres that are not reserved or protected in Alternative A would be subject to impact.

Impacts under Alternative B and C to special status plant species would be similar to Alternative A. Alternative B would provide protection on Public Domain lands and reserved old-growth blocks. Alternative C would provide additional protection on Public Domain lands and lands managed to maintain biological diversity. Under both Alternatives B and C, a total of ten special plant status species presently known to occur on 343 acres that are not reserved or protected in either alternatives would be subject to impact.

Under Alternatives D and E all known locations of special status species are protected and buffered. Special status plants would be protected from direct and indirect impacts the most under Alternative E with the use of 600 foot buffers around all populations where timber harvest and all surface disturbance would be prohibited. Alternative D and the PRMP would protect special status plants from direct impacts with the use of 300 foot and 100 to 300 foot buffers respectively. Indirect impacts would be possible in some cases depending on the locations of the special status plant population and factors such as slope and topographic position.

Effects resulting from timber management activities would be detrimental to four special status species closely associated with old-growth and mature habitats under Alternatives A, B, and C. Over time, important habitats and populations of these species could be lost. Alternatives C, D, E, and the PRMP would enhance the quantity and quality of old-growth and mature habitat so that the abundance and distribution of species utilizing this type of habitat would not be expected to decrease in the long term.

SEIS Special Attention Plant and Fungi Species

The analysis of impacts of the proposed resource management plan also incorporates by reference the conclusions in Appendix J2 of the SEIS regarding: nonvascular plants (bryophytes, lichens), vascular plants, and fungi. In summary, the SEIS concluded that its Alternative 9 (which was essentially adopted in the PRMP) would have the following consequences:

Bryophytes - Alternative 9 affords fairly high protection to bryophytes in the form of survey and manage measures. After application of these measures under Alternative 9, only three species remained of concern and no SEIS alternative would remove these concerns. The status of these three species (*Tritomaria exsectiformis*, *Marsupella emarginata var. aquatica*, and *Diplophyllum plicatum*) on the Roseburg District-administered lands is currently unknown.

Lichens - Likewise, survey and manage measures for lichens under Alternative 9 do not remove, but substantially reduce, the risk of extirpation of particular lichen species. The occurrence of many of the rare and endemic species on Roseburg District administered lands is not well substantiated. Some risk may also remain due to cumulative effects due to activities on nonfederal land related to short rotation timber harvesting and road building, and effects unrelated to forest harvest activities such as global concerns (e.g., acid precipitation).

Vascular Plants - Despite the survey and manage measures incorporated into Alternative 9, five species (*Abies lasiocarpa* [in California], *Bensoniella oregona*, *Coptis asplenifolia*, *Cypripedium fasciculatum*, and *Cypripedium montanum*) of vascular plants are still of concern generally because of limited distribution or rarity on federal lands. Of these, Besoniella oregona and Cypripedium montanum are known to occur on Roseburg District administered lands and Cypripedium fasciculatum is suspected to occur on Roseburg District administered lands.

Fungi - Survey and manage measures under Alternative 9 alleviate original concerns about many fungus species, but some risk of species extirpation remains, particularly for 115 rare and endemic species. Surveys for fungi on Roseburg District administered lands are not adequate at this time to fully gauge the effects of the PRMP on these species.

Early Successional Species - Species that find optimum habitat in early successional forests will likely be maintained under Alternative 9, due to the conclusion that the amount of these forests on the landscape within the range of the northern spotted owl is probably greater now than at any time in the past. According to the SEIS, "In general, species associated with early successional conditions are good disperses, have high reproductive rates, and are able to persist in small patches of habitat that result from small scale disturbance (Hunter 1990, Smith 1966)."

Wildlife

Bald Eagle

All alternatives provide for the protection of current and potential nest and roost sites along the Umpqua river systems, and are consistent with the Pacific Bald Eagle Recovery plan. Six existing nest sites and potential habitat would be protected under all alternatives to meet recovery plan goals. Alternatives C, D, E, and the PRMP would continue implementation of the Umpqua River Corridor habitat management plan which outlines action to improve and perpetuate bald eagle nesting territories. These alternatives also provide for acquisition of two existing nest sites as well as future occupied nest and roost sites. Such acquisitions would strengthen the long term protection and maintenance of the sites for bald eagles.

Under all alternatives, bald eagle populations on BLM-administered land would be expected to remain stable or increase in the short term and long term due to protection of all existing and potential nest sites. The bald eagle in the Pacific Northwest is a large tree obligate species. Although not directly dependent on old-growth ecosystems, the eagle is dependent on groves of large trees for nesting sites. Alternatives C, D, E, and the PRMP would provide more of these types of nesting sites in the long term whereas Alternatives No Action, A, and B would provide limited potential nesting sites outside of lands managed specifically for bald eagles.

The cumulative effects of Alternatives No Action, A, and B and actions on other lands in the planning area would not adversely affect current levels of bald eagle habitat and populations. Oregon Forest Practices Act rules for bald eagle and riparian habitat were recently revised to provide roosting and foraging habitat in addition to existing protection of active nest sites. The cumulative effects of Alternatives C, D, E, and the PRMP would be to provide more potential nesting sites in the long term than the additional breeding pairs targeted in the recovery plan. From a western Oregon perspective, similar levels of habitat protection on other federal lands (e.g., national forests and other BLM districts) would tend to result in modest increases in bald eagle habitat and populations over time.

Marbled Murrelet

The assessment of impacts on the marbled murrelet focuses on the amount of suitable nesting habitat (mature and old-growth forest) that would be available within 50 miles of the Pacific Coast in the short and long term. Table 4-12 displays, by alternative, the current estimated acres of suitable nesting habitat, the projected loss of habitat due to timber harvest over the first decade. The total land expected to provide nesting habitat in the long term is 115,400 acres within the 50 mile zone.

In the short term, all alternatives except Alternative E would remove suitable nesting habitat. Impacts would be expected to be greater under Alternatives NA, A, and B and less under C and D and the PRMP as a result of greater protection levels for the older forests in the latter alternatives. All stands occupied by murrelets will be protected under the PRMP. In order to identify occupied stands, all action areas within 50 miles of the coast subject to degradation of suitable nesting habitat would be surveyed to determine the murrelet occupancy status. For all alternatives, protection would be afforded to known occupied murrelet sites under the provisions of the Endangered Species Act.

In the long term, the availability of suitable nesting habitat would depend on the amount of older forest

Table 4-12. Impacts to Potential Marbled Murrelet Habitat During the First Decade Under the Various Alternatives.

Current	Proposed	HarvestAcres (thousands)			Over	Next Decade/Impact	
Murrelet	NA	A	B	C	D	E	PRMP
Short Term	30/-	33/-	30/-	9/-	5/-	0/+	0.5/+

+ favorable impact, increase in acres of suitable nesting habitat
- adverse impact, decrease in acres of suitable nesting habitat

protected and the amount that will grow into suitable nesting habitat condition. It would also be influenced by the success of developing old-growth characteristics through silviculture treatments which are planned under some alternatives, particularly C. Alternatives C through E and the PRMP would provide varying levels of nesting habitat in the long term, whereas Alternatives NA, A, and B would provide very limited suitable nesting habitat. Based upon availability of nesting habitat, marbled murrelet populations would likely increase in the long term under Alternatives C through E and the PRMP due to the increased amounts of habitat.

The cumulative effects of Alternatives NA, A, and B and the actions on other land ownerships would likely result in further declines in marbled murrelet populations due to the lower amounts of older forest having suitable nesting habitat conditions. Murrelet habitat and numbers of birds are not expected to increase from already low levels on private lands in the short or long term. Although additional suitable nesting habitat would be provided under Alternative C, the cumulative increase would result in only slightly higher amounts of habitat and numbers of murrelets in the planning area. Alternative D will result in very little change in total acres of suitable habitat long-term, where as Alternative E and the PRMP will result in significant increases in total acres of suitable habitat. The SEIS stated, "When all major factors affecting the species are taken into account, including at sea and land ownership patterns, the murrelet panel concluded there is between a 50 and 75 percent likelihood that the murrelet population on federal lands will be stable and well distributed after 100 years, regardless of the alternative selected." Thus from a western Oregon perspective, under the PRMP, the levels of protection projected for all federal lands would result in only a moderate increase in habitat and numbers of murrelets over time.

The U.S. Fish and Wildlife Service has proposed the designation of approximately three million acres of federal land in the range of the murrelet as critical habitat. Although no quantitative assessment or sensitivity analysis was conducted, it is estimated that this designation would involve approximately 85,000 acres in the Roseburg District and 542,500 acres in western Oregon on BLM-administered land. This would have the greatest impact on the implementation of Alternatives NA, A, and B as proposed, moderate impact on C and D and the least impact on Alternative E and the PRMP. Under all alternatives, the BLM will conference with the Fish and Wildlife Service on all actions that 'may adversely affect' proposed critical habitat. If it is designated, the BLM will consult on all proposed actions that 'may affect' critical habitat. The BLM will not carry out any action that is determined by the U.S. Fish and Wildlife Service to adversely modify or destroy designated critical habitat.

White-footed vole

This species is impacted primarily by management of riparian habitat and dead and down large woody material. Alternatives No Action, A, and B provide the least protection for these habitats while Alternatives C, D, E, and the PRMP provide for larger Riparian Management Areas and large areas dedicated to old-growth forest. Over the short term, approximately 90 percent or more of BLM-administered lands within the most likely distribution (Tyee Resource Area) of the white footed vole would be managed to maintain or restore old-growth conditions under Alternative E and the PRMP. Cumulatively, Oregon Forest Practices Act regulations for riparian habitat on private lands, Riparian Reserves, and emphasis on old-growth forest on BLM-administered lands would result in improved habitat conditions over the current situation.

Peregrine Falcon

Although there have been sightings and one occupied site on private land, there are no known peregrine falcon sites on BLM-administered lands within the planning area. As a result the alternatives would have minimal impact to Peregrine falcons or their habitat. Potential suitable nesting cliff habitat would be protected under all alternatives. Alternatives C, D, E, and the PRMP would improve the chances of establishing a breeding population in the district by providing greater protection of cliff habitat. These alternatives would also provide a greater degree of protection for sites occupied in the future than would be provided under Alternatives No Action, A, and B.

Columbian White-Tailed Deer

All alternatives will be in compliance with the Columbian White-tailed Deer Recovery Plan as well as maintaining existing habitat on BLM-administered lands. In 1994, the Roseburg District acquired through exchange approximately 6,600 acres of key columbian white-tailed deer habitat. These lands have been acquired with the columbian white-tailed deer in mind and provide the bases for meeting recovery plan objectives. Plans will be developed for management and development of this larger block for the benefit of Columbian white-tailed deer along with

other resource values. Alternatives C, D, E, and PRMP afford the opportunity for additional acquisition of habitat within the core area to provide long term security for habitat and populations. Timber harvest within occupied habitat will only occur when the species would not be detrimentally affected.

Northern Goshawk

Alternatives NA, A, and B would reduce mature old-growth habitat in the short-term and retain relatively little long-term. As a result, northern goshawk populations would remain low or further decline. Alternatives C, D, E, and the PRMP would retain significant existing habitat and provide for increased amounts long-term. Goshawk populations would increase in the long-term under these alternatives.

Cumulative effects on northern goshawks would be detrimental under Alternatives NA, A, and B. Under Alternative D the total acres of habitat would decline, but it would function more effectively in larger blocks. Alternatives C, E, and PRMP would provide for greater retention of older forest habitat and greater allowance for the development of future stands. Little nesting habitat will likely be available on private lands in the future, so the development of suitable habitat in large blocks on BLM will be essential for breeding populations.

Townsend's Big-eared Bats

The primary habitat features required by this species are caves and talus consisting of large boulders. These physical features would be protected under all alternatives, but maintenance of environmental conditions on these sites would vary by buffer width provided by each alternative. Alternatives No Action, A, and B do not provide for buffers and the suitability of potential or unknown sites would be lost. Alternatives C, D, E, and the PRMP provide for buffers as well as protection of the special habitat feature. Alternatives D, E, and the PRMP would pursue acquisition of one known hibernaculum located on private land and restrict pesticide use within the normal foraging range of known nurseries and hibernacula. Based on protection of roosts, the population could decline under Alternatives No Action, A, and B, remain stable under Alternative C and remain stable or slightly increase under Alternatives D, E, and the PRMP. Primary foraging areas for this bat are over open water/riparian areas and early successional forest stages. The greater the riparian protection and the addition of acres of early successional forest, the more foraging habitat would be available. Alternatives B, C, D, and the PRMP come closest to providing both types of foraging habitat.

Northern Spotted Owl

Information on the habitat and populations of the northern spotted owl is discussed in Chapters 3/4 of the SEIS. The discussions in this EIS will incorporate the SEIS by reference and further supplement SEIS information by subsequent discussions specific to the Roseburg District planning area.

Within the planning area, the primary land management activity affecting spotted owl habitat is timber management. Timber harvest may affect habitat suitability by removing stands of trees under a regeneration harvest prescription or it may be used for the long term benefit of habitat through selective cutting (thinning) of individual trees to promote tree growth and habitat diversification.

Other BLM conducted or BLM authorized activities which could affect spotted owls or their habitat include mining, road construction or other activities which remove or alter coniferous forests; blasting or other types of activity generating loud noise which could disturb nesting and ultimately reproductive success; granting of rights-of-way or road use permits which could lead to habitat loss on federal and nonfederal lands; and land exchanges which transfer habitat to other ownership which would then be subject to timber harvest, land development, or other activity contributing to habitat loss. Conversely, land exchanges could transfer suitable habitat to federal ownership to be managed for the conservation of the species, particularly where the transfer would block up federal ownership.

Effects on Suitable Habitat

Aerial photography and timber inventory data were used to evaluate the BLM-administered forest stands in the planning area. Based on habitat information in the Interagency Scientific Committee report (Thomas, et al 1990), two categories of suitable spotted owl habitat were identified:

> Habitat 1 - Comprised of coniferous forest stands that satisfy the full complement of daily and annual needs of the owl for nesting, roosting, and foraging. These stands have a multilayered canopy of several species of coniferous trees with large trees in the overstory

and an understory of shade tolerant conifers and hardwoods. The canopy closure exceeds 70 percent. There is a significant measure of decadence in the stand resulting from the occurrence of snags and broken topped live trees along with dwarf mistletoe infections. The forest floor has substantial accumulations of large down woody material in the form of fallen trees.

Habitat 2 - Comprised of coniferous forest stands, and some hardwood stands which provide roosting and foraging opportunities for spotted owls, but lack the necessary structure for consistent nesting. The roosting and foraging qualities are less than those described for Habitat 1 due to the reduced quality or complete absence of one or more of the components listed above (for example, the absence of large trees in the overstory or a reduced amount of down woody material on the forest floor). Habitat 2 stands generally have less diversity in the vertical structure and have either limited or poorly defined multi-layered canopy structure. The understory is somewhat open, allowing for owl movement and foraging. Canopy closure generally exceeds 70 percent.

Currently there are 113,000 acres of Habitat 1 and 89,100 acres of Habitat 2, for a total of 202,100 acres of suitable habitat within the planning area. There is a concern that large expanses of Habitat 2, without any inclusions of Habitat 1 to provide nesting groves, would not provide the same level of habitat suitability as if there were a mixture of the two habitat types. Within the planning area and under all alternatives, there would be interspersion of the two types of habitat due to riparian buffers, Timber Production Capability Classification nonsuitable lands, natural vegetation patterns, past harvest patterns, and other lands not available for timber management. Based on this assumption the two categories were combined for all analysis purposes.

Future habitat suitability was estimated by aging existing stands and projecting the location and timing of future harvests using the ten year timber management scenario for the short-term projections and random selection from lands available for harvest in each alternative for the longer-term projections. The effects of silvicultural prescriptions such as density management were also considered. A natural disturbance caused rate of habitat loss of 0.24 percent per decade was also included in the projection by random selection. Table 4-13 shows stand ages, or time following regeneration timber harvest, when stands become suitable spotted owl habitat.

The projected development of future spotted owl habitat over time is given in Table 4-14. In estimating the rate of development of future habitat, forecasts

Table 4-13. Stand Ages, or Time Following Regeneration Timber Harvest, When Stands Become Suitable Spotted Owl Habitat.

	Age or Time Following Harvest
Unmanaged Stands	[1]
Naturally Established	70
Established by Even-Aged Harvest	100
Managed Stands	
Even-Aged (Rotation 100 Years or Less)	[2]
Restoration and Retention Blocks (Alt.C)	[3]
35+% Basal Area Retention (Alt.C)	50
15 - 20% Basal Area Retention (Alt.C)	70
Connectivity Areas (PRMP)	70
General Forest Management Areas (PRMP)	100

[1] Also applies to existing stands managed under approaches designed to emphasize biological diversity.
[2] Stands under this silvicultural regime would never attain suitable habitat condition due to short rotation length.
[3] No regeneration harvests planned. Stands not currently suitable habitat would become habitat at the same age as managed stands depending on how they were established.

Table 4-14. Suitable Spotted Owl Habitat Within the Roseburg District Area by Alternative (1000 acres)

Decade/Province	[1]Current	ALTERNATIVES A	B	C	D	E	PRMP
After 10 yrs							
Coast Range	63	42	45	55	59	63	62
Klamath	65	44	46	53	62	65	61
W. Cascades	74	44	48	65	69	75	67
Total	202	130	139	173	190	203	190
After 50 yrs							
Coast Range		5	17	27	52	72	74
Klamath		9	19	30	56	76	67
W. Cascades		9	19	30	48	85	66
Total		23	55	87	156	233	207
After 100 yrs							
Coast Range		7	20	116	57	96	114
Klamath		13	25	119	71	103	108
W. Cascades		12	24	137	51	118	111
Total		32	69	372	179	317	333

[1] Current habitat includes 47,000 acres of Habitat 1 in the Coast Range Province: 42,000 acres of Habitat 1 in the Western Cascades Province; and 24,000 acres of Habitat 1 in the Klamath Province.

were more conservative for habitat development on existing stands regenerated following timber harvest due to the current lack of large trees and snags and typical single layered, evenly spaced, closed canopy conditions.

It was assumed that density management in the restoration and retention blocks in Alternative C would not negatively affect attainment or retention of suitable habitat condition. Such harvests could accelerate development of suitable habitat, but the success rate of such treatments is unknown at this time.

Within the Late-Successional Reserves of the PRMP, it was assumed that harvest would occur only when the treatment would be judged to result in beneficial effects to spotted owl habitat. The intent of any prescriptions would be to accelerate the development of old-growth forest characteristics, which should also enhance spotted owl habitat.

The analysis assumed that in the future nonfederal lands would have no suitable habitat. This is a worst case scenario, but it is likely that it would be true for the vast majority of those lands as it is highly likely they will be managed on harvest rotations ranging from 50 to 80 years. These short rotations would yield little, if any, habitat capable of sustaining significant numbers of reproducing spotted owls.

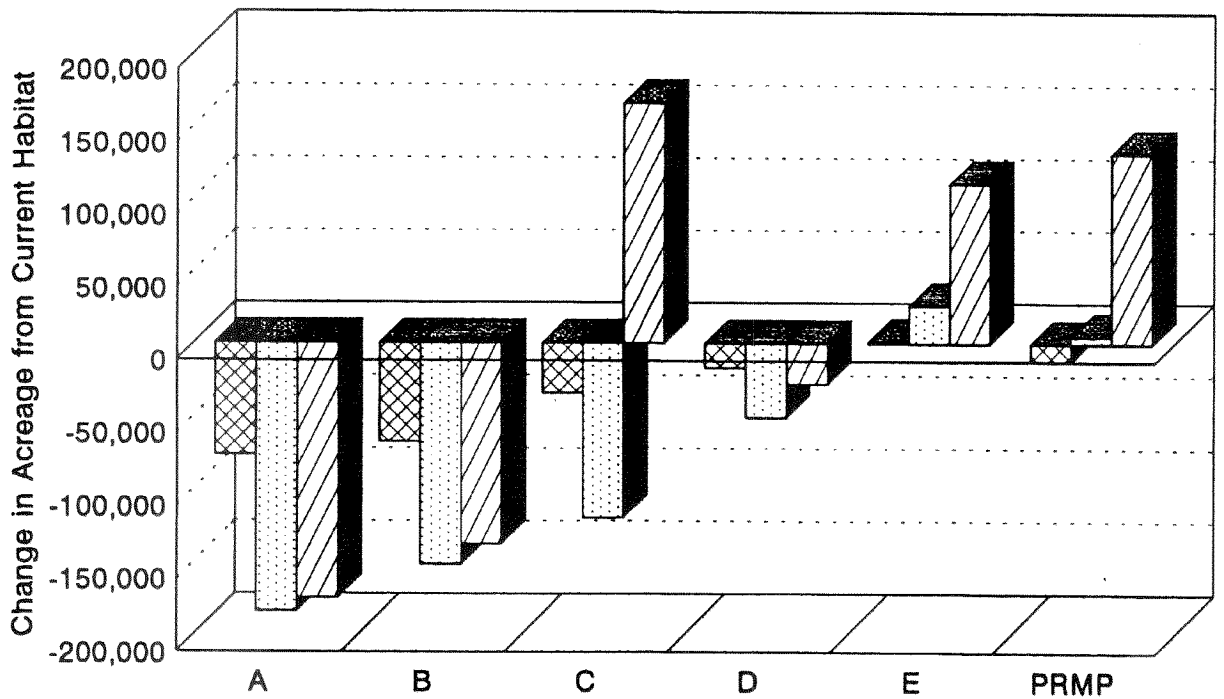
Current acres of spotted owl habitat and future owl habitat projected for the district, by alternative, are shown in Table 4-14. The data was stratified by spotted owl physiographic provinces (Thomas, et al. 1990; USDI 1991). The planning area occurs within the Coast Range, Western Cascade, and Klamath provinces.

Since the No Action Alternative is not mapped in BLM's Geographic Information System data base, habitat data could not be calculated, but the outcome would be similar to that of Alternative B.

Effects on Suitable Habitat Within Roseburg District

Habitat conditions for spotted owls would change over time under all alternatives. Under Alternatives NA, A, B, C, and D suitable habitat would decline on BLM-administered land over the short-term and throughout the first five decades. Between the fifth

Figure 4-7. Changes in Suitable Spotted Owl Habitat by Alternative
All Provinces - BLM Lands - Roseburg District



	A	B	C	D	E	PRMP
After 10 years	-77,000	-68,000	-34,000	-17,000	1,000	-12,000
After 50 years	-184,000	-152,000	-120,000	-51,000	26,000	5,000
After 100 years	-175,000	-138,000	165,000	-28,000	110,000	131,000

Figure 4-7. *Changes in Suitable Spotted Owl Habitat by Alternative — All Provinces - BLM Lands - Roseburg District*

decade and tenth decade, all alternatives would show some recovery in the amount of suitable habitat, although the recovered levels for Alternatives No Action, A, and B would be minor. Alternatives C, E, and the PRMP would result in significant long-term increases above current levels of suitable habitat. Alternative D would experience a decline of 14 percent in the long term. The amounts of suitable habitat provided long term by the No Action, A, and B Alternatives would be much lower and would not be expected to maintain clusters of owl sites, produce consistent occupancy of sites, or provide sites surrounded with adequate habitat acres. In the long term, under Alternatives No Action, A, and B, spotted owl populations in Oregon would depend on habitat located on U.S. Forest Service lands for survival. Changes in suitable habitat by alternative are shown in Figures 4-7 and 4-8.

Alternatives C, D, E, and the PRMP would provide substantial amounts of suitable habitat in the long term, although only D and the PRMP are specifically designed to provide areas where clusters of sites would be maintained. At one hundred years, in increasing order, Alternatives C, E, and the PRMP provide the greatest acreage of suitable habitat. In C, the habitat levels result from the management prescription which calls for regeneration harvests of younger stands for the first three decades. This results in a pulse of suitable habitat between 70 and 100 years in the future. This phenomenon along with the assumption that high retention harvest will retain suitable habitat, results in a high level of suitable habitat. (It should be noted that the untested nature of Alternative C management indicates higher levels of uncertainty that the projected habitat acres will be attained.) The effects of this habitat pulse would be diminished over time and eventually acres of suitable habitat under Alternative C would stabilize at a level below Alternative E but above Alternative D.

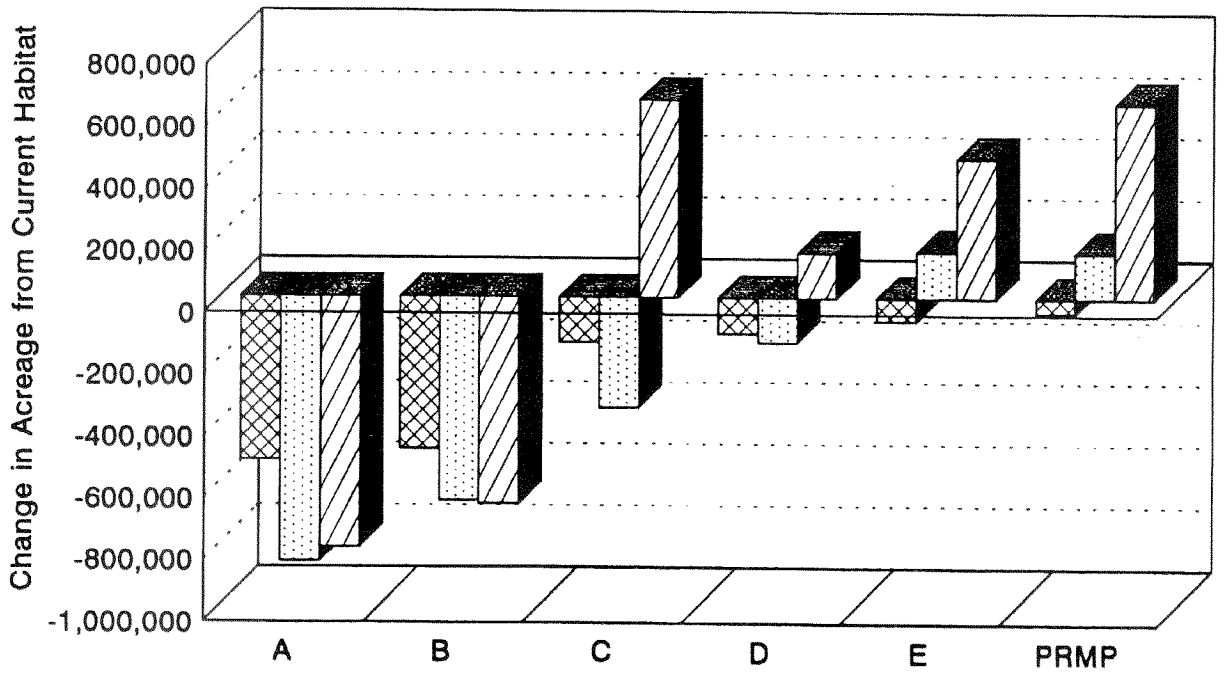
For Alternative C, the suitable habitat would be distributed throughout the planning area in the long term. It is possible that larger blocks would occur around the restoration and retention blocks or within the corridors, but there is no way to project precisely how the habitat would be distributed in the landscape. Approximately 68 percent of the suitable habitat under this alternative would be in managed forest stands, under either the high or low retention regimes.

The PRMP would yield the largest amount of suitable habitat in the long term. In this alternative 24 percent of the BLM-administered forest lands within the planning area would be available for timber management. Suitable habitat would dominate across the planning area with unsuitable habitat occurring in small units interspersed with Riparian Reserves and other reserves. The majority of suitable habitat would be in reserves.

Alternative D and the PRMP would provide approximately 56 and 108 percent respectively as much suitable habitat in the long term as Alternative E. (see Table 4-14) For Alternative D this amounts to 45 percent of the forested land base. Under Alternative D approximately 60 percent of the suitable habitat would occur within the Habitat Conservation Areas. In the PRMP, 33 percent of the suitable habitat would occur within the Late-Successional Reserves that exceed 10,000 acres in size. Fifty-seven percent would occur in Late-Successional Reserves of smaller size and in Riparian Reserves. The remaining ten percent will occur on lands managed under the Connectivity/ Diversity Block prescription. This relative concentration of habitat within large areas would result in a lower degree of habitat fragmentation within the Recovery Plan Habitat Conservation Areas and Late-Successional Reserves. Under Alternative D, suitable habitat outside the Habitat Conservation Areas would be more scattered and fragmented than in Alternatives C, E, and the PRMP. The suitable habitat within the Habitat Conservation Areas in Alternative D and the Late-Successional Reserves in the PRMP would be unmanaged.

In conclusion, all Alternatives except E and the PRMP significantly reduce the amount of suitable habitat available in the short term. The short term habitat loss is most acute in Alternatives No Action, A, and B. Alternatives No Action, A, and B would provide very little suitable habitat in the long term with no clumping of acres to facilitate habitat for clusters of owl pairs. Alternative D would provide less total suitable habitat in the long term than currently available. Alternative D would concentrate more suitable habitat in large areas to minimize fragmentation, while Alternatives C and E would distribute suitable habitat across the landscape. The PRMP would provide the highest level of habitat in the long term in a mosaic of both concentrated habitat blocks (Late-Successional Reserves), and other smaller reserves which occur on the lands between the habitat blocks.

Figure 4-8. Changes in Suitable Spotted Owl Habitat by Alternative
All Western Oregon Provinces - BLM Lands



	A	B	C	D	E	PRMP
After 10 years	-530,000	-493,000	-147,000	-117,000	-75,000	-48,200
After 50 years	-857,000	-659,000	-358,000	-145,000	151,000	148,900
After 100 years	-811,000	-670,000	638,000	146,000	454,000	631,500

PRMP projections for 50 and 100 years only include habitat on reserved acreage.

Figure 4-8. *Changes in Suitable Spotted Owl Habitat by Alternative — All Western Oregon Provinces - BLM Lands*

Effects on Suitable Habitat Within Western Oregon

Based on the data in the Final Draft Spotted Owl Recovery Plan, BLM-administered lands currently provide approximately 14 percent of the suitable owl habitat in the region (Washington, Oregon, and northern California), compared with 74 percent on Forest Service lands. (USDI, Fish and Wildlife Service 1992:34) In Oregon approximately 25 percent of suitable habitat occurs on BLM-administered lands; 70 percent on Forest Service lands.

As discussed above and shown in Figures 4-7, 4-8, and 4-9, in western Oregon the No Action, A, and B Alternatives would provide the least suitable habitat in the short and long term. Compared to the amount projected for Forest Service lands, the BLM would not contribute substantial habitat for spotted owls in the state under any of these three alternatives.

The PRMP would provide the greatest amount of suitable habitat in the long term, but would only be approximately 30 percent as much as is projected for Forest Service lands. Alternatives C, D, and E would contribute smaller acreage; 31, 22, and 28 percent of the Forest Service projections, respectively. The actual percentages on BLM-administered lands in Oregon are higher than those calculated since the Forest Service projections include suitable habitat in the California portion of the Klamath province.

The contribution of BLM-administered lands to the present and projected availability of suitable habitat in the different provinces varies substantially. BLM-administered lands are most important in the Coast Range, where these lands currently contain more suitable habitat than Forest Service lands. Under the No Action, A, and B Alternatives, suitable habitat on BLM-administered lands in the Coast Range would be reduced significantly from current acres.

Long term in the Coast Range under the PRMP, BLM-administered lands would produce more suitable habitat than currently exists. Alternatives C, D, and E would produce less suitable habitat in the Coast Range province compared to the PRMP. As shown in Table 4-15 the relative contribution of BLM-administered lands to suitable spotted owl habitat in other provinces in the long term compared with Forest Service lands is smaller than in the Coast Range.

Table 4-15. Known Spotted Owl Pairs; and Nesting, Foraging, and Roosting Habitat.

Region	Habitat Acres	Known Owl Pairs
(WA, OR CA)[1]	8,204,000	3,461
USFS	6,073,000	2,420
Oregon	4,119,000	1,974
USFS	2,895,000	1,330
BLM	1,031,000	541
Other	193,000	103

[1] Not reported by state.

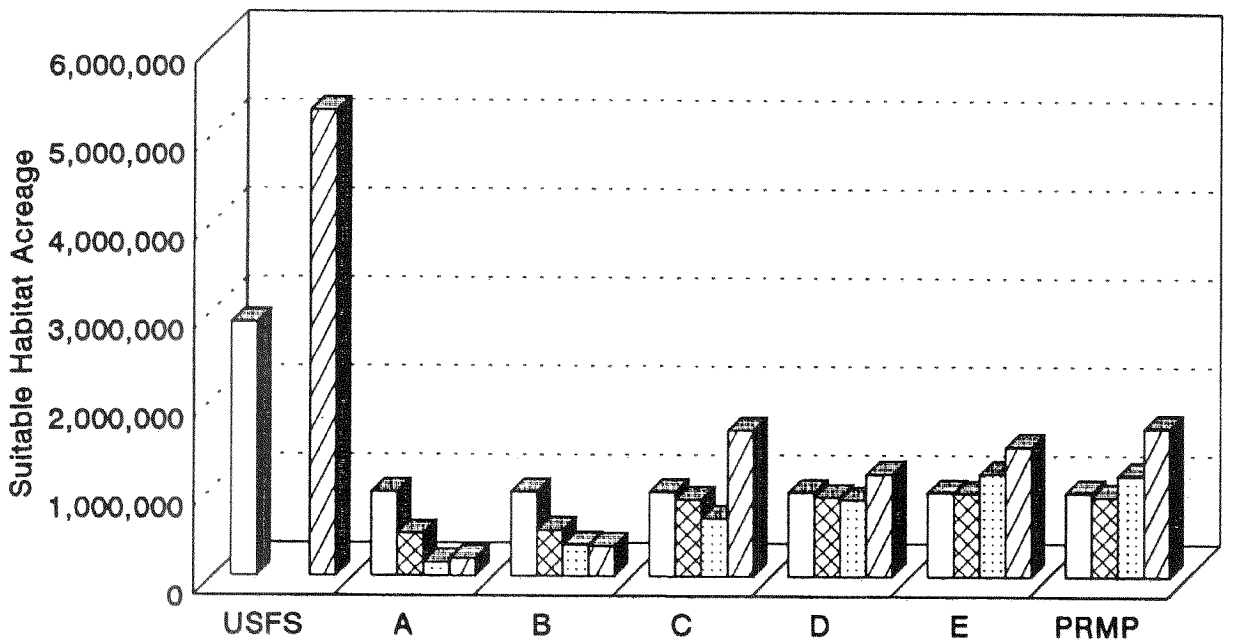
Effects on Dispersal Habitat

Habitats 1 and 2 provide for nesting, roosting, and foraging habitat and are concentrated in the Habitat Conservation Areas in Alternative D and the Late-Successional Reserves of the PRMP. Also of importance is the condition of forest vegetation between the large blocks of suitable habitat as these areas serve as dispersal habitat for owls. In the PRMP the Riparian Reserves contribute significantly to dispersal habitat and may also provide an added measure of nesting, roosting, and foraging habitat. Provision of forest habitat to permit movement of juvenile and adult owls between nest habitat clusters is important to facilitate replacement of deceased individuals by recruits from the pool of dispersing young and nonterritorial adults (Thomas, et al. 1990; USDI 1992).

The Interagency Scientific Committee (Thomas, et al. 1990) determined that under their proposed strategy, adequate dispersal habitat across the managed landscape was comprised of stands of high quality old-growth forest located within riparian buffer strips, sensitive soil areas and other areas not available for timber management, and other stands of mid and late-successional forest. In combination, these stands afford some level of security to nonterritorial owls as they exist in the landscape until they locate blocks of unoccupied suitable habitat and set up a territory.

The "50-11-40" rule was developed by the Interagency Scientific Committee to define a prescription for management of dispersal habitat under a strategy using large habitat blocks separated

Figure 4-9. Total Suitable Spotted Owl Habitat
Western Oregon - USFS and BLM Lands by Alternative



	USFS	A	B	C	D	E	PRMP
Current	2,859,000	948,500	948,500	948,500	948,500	948,500	948,500
After 10 years		479,000	516,000	862,000	892,000	934,000	900,300
After 50 years		152,000	350,000	651,000	864,000	1,160,000	1,143,600
After 100 years	5,260,000	198,000	339,000	1,647,000	1,155,000	1,463,000	1,677,700

USFS 10-year and 50-year projections not available.

Figure 4-9. *Total Suitable Spotted Owl Habitat Western Oregon - USFS and BLM Lands by Alternative*

by distances of eight to 12 miles (Thomas et al. 1990). The rule calls for maintaining at least 50 percent of the land outside nesting habitat clusters in a forested condition where stands have an average tree size of at least 11 inches dbh and canopy closure of at least 40 percent. Although based on limited field data, this method has been used for assessing habitat for dispersal of spotted owls. Quarter-townships (nine square miles) were the suggested scale on which to assess this standard.

Effects on Dispersal Habitat within Roseburg District

Within the Roseburg District planning area, there are distributed patches and strips of high quality old-growth habitat to meet the first component of dispersal habitat in most quarter townships. This would be the case in all alternatives, but alternatives No Action, A, and B would result in the least amount of these habitat patches.

The dispersal habitat condition of forest land outside of these patches and strips would vary dramatically among the alternatives. The No Action, A, and B Alternatives would very likely result in most, if not all, of the quarter townships within the planning area not meeting the 50-11-40 rule within two to three decades. This is due to the large amount of acreage available for timber management and a 60 year harvest rotation. Under these alternatives dispersal habitat would be attained in managed stands approximately 40 years after regeneration harvest, but most of these stands would be subject to harvest again in the subsequent 20 to 30 years. Under these alternatives large blocks of suitable habitat would not be available for clusters of nesting owls. Owls in this landscape would need to disperse long distances between reserve areas such as wilderness areas and Late-Successional Reserves on U.S. Forest Service lands. The increased distances involved would be likely to have a negative effect on both the survival rates of dispersing owls and the percentage that establish territories and reproduce.

Dispersal habitat conditions would be substantially improved under Alternative C, especially within the corridors where restoration and retention blocks and high retention silvicultural regimes would retain existing dispersal habitat and develop additional habitat. Outside the corridors the low retention regime would contribute to dispersal habitat in the long term as regenerating stands aged beyond 40 years. Overall, this alternative would probably meet or exceed the 50-11-40 rule in all quarter townships after five or six decades. As in the previous alternatives, dispersing owls would be moving greater distances between clusters of pair sites than in Alternative D and the PRMP. Generally, the quality of the habitat owls would be dispersing through would also be better. It would not only meet the 11-40 criteria, but in many instances would also meet the criteria for Habitat 1 or Habitat 2. Some of the restoration and retention blocks under Alternative C would be large enough to support reproductive pairs, but these would not be the large blocks called for in the Final Draft Spotted Owl Recovery Plan.

Alternative D portrays the Interagency Scientific Committee report recommendations and would require compliance with the 50-11-40 rule when planning timber harvest. The distance which owls would be required to disperse across the managed landscape would be much less under this alternative than any previously mentioned alternative due to the presence of the large Category 1 Habitat Conservation Areas. The large Habitat Conservation Areas, along with the improved dispersal habitat conditions, would facilitate adequate dispersal as prescribed under the Interagency Scientific Committee conservation strategy.

For Alternative E, dispersal habitat is likely to recover similarly to Alternative D and ultimately exceed the 50-11-40 rule on the majority of quarter townships. In most cases, the condition of the dispersal habitat would be far superior to the minimum levels found in Alternative D. Any quarter township not meeting the rule would likely occur along the valley margins and contain below average BLM ownership.

Under the PRMP the reserve system is more extensive than that originally proposed by Interagency Scientific Committee or the Spotted Owl Recovery Team. This results in a smaller land area where dispersal habitat conditions would need to be considered and in some situations the reserves are much closer to each other than in Alternative D thus reducing, or even eliminating, the concern for dispersal habitat. The Riparian Reserves, which are an important component in providing dispersal habitat, are significantly larger under the PRMP compared to other alternatives. This results in benefits to dispersal habitat conditions by reducing potential harvest unit sizes and the amount of total land available for harvest. The dispersal habitat conditions under the PRMP will be adequate in the short term and improve over time on a track similar to that of Alternative D, and in the long term exceed the conditions projected under Alternative D. As stated in

Appendix G of the SEIS, "the elements of Alternative 9 (the PRMP) should enhance the dispersal situation in the long term as habitat grows back in areas previously harvested, both in and outside of Late-Successional Reserves. It would also reduce concerns in the short term since the amount of habitat subject to harvest would be less especially in areas where dispersal may be a concern." In future planning and implementation of the PRMP, if it is determined that there is a question of the adequacy of dispersal habitat conditions in a given locale, the BLM will informally consult with the U.S. Fish and Wildlife Service to evaluate the situation.

In conclusion, Alternatives No Action, A, and B would result in the least effective dispersal habitat conditions of all the alternatives. Alternatives C, D, E, and the PRMP would provide adequate dispersal habitat conditions in the long term, but Alternatives C, E, and the PRMP provide more total acres. Under Alternative D and the PRMP, most quarter townships would be managed at the minimum level necessary to maintain or restore dispersal habitat on at least 50 percent of BLM-administered lands outside the reserves inherent in Alternative D. Both D and the PRMP would follow the same pattern of habitat availability but the quality and quantity of dispersal habitat in the PRMP would ultimately exceed Alternative D. The PRMP will result in 76 percent of the forest lands being managed as reserves long-term and no significant change in the total acres meeting dispersal criteria short-term. By the fourth to fifth decade, 85 percent of the forest on BLM-administered lands will function as dispersal habitat.

The BLM checkerboard ownership pattern may yield cumulative dispersal habitat conditions that constitute less than 50 percent of the landscape. It is unknown if conditions in the checkerboard pattern under the PRMP will be sufficient to provide for successful dispersal of owls between suitable nesting areas. This situation was recognized by the Interagency Scientific Committee (Thomas 1990:327) when they recommended that the 50-11-40 rule be prorated by ownership for the first three years and then be re-evaluated "as it applies to multiple-ownership areas". The BLM will monitor habitat conditions and owl dispersal in an effort to provide insight into the adequacy of habitat conditions under the PRMP.

Effects on Critical Habitat

In 1992, the U.S. Fish and Wildlife Service designated 6.5 million acres as Critical Habitat for the northern spotted owl. The acres are arranged in 190 separate Critical Habitat Units across the states of Washington, Oregon and California. Those containing BLM-administered lands are highlighted. There are 76 Critical Habitat Units in Oregon totaling 3,257,000 acres of which 1,066,000 acres are administered by the BLM. Within the Roseburg District there are 18 Critical Habitat Units with a combined BLM acreage of 222,285 acres. All proposed actions that may affect lands designated as critical habitat would be consulted upon informally and,if necessary, formally with the U.S. Fish and Wildlife Service. For all alternatives, the BLM will not implement any action that the Fish and Wildlife Service determines through consultation would result in the destruction or adverse modification of critical habitat. A sensitivity analysis of the effects of excluding all timber management activities from designated critical habitat is provided in the Effects on Timber section of this chapter. The sensitivity analysis shows that the Proposed Sale Quantity associated with the PRMP would be reduced by 29 percent under this scenario.

Effects on Populations

This EIS incorporates by reference the discussion and conclusions of the Final SEIS relating to analysis of spotted owl population trends in Appendix J3 and Chapters 3/4, pages 212 to 237. An indepth discussion of the significance and context of demographic studies in the conservation of the northern spotted owl is provided in the FSEIS, pages 212 to 235. The following points summarize the key items from that discussion.

1. The overall results of the demographic analysis by Burnham et. al. (1994) were not unexpected since the data was gathered during a time of habitat decline that was of sufficient concern to serve as a primary reason for the listing of the owl as a threatened species. Given this, it would have been surprising if the population had shown a stable or increasing trend.

2. The result that should be of most concern is the declining rate of adult survival. It is not possible to know with certainty what specific actions could be implemented to reverse the declining rate of adult survival shown in the demographic studies. This information does argue for a relatively conservative plan for owls, but whether the demographic results of these studies call for any more measures than what are contemplated in the proposed RMP is not known. These data, however, would support a

decision to adopt a markedly more conservative approach to owl management in the PRMP. (USDI unpubl. and Thomas et.al., 1990)

3. Concerns were raised about whether the population of northern spotted owls could survive over the transition period until habitat recovery occurred. These were based largely on the finding of declining survival rates for adult female owls and the contention that the population may already have or is about to pass a threshold from which it cannot recover. In order for the spotted owl to be at or near such a threshold that would be passed resulting in extirpation of the species from large parts of its range as a result of harvest under the PRMP, the following four conditions would have to be met.

a. Owl populations would have to be declining throughout all or most of their range.

b. Within the general areas where overall declines were seen, there would have to be no significant source areas that could provide for demographic rescue.

c. The factor, or factors, causing the decline would have to be operating in a similar fashion throughout all or most of the range.

d. The decline would have to continue as a function of habitat conditions until owl populations sizes and densities were reduced to the point that the populations could not recover.

There is additional discussion on each of these points in the FSEIS. This discussion concluded that 1) while there is strong reason to believe that the owl populations have declined across much of their range, there is ample reason to believe that the pattern of population change is not the same everywhere, 2) there are areas within the range of the owl with characteristics thought to be important to the productivity and stability of local populations and that such areas could act as sources for the owl population even in the face of an overall decline. Many of these areas are within the Late-Successional Reserves designated by the PRMP, 3) it is unlikely that a single factor, with the exception of habitat loss, is primarily responsible for the declines in the owl population across the range. With the full range of environmental heterogeneity represented within reserves, there is reason to believe that owl population performance will vary in both positive and negative ways throughout the range. Given this it would be inappropriate to make a simple extrapolation from the current estimated rates of decline in the owl population to single future projection of irreversible decline, and 4) there is no part of the demographic studies that link them to either historic or projected rates of decline and there is no other evidence that the owl population losses will accelerate in the future or no empirical or theoretical basis for believing that the current habitat condition or condition of the owl population represents a unique threshold point.

The Draft RMP/EIS utilized a spatially explicit population model by McKelvey (1992) to evaluate the likely response of a model generated owl population to a varying set of habitat situations characteristic of the range of alternatives. This model was subsequently used in the SEIS analysis. This EIS incorporates the discussion of that application found in Appendix J3 of the SEIS. As stated in Appendix J3, "Our results support the conclusions reached by the FEMAT in assessing likelihood of habitat conditions to provide for stable and well distributed populations(measured against the owl's historic range) on federal lands over both the short and long term." The authors also stated that "The FEMAT based their ratings on an assumption that the amount and distribution of habitat would be sufficient to support a large enough population of owls to prevent passing an extinction threshold. Our simulation results do not prove this assumption correct (nor could they), but they do lend support to it for Alternatives 1 and 9 under the most likely rule sets." The standards and guidelines of Alternative 9 were embraced by the PRMP.

Conclusion

Analysis of the information on population levels and the quantity and arrangement of suitable habitat on the landscape indicated that the alternatives in this EIS would likely have different outcomes for sustaining owl populations on BLM-administered lands in western Oregon and contributing to the long term stability (recovery) of populations within the range of the owl. For Alternatives No Action, A, and B the outlook for sustaining owls on the BLM-administered lands is near zero, thus virtually eliminating any contribution to the overall spotted owl population stability in the region. For Alternatives C, D, E, and the PRMP, the likelihood of sustained

populations on BLM-administered lands is greatly increased and there would be an important contribution to the overall spotted owl population stability in the region. The contribution to recovery associated with each alternative varies because of the amount and distribution of suitable habitat and/or the amount and distribution of dispersal habitat in the first several decades of implementation. The level of contribution to the recovery of the spotted owl for Alternative D is about the same as implementation of the Final Draft Recovery Plan for the Northern Spotted Owl (USDI, 1993). On the other hand, the PRMP would provide a somewhat higher level of contribution to the recovery of the owl than the Final Draft Recovery Plan. The PRMP contribution as compared to D, is greater due to the large increase in suitable habitat that occurs. In the long term, the PRMP will exceed Alternative D in amount of suitable habitat and overall habitat capability. The lower expectation of contribution under Alternative C results from the uncertainty that silviculture will be successful in recreating habitat over large portions of the landscape. Under Alternative E, the allocations perpetuate the habitat conditions of today and do not afford opportunity for regrowth of habitat in areas presently deficient or in contiguous blocks, thus resulting in a habitat area of lesser extent than provided for under Alternatives C, D, and the PRMP.

Other Candidate Species

Western pond turtle, red legged frog, yellow legged frog, Del Norte salamander, and spotted frog (the latter two species are suspected to occur within the planning area) are candidate species associated with riparian and aquatic habitats. Riparian habitat and water quality have the greatest effect on influencing impacts to these species. Alternatives C, D, E, and PRMP provide the greatest riparian habitat protection. Alternatives NA, A, and B provide the least riparian protection and would result in the greatest amounts of disturbance across the landscape. The PRMP riparian reserves and emphasis on reduced sedimentation through road limitations and closures in Late-Successional Reserve and Tier 1 watershed will provide the best overall aquatic/riparian conditions for these species. The western pond turtle, a low gradient, interior valley species is generally not associated with coniferous forest riparian types, instead preferring streams with open canopies. Reduced sedimentation and high water quality will provide the greatest benefit to this species.

SEIS Special Attention Animal Species

The analysis of impacts of the Proposed Resource Management Plan also incorporates by reference the conclusions of the SEIS Appendix J2 regarding: arthropods, mollusks, amphibians and reptiles, birds, mammals other than bats, bats, and early successional species. In summary, the SEIS concluded that its Alternative 9 (which is essentially incorporated in the PRMP) would have the following consequences:

Fish - The SEIS identified 136 salmonid stocks at risk or of special concern within the BLM districts in western Oregon. Of these, a total of 15 stocks occur in streams managed by the Roseburg District in the Umpqua, Coquille, and Smith basins. Alternative 9 would result in a strong likelihood of providing sufficient aquatic habitat to support stable, well distributed populations of coho salmon, fall and spring chinook salmon, summer and winter steelhead trout, sea run cutthroat trout, and resident rainbow and cutthroat trout.

Arthropods - Alternative 9 would provide fairly high habitat protection to the various functional groups assessed in the SEIS compared to the other alternatives. Standards and guidelines were incorporated into Alternative 9 which might increase the likelihood that the necessary habitat components would be maintained.

Mollusks - Alternative 9 also provides fairly high habitat protection to mollusks. For example, Riparian Reserves are important to the maintenance of habitat for freshwater snails and clams, and Alternative 9 rated well for these species. In addition, standards and guidelines were incorporated into Alternative 9 to benefit the habitat components required by many of these species. Nonfederal lands are an important consideration for the persistence of some mollusks, and substantial risks of extirpation will remain even with significant conservation measures in place on federal lands. Species with especially high risk are associated with large rivers.

Amphibians - Alternative 9 ranks well in providing the necessary habitat components for amphibians. Standards and guidelines were incorporated into Alternative 9 which might benefit all amphibians assessed in the SEIS. For example, for the Cascade torrent salamander, southern torrent salamander, and tailed frog, Alternative 9 is expected to provide

habitat protection from Riparian Reserve Scenario 1. Retention of coarse woody debris in the matrix is expected to provide habitat protection for the clouded salamander and Oregon slender salamander; and survey and manage standards and guidelines will benefit the Larch Mountain salamander.

Birds - Alternative 9 is favorable to birds because it provides a set of allocations and management practices that produce the necessary habitat components for birds. Standards and guidelines incorporated into Alternative 9 will benefit the black-backed woodpecker. All of the birds considered in the SEIS occur on both federal and nonfederal lands. Some are neotropical migrants and migrate to Mexico or central America for the winter season. For all of these migratory species, habitat on the winter range is likely as important as breeding habitat in maintaining viable populations. No other standards and guidelines on federal land can provide habitat to mitigate the potential cumulative effects on these species from loss of habitat on nonfederal lands. Because the common merganser occupies low elevation waterways and riparian habitat primarily on nonfederal lands, its persistence can not be adequately assured by any of the alternatives. No measure on federal habitat can provide habitat to mitigate the potential cumulative effects on this species from loss of riparian habitat on nonfederal lands.

Mammals Other Than Bats - Alternative 9 provides the necessary habitat components for those species assessed in the SEIS. Standards and guidelines were incorporated in Alternative 9 which will benefit all these species, including implementation of Riparian Reserve Scenario 1 and retention of coarse woody debris on matrix lands. Other standards and guidelines include provision of spotted owl activity centers in the matrix and the survey and manage guideline for the red tree vole. None of the species that occur within the planning area are highly restricted to nonfederal lands.

Bats - Alternative 9 will maintain and enhance the habitat components needed by bats in the district. Two standards and guidelines including protection of caves and abandoned mines and other structures and retention of clumped green trees and snags in the matrix would contribute to the protection of these species.

Early Successional Species - Alternative 9 would provide for a relatively low amount of acres of this successional stage on BLM-administered lands. The BLM-administered lands in the district occur within a broader landscape of nonfederal lands where substantial early seral forests will be created through logging and other management activities. These lands may contribute to the maintenance of early successional forest habitat over time.

Effects on Special Areas

Protection of Special Areas varies with each alternative (Table 2-5). The Little River Arch Outstanding Natural Area would not be designated under any alternative except the No Action alternative since the natural features for which the area was originally designated were determined not to meet Area of Critical Environmental Concern qualification criteria. The natural feature for which this Special Area was originally designated was determined by an interdisciplinary team not to require special management.

The natural features in three existing Special Areas and one of the potential Special Areas would be protected under other authorities in all of the alternatives regardless of Area of Critical Environmental Concern designation. The North Umpqua River Area of Critical Environmental Concern is completely included in the North Umpqua Wild and Scenic River Corridor. All of the natural features which qualify the area for Area of Critical Environmental Concern status would be preserved under the authority of the 1968 Wild and Scenic Rivers Act. The natural features found in the Brad's Creek and Golden Bar Area of Critical Environmental Concern and the Umpqua Wildlife Area potential Area of Critical Environmental Concern would be protected under the 1973 Endangered Species Act, the 1918 Migratory Species Act, the 1906 Antiquities Act, and the 1979 Archeological Resources Protection Act. Failure to designate potential and existing Research Natural Areas in Alternatives No Action, A, B, and the PRMP would withhold protection as Research Natural Area cells listed in the Oregon Natural Heritage Plan (Natural Heritage Advisory Council and The Nature Conservancy 1988). These cells are not known to be adequately represented at other locations. Failure to protect these Research Natural Area cells would reduce biological diversity and decrease research and educational opportunities on district lands. Limiting research could diminish the quality of future management on lands allocated for commodity use. A summary of adverse impacts to all Special Areas under each alternative is provided in Table 4-16.

Table 4-16. Adverse Impacts to Special Areas by Alternative.

Special Area	Proposed Designation	Alternative	Impacts
Bear Gulch	ACEC/RNA	NA, A, B	Failure to represent one cell in the ONHP[1].
Beatty Creek	ACEC/RNA	A	Failure to represent one cell in the ONHP.
		NA, B	Loss of potential riparian representation and diversity of upland vegetation.
		NA, B	Potential impacts from mining and adjacent logging and road construction.
Brad's Creek	ACEC		No anticipated impacts any alternative.
Bushnell-Irwin Rocks	ACEC/RNA	NA,A	Failure to represent two cells in the ONHP. Irreversible impact to two ONHP cells (oak-madrone-conifer woodland and first to third order stream in Umpqua valley).
		B	Failure to represent one cell in the ONHP.
		NA,B	Potential impacts from mining and adjacent logging and road construction.
Golden Bar	ACEC		No anticipated impacts any alternative.
Myrtle Island	ACEC/RNA	A	Failure to represent one cell in the ONHP.
North Bank	ACEC		No anitcipated impacts, any alternative.
North Myrtle Creek	ACEC/RNA	NA,A,B	Failure to represent one cell in the ONHP.
		NA,B	Potential impacts from mining and adjacent logging and road construction.
North Umpqua River	ACEC		No anticipated impacts any alternative.
Red Ponds	ACEC/RNA	NA, A, B	Failure to represent one cell in the ONHP.
Tater Hill	ACEC/RNA	A	Failure to represent one cell in the ONHP.
		A, B	Potential impacts from mining and adjacent logging and road construction.
Umpqua River Wildlife Area	ACEC		No anticipated impacts any alternative.

[1] ONHP=Oregon Natural Heritage Plan mandated by ORS 273.561-591

Logging could impact Areas of Critical Environmental Concern/Research Natural Areas designated in Alternative B and the No Action Alternative. Even though logging would not occur inside designated boundaries in those alternatives, adjacent logging could impact the Research Natural Area cells these Special Areas are intended to protect. Logging is known to affect adjacent plant communities for distances of up to 600 feet by changing environmental parameters such as light, temperature, relative humidity, and soil moisture and by reducing the amount of soil mycorrhizae (Harris 1984, Harvey et al. 1980). Adjacent logging would also increase exposure of forest stands inside Areas of Critical Environmental Concern/Research Natural Areas increasing the potential for windthrow. The potential of wildfire in Special Areas caused by escapements exists when prescribed fire is used for disposal of slash in adjacent logging units. Grass mulching after logging and road construction would increase the potential for the introduction of exotic species. Construction of roads to adjacent units would increase the potential for unauthorized Off Highway Vehicle use and the unauthorized harvesting of miscellaneous forest products. Boundaries have been configured in Alternatives C, D, E, and the PRMP to mitigate these impacts.

Special Areas designated Areas of Critical Environmental Concern/Research Natural Areas are not proposed for mineral withdrawal in Alternatives A and B. Mining of locatable, salable, and leasable minerals within or adjacent to these Special Areas could impact the natural features the areas are intended to protect. Special Areas designated solely as Area of Critical Environmental Concern are not

proposed for withdrawal from mineral entry in any of the alternatives but are not located in areas of significant mineral potential. No impact from mining is anticipated in these Special Areas under any alternative.

Effects on Cultural Resources

The potential for adverse impacts on cultural resources varies with the amount of surface disturbing activity permitted under each alternative. Since the most severe adverse impacts to cultural resources to date have resulted from timber harvesting and associated road construction, Alternatives No Action, A, and B which emphasize timber harvest have the highest potential for adversely impacting cultural resources. Alternatives C, D, E, and the PRMP which emphasize reduced timber harvest and allocate more land to such nondisturbing uses such as Late-Successional Reserves and Riparian Reserves have a reduced potential for adversely impacting cultural resources. Other ground disturbing activities contributing to adverse impacts are recreation developments, Off Highway Vehicle use, mining, and construction and maintenance of utility corridors. Consequently, alternatives that emphasize these activities will also contribute to the deterioration of the resource base.

Three types of adverse impacts to cultural resources from motor vehicles have been identified by cultural resource specialists:

1. Direct damage from vehicles traversing sites.

2. Indirect damage from vandals having increased ease of access to previously inaccessible sites, either riding Off Highway Vehicles themselves or creating access ways for others.

3. Temporarily compromising the historical character and setting of sites by increased dust, noise, and traffic associated with Off Highway Vehicle activity.

In the PRMP and Alternative E, closing or limiting Off Highway Vehicle travel to existing roads and trails in the majority of the district would help preserve cultural resource sites located off roads and trails. However, impacts to cultural resource sites located within roadways or on trails would continue through erosion, soil compaction or displacement.

In Alternatives A, B, C, D, and No Action, the majority of the area would be open to motorized travel, (see Table 2-1) allowing unrestricted travel which could cause potential adverse effects to cultural resources. These unmitigated actions would not be consistent with historic and cultural preservation regulations and laws.

Slight positive impacts will accrue from the information gained from inventory and mitigation work associated with high disturbance alternatives. However, low disturbance alternatives will result in a higher level of positive impacts, primarily in the form of the preservation of information. Riparian Management Areas or Riparian Reserves may be especially beneficial to the preservation of cultural resources because of the correlation of important cultural resources and water sources. Affirmative measures common to all alternatives, such as interpretation, law enforcement monitoring, and noncompliance inventory and evaluation, will also result in positive impacts.

However, some adverse impacts will occur regardless of which alternative is selected for implementation, due in large part to natural deterioration and erosion.

Effects on Visual Resources

Clearcutting, road construction, and most other timber management practices change vegetative patterns, alter species composition, alter the land surface, and thereby cause visual impacts. The severity of an adverse visual impact depends on many factors, including:

- Type of harvest - location, number, size and shape of cutting units.
- Yarding method - location and design of roads.
- Amount and treatment of logging slash and road construction debris.
- Visibility of disturbed areas.
- Pretreatment condition (i.e., scenic quality) of a viewshed.

Other land disturbing activities can also alter the landscape. Powerlines, new recreation sites, Off Highway Vehicle use, microwave relay sites, and drilling platforms are all examples of other activities which alter a viewshed. Generally, viewsheds that are noticeably altered can be further modified with less adverse visual impact than viewsheds with little or no

visible alteration. In some situations, visual impacts from management practices can be beneficial. Examples are the removal of dying or dead trees, thinning foreground vegetation to create pleasing views, and the manipulation of contrasting cutting boundaries, especially on ridgetops.

Under Alternative E or the PRMP, relatively few impacts to visual resources would result in closed or limited designations as a result of Off Highway Vehicle use since all of the district would be restricted or closed to motorized use.

Under Alternatives A, B, C, D and the No Action Alternative, the majority of the District would remain open to Off Highway Vehicle use. See Table 2-1. Impacts in these areas would be consistent with Visual Resource Management Class IV objectives, but would not be fully compatible with Visual Resource Management II objectives which imply that the existing character of the landscape would be retained and that the level of change to the characteristic landscape would be low.

In each of the alternatives the Visual Resource Management classes and management objectives differ from the inventory classifications of areas shown in Map 3-8. The Visual Resource Management classes and objectives of an alternative are designed to fit into the overall resource management emphasis of the alternative. Visual Resource Management designations as shown in Table 4-17 in the PRMP (Map 2-3) are compared to the Visual Resource Management inventory (Map 3-8). Downgrading would result in a higher level of vegetative disturbance in affected areas. The effect of downgrading might be to lower the scenic quality of affected areas. However, BLM's ability to affect an area's overall scenic quality depends to a large extent on land ownership patterns. In more than 60 percent of the areas inventoried, non-BLM lands and management practices dominate the landscape, and this may have a greater effect on overall scenic quality than activities on downgraded BLM-administered lands.

Table 4-17. Visual Resource Management Inventory Comparison to PRMP Designations.

	Inventory		PRMP Designation	
	Acres	%	Acres	%
VRM I	25	.1	28	.1
VRM II	86,779	20.6	118,045	4.3
VRM III	22,855	5.4	4,385	1.0
VRM IV	310,501	73.9	396,546	94.6
Total	420,160	100	419,004	100

Table 4-18 shows probable changes in visual resource conditions in the short term due to management activities under each alternative.

Under all alternatives, no adverse changes in visual resource conditions are expected on approximately 4,200 acres of BLM-administered land listed below because they would be managed to meet Visual Resource Management inventory standards.

Table 4-18. Probable Changes in Visual Resource Conditions in the Short Term.

Inventoried VRM Class	Existing Condition[1]	Visual resource condition changes[2]						
		NA	A	B	C	D	E	PRMP
I	good	0	0	0	0	0	+	0
II	good	-	-	-	0	+	+	0
III	fair	-	-	-	+	+	+	+
IV	poor	0	0	0	+	+	N/A	+

[1] Condition estimated by district landscape architect based on field observations.
Good = slightly altered viewsheds with scenic value
Fair = moderately altered viewsheds
Poor = highly altered viewsheds with low scenic value
[2] + = beneficial, 0 = none or negligible, - = adverse. Ratings of change (+, -, 0) represent the anticipated effect of timber management and other commodity development on existing visual resource conditions, taking into consideration: (1) VRM class objectives for affected areas; (2) probable effects of upgrading/downgrading; (3) land ownership patterns and adjacent land uses, and (4) level of timber harvest and other commodity development within the next 10 years. (See Chapter 2 Visual Resources Management Common to All Alternatives for background information regarding ratings.)

Special Areas

Beatty Creek
Myrtle Island
Brads Creek
Tater Hill
North Myrtle Creek
Golden Bar
North Umpqua Wild and Scenic River
Little River Arch
Red Pond Environmental Education Area

Recreation Site

Susan Creek
Mili Pond
Rock Creek
Cavitt Creek
Scaredman
Tyee
Gunter Wayside
Cow Creek Recreation Gold Pan Area
Swiftwater
North Umpqua Wild & Scenic River
Lone Rock Boat Launch
Emile

On the remaining acres of BLM-administered land, changes in visual resources conditions would vary by alternative because of downgrading of inventory classes. See Table 4-18.

Under the No Action Alternative, general visual resource conditions on BLM-administered land would continue in a moderate decline due to Visual Resource Management Class IV management of lands inventoried as Visual Resource Management Classes II and III and continuation of the management directions established in 1983.

Alternative A would be the most detrimental alternative for visual resources due to Visual Resource Management Class IV management of areas inventoried as Visual Resource Management Classes II and III. An adverse impact on visual resources would occur in the short term due to widespread vegetative disturbances.

Under Alternative B, Visual Resource Management Class IV management would be applied to areas inventoried as Visual Resource Management Classes II and III except those areas within _-mile of highly sensitive areas such as major highways. An adverse impact on visual resources would occur due to widespread vegetative disturbances.

Under Alternative C, inventoried Visual Resource Management Cass II areas which fall within areas managed for 15 to 20 percent basal area retention would in essence be managed as Visual Resource Management Cass III. An adverse impact on visual resources would occur due to widespread vegetative disturbances.

Alternative D would benefit visual resources because all lands would be managed to inventory standards. Scenic quality would be maintained or improved on BLM-administered lands.
Alternative E would be the most beneficial alternative for visual resources because it would provide for the least amount of vegetative disturbance. Unharvested areas would be maintained at inventory class conditions or better. All high value scenery and sensitive viewing areas would be protected from noticeable disturbance. The condition of areas with moderate to low value scenery and/or low sensitivity would improve in the long term because Visual Resource Management IV areas would be managed to Visual Resource Management III standards. However, there would be sharp contrast between intermingled ownership.

Under the PRMP, there would be 87,204 acres which would be changed from Visual Resource Management inventory standards (68,734 Visual Resource Management II acres designated to Visual Resource Management III or IV and 18,470 Visual Resource Management III acres designated to Visual Resource Management IV).

Effects on Wild and Scenic Rivers

River related values within approximately _-mile of the existing Congressionally designated North Umpqua River Wild and Scenic River would not be significantly impacted by BLM resource management activities, as their riverine values would be fully protected under all management alternatives.

Interim management would be implemented under all alternatives to fully protect river related values of the three river segments (Cow Creek, South Umpqua River, main stem Umpqua River) determined to be eligible for inclusion as components of the National Wild and Scenic Rivers System, but which are not being studied for suitability in the Resource Management Plan. This interim protection would continue pending resolution of the wild and scenic river issue involving these eligible river segments. The following environmental consequences discussion relates solely to the two BLM-administered river segments (Smith River and

Canton Creek) being studied for suitability in the Resource Management Plan.

To be eligible for inclusion as a component of the National Wild and Scenic Rivers System, a river or river segment must be in a free flowing condition and possess at least one river related value determined to be outstandingly remarkable. These two Congressionally established criteria are used to judge changes in resource conditions, particularly adverse changes. If resource management activities inherent to a specific alternative would alter flow characteristics of a study river segment, or degrade the segment's river related Outstandingly Remarkable Values, the change created by the actions allowed under that alternative would be adverse.

Addressing first the impacts of BLM resource management activities on flow characteristics, none of the alternatives include management activities that would adversely affect the free flowing condition of the two study river segments (Canton Creek and Smith River). However, under alternatives where a river or river segment is found to be unsuitable for inclusion as a component of the National Wild and Scenic Rivers System, an externally proposed project, such as a dam, could be proposed. However, Section 10 (a) of the Federal Powers Act requires Federal Energy Regulatory Commission to consider consistency with federal or state comprehensive plans for improving, developing, or constructing a waterway prior to issuing licenses. Licensing by Federal Energy Regulatory Commission is restricted because of inconsistency with the Northwest Power Planning Council "protected area" designation. Designation would give congressional protection from hydroelectric development of the study segment, however, development is essentially foreclosed already under current regulations.

The impacts from BLM resource management activities under all alternatives would not cause changes in the river related values in the short term. Table 4-19 shows probable short-term changes in the Outstandingly Remarkable Value conditions of both of the river segments by alternative. The rationale supporting these determinations of condition change is presented in the separate suitability assessment for each study river. (Appendix R)

Fish was identified as the sole Outstandingly Remarkable Value for both Canton Creek and Smith River. As shown in Table 4-19, short-term changes to the fish-related Outstandingly Remarkable Value of these stream segments would not occur under any alternative.

Outside the protective land allocations prescribed under the No Action Alternative, most BLM-administered lands within the two study river corridors would be managed for timber production consistent with a variety of other uses. In terms of timber harvest, the No Action Alternative is most similar to Alternative B. The ten year scenario analysis for Alternative B, which may be applied to No Action, indicates that approximately 1,000 acres could be harvested in these corridors during the life of the plan (see Introduction to this chapter for discussion of the ten year scenario analysis). Under No Action, riparian buffers would be approximately 100 feet on each side of third order streams. Most of the Large Woody Debris required for proper stream function would be provided. (Murphy and Koski 1989) First and second order perennial or intermittent streams would not receive protection under the No Action Alternative. An adverse impact to water quality in these streams would be increased temperature and sedimentation. The flow from these streams would create a high risk to cause an adverse impact to both river segments. Peak flow events would be

Table 4-19. Probable Short-Term Changes in Outstandingly Remarkable Value Conditions for Study River Segments Under Each Alternative.

Study River Name	Highest Potential Classification	Value[1]	Probable Changes by Alternative[2] NA	A	B	C	D	E	PRMP
Canton Creek	Recreational	Fish	0	0	0	0	0	0	0
Smith River	Recreational	Fish/Wildlife	0	0	0	0	0	0	0

[1] identified outstandingly remarkable values
[2] + = beneficial - = adverse
0 = none or negligible (see Appendix 2-10 for the rationale supporting these determinations of condition change)

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transported immediately from first and second order drainages to both study river segments. Although the following discussion outlines some adverse impacts that would occur under Alternatives No Action, A, B, and C, none of the impacts would be sufficient to cause an adverse change to the fish Outstandingly Remarkable Value or affect the eligibility status and highest potential classification of Canton Creek and Smith River segments.
Outside the Riparian Management Areas prescribed under Alternative A, most BLM-administered lands within the two study river corridors would be managed for timber production. The ten year scenario analysis indicates that approximately 1,600 acres could be harvested and approximately five miles of road could be constructed in the corridors.

Outside the Riparian Management Areas prescribed under Alternative B, most BLM-administered lands within the two study river corridors would be managed for timber production consistent with a variety of other land uses. The ten year scenario analysis indicates that approximately 1,100 acres could be harvested and approximately three miles of road could be constructed that would occur in these two corridors. Under this alternative Riparian Management Area width would not provide sufficient Large Woody Debris in the long-term to third order and smaller streams. The fish Outstandingly Remarkable Value would experience a slight adverse impact due to slightly elevated water temperature, and an increased potential for channel scouring. Under Alternative B, the Riparian Management Area width would not provide sufficient Large Woody Debris in the long term and would preclude development of optimum conditions.

Riparian Management Areas under Alternative C would provide sufficient protection to the third order and larger streams. The smaller Riparian Management Area width protection provided to first and second order streams in the two study segments would result in an adverse impact to water quality, but because of the very small areas affected by harvest activity (ten year scenario analysis indicates a possible harvest of approximately 20 acres in Canton Creek and approximately 150 acres in Smith River) the affect on the fishery Outstandingly Remarkable Value would be minimal or nonexistent.

Under Alternatives D, E, and the PRMP short-term management activities would not impact the eligibility status of either Canton Creek and Smith River. The lower harvest level along with the Riparian Management Areas provided for under these alternatives would result in no adverse impact on the fisheries Outstandingly Remarkable Value.

Under the PRMP there would be no long term impacts that would cause a degradation of the fish Outstandingly Remarkable Value to a less than outstandingly remarkable condition.

Effects on Recreation

Recreationists visit BLM-administered lands to gain satisfying outdoor activity experiences. They accomplish this by participating in recreation activities within preferred surroundings or settings. The broadest segment of visitors will realize quality experiences when there is available to them a real choice among a diverse set of outdoor recreation opportunities. The degree to which a particular alternative would either beneficially or adversely affect a visitor's outdoor recreation experience depends on the management actions involved. Management actions which tend to improve opportunities for visitors seeking one form of recreation may diminish opportunities for visitors seeking other forms, since activity participation requirements and expectations vary so greatly from one recreation user group to the next.

The primary impacts of BLM resource uses and management practices on recreation (e.g., timber harvest, construction of roads and structures, and mineral development) are related to changes in settings. These may be physical alteration of resources available or new and different opportunities for social interaction with other forest visitors. They may also be regulatory actions such as road closures and limits on the length of time visitors may stay in a particular area or site. These setting changes affect the type and distribution of recreation opportunities available on BLM-administered lands, the levels and patterns of visitor use and, ultimately, the quality of recreational experiences desired by the visiting public.

For example, use of a recreation management area might be increased by new road construction. Under this circumstance, the setting condition change would provide more and easier access, allow use of recreation vehicles and equipment not previously possible in an unroaded setting, or foster additional social interaction among the area's visitors. On the other hand, use of the area for recreation purposes may temporarily or permanently decline if the area's overall setting is altered to the point where desired recreation experiences can no longer be realized by visitors. When experience expectations of people cannot be satisfied in a particular area, their natural inclination is to shift their use to other BLM-

administered lands or to areas administered by other public or private entities.

Dispersed recreation activity on BLM-administered lands throughout the planning area would increase, as visitor demands for such use increases, under all Alternatives. Although levels of use might change from alternative to alternative, the differences are considered minor. Of particular relevance is the fact that BLM-administered lands and waters and the transportation system providing access to them are extensive and would not be used to capacity during the short-term period for many preferred activities under any alternative. Even Alternatives D, E, and the PRMP which would limit motorized vehicle use to existing roads and trails on most BLM-administered lands, would continue to provide more than adequate opportunities for public participation in many of the dispersed recreation activities with no appreciable deterioration in experience quality, and could provide a higher quality hunting experience for some hunters.

Table 4-20 shows anticipated short-term capability of BLM-administered facilities and resources to meet projected recreational demand for 11 major use categories by alternative.

Under the No Action Alternative, projected demand would be met for all recreation uses in the short term with four exceptions. "Demand for other land based use" activities, which includes picnicking, would probably not be met in certain locations in the district because of an absence of developed picnicking facilities. Particularly at the south end of the district,

Table 4-20. Anticipated Short-Term Capability of BLM-Administered Facilities and Resources to Meet Projected Recreational Demand for 11 Major Use Categories by Alternative.

Recreation Use Category[1]	Projected Demand (in Visits for Year 2000)[2]	Anticipated Capability to Meet Demand:						
		NA	A	B	C	D	E	PRMP
Off-road travel (e.g., driving motorcycle, ATV and 4X4 vehicles off the road)	74,200	yes	yes	yes	yes	no	no	no
Motorized travel (e.g., sightseeing and exploring)	126,500	yes	yes	yes	yes	yes	yes	yes
Nonmotorized travel (e.g., bicycling, day hiking/backpacking and horseback riding)	168,800	no	no	no	no	yes	yes	yes
Camping	71,500	no	no	no	no	yes	yes	yes
Hunting	48,900	yes	yes	yes	yes	yes	yes	yes
Other land-based use (e.g., picnicking, studying nature and viewing wildlife)	148,400	no	no	no	no	yes	yes	yes
Fishing	75,500	yes	yes	yes	yes	yes	yes	yes
Boating	21,500	no	no	no	yes	yes	yes	yes
Other water-based use (e.g., swimming, general waterplay, tubing)	25,200	yes	yes	yes	yes	yes	yes	yes
Winter sports (e.g., cross-country skiing, snowshoeing and sledding/snowplay)	0	NA	NA	NA	NA	NA	NA	NA
Snowmobiling	0	NA	NA	NA	NA	NA	NA	NA
TOTAL	760,500							

[1] Source USDI - Bureau of Land Management, Recreation Management Information System.
[2] Extrapolated from Hospodarsky, Denver, 1989. The Pacific Northwest Outdoor Recreation Consumption Projection Study Oregon Project, Final Report. Oregon State University.

there are few opportunities under the No Action Alternative for the public to picnic in developed sites. Development of such sites at various man made ponds scattered throughout the southern end of the district was not included as a part of the 1983 land use plan under which BLM is currently operating. Demand for camping would not be completely met in certain locations because of the current absence of campground facilities in those locations. Demand for boating activities would likewise probably not be met under this alternative. There is a need to develop additional boat launch facilities. Nonmotorized travel use, primarily that related to developed trail systems, would not be met since several potential trails capable of handling hiking, backpacking, horseback riding, and mountain biking were not included as part of the 1983 land use plan. Management actions carried out under the No Action Alternative, however, are not expected to adversely affect the experience expectations of forest visitors either for preferred dispersal recreation activities or for activities dependent on developed recreation facilities.

Projected demand would not be met for several recreation uses in the short term under Alternatives A and B. During the ten year period it is possible that some prescribed management activities, primarily the estimated 3,235 timber harvest units totaling 74,040 acres under Alternative A, and the estimated 2,924 timber harvest units totaling 65,553 acres under Alternative B, could adversely affect visitor experience expectations to the point that participation in some preferred recreation activities would be sought on lands managed by other government agencies or the private sector. Neither of these alternatives includes an allocation for lands covering the Cow Creek or Umpqua River Special Recreation Management Area.

Under Alternative A all existing high use recreation sites and all trails would continue to be managed for recreation. No additional facilities or trails would be developed. Projected demand for facility dependent activities would not be completely met other than for those dispersed recreation activities requiring additional miles of road access. Demand for Off Highway Vehicle use would be met in most areas, however it would not be met on 2,166 acres of land which would remain closed to Off Highway Vehicle use.

Under Alternative B, all existing recreation sites and trails would continue to be managed for recreation. In addition, three new recreation sites would be added. Projected demand for facility dependent activities would not be completely met other than for those dispersed recreation activities requiring additional miles of road access. Demand for Off Highway Vehicle recreation use would be met in most areas, however, this use would not be allowed in 10,841 acres closed to Off Highway Vehicle use. Under both Alternatives A and B, parts of the district (generally the north end) would continue to meet most of the recreation demand. However, the south end of the district which currently has little in the way of recreation development, would fail to meet a growing need for facility dependent activities.

Under Alternative C, projected demand would be met for most recreation uses in the short term with three exceptions. "Other land based use", which includes picnicking, would probably not be met in certain locations in the district because of an absence of developed picnicking facilities. Particularly at the south end of the district, there are few opportunities for the public to picnic in developed sites, and this situation would continue under Alternative C. There is also a growing need for group reservation camping facilities which would not be met under Alternative C. "Nonmotorized travel use", primarily that related to developed trail systems, would still not be met since several potential trails capable of handling hiking, backpacking, horseback riding, and mountain biking would not be proposed for development under Alternative C. Demand for Off Highway Vehicle recreation use would be met in most areas, however, this use would not be allowed in 11,665 acres closed to Off Highway Vehicle use. It is anticipated that management actions carried out under this alternative would not adversely affect the experience expectations of forest visitors, either for preferred dispersed recreation activities or for activities dependent on developed recreation facilities.

In Alternative E and the PRMP, the effects of limited and closed public lands to Off Highway Vehicle uses to motorized dependent users (Off Highway Vehicle enthusiasts, wood gatherers, some hunters and rockhounds) would not meet use demands. In contrast, the same alternatives would promote the recreational experience of some hunters, campers, explorers, hikers, mountain bikers, etc. with limited controls on motorized use, i.e., limitations and closures to motorized use.

Under Alternative E and the PRMP, projected demand for all other recreation uses in the short term would be met. Hunting, hiking, horseback riding, nature study, and viewing wildlife would be benefitted by selective road closures and off highway travel restrictions. Actions carried out under these alternatives would not adversely affect the experience expectations of most forest visitors, either for preferred dispersed recreation activities or for

activities dependent on developed recreation facilities.

As shown, projected demand for all recreation uses would be met under Alternatives D, E and the PRMP. This conclusion appears valid even though the FSEIS presents evidence to the contrary regarding recreation activities dependent on landscape settings with little development, little management activity, and no motorized access. Stated another way, the supply of acres providing opportunities for primitive and semiprimitive, nonmotorized recreation activities would not meet anticipated demand over the short term. There is a two part explanation for this apparent inconsistency. First is the matter of landscape scale. The FSEIS considered a vast area encompassing the range of the northern spotted owl, including federal forests of the Pacific Northwest and northern California. The Table 4-20 assessment of anticipated capability to meet demand represents a very localized perspective and considers only BLM-administered lands within Roseburg District boundaries. Short-term demand for nonmotorized travel activities can be met within the district, even though there is evidence that demand for similar recreational activities cannot be met within the larger region during the same period. The second part of the explanation deals with how demand and supply were analyzed. The FSEIS considered recreation needs in terms of setting category (i.e., acreage). Table 4-20 considers recreation demand in terms of recreational use (i.e., visitation). Visitation analysis for this RMP has determined that it is possible to fully meet demand for activities listed under the nonmotorized travel recreation use category (including uses such as bicycling, day hiking/ backpacking, and horseback riding), without having cumulatively large acreages categorized in the primitive and semiprimitive nonmotorized settings. This is because roaded settings in the Roseburg District have, more often than not, accommodated these particular recreational activity preferences and met visitor experience expectations. It is assumed that these roaded settings will continue to provide opportunities for nonmotorized recreation activities through the short term.

Effects on Timber Resources

Each of the alternatives described in Chapter 2 would affect BLM's timber resource and its availability for harvest in a different way. The management decisions contained in the final plan will directly affect the manner in which the age, size, type, distribution, and productivity of district timber stands change over time. These characteristics of the forest, in turn, help determine the nondeclining even flow, as well as the size and quality of timber that will be available for harvest.

The Probable Sale Quantity under all alternatives would be based on the objective of providing a nondeclining even flow of forest products. The Probable Sale Quantity level would depend on the number of acres allocated to the various levels or intensities of timber management, the sustained yield capacity of those acres, and the initial volume and age class distribution of the timber. Additionally,the nondeclining yield may be constrained by any of the following:

- Allocations established for the benefit of other resources.
- Economic feasibility of management on specific tracts.
- Limitations on intensity of timber management.
- Minimum harvest size or age standards.

The Timber Production Capability Classification system described in the timber resources section of Chapter 3 and in Appendix BB refers to the Suitable Commercial Forest Land and Suitable Woodland categories. Suitable Commercial Forest Land sites are judged to be suitable to manage for a sustained yield of commercial conifer species, and are included in the land base used for Probable Sale Quantity calculations under all alternatives, unless excluded for other reasons.

Some Suitable Woodland sites may be capable of producing a sustained yield of forest products, but would generally require a longer regeneration period (due to reforestation problems) and/or a longer rotation (due to low site quality) to produce a commercial product. Other Suitable Woodland sites are capable of producing a sustained yield of only noncommercial species. Under Alternatives A, B, and C, some portions of the Suitable Woodland sites are included in the Probable Sale Quantity calculations.

Some researchers suggest productivity, even on Suitable Commercial Forest Land sites, may not be sustainable over the long term under an intensive management regime such as that proposed for Alternatives No Action, A, and B. Soil fertility may be diminished over time by repeated cycles of harvest, site preparation, and control of competing vegetation (Perry and Maghembe 1989).

In addition, the simplification of the ecosystem that is associated with an intensively managed forest may result in less resistance to insect pests and pathogens and less ability to adapt to changing environmental conditions, such as a potential long-term climate change or increased levels of air pollution (Franklin et al. 1989). The most intensive management would occur under Alternatives No Action, A, and B. Alternative C and the PRMP incorporate biodiversity considerations and Alternatives D and E intensively manage decreasing portions of the land base respectively, compared to Alternatives No Action, A, and B.

The acreage of Suitable Commercial Forest Land that is allocated for protection or management of nontimber resources varies among the seven planning alternatives. The allocation of lands to timber production determines how many acres would be available for harvesting. Table 2-1 displays the acres available for unconstrained timber production by alternative for each category of Suitable Woodland and Suitable Commercial Forest Land.

Under the PRMP, there is a provision for retention of late-successional fragments where federal forest lands, on a fifth field watershed (approximately 20 to 200 square miles) basis, are currently composed of 15 percent or less of late-successional forests. The likelihood of a substantial change from the outcomes projected in the SEIS is low.

The TRIM-Plus computer harvest scheduling model was used to produce an estimate of the Probable Sale Quantity for the sensitivity analyses. Empiric yield tables (derived from the timber inventory) provided the initial volume of existing stands, and the ORGANON, a computerized stand growth and yield simulator, generated yields for future managed stands.

For each of the basic land use allocations and most of the management prescriptions, the TRIM-Plus model projected the age, size, and cubic foot volume of timber that could be harvested each decade for up to 40 decades. In the case of Alternative C, and Connectivity/Diversity Blocks under the PRMP, these projections are more speculative than the Probable Sale Quantity projections for the other alternatives. The prescriptions for Alternative C call for retention of a portion of the stand at harvest, development of stands with multiple canopy layers, maintenance of wider tree spacing by means of a series of intermediate cuttings, and management on rotation lengths sufficient to attain old-growth structural characteristics. There is currently little available research that quantifies the expected timber yields from such stand management regimes.

Appendix K contains a brief description of the Probable Sale Quantity computation process.

The Probable Sale Quantity would be greatest under Alternative A and least under Alternative E, with the Probable Sale Quantity for the other alternatives falling in between those extremes. Table 4-21 displays the Probable Sale Quantity produced by the TRIM-Plus model for each alternative. The Probable Sale Quantity is defined as an annual even flow quantity based on cubic foot measure; however, the board foot equivalent may vary somewhat over time as progressively younger, smaller diameter stands are harvested. Board foot equivalents are shown for decades 1, 2, 3, 5, 10, and 20 of the plan.

Under Alternative C, some timber harvest volume in addition to the even flow quantity calculated for the Probable Sale Quantity would be removed as partial cuttings from the blocks of land designated for restoration and retention of mature and old-growth forest. Partial cuttings from these blocks would be

Table 4-21. Probable Sale Quantity of the Alternatives by Decade.

Alternative	MMCF	MMBF					
		1	2	3	5	10	20
NA	405	2470	2397	2185	1947	1836	1879
A	477	3150	3070	2810	2480	2340	2420
B	440	2910	2820	2570	2290	2160	2210
C	112	740	740	730	620	720	740
D	143	920	910	900	840	810	800
E	32	180	160	160	160	170	200
PRMP	70	453	477	426	415	423	458

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Table 4-22. Average Age at Regeneration Harvest by Alternative and Decade.

Alternative	Decade 1st	2nd	3rd	5th	10th
NA	314	158	102	61	61
A	227	160	96	50	37
B	222	154	91	51	40
C	177	187	201	89	156
D	167	154	140	93	64
E	82	45	45	50	65
PRMP	167	166	157	104	116

designed to accelerate development of old-growth structural characteristics in younger stands contained in the blocks.

Under Alternatives No Action, A, and B, the average age and diameter of harvested timber stands would decline over time, approaching the minimum harvest age specified for each alternative. Under Alternatives C through E and the PRMP, the average age and diameter at harvest would remain about the same or increase as some stands are placed on longer rotations. Table 4-22 shows the average age at regeneration harvest by alternative and decade.

In Alternatives No Action, A, B, D, and E, the minimum harvest age (40 to 60 years) was allowed to be determined by the TRIM-Plus Harvest Scheduling model to optimize the Probable Sale Quantity level. In contrast, the minimum harvest age for the General Forest Management Area under the PRMP was assigned two configurations. A Culmination of Mean Annual Increment minimum harvest age, ranging from 80 to 110 years for the Roseburg District depending on stand type and treatments, was used for all future stands. The currently managed stands, those stands which have already been harvested and planted, were given a minimum harvest age of 60 years. The use of minimum harvest age set to less than the Culmination of Mean Annual Increment for an individual stand allows the restructuring of the district's age class distribution. On any large forest resource land base maximizing yields over the long term under a nondeclining even-flow scenario requires having a balanced age class distribution available for harvest scheduling. Without a balanced distribution of age classes the use of a Culmination of Mean Annual Increment minimum harvest age could constrain the Probable Sale Quantity level. The current age class distribution of the Roseburg District can be characterized as bimodal. To optimize yields under the PRMP, to balance the age class distribution in the General Forest Management Area, and to move towards attainment of a Culmination of Mean Annual Increment minimum harvest age, requires flexibility in minimum harvest age for harvest scheduling model in the short term.

Appendix HH displays volume and acres of final harvest by age class, for the first, second, third, fifth, and tenth decades of the plan, for each of the seven alternatives. Appendix PP shows the PRMP planned harvest for the first, second, third, fifth, and tenth decades.

Some additional volume, in the form of density management, will be derived from Late-Successional Reserves and Riparian Reserves, in order to meet the Aquatic Conservation Strategy or to develop late-successional stand characteristics. Volume could also result from the harvest after a catastrophic event within the above or other lands not available for regular harvest. The volume from these sources would not be part of the Probable Sale Quantity computation and therefore modeling would not be an issue. Timber volume from these other sources that are not part of the timber base is expected to be approximately ten percent additional volume to the computed Probable Sale Quantity. Although the SEIS displayed this "other volume" with the Probable Sale Quantity discussed in Chapters 3&4 of the SEIS, this additional volume is not shown with the computed Probable Sale Quantity for the Roseburg District in the PRMP. This "non-chargeable" volume from unscheduled timber sales for the enhancement of other resources may amount to approximately ten percent beyond the level of the Probable Sale Quantity.

Construction of new permanent roads, landings, and rock quarries would reduce the total acres of land available for timber production. Roads would be constructed to provide access to BLM timber sale areas and to adjacent non-BLM lands under the terms of right-of-way permits and reciprocal right-of-way agreements. The reduction in forest land acreage resulting from road construction would continue until all roads necessary to manage lands allocated to timber production are constructed. This length of time would vary by alternative.

The amount of land eventually taken up by permanent roads, which for practical purposes is considered an irreversible or irretrievable commitment of resources, would not be significantly different under any alternative except Alternative E and the PRMP which will have the least road

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construction. In addition, the PRMP provides for decommissioning roads or no net increase of roads in key watersheds.

Table 4-23 displays total mileage of permanent roads, and the acres taken up by the road system, for the first and fifth decades of the plan, by alternative. The table reflects that the district would be fully roaded at the end of the fifth decade.

Though dedication of land to permanent roads is an unavoidable adverse effect of timber management, the loss of timber production acres would be minimized by:

1. Careful advance planning to minimize the total length of road system needed, making effective use of available logging systems.

2. Building roads to the minimum width required for the expected use of each road.

3. Avoiding unnecessarily wide clearing limits in road design and construction.

4. Constructing temporary dirt spur roads, which are replanted after harvest, where permanent roads are not necessary.

5. Decommissioning existing roads based on watershed analysis.

Under all alternatives some live conifer trees would be left standing within harvest units to provide for wildlife habitat diversity. Retention of green trees results in a reduction in the Probable Sale Quantity. To maintain and improve the genetic base, some trees selected for retention under Alternative C and the PRMP would be commercial conifers of good form as well as minor species, including hardwoods. If trees with poor form are retained, the seed they disseminate may carry undesirable genetic traits unless such trees are girdled or topped.

Spread of the laminated root rot fungus, *Phillinus weirii*, would be favored by forest management regimes that emphasize timber harvest followed by prompt replanting of Douglas-fir, which is highly susceptible to *Phillinus*. This impact can be mitigated by replanting identified infection sites with tree species which are resistant or immune to the disease.

Intensive forest management practices would be implemented under every alternative, to some extent. However, under Alternatives No Action, A, and B, intensive practices would be applied to a greater proportion of the area than under the other alternatives. Table 4-1 displays the projected acres to which each practice would be applied, by decade and alternative. These acreage figures have been estimated for the purpose of analyzing potential environmental impacts. Actual acres of each type of harvest and stand treatment will vary in the course of implementation of the plan. Appendix II shows average acres treated by various practices by decade for each alternative.

Under Alternatives No Action, A, B, D, and the General Forest Management Area in the PRMP, genetically selected seedlings would be planted following regeneration harvest, to the extent that improved seed is available from the seed orchards. Under Alternative C, and the Connectivity/Diversity Blocks in the PRMP, genetically selected seedlings will comprise not more than half of the trees planted following regeneration harvest.

Table 4-23. Miles and Acres of Roads by Alternative.

Alternative	Existing Miles	Decade: First Acres	First Miles	Fifth Acres	Fifth Miles	Total Miles When Fully Roaded
NA	3,000	2,727	500	273	50	4,000
A	3,000	2,727	500	273	50	4,000
B	3,000	2,455	450	273	50	3,900
C	3,000	1,036	190	709	130	3,700
D	3,000	1,036	190	709	130	3,700
E	3,000	191	35	191	35	3,170
PRMP	3,000	350	65	195	36	3,200

Artificial reforestation has the potential to change the genetic makeup of forest stands, regardless if the seed used has been produced through a genetic improvement program. If the genetic variation of the forest is decreased through use of genetically improved or other seed sources, this may reduce resistance of the trees to attacks of disease or insects or to changes in the environment.

However, tree selection and breeding programs are designed to prevent excessive narrowing of gene pools or the complete loss of genetic traits. Moreover, genetic improvement may provide the only viable method of protecting genetic material in species whose existence is threatened by plant diseases, such as the white pine blister rust.

Use of genetically improved trees should result in accelerated growth rates and earlier attainment of merchantable stem sizes, as well as more rapid development of old-growth type structure. Under Alternatives No Action, A, B, D, E, and in the General Forest Management Area in the PRMP, the Probable Sale Quantity would reflect anticipated future yield increases from genetically improved stands.

Use of genetically selected trees should result in accelerated growth rates and earlier attainment of merchantable trees, as well as more rapid development of old-growth type structure. Under all Alternatives except C and the Connectivity/Diversity Blocks of the PRMP, the Probable Sale Quantity would reflect anticipated future yield increases from stands of genetically selected trees where stands are harvested within 100 years. In Alternative C and the Connectivity/Diversity Blocks of the PRMP, no future yield increases would be projected due to the uncertainty of the contribution of the genetically selected trees. A genetic gain is not projected in the final yield in Alternative C and the Connectivity/ Diversity Block portion of the PRMP that prescribe long rotations of 120 years or more. Genetic gains for long rotations of 120 years or more have not been substantiated.

See Appendix M for a more complete discussion of the effects of the tree improvement program.

Fertilization of managed stands would take place under all of the alternatives. Effects would include higher growth rates and earlier production of merchantable trees. Also, under Alternatives No Action, A, B, D, E, and in the General Forest Management Area under the PRMP the Probable Sale Quantity would reflect expected future gains resulting from fertilization.

Some type of intermediate harvest (commercial thinning or density management), is planned to occur under all of the alternatives on available forest sites where topography and road locations are suitable for partial cut logging operations. When applied to young, well stocked stands, thinning can produce an increase in total net yield and permit a higher Probable Sale Quantity. The yield increase results from early harvest of merchantable trees which otherwise would have died and become unusable before final harvest of the stand and, on some sites, from the response of residual trees to reduced competition. The increased Probable Sale Quantity results from the timing of intermediate harvests as well as from the higher total yield over a rotation. Depending on spacing of residual trees, thinning also can result in production of larger trees, higher stumpage values, and lower logging costs at regeneration harvest. Under Alternative C and in the Connectivity/Diversity Blocks under the PRMP, density management of young stands would be used to maintain open canopy conditions and promote retention of mixed species, as well as to accelerate development of old-growth structure conditions and prepare the stands for regeneration harvest in the future.

Without careful implementation, thinning and density management can result in damage to tops, crowns, bark, and roots of residual trees, reducing wood quality and increasing the risk of insect and disease attacks. These stands may also be more susceptible to windthrow in some locations.

Precommercial Thinning would be applied to overstocked young stands under Alternatives No Action, A, B, D, E, and in the General Forest Management Area under the PRMP, on sites allocated to timber production where analysis indicates the practice would be economically feasible. Precommercial Thinning would be used for restoration silviculture under Alternative C and in the Connectivity/Diversity Blocks under the PRMP, density management of young stands would be used to maintain open canopy conditions and promote retention of mixed species, as well as to accelerate development of old-growth structure conditions.

Some negative effects of Precommercial Thinning are at times evident. The increased vigor of stands which have received Precommercial Thinning may make the trees more susceptible to bark damage by bears in local areas. At times, Precommercial Thinning cutting assists the spread of the black stain fungus, especially in stands where soil compaction resulted from previous tractor logging.

Environmental Consequences

Overall, Precommercial Thinning usually results in a small increase in the Probable Sale Quantity, allows earlier development of a merchantable stand, and provides an opportunity to control density and species composition, and eliminate poorly formed and diseased trees early in the life of the stand.

When land exchanges result in acquisition of lands that would be allocated to timber production, the nondeclining harvest level (the Probable Sale Quantity) could be increased. Conversely, any exchanges of commercial timberland for tracts which would be allocated to nontimber uses would result in a decrease in the Probable Sale Quantity. The types of land that would be considered for exchanges would vary by alternative.

Under Alternatives B, C, D, E, and the PRMP, some BLM-administered lands would be allocated to receive special management practices due to the concerns of residents who live in close proximity. Such Rural Interface Areas would produce a lower yield of timber than other BLM Commercial Forest Lands because of limitations on vegetation management, types of harvest, and prescribed burning.

A sensitivity analysis or change in the Probable Sale Quantity for the PRMP was examined for scenarios where a number of silvicultural practices were not used. If no genetic stock were used, the Probable Sale Quantity would decrease by 2.6 percent. If no genetic stock were used and no fertilization were done, the Probable Sale Quantity would be reduced by 2.6 percent. If no genetic stock were used, no precommercial thinnings were conducted, and fertilization were not done, the Probable Sale Quantity would be reduced by 3.3 percent.

A sensitivity analysis or change in the Probable Sale Quantity for the PRMP was also examined for a scenario where the current critical habitat for the northern spotted owl was not available for timber harvest. Under this scenario, the Probable Sale Quantity would be reduced by 28.8 percent. Analysis also shows that harvest in the Key Watershed accounts for 18.6 percent of the Probable Sale Quantity computation under the PRMP. These two analyses are only to determine sensitivity of Probable Sale Quantity computation under the PRMP and are not intended to assign a specific harvest level to these land designations.

Adaptive Management Areas are unique to the PRMP, therefore, no comparison can be made with the other alternatives. Management activities in these areas will be conducted to achieve the objectives as described in Chapter 2. The Little River Adaptive Management Area has been modeled as General Forest Management Areas, Connectivity/Diversity Blocks, and Riparian Reserves in the approximate proportion that these land use allocations occur in the surrounding landscape. Since the management strategy to meet the objectives and emphasis of the Adaptive Management Areas is not prescribed and left open to local innovation, the Probable Sale Quantity associated with the Little River Adaptive Management Area is uncertain. Each Adaptive Management Area will ultimately have a plan that will include a short-term (three to five year) timber sale plan and long-term yield projections.

When merchantable live trees and dead and down material are reserved within harvest areas, there would be a reduction in yield to account for volume not being removed. Where any overstories were retained, there could be an additional reduction in growth of the next stand. Yields of existing stands were reduced to account for the volume of trees being retained on harvested units. The ORGANON model was employed to project reduced growth due to competition of the retained trees or overstory. In general, growth reduction due to retained trees or overstory competition would depend on how the retained trees are distributed, the position of the individual trees or clumps within the unit, the aspect of the harvest unit, and the size of retained trees. The Probable Sale Quantity of Alternatives C and the PRMP reflect the growth reductions in future stands due to retained overstory trees.

Retaining trees that display characteristics such as limbiness, excessive taper, and crooks or forks would have the potential for transmitting those traits to subsequent stands.

Wood quality refers to the physical characteristics of harvested logs and their suitability to produce valuable wood products. The most important wood quality factors are log size; wood density and strength; number, size, and type of knots; and proportion of juvenile wood.

Larger logs generally command a higher price per unit of measure than smaller logs because, in general, the larger diameter trees are more economical to fall, yard, and transport and can be converted into a greater variety of higher value wood products. To produce larger logs, timber must be grown either for long periods of time or at low densities to allow more rapid diameter growth.

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Wood density is closely related to strength which, in general, is related to the proportion of spring to summer growth, juvenile to mature wood, and genetic characteristics of the tree.

Knots are produced when wood is formed around live or dead limbs. The larger the limbs, the larger the knots. Generally, product value is reduced as the number and size of knots in the wood increase. Trees grown in lower density stands are likely to have more and larger limbs, and therefore more and larger knots, than trees grown in higher density stands.

Juvenile wood refers to the wood that forms in the portion of a tree within the live crown. More accurately, it is the initial core of wood produced during the first few decades of the life of a tree. Juvenile wood typically has lower density and strength with a greater tendency to warp than mature wood which forms in the part of a tree below the crown. Logs that contain high proportions of juvenile wood typically would have lower product values.

In the PRMP, pruning of managed stands could occur in suitable stands where the cost of the practice would show a positive present net value. Pruning at least the first log approximately ten years after precommercial thinning could produce lumber that has tight knots or is knot free, and would also reduce the proportion of juvenile wood. The lower occurrence of knots and juvenile wood characteristics would result in a higher quality product. Pruned stands could also have a reduced risk of crown fires once pruned limbs have decayed.

Under Alternatives NA, A, B, E, and the General Forest Management Area portion of the PRMP, timber management practices are designed to maintain well spaced stands and rapid growth, with harvests scheduled on short rotations (40 to 60 years under alternatives NA, A, B and E; 80 to 110 years under the PRMP). This combination of factors is likely to result in the production of wood of lower quality and value per unit volume in the future than under the longer rotations of Alternatives C, D, and in the Connectivity/Diversity Blocks of the PRMP.

Under Alternatives C, D, and in the Connectivity/ Diversity Blocks under the PRMP, timber stands would be managed at wider spacings than the other alternatives and with rotations of 150 years or more. Trees grown on such regimes are expected to have very large diameters, but are also likely to have many limbs, low to medium density wood, large knots, and a large core of juvenile wood.

To retain recreation management options for future development of high value recreation sites and facilities, scheduled harvest of timber will not be allowed on these sites. The acreage involved varies by alternative, however, the most significant acreage is 1,620 acres in the North Umpqua Wild and Scenic River Corridor which would be withdrawn from lands allocated for timber production under all alternatives. The overall effect would be a slight decrease in the Probable Sale Quantity. Appendix JJ shows the summary effect of land use allocations on lands available for timber production.

Under the PRMP, the prescribed widths of Riparian Reserves are intended to be interim until the completion of watershed analysis that will enable managers and interdisciplinary teams to determine the appropriate width to meet the objectives of the Riparian Reserves. Post watershed analysis Riparian Reserves for permanently flowing streams should approximate the boundaries prescribed in the PRMP. However, post watershed analysis Riparian Reserve boundaries for intermittent streams may be different from those prescribed in the PRMP. These adjustments of Riparian Reserves could increase or decrease the acreage of Connectivity/Diversity Blocks and General Forest Management Area. Although this variability of Riparian Reserves on intermittent streams adds an element of uncertainty to the Probable Sale Quantity calculation, overall it is expected to have a negligible effect.

It is also possible that analysis could indicate the need to reduce or defer harvest in some watersheds for one or more decades. The number, size, and location of watersheds that may need to have harvest deferral is unknown as is the amount of time of the harvest deferral. With the Riparian Reserves and Aquatic Conservation Strategy of the PRMP, the number of watersheds that may require harvest deferral may be less than those alternatives with less protective watershed strategies. The possibility of watershed harvest deferrals and their magnitude is an uncertainty that is not reflected in the Probable Sale Quantity calculation.

Under the PRMP, certain species would require protection as outlined in the Record of Decision for the SEIS under the standard and guidelines for Protection Buffers, and Survey and Manage. Because the number and extent of these species and their protection requirements is not fully known, the impact on the Probable Sale Quantity is uncertain.

Timber Supply

An analysis of the timber supply for the Roseburg District has been conducted by the Pacific Northwest Research Station (USDA Forest Service). That study modeled the timber supply from each of the ownership categories in western Oregon. Timber supply from BLM in the Roseburg District under each alternative was then included, and overall economic timber supply for 1993-2000 was estimated. In this process the private timber supply was adjusted to account for price changes attributable to the different levels of BLM timber supply by alternative. Then a similar process was followed to estimate the outlook for the 2000-2010 period. The results are displayed in Table 4-24. Because this model has not been validated, its predictive capability is uncertain. However, it is useful for comparison of alternatives.

Compared to the 1984-88 baseline period, total timber harvest in the Roseburg District would decrease under all alternatives. The change in timber harvest would range from a 31 percent decrease in Alternative A to a 54 percent decrease in Alternative E. The decline in overall timber harvest in Alternative A would result in spite of an increase in BLM timber harvests.

The timber supply analysis estimated the amount of timber which would be harvested in the district by all sources from 2001 to 2010 using the same assumptions as for the previous period. The results indicate that total harvest for any given alternative would increase slightly from the first decade.

Table 4-24. Roseburg District Timber Harvest (1993-2000) - Millions of Cubic Feet (MMCF) per Year.

Supplier[1]	1984-88 Baseline	Alternative NA	A	B	C	D	E	PRMP
BLM[2]	41	39	48	44	11	14	3	7
USFS[3]	63	13	13	13	13	13	13	13
Private (industrial & non-industrial)	79	67	66	66	69	69	69	69
Other Public	0	0	0	0	0	0	0	0
Total	183	119	127	123	93	96	85	89

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Roseburg District Timber Harvest (2001-2010) - Millions of Cubic Feet (MMCF) per Year

Total	183	135	142	139	108	111	100	104

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Roseburg District Timber Processed (1993-2000) - Millions of Cubic Feet (MMCF) per Year

Total	178	129	137	134	103	106	96	100

Note: (1) Timber Processed from all sources was partitioned on county boundaries to approximate the BLM District, with the exception of the coastal portion of Douglas County which was included in Coos Bay District. (2) This analysis accounts for historic patterns of log flows across county boundaries. (3) Assumes all BLM districts have implemented the same alternative. (4) Includes logs exported overseas.

Data Source: Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

[1] Non-BLM supply partitioned to approximate BLM District. Excludes the coastal portion of Douglas County.
[2] Baseline data from BLM Facts, USDI-BLM. Converted from board feet using a factor of 6.2 bd. ft. per cu. ft.
[3] Assumes implementation of the President's Forest Plan.

Due to the fact that a portion of the raw logs harvested in the district are processed outside the district, the changes in available supply would affect areas outside the district also, but to a lesser degree. Similarly, these log flows affect the quantity of wood processed in the lumber and wood products industry in the district. Both inflows and outflows of logs affect the amount of wood actually processed in the district. Estimates of the amount of wood processed are shown in Table 4-24. Overseas log exports are not excluded. The wood processing sector would consume less wood under all alternatives than during the reference 1984-88 period. Differences between the amounts processed under different alternatives may be attributed to their Probable Sale Quantity levels.

The cumulative effects of the alternatives are shown in Table 4-25. This table shows projected timber harvests in western Oregon based on the assumption that each BLM district adopts the same alternative. The table does not include harvests in Klamath County because BLM's share of total harvests there is very small.

Compared to the 1984-88 baseline, BLM harvests would range from a 6 percent decrease in Alternative NA to an 82 percent decrease in the PRMP. Total harvests in western Oregon would decline under all alternatives, principally due to decreases in harvests on the National Forests. Total harvests would also decrease in all of the alternatives in the 2001-2010 time period, though they would be greater than harvests during the 1993-2000 time period.

Timber processed in western Oregon during 1993-2000 would also decrease under all alternatives. Logs exported overseas are included in this total.

Table 4-25. Western Oregon Timber Harvest (1993-2000) - Millions of Cubic Feet (MMCF) per Year[1].

Supplier	1984-88 Baseline	Alternative NA	A	B	C	D	E	PRMP
BLM	199	187	250	224	67	74	56	35
USFS[2]	376	60	60	60	60	60	60	60
Private (industrial & non-industrial)	603	618	610	614	634	634	638	640
Other Public	62	62	64	64	64	64	64	64
Total	1240	927	984	962	825	832	818	799

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Western Oregon Timber Harvest (2001-2010) - Millions of Cubic Feet (MMCF) per Year

Total	1240	1068	1124	1102	959	964	947	928

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Western Oregon Timber Processed (1993-2000) - Millions of Cubic Feet (MMCF) per Year

Total	1294	1115	1170	1148	1008	1014	997	979

Note: (1) Timber Processed from all sources was partitioned on county boundaries to approximate BLM Districts, with the exception of the coastal portion of Douglas County which was included in Coos Bay District. (2) This analysis accounts for historic patterns of log flows across county boundaries. (3) Assumes all BLM districts have implemented the same alternative. (4) Includes logs exported overseas.

Data Source: Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)
[1] Totals do not include Klamath Falls Resource Area.
[2] Assumes implementation of the President's Forest Plan.

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Effects on Special Forest Products

The alternatives would affect the availability of Special Forest Products primarily in two ways:

1. The alternatives would affect the availability of Special Forest Products by the degree to which they permit Special Forest Product harvest to occur. Acres closed to harvest or having seasonal restrictions could include Areas of Critical Environmental Concern, Research Natural Areas, or any of the categories listed in the Land Use Allocation section of Chapter 2, Special Forest Products. Alternatives NA, A, and B would provide the largest number of acres open/unrestricted for Special Forest Product harvest. Alternatives C, D, and E would have the fewest number of acres open/unrestricted. The PRMP would have the median number of acres available.

2. The alternatives would affect the availability of Special Forest Products by their objectives and silvicultural systems chosen to meet those objectives, especially timber management and forest health objectives. In general, Special Forest Products which are shade intolerant would be favored under Alternative NA, A, and B. Special Forest Products which are shade tolerant would be favored under Alternatives C, D, E, and the PRMP. Likewise, Special Forest Products adapted to younger forests would be favored under Alternative NA, A, and B. Special Forest Products that were more adapted to older forests or forests containing older components would be favored under Alternatives C, D, E, and the PRMP. Access to harvest sites is also a factor in Special Forest Product availabilities. Alternatives A, B, and D contain the greatest number of miles of proposed road construction. Alternative E contains the least. The PRMP is ranked sixth in proposed road construction.

With the exception of fuelwood, the size of the Special Forest Products program has limited the effects of harvests on the resource harvested and on other resources, impacts have generally been dispersed throughout the district and not concentrated in a few specific sites. The fuelwood portion of the program however, has resulted in a decline in the amount of wood available for commercial and home use. Affected most are areas along roads, especially above the road.

Properly harvested, many Special Forest Products can sustain repeated harvests with little or no short term effects on resource availability. Special Forest Products capable of repeated harvests are generally those with root systems that are not disturbed during harvest operations. These Special Forest Products would include: perennial, species which grow from rhizomes such as salal and Oregon grape, and many hardwoods which sprout from stumps. Mushrooms are also capable of repeated harvest provided the below surface parent mycelium remains healthy. For some species light disturbance may stimulate growth of new vegetation and production of mushrooms.

As the demand for Special Forest Products increases, the probability of impacts also increases. Management within an ecosystem based context is expected to maintain continued Special Forest Product availability

Effects on Energy and Minerals

The allocations and management prescriptions of the alternatives may affect availability of land for exploration and development of energy and mineral resources, by imposing operating constraints on leasable, locatable and salable mineral activity.

To assess these effects, constraints have been divided into three categories: (1) closures (including withdrawals); (2) severe restrictions (for leasable minerals, the equivalent is a prohibition of surface occupancy); and (3) moderate restrictions (for leasable minerals, other restrictions which exceed standard terms and conditions. Closures are further divided into discretionary (under the control of BLM) and nondiscretionary (imposed by legislation or under the jurisdiction of another agency).

Severe restrictions can be imposed for locatable mineral development in Areas of Critical Environmental Concern, Research Natural Areas, and corridors of designated wild and scenic rivers. No surface occupancy on mineral leases is also considered a severe restriction. Seasonal operating and Visual Resource Management constraints are considered moderate restrictions. Seasonal operating restrictions which may be utilized to protect wildlife during spawning or mating periods, or possibly limit salable mineral entries near a Rural Interface Area, are considered moderate restrictions. Visual Resource Management restrictions can be imposed on mineral leasing and salable mineral entries. Visual Resource Management constraints may also apply to locatable mineral entries along a river designated as

wild or scenic, and in some cases these constraints may be severe.

Existing community pit designations will continue under all alternatives. The establishment of community pits for salable mineral use by the BLM creates a superior right to remove mineral materials from the sites against subsequent mining claims. Existing power site withdrawals, which can severely restrict locatable mineral operations, would also remain in effect.

Tables 4-26 through 4-29 show by alternative, the acres of land available for, as well as restricted to, mineral development. Alternatives No Action, A, and B make more acres of land available to mineral development. Likewise, Alternatives C, D, E, and the PRMP illustrate the restrictive effects of closures and restrictions on the availability of lands to mineral entry. Under all Alternatives over 99 percent of the mineral estate would be available for mineral development.

There is no significant difference between the alternatives in opportunities for leasable or locatable mineral development or salable mineral disposal including the No Action Alternative. Therefore there would be no expected reduction in these types of mineral developments under any alternative as compared to current restrictions. The irreversible and irretrievable commitment of resources will be the amounts of mineral commodities actually removed from the public lands.

No significant impacts are expected on mineral development or the environment under Alternatives A, B, C, D, and No Action as a result of maintaining the majority of the district open to motorized use. See Table 2-1.

Under Alternative E and the PRMP (which have the most restrictive motorized designations), limited Off Highway Vehicle areas would have the same effect on miners as on the general public. Therefore, a miner wishing to operate off designated roads or trails would have to file a mining "Notice" which would constitute authorization for the proposed activities, so long as Off Highway Vehicle travel did not cause unnecessary or undue degradation. Mineral activities proposed in "closed" areas would be allowed after a plan of operations was filed and processed. (43 CFR 3809.1-4(c))

Effects on Socioeconomic Conditions

Introduction

Each alternative analyzed in this Final RMP/EIS proposes varying management prescriptions that would alter the production of commodity outputs and other natural resource values associated with BLM-

Table 4-26. Locatable Mineral Availability by Alternative (Acres).

Restrictions	Mineral Potential	Alternative NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Non-	Moderate	82	82	82	82	82	82	82
Discretionary	Low	212	212	212	212	212	212	212
Closed:	High	375	0	213	371	533	533	533
Discretionary	Moderate	425	171	521	1,083	1,098	1,098	1,098
	Low	2,116	1,948	2,671	3,125	3,125	4,497	3,125
Open: Standard	High	22,699	23,044	22,831	22,673	21,118	22,511	21,118
Requirements	Moderate	84,157	84,411	84,061	83,499	79,447	83,484	79,447
	Low	288,493	288,771	287,828	287,374	265,682	285,275	265,682
Open:	High	1,346	1,376	1,376	1,376	2,769	1,376	2,769
Additional	Moderate	3,314	3,314	3,314	3,314	7,351	3,314	7,351
Restrictions	Low	16,154	16,044	16,264	16,264	37,956	16,991	37,956

Table 4-27. Oil and Gas Availability by Alternative (Acres).

Restrictions(X)	Mineral Potential	Alternative NA	A	B	C	D	E	PRMP
Closed:	High	28	28	28	28	28	28	28
Non-	Moderate	0	0	0	0	0	0	0
Discretionary	Low	0	0	0	0	0	0	0
Closed:	High	0	0	0	0	0	0	0
Discretionary	Moderate	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0
Open: No	High	4,048	1,405	4,821	5,254	5,805	5,805	4,847
Surface	Moderate	589	462	589	589	765	765	765
Occupancy	Low	3,451	3,842	3,375	4,071	4,071	4,071	4,071
Open: Standard	High	141,657	144,290	132,200	126,988	34,686	76,722	131,283
Stipulations	Moderate	74,278	74,405	73,267	73,197	42,740	54,194	3,526
	Low	173,011	160,254	161,906	151,010	82,349	121,819	151,520
Open:	High	10,106	10,106	18,780	23,559	114,310	73,274	19,671
Additional	Moderate	1,790	1,790	2,801	2,871	33,152	21,698	2,366
Restrictions	Low	10,425	22,791	21,606	31,806	100,467	60,997	31,296

X Total Acreage includes 1,717 acres of split estate.
Not all additional restrictions are additive because of overlaps.

Table 4-28. Geothermal Availability by Alternative (Acres).

Restrictions(X)	Mineral Potential	Alternative NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Non-	Moderate	0	0	0	0	0	0	0
Discretionary	Low	28	28	28	28	28	28	28
Closed:	High	0	0	0	0	0	0	0
Discretionary	Moderate	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0
Open: No	High	0	0	0	0	0	0	0
Surface	Moderate	0	0	0	0	0	0	0
Occupancy	Low	8,371	6,128	9,204	10,333	11,060	11,060	10,063
Open: Standard	High	0	0	0	0	0	0	0
Requirements	Moderate	0	0	0	0	0	0	0
	Low	390,399	391,338	382,794	372,622	307,547	297,450	372,307
Open:	High	0	0	0	0	0	0	0
Additional	Moderate	0	0	0	0	0	0	0
Restrictions	Low	22,291	23,595	29,063	38,106	102,454	112,551	38,691

X Total acreage includes 1,717 acres of split estate.

administered lands. Alternatives NA and A through E have been carried forward from the Draft RMP/EIS and reanalyzed within the context of changed U.S. Forest Service management direction specified in the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl and decisions in the SEIS Record of Decision. While the alternatives only represent actions which could occur on BLM-managed lands, many analytical components of the plan consider the relationship between BLM-administered lands and other federal, state, and private landowners. In order to estimate what future actions are likely to occur on U.S. Forest Service lands, and in order to enhance the discussion of cumulative impacts, the economic analysis has drawn heavily upon the analyses conducted by the Forest Ecosystem Management Assessment Team in the Forest Ecosystem Management report and the SEIS and decisions in the SEIS ROD.

No estimates have been made of the economic contributions to local personal income and employment that could be made by any potential developments such as mineral, energy, communication, hydroelectric, and fishing. The timing, duration, and degree of such developments are speculative and cannot be estimated at reasonably accurate levels given current information.

Impacts to Resource Uses

The availability of commodities, natural resources, and opportunities would be altered by each alternative. Commodity uses generate measurable economic activity, both within and beyond the district. These activities include timber production and harvest, mining, recreation, special forest products, and fisheries production.

In addition to these activities, natural resources also have values that do not generate measurable economic activity within markets. These nonmarket values include: scenic areas, water quality, recreational use, nature study, cultural and subsistence hunting and gathering, and historic and prehistoric sites and resources. These values are demonstrated by people who express a desire for these resources or opportunities on public lands. These nonmarket values are to some extent reflected in changes in visitor use, but are not sufficiently quantifiable to be compared to other values in the socioeconomic analysis.

Table 4-29. Salable Mineral Availability by Alternative (Acres).

		Alternative						
Restrictions(X)	Mineral Potential	NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Non-	Moderate	28	28	28	28	28	28	28
Discretionary	Low	0	0	0	0	0	0	0
Closed:	High	0	0	0	0	0	0	0
Discretionary*	Moderate	6,689	4,446	7,522	8,651	9,378	9,378	8,387
	Low	0	0	0	0	0	0	0
Open: Standard	High	1,890	1,890	1,890	1,890	1,890	1,890	1,890
Stipulations	Moderate	405,546	407,789	404,713	403,584	378,857	402,857	379,848
	Low	0	0	0	0	0	0	0
Open:	High	0	0	0	0	0	0	0
Additional	Moderate	5,218	5,218	5,218	5,218	29,218	5,218	29,218
Restrictions+	Low	0	0	0	0	0	0	0

X Total acreage includes 1,717 acres of split estate.
* Withdrawals, ACECs, cultural sites, areas suitable for designation as a recreational river.
+ Time restriction within 1/4 mile of any migratory bird site.

Timber

Timber markets within the Northwest region have undergone significant changes since the 1984-1988 baseline period. Two forces particularly relevant to federal timber supply and stumpage price are: the curtailment of federal timber sales due to court injunctions, and the adoption of the SEIS ROD by the Secretaries of Agriculture and the Interior, and thus the U.S. Forest Service and the BLM. The curtailment of federal timber sales within the range of the Northern Spotted Owl resulted in forest industry reliance on sales remaining under contract for federal timber harvest since 1992. This volume is now essentially exhausted on the lands of both agencies.

The April 1994 SEIS ROD projected future timber harvest levels significantly lower than those identified in the U.S. Forest Service's Forest Plans and BLM's 1992 Draft RMP/EISs in western Oregon. Any substantial change in timber supply could be expected to affect timber stumpage prices within the range of the Northern Spotted Owl. The size of changes in federal timber harvests considered in the SEIS ROD was much larger than the changes in BLM harvests analyzed in this FEIS/PRMP.

Future timber price projections were required in this FEIS/PRMP to conduct portions of the analysis relating to employment, income, and county revenues. This FEIS/PRMP assumes under all BLM alternatives that the SEIS ROD is implemented on all of the affected National Forests. The result is higher future stumpage price estimates than in the 1992 Draft RMP/EIS. For a complete description of the price estimation process, consult Draft RMP/EIS Appendix 4-24, *Timber Supply Analysis for BLM Planning*.

Multiple factors have combined to cause significant price changes since the baseline period. In general, the price variation among alternatives is expected to be minimal. The most significant change was between the baseline period and the 1993-2000 period. Future variations in BLM timber harvest, when examined alone, would have only marginal impacts on stumpage prices. Although price is one important market component that has changed, timber market structures are also undergoing change.

Alternatives C, D, E, and the PRMP, reduce BLM timber harvest below historic levels. Reductions in BLM harvests, combined with reductions in U.S. Forest Service harvest levels, would reduce federal timber supplies in the Pacific Northwest. Although increased harvest levels on private land (industrial and nonindustrial) would mitigate a portion of this reduction, an overall reduction in Northwest timber supply is expected. Analyses using the CINTRAFOR Global Trade Model indicate that reduced timber supply in the Pacific Northwest would be offset by a combination of reduced demand for wood products and additional supplies from other areas in the United States and other wood producing countries of the global economy (Perez-Garcia 1991). Increased use of substitute or recycled materials, including plastics, aluminum, steel, and cement, would result in reduced demand for wood products and are expected to gain wider use, particularly in residential construction.

Use of substitute building materials and alternative timber resources has raised concerns about their environmental impacts. Questions have also been raised about the incremental impacts of local, regional, and national environmental policy choices on the global economy and environment (Lippke 1991, Schallau and Goetzl 1992).

Issues of concern that have been studied include the increased use of fossil fuels, CO_2 emissions, environmental impacts of increased mining and quarrying, and supply of wood products from less productive or less efficient producers. Use of these and other materials, instead of wood products, for similar uses in residential construction required more energy (as measured in oil equivalent BTUs) to produce and deliver (Koch 1991).

The rates at which reduced demand, substitute materials, and alternative supply sources would affect the wood products market are unknown. However, each replacement source can be expected to have associated economic and environmental impacts, often in other regions of the United States and the world.

Forest Production Activities

The structure of the forestry services sector would likely change under the direction established in the SEIS ROD as management emphasis shifts from timber production to ecosystem management. As fewer acres are subject to harvest, there would be a decrease in post-harvest reforestation, stand maintenance, and protection needs. Workers in these forest production activities, who are predominantly Hispanic, would likely have many of the skills needed to conduct the additional forest treatment, inventory,

monitoring, and restoration activities envisioned in the forest management field described in the SEIS. It has been estimated that an additional 6,000 forestry services workers would be employed as a result of the SEIS within the range of the Northern Spotted Owl (BLM, U.S. Forest Service 1994). Many of these forestry services jobs, however, are low paying and cannot replace the wages associated with higher paying jobs associated with logging and millwork (Richardson 1993).

Recreation

Each alternative in the Roseburg District identifies management actions that would favor certain types of recreation, or constrain development of recreation sites and facilities. Alternatives NA, A, B, and C would not meet the demand for nonmotorized travel, camping, and other land based recreation activities on BLM-managed lands. (See discussion of recreation demand in the Recreation Section of Chap. 4.) These unmet needs are primarily due to constraints these alternatives would place on development of trails, picnic areas, and campsites. Demands for boating access would not be met under Alternatives NA, A, and B. Finally, Alternatives C, D, E, and the PRMP would not meet visitor demands for motorized off highway travel opportunities on BLM-managed lands due to road closures and Off Highway Vehicle closures. These constraints would change the amount of recreation dependent personal income and employment attributable to BLM-managed lands in the Roseburg District. However, substitution of recreation opportunities associated with other ownerships and areas within the Pacific Northwest is expected to satisfy all demand for recreation activities.

Special Forest Products

Demand for all Special Forest Products would be met under Alternatives NA, A, and B. (See discussion in the Special Forest Products Section of Chap. 4.) Lower fuelwood sales under Alternatives C, D, E, and the PRMP would result in lower federal permit receipts. There would be reduced self-sufficiency of some individuals who would be forced to purchase fuelwood from other sources at significant additional expense. Demand for all other identified Special Forest Products is expected to be met under these alternatives.

Native Americans and nonnative settlers have collected forest products for personal use for many years. Commercial collection has expanded as more products are marketed. The competition between local collectors and collectors from outside the region can sometimes generate conflict (Richardson 1993). Recent Asian and Hispanic immigrants have been identified as specific cultural groups entering the region specifically to collect Special Forest Products. Anecdotal evidence suggest that unemployed wood products workers are also participating in commercial collection.

Table 4-30. Summary of Measurable Annual Outputs by Alternative in the Roseburg District.

	Base	NA	A	B	C	D	E	PRMP
Timber Harvest (MMCF)	41.07	39.47	47.67	44.02	11.22	14.33	3.15	6.99
Non-Resident Recreational Use [1]								
Fishing (Angler Days)	4,700	5,940	5,940	5,940	5,940	5,940	5,940	5,940
Hunting (Hunter Days)	4,200	4,930	4,930	4,930	4,930	4,930	4,930	4,930
Non-Consumptive (User Days)	33,100	43,590	38,740	41,150	46,580	48,580	48,580	48,580
Timber Management Activity ($MM)	N/A	4.493	4.925	4.550	3.478	1.632	0.584	2.400

[1] Hospodarsky, 1989. Pacific Northwest Outdoor Recreation Consumption Projection Study: Oregon Project Final Report. Eixenburger, Don. Oregon State Parks. Personal Communications. July 23, 1991 and December 10, 1991.
[2] Carter, C. Oregon Dept. of Fish and Wildlife. Personal Communication. December 16, 1991.

Permitted collection of Special Forest Products would be encouraged under all alternatives and may enhance local economies.

Impacts to Personal Income and Employment

The BLMPACT model was used to analyze the employment and income associated with the use of timber, provision of recreation, and forest management within the Roseburg District. Table 4-30 provides a summary of measurable outputs under each alternative in the Roseburg District. These quantities represent values associated with BLM management actions under each alternative and were used to estimate dependent personal income and employment. Table 4-31 displays the varying levels of income and employment by sector associated with each alternative. Display of these impacts was changed from the Draft RMP/EIS in response to public comments. Impacts are now displayed by economic sector; employment and personal income associated with each resource commodity or activity are not shown. Nonmarket natural resource values were not included in the personal income and employment analyses.

Under all alternatives, reaching full implementation would take several years of increasing activities. This could prevent fully reaching the employment and income levels shown here for several years. The employment and income estimates for the PRMP do not include the effect of restoration activities or the processing of wood removed from reserves as part of density management. In the Roseburg District four million cubic feet per year of timber might be removed from various reserves, providing additional wood supply income and employment.

Cumulative Impacts to Personal Income and Employment

An analysis was conducted to examine the effect of BLM management in all western Oregon districts on the western Oregon region. The common alternatives and the PRMPs from all six BLM districts in western Oregon were combined. The BLMPACT model was then used to estimate dependent personal income and employment. The analysis methodology paralleled that of the individual districts. It should be noted that, as a result of the economic interactions within the larger analysis area, the individual district results do not sum to the values calculated for western Oregon. Some areas have greater natural resource dependence with more direct effects, while other areas have greater economic diversity resulting in more indirect effects. Table 4-32 displays the results of the western Oregon cumulative analysis for the BLM alternatives.

The management of BLM's timber resource is only one component of a larger economy. The SEIS examined the cumulative effects on timber industry employment of ten alternatives. SEIS Alternative 9, which was the basis for the SEIS ROD, is the focus of the following discussion.

The SEIS analysis of cumulative effects was conducted using regional coefficients representing timber industry employment affected per million board feet of timber harvest. Timber industry employment was defined as Solid Wood Products plus Pulp and Paper. Self-employment, wage, and salary employment was included.

Within Oregon, subregional differences were identified. Employment in Solid Wood Products was similar for all regions except the Central region (Deschutes, Klamath, Lake, Jefferson, and Wasco counties). In the Central region, approximately 16 jobs per million board feet are affected. For the remaining subregions, approximately nine jobs per million board feet are affected. The Northwest region (Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill counties) was identified as having significant Pulp and Paper employment, 2.19 jobs per million board feet. The remaining subregions have limited Pulp and Paper employment per million board feet.

Overall, timber industry employment in western Oregon is projected to decline 23 percent from 1990 levels under the SEIS ROD. A 40 percent reduction from the 1990 timber industry employment level is projected for the Southwest subregion. A decline of 28 percent is projected for the West-Central subregion (Benton, Lane, Lincoln, and Linn counties). The Northwest and Central regions are both projected to experience less than ten percent reductions in timber industry employment from the 1990 level.

Table 4-31. Estimated Dependent Personal Income and Employment by Alternative.

Personal Income, Millions (1989 Dollars)	1984-1988		NA		A		B		C		D		E		PRMP	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Total	21.528	43.962	22.197	44.843	26.545	53.439	24.554	49.670	7.279	14.391	8.319	16.702	2.204	4.287	4.758	9.333
Farm	0.001	0.034	0.001	0.050	0.001	0.058	0.001	0.053	0.001	0.024	0.001	0.020	0.001	0.007	0.001	0.017
Nonfarm	21.527	43.573	22.196	44.413	26.545	53.206	24.553	49.198	7.278	14.235	8.318	16.538	2.203	4.239	4.757	9.228
Ag. Serv., For., Fish., and Other	0.000	0.254	1.416	1.675	1.553	1.864	1.434	1.722	1.096	1.178	0.514	0.609	0.184	0.206	0.757	0.808
Mining	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Construction	0.000	0.699	0.000	0.699	0.000	0.839	0.000	0.775	0.000	0.217	0.000	0.260	0.000	0.065	0.000	0.140
Manufacturing	21.263	33.160	20.439	31.909	24.680	38.527	22.792	35.580	5.823	9.108	7.432	11.604	1.647	2.575	3.629	5.680
Nondurable Goods	0.013	0.140	0.016	0.159	0.015	0.183	0.016	0.171	0.017	0.071	0.018	0.074	0.018	0.037	0.018	0.055
Paper & Allied Products	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Durable Goods	21.250	33.020	20.422	31.751	24.665	38.344	22.776	35.409	5.805	9.037	7.414	11.530	1.630	2.539	3.612	5.624
Lumber & Wood Products	21.250	32.791	20.422	31.522	24.665	38.069	22.776	35.155	5.805	8.965	7.414	11.445	1.630	2.517	3.612	5.578
Transportation & Pub. Utilities	0.036	1.868	0.047	1.909	0.043	2.273	0.045	2.108	0.049	0.648	0.050	0.748	0.050	0.234	0.050	0.441
Wholesale Trade	0.005	0.064	0.007	0.069	0.006	0.080	0.007	0.075	0.007	0.030	0.008	0.032	0.008	0.015	0.008	0.023
Retail Trade	0.074	1.714	0.095	1.871	0.087	2.200	0.091	2.046	0.100	0.727	0.103	0.775	0.103	0.293	0.103	0.520
Finance, Insurance &Real Estate	0.000	0.835	0.000	0.890	0.000	1.060	0.000	0.981	0.000	0.307	0.000	0.336	0.000	0.093	0.000	0.203
Services	0.149	4.978	0.193	5.390	0.175	6.362	0.184	5.909	0.203	2.021	0.211	2.174	0.211	0.758	0.211	1.414
Government	0.000	0.355	0.000	0.380	0.000	0.176	0.000	0.418	0.000	0.132	0.000	0.144	0.000	0.040	0.000	0.088
Federal, Civilian	0.000	0.240	0.000	0.258	0.000	0.031	0.000	0.284	0.000	0.091	0.000	0.098	0.000	0.028	0.000	0.060
State and Local	0.000	0.114	0.000	0.122	0.000	0.145	0.000	0.134	0.000	0.042	0.000	0.046	0.000	0.012	0.000	0.027
Employment (Jobs)																
Total	1,003	2,138	1,143	2,316	1,351	2,755	1,252	2,550	435	819	440	877	135	248	294	544
Farm	0	7	0	10	0	12	0	11	0	5	0	4	0	1	0	3
Nonfarm	1,003	2,112	1,143	2,286	1,351	2,719	1,252	2,516	434	807	440	866	134	244	293	536
Ag. Serv., For., Fish., and Other	0	26	170	197	186	219	172	202	132	140	62	72	22	24	90	96
Mining	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	12	0	12	0	15	0	13	0	4	0	5	0	1	0	2
Manufacturing	978	1,369	940	1,318	1,135	1,591	1,048	1,469	268	377	342	480	76	107	167	235
Nondurable Goods	1	7	1	9	1	10	1	9	1	4	1	4	1	2	1	3
Paper & Allied Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Durable Goods	977	1,361	939	1,309	1,134	1,581	1,047	1,460	267	373	341	475	75	105	166	232
Lumber & Wood Products	977	1,351	939	1,299	1,134	1,568	1,047	1,448	267	369	341	472	75	104	166	230
Transportation & Pub. Utilities	2	74	2	76	2	91	2	84	2	26	2	30	2	9	2	18
Wholesale Trade	0	19	0	19	0	23	0	21	0	6	0	7	0	2	0	4
Retail Trade	7	139	9	151	8	178	8	165	9	59	9	63	9	25	9	43
Finance, Insurance & Real Estate	0	55	0	59	0	71	0	65	0	21	0	22	0	6	0	14
Services	17	418	22	453	20	534	21	496	24	174	25	187	25	70	25	124
Government	0	19	0	21	0	24	0	23	0	7	0	8	0	2	0	5
Federal, Civilian	0	10	0	10	0	12	0	11	0	4	0	4	0	1	0	2
State and Local	0	10	0	10	0	12	0	11	0	4	0	4	0	1	0	2

Source: USDI,BLM 1989b

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Table 4-32. Estimated Dependent Personal Income and Employment by Alternative, Western Oregon BLM.

			Alternatives													
Personal Income, Millions	**1984-1988**		**NA**		**A**		**B**		**C**		**D**		**E**		**PRMP**	
(1989 Dollars)	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Total	111.057	254.892	112.261	257.286	145.002	333.352	131.645	302.220	47.819	107.514	51.501	115.954	39.842	88.756	29.974	65.915
Farm	0.088	0.284	0.088	0.356	0.105	0.436	0.091	0.394	0.084	0.249	0.079	0.241	0.069	0.200	0.088	0.214
Nonfarm	110.969	252.980	112.173	255.202	144.896	330.702	131.555	299.811	47.735	106.471	51.422	114.874	39.773	87.901	29.887	65.179
Ag. Serv., For., Fish., & Other	0.010	5.191	6.538	11.515	8.230	14.767	7.410	13.306	4.665	6.509	3.935	5.976	2.316	3.825	2.814	3.824
Mining	0.000	0.017	0.000	0.017	0.000	0.022	0.000	0.020	0.000	0.007	0.000	0.008	0.000	0.006	0.000	0.005
Construction	0.000	3.575	0.000	3.499	0.000	4.555	0.000	4.123	0.000	1.395	0.000	1.525	0.000	1.162	0.000	0.830
Manufacturing	104.873	173.346	99.001	164.433	130.380	216.310	117.517	195.043	35.538	59.720	39.734	66.569	29.295	49.217	18.936	32.207
Nondurable Goods	0.294	4.861	0.325	5.259	0.309	6.563	0.323	6.041	0.365	2.785	0.375	2.912	0.392	2.425	0.392	2.073
Paper & Allied Products	0.000	0.566	0.000	0.620	0.000	0.783	0.000	0.717	0.000	0.311	0.000	0.325	0.000	0.262	0.000	0.220
Durable Goods	104.579	168.485	98.675	159.173	130.072	209.746	117.193	189.003	35.174	56.935	39.359	63.658	28.903	46.792	18.544	30.134
Lumber & Wood Products	104.579	165.154	98.675	155.855	130.072	205.439	117.193	185.100	35.174	55.574	39.359	62.182	28.903	45.664	18.544	29.309
Transportation & Pub. Utilities	0.622	12.587	0.681	12.971	0.646	16.486	0.679	15.068	0.770	6.126	0.792	6.522	0.832	5.271	0.830	4.233
Wholesale Trade	0.127	0.771	0.139	0.807	0.132	0.977	0.139	0.913	0.157	0.483	0.162	0.507	0.170	0.453	0.170	0.401
Retail Trade	1.665	9.742	1.819	10.544	1.726	12.926	1.816	11.999	2.057	6.046	2.116	6.310	2.224	5.458	2.218	4.791
Finance, Insurance & Real Estate	0.000	11.073	0.000	11.843	0.000	15.202	0.000	13.822	0.000	5.398	0.000	5.690	0.000	4.403	0.000	3.496
Services	3.672	36.678	3.996	39.573	3.783	49.458	3.994	45.518	4.548	20.786	4.683	21.766	4.936	18.107	4.919	15.392
Government	0.000	1.628	0.000	1.729	0.000	2.214	0.000	2.015	0.000	0.794	0.000	0.839	0.000	0.656	0.000	0.522
Federal, Civilian	0.000	1.183	0.000	1.259	0.000	1.610	0.000	1.466	0.000	0.583	0.000	0.616	0.000	0.483	0.000	0.387
State and Local	0.000	0.445	0.000	0.470	0.000	0.604	0.000	0.549	0.000	0.211	0.000	0.223	0.000	0.172	0.000	0.135
Employment (Jobs)																
Total	5,299	12,204	6,107	13,236	7,760	16,982	7,080	15,442	3,031	6,078	3,126	6,382	2,437	4,920	2,048	3,930
Farm	15	58	15	72	17	89	15	81	14	50	13	48	12	40	15	42
Nonfarm	5,285	12,068	6,093	13,081	7,742	16,788	7,065	15,265	3,017	5,991	3,112	6,294	2,425	4,849	2,033	3,863
Ag. Serv., For., Fish., and Other	0	756	1,024	1,751	1,289	2,245	1,161	2,022	730	998	616	913	362	580	440	586
Mining	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0
Construction	0	132	0	130	0	169	0	153	0	52	0	56	0	43	0	31
Manufacturing	4,734	6,574	4,469	6,247	5,885	8,213	5,304	7,407	1,605	2,280	1,795	2,539	1,324	1,880	856	1,237
Nondurable Goods	15	224	16	247	15	307	16	283	18	133	19	138	19	115	19	100
Paper & Allied Products	0	24	0	26	0	32	0	30	0	13	0	13	0	11	0	9
Durable Goods	4,719	6,350	4,453	6,000	5,869	7,906	5,288	7,124	1,587	2,147	1,776	2,401	1,304	1,765	837	1,137
Lumber & Wood Products	4,719	6,186	4,453	5,838	5,869	7,695	5,288	6,934	1,587	2,082	1,776	2,329	1,304	1,711	837	1,098
Transportation & Pub. Utilities	23	463	26	477	24	606	25	554	29	225	30	240	31	194	31	155
Wholesale Trade	5	145	6	146	5	188	6	171	6	64	6	69	7	54	7	42
Retail Trade	132	753	144	815	137	997	144	926	163	469	168	490	176	425	176	373
Finance, Insurance & Real Estate	0	601	0	646	0	828	0	753	0	296	0	312	0	242	0	193
Services	391	2,643	425	2,871	402	3,541	425	3,279	484	1,606	499	1,676	526	1,432	524	1,247
Government	0	78	0	83	0	106	0	97	0	38	0	40	0	31	0	25
Federal, Civilian	0	44	0	47	0	60	0	54	0	22	0	23	0	18	0	14
State and Local	0	34	0	36	0	47	0	43	0	16	0	17	0	13	0	10

Source: USDI,BLM 1989b

Impacts to County Revenues

Future prices for timber stumpage in the Northwest are a key determinant of future revenue effects. O&C payments to counties, severance taxes, and federal treasury receipts are all affected by the level of BLM timber harvest, with the price of timber determined by a competitive bid process. Northwest timber prices are expected to increase from the baseline period as supplies from federal lands decrease.

Table 4-33 displays the projected prices and harvest levels by alternative together with the estimated O&C payments to each county. Prices under all alternatives are projected to increase significantly from the baseline period due to external factors beyond the scope of BLM's management alternatives (such as reduced harvest on National Forest lands within the spotted owl region). The analysis assumes all BLM districts would adopt the same alternative. Under Alternatives A and B, which increase harvest levels relative to those of the baseline period, county O&C revenues would increase significantly over those of the baseline period. This is partly because external factors would cause timber prices to be higher than those of the baseline period. Under Alternatives C, D, E, and the PRMP, increased stumpage prices would not fully mitigate timber harvest reductions, thus reducing O&C payments to counties below those during the baseline period. In recent years, legislation has provided for additional "safety net" payments to the counties. As an example, in Fiscal Year 1991, payment of 96 million dollars was guaranteed. This was 152 percent of the average payment during the baseline period. Current legislation specifies a gradual ramping down of the guaranteed payment level from the 1986-1990 average payment. These "safety net" payments have mitigated a large portion of county revenue impacts of reduced BLM harvest under the recent court injunctions. Table 4-33 does not incorporate this

Table 4-33. Projected O&C Payments to Counties Attributable to Timber Harvest in Western Oregon (Thousands of Constant Dollars).

	1984-1988 Average	NA	A	B	C	D	E	PRMP
Benton	$1,770	$3,652	$4,761	$4,333	$1,352	$1,521	$1,115	$724
Clackamas	$3,478	$7,213	$9,403	$8,558	$2,670	$3,005	$2,203	$1,430
Columbia	$1,302	$2,677	$3,490	$3,176	$991	$1,115	$818	$531
Coos	$4,148	$7,668	$9,996	$9,097	$2,838	$3,195	$2,342	$1,520
Curry	$2,290	$4,743	$6,184	$5,628	$1,756	$1,976	$1,449	$941
Douglas	$15,850	$32,555	$42,439	$38,625	$12,051	$13,563	$9,943	$6,456
Jackson	$9,828	$20,364	$26,548	$24,162	$7,538	$8,485	$6,220	$4,038
Josephine	$7,579	$15,699	$20,466	$18,626	$5,811	$6,541	$4,795	$3,113
Klamath	$1,464	$3,041	$3,964	$3,608	$1,126	$1,267	$929	$603
Lane	$9,627	$19,845	$25,870	$23,545	$7,346	$8,268	$6,061	$3,935
Lincoln	$234	$468	$610	$555	$173	$195	$143	$93
Linn	$1,669	$3,431	$4,473	$4,071	$1,270	$1,429	$1,048	$680
Marion	$919	$1,897	$2,474	$2,251	$702	$791	$580	$376
Multnomah	$685	$1,417	$1,847	$1,681	$524	$590	$433	$281
Polk	$1,359	$2,807	$3,659	$3,331	$1,039	$1,170	$857	$557
Tillamook	$355	$728	$949	$863	$269	$303	$222	$144
Washington	$398	$819	$1,067	$971	$303	$341	$250	$162
Yamhill	$460	$936	$1,220	$1,110	$346	$390	$286	$186
Total	$63,415	$129,958	$169,418	$154,190	$48,107	$54,145	$39,693	$25,771
Assumed Price 1/	$707	$1,608	$1,576	$1,589	$1,674	$1,667	$1,680	$1,692
Total Volume (MMCF)		191	251	227	68	76	56	36
O&C Volume (MMCF)		162	215	194	57	65	47	30

(1) Prices estimated based on an index of 1982 constant dollars scaled to the 1984-88 actual average price of $707.34.

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legislation into the estimates displayed, as it is subject to Congressional revision.

Payments in Lieu of Taxes, made for a variety of federal lands within each county, are projected to remain unchanged under all alternatives. Potential changes in land tenure by the BLM and other federal agencies could alter the level of payment made to the county. County revenue impacts of specific exchanges or disposals are evaluated as they are proposed, and are not included in this document.

Coos Bay Wagon Road payments to local taxing districts would decline from the baseline period and the NA Alternative under Alternatives C through E, and the PRMP. Camas Valley School District 21, which historically has received approximately 4 percent of its funding from this source, would be particularly impacted.

Approximately five percent of the revenues generated by public domain lands are dispersed through the state to counties proportionate to the land area within the county. Historically, timber harvest has been the dominant source of revenue from these lands. Based on estimated Probable Sale Quantities, revenues of Alternatives A, B and NA would increase. Under the other Alternatives (C, D, E, and the PRMP), revenues would be reduced. The counties must use these revenues to build roads and bridges. Funding for these capital projects would be reduced by Alternatives C, D, E, and the PRMP. Opportunities exist in the future to increase revenue collections for use of Public Domain lands. For example, collections associated with special forest products permits and special recreation permits could increase if these programs expand.

Under Alternatives NA, C, D, E, and the PRMP, harvest volumes subject to state Forest Products Harvest Tax would decline from baseline levels. Given constant tax rates, revenues could be expected to decline under these alternatives. Decreases in revenues would negatively impact programs funded by this tax, such as forest research and fire prevention or suppression. The Oregon State Legislature sets the tax rate and in recent bienniums has significantly increased the tax rate, as well as a number of programs funded by the tax. In future sessions, the legislature could increase the tax rate to maintain constant revenue streams despite decreased harvest volumes.

Cumulative County Revenue Impacts

After examining the impacts of reduced timber harvest on both BLM and U.S. Forest Service lands, the SEIS concluded that anticipated timber price increases would not fully offset the revenue declines to the federal and local governments from implementation of the SEIS alternatives. Like the analysis displayed in Table 4-33, the historical distribution formula of O&C payments was used. The current congressional safety net was not included.

Several state and county issues would make it difficult for counties to replace federal timber revenues. Among the issues are passage of Ballot Measure 5 Property Tax Limitation and a general anti-tax sentiment among voters as demonstrated by the defeat of several sales tax initiatives. Interviewed individuals and county officials in rural counties expressed concern about this decreasing tax base (Richardson 1993).

Impacts to Community Structure and Attributes

Recent discussions of community stability by natural resource sociologists have identified three broad definitions for human communities: a geographic area; local social systems; and types of relationships. Examples of these communities include town, county or state boundaries, commuting area, or relationships such as occupation or religious affiliation.

Community stability is an often stated desire of all types of communities. Stability is a misnomer, however, since communities are in a constant state of transition, and the status quo is rarely maintained. Attributes of prosperity, adaptability, cohesiveness, and ability to absorb and cope with change have been identified as desirable by some definitions of community stability (Society of American Foresters 1989). These definitions recognize change and seek orderly change as a desired goal.

Many geographic, social, or relational factors affect the above listed desired attributes of any community. These factors include economic diversity, economic stability, population stability, social cohesion or community solidarity, structural diversity, location, quality of life, human capital, size, and local leadership (BLM, U.S. Forest Service 1994). In the

Pacific Northwest, timber or forest dependence has been identified as a destabilizing factor due to recent changes in forest management (BLM, U.S. Forest Service 1994).

The FEMAT report and the SEIS identify attributes of communities likely to experience economic and social impacts which would disrupt existing community structures and trends. Communities with these attributes were labeled "most at risk". Specifically, the SEIS text (page 2-82) states:

> The "most at risk" communities differ from others in significant ways. These communities are smaller (average population 3,000), and they are located in counties with low population density. Isolated communities are more likely to experience negative consequences... because they have fewer employment options available locally or in nearby communities, and because of limited access to capital, transportation links, and other resources. Communities that are small, isolated, and lacking in economic diversity are more likely to be "at risk" than others. These communities may find it difficult to mobilize and respond to changing conditions that may affect a variety of groups. These communities are likely to experience unemployment, increased poverty, and social disruption in the absence of assistance.

In response to concerns about the adequacy of the socioeconomic analyses in the Draft RMP/EISs for western Oregon, a study of the socioeconomic effects of resource management plans in western Oregon was commissioned. Catherine Woods Richardson, of the Institute for Resources in Society at the University of Washington, prepared a report designed to provide an analysis of the socioeconomic conditions affected by BLM management in western Oregon. The report set out to find out who is affected by agency actions and how they are affected. Richardson obtained information through interviews with BLM employees and several people in each district who were familiar with the BLM and the area. These individuals were selected by district employees, and often had worked with the BLM citizen advisory council in the district. They included local bank officers; tribal representatives; city, county and state officials; social service and development administrators; timber interests; and environmental professionals; among others.

The following discussion of the socioeconomic effects of BLM management within the district includes information from a variety of sources but relies heavily on the research done by Richardson.

Timber industry impacts are estimated to vary substantially by subregion and BLM district. The Roseburg District is included within the Southwest region, which is identified as having the greatest potential for job displacement in the timber industry and the fewest opportunities for alternative employment (Phillips 1994). Of all western Oregon counties, Douglas County shows the highest portion of total personal income from the lumber and wood products sector (approximately 20 percent in 1990). Despite this dependence on the timber industry, people interviewed by Richardson (1993) thought the effect of industry cutbacks occurring due to reduced federal supply would not be as strong on the local economy as recession driven cutbacks of the early 1980s. One example cited was diversification of the economy during the 1980s due to both the development of new businesses and an influx of people (especially retirees) whose incomes are not linked to timber. These discussions of diversification and economic development focused on communities located near Interstate 5 (Richardson 1993).

Douglas County receives over 25 percent of all O&C revenues paid to Oregon counties, the most of any county. County health services and law enforcement, which are most dependent upon these receipts, are both expected to be impacted (Lee et al. 1991). Reduced receipts for county health services are expected to reduce or eliminate capital investments, staff training, continuing education, and home visits. Cutbacks in law enforcement would result in increased response time to property crimes. Substance abuse and related domestic violence are expected to increase along with unemployment (Lee et al. 1991).

As community residents, Native Americans are users of federal lands in the same manner as other Oregon residents. They have concerns relating to timber management, special forest products, fish and wildlife, recreation, and commercial uses. In addition, the federal government maintains a trust relationship with tribal governments. Most federal treaties and executive orders that affect western Oregon tribes—unlike treaties with some eastern Oregon and Washington tribes—do not provide off reservation rights for fishing, hunting, gathering, or grazing. BLM is, however, required to consult with tribal governments about actions that will affect tribal interests.

Federally recognized tribes in western Oregon include:

- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians

- Confederated Tribes of Grande Ronde
- Confederated Tribes of Siletz
- Confederated Tribes of the Warm Springs Reservation
- Coquille Indian Tribe
- Cow Creek Band of the Umpqua Tribe of Indians
- Klamath Tribe

Effects on Rural Interface Areas

Resource management activities, such as road construction and timber harvest, can create adverse impacts on neighbors living in Rural Interface Areas (see Chapter 3, Rural Interface Areas, for a list of known impacts related to BLM management in the Roseburg District). In turn, the reactions of neighbors to these activities can create opportunity costs (e.g., decisions to defer or not harvest timber) or additional costs for BLM to manage resources in Rural Interface Areas. In some situations, the number of neighbors and the number of resource management activities are directly proportional to the number of concerns expressed by neighbors, conflicts, and additional costs to BLM. The water quality of domestic water sources would be maintained under all alternatives.

The no action alternative provides a moderate level of timber harvest. No special or alternative timber management practices are identified under this alternative. Impacts and conflicts in the Rural Interface Areas would be expected to be similar to those described under Alternative A.

Alternative A provides the highest level of timber harvest and road construction in Rural Interface Areas. No special timber management actions or mitigation measures would be required under this alternative.

Potential mineral development would be minimally constrained. Short term adverse impacts associated with timber management and mineral development include smoke, dust, noise, and increased truck traffic. These impacts would be intermittent and of short duration. Visual impacts of timber management in the rural interface would vary in magnitude and duration. The visual impact of harvesting timber would lessen as the harvested area was revegetated.

The visual impact of forest road construction could be a long term impact depending on the visibility of the road and the ability of subsequent revegetation to screen the road. The visual impact of mineral development could be long term depending on the visibility of the operation in the interface, the type of operation, the ability to effectively perform reclamation, and the ability of subsequent revegetation to screen the operation.

Alternative B provides for a high level of timber harvest. In Rural Interface Areas special timber harvest mitigation measures may be used on 8,552 acres of public lands within 1/4-mile of areas zoned by Douglas County for residential use of one to five acre lots.

Examples of mitigating measures applicable to Alternatives B and C include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, inclusion of additional buffers for domestic water sources, and hand piling of slash for burning as opposed to broadcast burning. The land would be managed for Visual Resource Management Class III objectives and no surface occupancy for oil and gas development would be allowed. Short term and cumulative impacts of Alternative B would be less than Alternative A because forest management practices would be altered within 1/4-mile of the Rural Interface Areas, where practical to mitigate adjacent neighbors concerns.

Alternative C provides a moderate level of timber harvest. In Rural Interface Areas special timber harvest mitigation measures would be used on 8,552 acres within 1/4-mile of areas zoned by Douglas County for residential use of one to five acre lots.

Conflicts and impacts under Alternative C would be expected to be less than Alternatives A and B because of the harvest and silvicultural practices used. The practices used under Alternative C which are less intensive than Alternatives A and B include green tree retention or shelterwood harvesting, less broadcast burning, less reliance on herbicides and pesticides, and more areas of permanently reserved old-growth stands.

Alternative D provides a moderate level of timber harvest. In Rural Interface Areas, special timber harvest constraints would be used on 8,552 acres within 1/4-mile of areas zoned by Douglas County for residential use of one to five acre lots. The following alternative timber management practices would not be applied on those lands: herbicide spraying, clear cutting, and prescribed burning. Future oil and gas development would be allowed within 1/4-mile of these areas, but with no surface occupancy. These lands would be managed according to Visual Resource Management Class II objectives. Short

term and cumulative impacts would be less under this alternative than under Alternatives A, B, and C because implementing the above practices would reduce conflicts and impacts in the Rural Interface Area.

Under Alternative E, potential conflicts in Rural Interface Areas within 1/2-mile of areas zoned by Douglas County for residential use of one to five acre lots would be low due to constraints on timber harvesting. The following alternative timber management practices would not be applied on the 24,139 acres which comprise those lands: herbicide spraying, clear cutting, and prescribed burning.

Future oil and gas development would be allowed within 1/4-mile of these areas, but with no surface occupancy. These lands would be managed according to Visual Resource Management Class II objectives. Alternative E would cause the least short term and cumulative impacts compared to other alternatives because of practices used and the widely dispersed and infrequent management practices associated with low commodity and high amenity management.

The following alternative timber management practices would not be applied on those lands: aerial application of herbicide, clear cutting, and broadcast burning. Future oil and gas development would be allowed within 1/4-mile of these areas, but with no surface occupancy. These lands would be managed according to Visual Resource Management Class II objectives. Short term and cumulative impacts would be less under this alternative than under Alternatives A, B, and C because implementing the above practices would reduce conflicts and impacts in the Rural Interface Area. Impacts and conflicts under the PRMP would be expected to be similar to those under Alternative D and somewhat more than under Alternative E.

In addition to management practices described above, impacts and conflicts in the Rural Interface Area would vary under the PRMP depending on the overall management of the lands where the Rural Interface Area is located. Rural Interface Areas would be managed to Visual Resource Management III standards unless the area is classified as Visual Resource Management Class I or II, under the PRMP alternative. In the General Forest Management Area, six to eight trees would be retained on all harvest units. This practice would further lessen visual impacts in addition to those practices described above for the Rural Interface Areas under the PRMP. In Connectivity/Diversity Blocks, rotation would be set at 150 years, 12 to 16 trees per acre would be retained on harvest units, and there would be less intensive forest management practices used (such as broadcast burning) compared to traditional forest management. These practices, in addition to specific management guidelines for Rural Interface Areas described above would further lessen impacts. In Late-Successional Reserves there would be no scheduled timber harvest. Density management harvests in Late-Successional Reserves will occur in stands less than 80 years old to benefit the development of old-growth characteristics. These very limited harvests should have inconsequential impacts or conflicts to Rural Interface Areas located in Late-Successional Reserves.The widths of Riparian Reserves in the PRMP should further reduce impacts and conflicts to the Rural Interface Areas in General Forest Management Area and Connectivity/Diversity blocks.

Under the PRMP, special timber harvest mitigation measures would be used in Rural Interface Areas on 8,552 acres within 1/4-mile of areas zoned by Douglas County for residential use of one to five acre lots.

Effects on Wildfire

The intensity and size of any wildfire depends largely on the local weather at the time of and following ignition, long term and seasonal climatic patterns, amount and distribution of available fuel, the slope and aspect of the landscape on which the fire is burning, the availability of suppression forces, and the amount of time it takes to reach the wildfire and take suppression actions. Most of these factors remain constant under each of the alternatives, except for the type and level of fuels management. Suppression efficiency and effectiveness analysis is conducted at the activity planning level of management.

Due to the fragmented ownership pattern in most of the planning area, wildfire potential is not dependent on BLM land management activities alone. Historically, the majority of large stand replacement wildfires have involved multiple ownerships and either started in or were intensified by untreated logging and precommercial thinning slash fuel. Fire intensity and severity has also increased due to the exclusion of fires from fire dependent ecosystems. Salvage of dead and dying trees and stands could further reduce fuel hazard, but is not proposed for all land allocations under all alternatives.

Lightning has been the primary cause of wildfires throughout much of the planning area. The occurrence of human caused wildfires has increased due to recreation use, debris burning by private residences within the Rural Interface Areas, and timber management activities on both private and public land. Certain activities proposed in the alternatives change the risk of large scale, high intensity wildfires. The primary factors that could increase the relative risk of wildfire are an increased amount of fuel produced through timber management and silvicultural stand treatments (e.g., thinning), the unnatural build up of fuels through fire suppression activities, as well as the natural successional changes in ecosystems. Unless fuels are actively managed, this increased risk will affect the objective of limiting the occurrence of large scale, high severity wildfires.

Prescribed burning and other types of fuels management that would reduce fuel buildups could decrease the relative risk of wildfire. Prescribed burning includes both traditional broadcast and pile burning as well as underburning prior to harvest. Underburning, brushland burning, burning of oak savannas, and grassland burning are also proposed as a methods to reintroduce fire into these ecosystems. Each of these ecosystems had some natural fire regime prior to fire suppression and will change in species composition, structure and function without fire as a natural process. Underburning can be used to reduce fuel loading and vertical fuel continuity. Wildfires in stands that are managed using underburning are generally less severe, and fire suppression is aided thereby limiting the size of wildfires, while using methods that have a lower environmental impact and reducing the costs of wildfire suppression, particularly when underburning is implemented over large areas (USDI 1992).

Mosaics of stands and landscapes with varying forest ages, structures, and densities and with areas of reduced fuels would allow safe access for fire suppression crews and provide strategic locations for efficient and effective fire suppression. Silvicultural treatments other than prescribed fire would be used in some stands reduce wildfire hazard. Alternatives NA, A, and B would have the greatest likelihood of decreasing the risk of wildfires from natural fuels because of the acres of that would be treated. Conversely, Alternatives D and E would have the least effect on reducing wildfire hazard. The specific effects of fuel reduction to mitigate wildfire risk cannot be fully assessed at this planning scale but should be considered in province level, watershed and landscape level analyses, as well as in site specific planning.

Forest thinning, conifer release by cutting hardwoods, and thinning of the forest understory will produce fuels that would remain a fire hazard until the material is reduced by natural decomposition (10 to 20 years), unless managed effectively. Thinning or brushing early in early successional stages can facilitate fuel hazard mitigation. Operationally, some timber harvest units planned for treatment with prescribed fire could not be completed due to timing objectives for reforestation. These "untreated" acres would directly contribute to fuel hazard.

Alternatives NA, A, and B have the greatest potential for increasing wildfire risk because of the large amounts of untreated logging slash, precommercial thinning slash, and hardwood slash that would be produced. Alternatives C, D, and the PRMP would produce moderate amounts of untreated logging slash while Alternative E would produce the lowest amount. The amount of untreated slash fuel varies by type of harvest. Regeneration harvest creates the most fuel, followed by overstory removal and commercial thinning.

Underburning proposed in the alternatives would also reduce the risk of wildfire. Alternatives C, D, E, and the PRMP have the highest likelihoods of reducing the risk of wildfire through underburning, while Alternative B has a somewhat lower potential. Under Alternatives NA and A, no underburning is proposed and this would increase the risk of wildfire.

The prohibition of burning within the Rural Interface Area in Alternatives D and E would increase the potential risk of wildfire in these areas from untreated fuels. This risk can sometimes be decreased by the use of alternative fuel treatments. The projected harvest acres and corresponding level of untreated slash under Alternative D and E would be greater than for Alternative E.

Conclusion

Alternatives A and B would increase the potential risk of wildfire over the NA due to the increase in the amount of untreated slash and lack of, or small amount of, planned underburning. Alternatives C, D, E, and the PRMP would reduce the risk of wildfire compared to the NA by increased fuels management including the use of underburning. The BLM will continue to contract with the State of Oregon for fire suppression, including prevention and detection, under each of the alternatives. While the costs of the contract and actual fire suppression costs will vary under the range of alternatives, these costs cannot

be determined at this time, as they are more dependent upon costs incurred from wildfires rather than from the potential of wildfire.

While management activities that reduce fuel hazards would help reduce potential wildfire risk, the potential for wildfire on all lands in the planning area under all alternatives would be expected to remain high for the short term. This is due to the continued increase in fuel hazard from timber management activities, conifer mortality associated with drought, and unnatural accumulations of fuels within established stands due to historical suppression of wildfire in some fire dependent or fire adapted plant communities. A total fire protection strategy is likely to be unsuccessful in providing protection against catastrophic disturbance in the planning over the next 50 to 100 years, while fire severity will become skewed toward higher severity levels. The risk of large, high severity wildfires, as well as potential mitigation of that risk, is best evaluated at the watershed level and was not assessed in this RMP.

Consistency with Other Agency Plans and Programs

BLM planning regulations require that RMPs be consistent with officially approved or adopted resource related plans and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs are also consistent with the purposes, policies and programs of federal laws and regulations applicable to public lands. . . (43 CFR 1610.3-2). Consistency is construed as the absence of conflict. Based on BLM's knowledge of the plans of such other agencies, the proposed RMP has been compared to the following agencies' plans, for consistency, and BLM has reached the conclusions stated.

Federal Agencies

The PRMP is believed to be consistent with the following plans of other federal agencies:

- The Record of Decision on the 1994 Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.
- The Forest Service's forest-wide land use plans for the adjacent National Forests.
- Soil Conservation Service watershed plans.
- The Coastal Barrier Improvement Act of 1990 and draft (proposed) Pacific Coastal Barriers Study for areas under consideration for inclusion in the Coastal Barriers Resource System, as administered by the U.S. Fish and Wildlife Service.
- The Endangered Species Act and the following Fish and Wildlife Service plans (see Effects on Threatened and Endangered Species):
  - Pacific Bald Eagle Recovery Plan.
  - Final Draft Northern Spotted Owl Recovery Plan.
  - Recovery Plan for the Columbian white-tailed deer.
  - Fish and Wildlife Service determination of critical habitat for the northern spotted owl.
- The National Park Service's Nationwide Rivers Inventory (see Effects on Wild and Scenic Rivers).
- The Bonneville Power Administration's latest annual Transmission System Facilities Resource Program.
- The Northwest Power Planning Council, Columbia River Basin, Fish and Wildlife Program and subordinate species specific strategies.

State Government

The PRMP is believed to be consistent with the following plans, programs, and policies of State of Oregon agencies:

- Department of Environmental Quality (see Effects on Air Resources)
- Smoke Management Plan
  - Visibility Protection Plan and air quality policies
  - Prevention of Significant Deterioration requirements
- Water Resources Department river basin programs for the Umpqua River
- Water Resources Commission rules and statutes
- Department of Human Resources, Health Division, standards for public water systems
- Department of Agriculture
  - Weed control plans
  - State-listed endangered plant species (see Effects on Special Status Species)
- Division of State Lands
  - Removal - Fill Law
  - Natural Heritage Program (See effects on Special Areas)
- Parks and Recreation Department
  - Statewide Comprehensive Outdoor Recreation Plan (see Effects on Recreation)

- State Parks and Recreation System Plan
- State Recreation Trails Plan (see Effects on Recreation)
- State Historic Preservation Program
- Oregon Beach Law
- State Scenic Waterways Program and related projects.

• Department of Transportation, Highway Division
  - Oregon Highway Plan
  - Six Year Highway Improvement Plan
• Economic Development Department, Regional Economic Development Strategies

Consistency of the alternatives with some other State plans and programs is more complex, as described in the following discussions.

Consistency with the Department of Environment Quality's Statewide Water Quality Management Plan (including Water Quality Standards and Guidelines) and the State's antidegradation policy would vary by watershed analyzed. The cumulative effects of timber harvest activities on BLM-administered lands plus other ownerships could lead to violation of the state's antidegradation policy in one or more of the watersheds analyzed unless either private activities are less than anticipated (by BLM) or BLM can lessen the cumulative impacts by scheduling its timber sales to occur at different periods than most of the anticipate private timber harvest.

Consistency with the Department of Fish and Wildlife's many plans, policies, rules, and objectives is addressed in Appendix LL.

Consistency with the Board of Forestry's Forestry Program for Oregon is complex, due to the diversity of goals of the Forestry Program For Oregon. Specificity regarding consistency with the five Forestry Program For Oregon objectives is provided in Appendix MM.

The proposed plan would designate only some of the potential research natural areas identified in the Natural Heritage Program administered by the Division of State Lands, and would thus be inconsistent with that program. See Effects on Special Area for further discussion.

The proposed plan would be consistent with the Oregon Benchmarks (Report to the 1993 Legislature by the Oregon Progress Board, December 1992) for water, forest land, wetlands, fish and wildlife, and outdoor recreation. It would not, however, be likely to support reaching the 1995 and 2000 benchmarks for increasing standard of living, affordable housing, family stability, and stable home life.

Consistency with the statewide planning goals and guidelines administered by the Land Conservation and Development Commission through the Department of Land Conservation and Development is variable among the 13 goals for which District BLM plan consistency is relevant. Oregon's land use program was enacted years ago. Today a complex body of land use policy and goal interpretations exists due to the acknowledgment process, goal amendments, Land Conservation and Development Commission rule making, and Land Use Board of Appeals and appellate court decisions. The matter of BLM consistency with the statewide goals involves a number of interrelated issues of policy, intergovernmental coordination and state and federal legal requirements. Consistency with these goals is characterized generally in Appendix NN. That discussion also addresses consistency of BLM's PRMP with the goals established for the Oregon Coastal Management Program.

The statewide planning goals are legally binding on all planning activity relating to land use undertaken by cities, counties, special districts, and state agencies. The planning goals function similarly to affect federal agencies making consistency determinations under the Oregon Coastal Management Plan in accordance with the (Federal) Coastal Zone Management Act. All applicable local government plans have been acknowledged by Land Conservation and Development Commission to be in conformance with the Coastal Zone Management Area and all state agency programs and activities have been certified by Land Conservation and Development Commission to be in conformance with the Coastal Zone Management Area. Local governments will, over the next few years, be revising their plans to comply with recent administrative rule revisions related to Goals 4 and 12 in the former instance increasing protection of forest lands and resources from conflicting uses and inappropriate rural development.

A section of the Coastal Zone Management Area requires that "Each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is to the extent practicable, consistent with approved state management programs" [Subsection 308(c)(1)]. The term "to the maximum extent practicable" means that federal agency's activities must be consistent with mandatory, enforceable, federally approved state coastal zone policies wherever the agency has discretion under federal law to abide by state policies. The Coastal Zone Management Area does not, however, impose a higher duty on federal agencies than a state requires

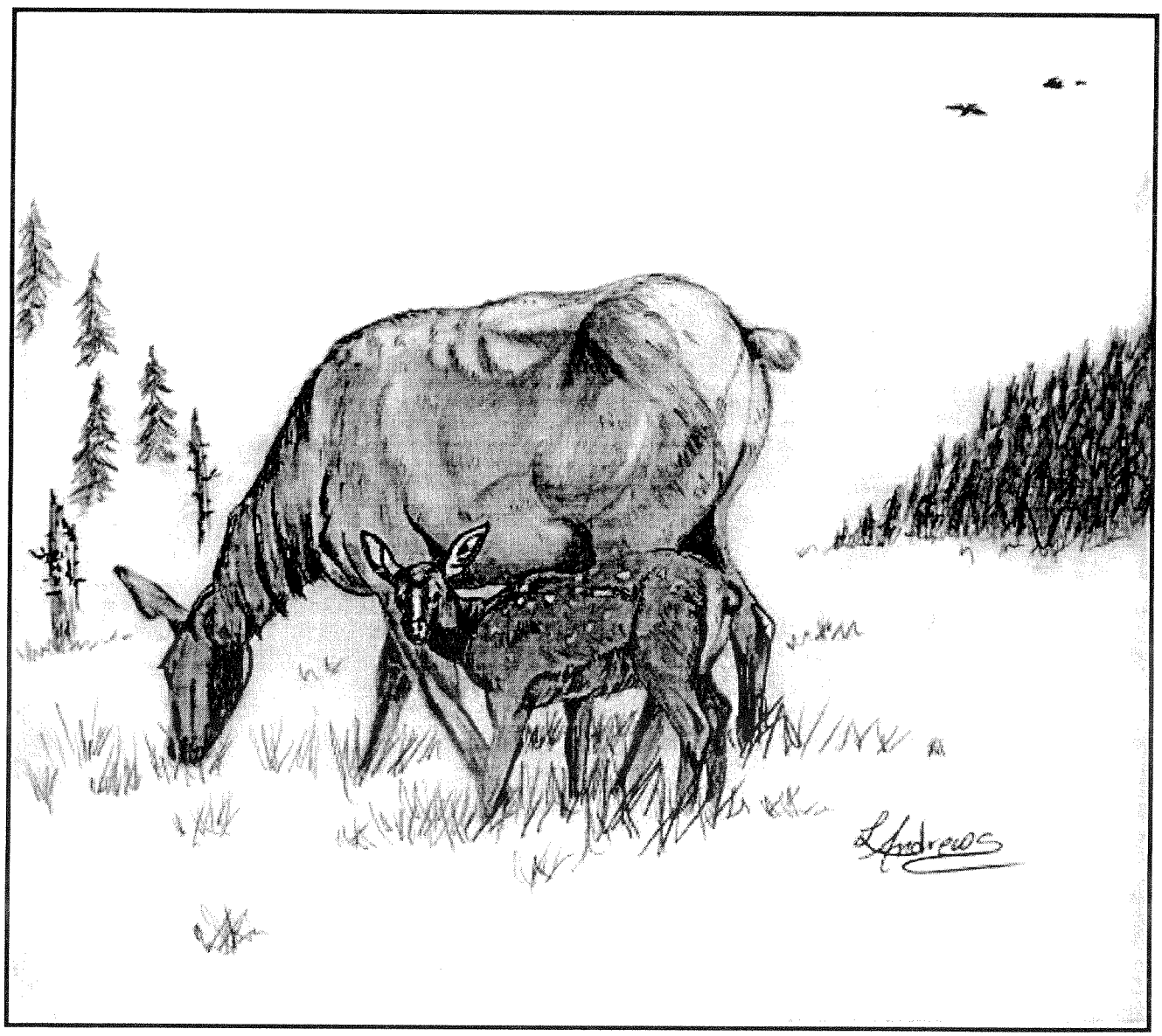
of its own agencies. The Oregon Coastal Management Plan mandatory enforceable policies consist of the statewide planning goals, acknowledged city and county comprehensive plans and land use regulations, and the statutory authorities and regulations of state agencies listed in the Oregon Coastal Management Plan. Although federal lands are excluded from the boundaries of the coastal zone, the "directly affecting" provision requires federal agencies to examine their activities for offsite effects. An effect may be either a primary, secondary, or cumulative effect on the coastal zone.

Local Government

The Oregon statewide planning program attached substantial importance to the coordination of federal plans with acknowledged local comprehensive plans. To the extent that BLM actions and programs are consistent with acknowledged county and city comprehensive plans and land use regulations, they can also be considered consistent with statewide planning goals. Local plans do not, however, address protection of Goal 5 values from the effects of forest management, as state law prohibits local governments from regulating forest practices. The comprehensive plan for Douglas County could be affected by BLM's Roseburg District RMP.

The District has contributed data for development of county comprehensive plans, followed the development of those plans through the years and consulted on issues of mutual interest. Based on knowledge gained through this involvement, the district planning staff believes that the PRMP is consistent with the comprehensive plans and land use regulations cited above.

Chapter 5
Consultation and Coordination



Summary of Major Changes from Chapter 5 of the Draft Resource Management Plan

A description of the protest process has been added. The public involvement summary has been updated.

Introduction

The Roseburg District Proposed Resource Management Plan/Final Environmental Impact Statement was prepared by an interdisciplinary team of specialists from the Roseburg District Office with assistance from the Oregon State Office. Writing of the Draft began in early 1990; however, an elaborate process that began in 1986 preceded the writing phase. The planning process involved many steps with public participation, as well as consultation and coordination with many agencies and organizations throughout the process. Following is a list of people involved in the preparation of this Proposed Resource Management Plan/Final Environmental Impact Statement, a list of agencies and organizations contacted during its preparation and to whom a copy of the Proposed Resource Management Plan/Final Environmental Impact Statement has been sent and a summary of public involvement to date.

Consistency Review

Prior to approval of the RMP, the State Director will submit the plan to the Governor of the State of Oregon and request that she identify any known inconsistencies with State or local plans, policies, or programs. The Governor will have 60 days in which to identify inconsistencies and provide recommendations in writing to the State Director. The consistency of the plan with the resource related plans, programs and policies of other Federal agencies, State and local government and Indian tribes will be reevaluated in the future as part of the formal monitoring and periodic evaluations of the plan.

Comments on the Proposed Resource Management Plan/ Final Environmental Impact Statement

If you wish to make comments for the District Manager's consideration in the development of the decision, please submit your comments to:

John Singlaub, District Manager
Bureau of Land Management
Roseburg, District Office
777 NW Garden Valley Blvd.
Roseburg, Oregon 97470

In order to be timely, comments should be received within 30 days of when the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of the final environmental impact statement concerning the proposed resource management plan. For further information on this date and time period, contact Phil Hall at the Roseburg District Office, (503) 440-4930.

Protest Process

The resource management planning process includes an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of a proposed RMP would be in error under 43 CFR 1610.5-2. Careful adherence to these guidelines will assist in preparing a protest that will assure the greatest consideration to your point of view.

Only those persons or organizations who participated in our planning process leading to this proposed RMP may protest. If our records do not indicate that you had any involvement in any stage in the preparation of the proposed Roseburg District RMP, your protest will be dismissed without further review. A protest must also be limited to a single proposed RMP, even if the issue or concern involves more than one proposed RMP. Protests that challenge proposed decisions in more than one proposed RMP will not be accepted by the Director. In effect, if you may be adversely affected by more than one RMP, you must file an individual protest for each RMP citing why and

where that particular RMP is incorrect or not in compliance with existing laws, regulations, etc.

Protests of proposed plan elements that merely adopt decisions made in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl signed by the Secretary of the Interior will be dismissed, as the Director has no authority to overrule those decisions.

A protesting party may raise only those issues which he or she submitted for the record during the planning process. New issues identified during the protest period should be directed to the District Manager for consideration during plan implementation, as potential plan amendments, or as otherwise appropriate. If an issue is shared by several individuals or landowners or interest groups, a combined protest on the common neighborhood issue or concern may be mutually more efficient and effective. For example, several landowners in a portion of the planning area may wish to combine their concerns on a proposed land allocation or management issue that affects their common interests in a given watershed.
The period for filing a plan protest begins when the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of the final environmental impact statement concerning the proposed RMP or amendment. The protest period extends for 30 days and is expected to close on or about October xx, 1994. There is no provision in BLM's regulations for any extension of time, and no extensions for filing protests will be granted. To be considered "timely," your protest must be postmarked no later than the last day of the protest period. Also, although not a requirement, we suggest that you send your protest by certified mail, return receipt requested.

Protests must be filed in writing to:

Director (760)
Chief, Planning and Environmental Coordination
Bureau of Land Management
406 "L" Street
Washington, D.C. 20240

To be considered complete, your protest must contain, at a minimum, the following information:

1. The name, mailing address, telephone number, and interest of the person filing the protest.

2. A statement of the issue or issues being protested.

3. A statement of the part or parts of the specific (named) proposed RMP being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the document.

4. A copy of all documents addressing the issue or issues that you submitted during the planning process or a reference to the date the issue or issues were discussed by you for the record.

5. A concise statement explaining why the BLM State Director's decision is believed to be incorrect. This is a critical part of your protest. Document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, and available planning records (e.g., meeting minutes or summaries, or correspondence). A protest which merely expresses disagreement with the Oregon/Washington State Director's proposed decision, without any data, will not provide us with the benefit of your information and insight. In this case, the Director's review will be based on the existing analysis and supporting data.

List of Preparers

Management Team

John O. Singlaub
District Manager
Responsibilities: Management Direction.
Education/Experience: M.P.(Master of Planning), Environmental and Land Use Planning, University of Virginia; B.A., Geography, U.C.L.A.; BLM, 15 years.

David R. Baker
Chief Branch of Multi-Resources/Acting Associate District Manager
Responsibilities: Resource Management Plan Team Member, Document Review, Management Direction.
Education/Experience: B.S., Forestry, University of Montana; Graduate Studies, Outdoor Recreation Management, University of Wyoming; BLM, 22 years.

John L. Hayes
Area Manager, Tyee Resource Area

Responsibilities: Resource Management Plan Team Member, Document Review, Management Direction.
Education/Experience: B.F., Forest Management, Stephen F. Austin State University; BLM, 28 years.

Bennie C. Hobbs
Assistant District Manager, Division of Operations
Responsibilities: Resource Management Plan Team Member, Document Review.
Education/Experience: B.S., Forestry, University of Idaho; BLM, 25 years.

Gail Schaefer
Area Manager, Mt. Scott Resource Area
Responsibilities: Resource Management Plan Team Member, Document Review, Management Direction.
Education/Experience: B.S., Forestry/Recreation Resource Management, University of Minnesota; Minnesota DNR, 1 year; BLM, 19 years.

Lyndon A. Werner
Chief, Branch of Forestry/acting Assistant District Manager, Division of Resources
Responsibilities: Resource Management Plan Team Member, Document Review.
Education/Experience: B.S., Forest Resource Management, University of Illinois; M.F., Forest Administration, Oregon State University; BLM, 18 years.

Al Wood
Area Manager, South Douglas Resource Area
Responsibilities: Resource Management Plan Team Member, Document Review, Management Direction.
Education/Experience: B.S., Forestry, University of Minnesota; USFS, 1 year; BLM, 20 years.

Resource Management Plan Team

Isaac Barner
District Archaeologist
Responsibilities: Cultural and Paleontological Resources.
Education/Experience: B.A., Anthropology, Portland State University; BLM, 15 years.

Monte Fender
Access Specialist
Responsibilities: Access.
Education/Experience: B.S., Forest Resource Management, University of Idaho; BLM, 28 years.

Joseph N. Graham
District Inventory Specialist
Responsibilities: Timber Resources (Technical), ASQ Determinations, Sensitivity Analyses, Inventory statistics and projections.
Education/Experience: B.S., Forestry, Purdue University; M.S., Forest Management, Oregon State University; USFS PNW Experiment Station, 3 years; Medford Corporation, 3 years; BLM, 9 years.

Philip J. Hall
Planning and Environmental Coordinator
Responsibilities: Resource Management Plan Team Leader, Document Preparation, Public Involvement Technical Coordinator.
Education/Experience: B.S., Forestry, North Carolina State University; B.S., Conservation, North Carolina State University; BLM, 18 years.

Steve Hofford
District Hydrologist
Responsibilities: Water Resources.
Education/Experience: B.S., Watershed Science-Hydrology, Colorado State University; BLM, 2 years; Forest Service, 14 years; Geological Survey, 1 year.

Russ Holmes
District Botanist
Responsibilities: Vegetation, Special Status Species, Special Areas.
Education/Experience: B.S., Biology, East Carolina University; M.S., Biology, East Carolina University; BLM, 14 years.

Dennis Hutchison
District Soil Scientist
Responsibilities: Soils.
Education/Experience: B.S., Resource Management-Specialization, Soil Science; Soil Conservation Service, 10 years; BLM, 16 years.

Craig Kintop
District Silviculturist
Responsibilities: Timber Resources, Managed Stand Yield Tables.
Education/Experience: B.S., Forest Resources Management, University of Minnesota; BLM, 18 years.

Fred Larew
Realty Specialist, Mt. Scott Resource Area
Responsibilities: Land Tenure, Rights-of-way, Land Classification and Withdrawal, Rural Interface.
Education/Experience: B.S., Geography, Weber State University; BLM, 17 years.

Doug McVean
District Wildlife Biologist
Responsibilities: Wildlife, Special Status Species.
Education/Experience: B.S., Game Management, Humboldt State University; BLM, 28 years.

Gregg Morgan
District Outdoor Recreation Planner
Responsibilities: Recreation planning, inventory, and development.
Education/Experience: B.S., Outdoor Recreation Planning, Utah State University, BLM, 16 years.

Steven D. Niles
Presale Forester, South Douglas Resource Area
Responsibilities: Timber Resources.
Education/Experience: B.S., Forest Management, University of Massachusetts; BLM, 16 years.

Curtis J. Ritter II
District GIS/ARD Coordinator
Responsibilities: GIS Analyses.
Education/Experience: B.S. Forest Management, Northern Arizona University; Graduate Studies, Silvicultural Institute, University of Washington and University of Oregon; BLM, 25 years.

LaVon Ritter
Writer/Editor
Responsibilities: Document Preparation and Editing.
Education/Experience: B.S., Business Administration, B.S., Education, Southern Oregon State College; Private Industry, 15 years; BLM, 6 years.

Merrill Tester
District Fire Management Officer
Responsibilities: Fire.
Education/Experience: U.S. Forest Service, 10 years; BLM, 15 years.

Ted R. Weasma
District Geologist
Responsibilities: Energy and Minerals, Hazardous Waste.
Education/Experience: B.S., Geology, University of Washington; Registered Professional Geologist; Certified Review Mineral Examiner, BLM, 13 years.

State Office

Dale E. Bays
State Office Economist
Responsibilities: Timber Supply Analysis.
Education/Experience: B.S., Forestry, SUNY; Graduate Studies in Economics, SUNY and Utah State University, 5 years; BLM, 23 years.

Chris Cadwell
Natural Resource Database Specialist
Responsibilities: Inventory Analyses.
Education/Experience: B.S., Forest Management, Humbolt State University; BLM, 13 years.

Duane Dippon
GIS Specialist in Planning
Responsibilities: Automated Resource Data.
Education/Experience: B.S.F., Forest Management, Purdue University; M.S.F., Forest Management, Purdue University; Ph.D., Forest Economics, Oregon State University; Associate Professor, University of Florida, 8 years; BLM, 5 years.

Leslie Frewing-Runyon
Economist
Responsibilities: Socioeconomics.
Education/Experience: B.A., Economics, Willamette University; BLM, 5 years.

Rebecca Gravenmier
Natural Resource Specialist, GIS Use Analyst, GIS Section
Responsibilities: GIS Coordination and Development of GIS Computer Programs.
Education/Experience: B.S., Range Management, Utah State University; BLM, 8 years.

Phil Hamilton
Planning Process Coordinator
Responsibilities: State Resource Management Plan Leader.
Education/Experience: B.S., Forestry, State University of New York; Graduate Studies in Public Administration and Economics; BLM, 35 years.

Jeffery S. Nighbert
State Office Senior Technical Specialist for Land Information Systems
Responsibilities: Biological Diversity Team Member, Hexagon Analysis, GIS Technical Advisor.
Education/Experience: B.U.S., Geography, University of New Mexico; M.A., Geography, University of New Mexico; BLM, 14 years; GIS Specialist, 14 years.

Peter D.A. Teensma
Forest Ecologist
Responsibilities: State Office Fire Ecologist
Education/Experience: Ph.D. in Geography (Biogeography), University of Oregon, Forest Service and BLM, 9 years.

Other Agencies and Organizations Contacted

The Resource Management Plan/Environmental Impact Statement team or supporting individuals in

the Oregon State Office contacted or received input from the following organizations during development of the Resource Mangement Plan/Environmental Impact Statementt or the planning steps preceding its development. Copies of the Proposed Resource Management Plan/Final Environmental Impact Statement have been sent to these organizations, agencies, or groups along with a large number of individuals and companies.

Federal Agencies

USDA, Forest Service
USDI, Bureau of Mines
USDI, Fish and Wildlife Service
USDI, Minerals Management Service
USDI, National Park Service
USDE, Bonneville Power Administration
US Environmental Protection Agency

State of Oregon Agencies

Office of the Governor
State Economist
Commission on Futures Research
Department of Agriculture
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Land Conservation and Development
Department of Transportation, Highway Division
Department of Transportation, Parks and Recreation Division
Department of Water Resources

Local Government and Other Government Bodies

Association of O&C Counties
Coos Curry Council of Governments
Benton County, Board of Commissioners
Curry County, Board of Commissioners
Douglas County, Board of Commissioners
Douglas County, Planning Department
Jackson County, Commissioner Jeff Golden
Josephine County, Board of Commissioners
Linn County, Board of Commissioners
Washington County, Department of Land Use and Transportation
City of Klamath Falls, Planning Director
City of Salem, Public Works Department
Confederated Tribe of Siletz Indians

Organizations

American Fisheries Society, Oregon Chapter
Associated Oregon Loggers
The Chamber of Medford/Jackson County
Coalition for Wise Forest Use
Douglas Timber Operators
Eastern Oregon Mining Association
Friends of Greensprings
Headwaters
Local Residents for Old Growth
Mazamas
National Association of Conservation Districts
National Audubon Society
National Council of the Paper Industry for Air and Stream Improvement
Northwest Environmental Defense Center
Northwest Federation of Mineralogical Societies
Northwest Forest Resource Council
Northwest Forestry Association
Northwest Rivers Council
North West Timber Association
Oregon Natural Resources Council
Oregon Rivers Council
Public Lands Foundation
Sierra Club, Oregon Chapter
Siskiyou Audubon Society
Southern Oregon Timber Industries Association
Umpqua Valley Audubon Society
Upper Cow Creek Community Center
Western Forest Industries Association
Western Wood Products Association
The Wilderness Society
Willamette Timberman Association

BLM Planning and Resource Inter-relationships with Other Agencies

Interagency coordination with other federal, state, and local government agencies is required by BLM regulations (43 Code of Federal Regulations Part 1610.3). Many formal coordination relationships between the BLM and these other government agencies or units have been established through Memoranda of Understanding (with Interior Department agencies) and interagency agreements (all discussed hereafter as agreements). A number of these have been approved by the director of the Bureau and are sufficiently detailed to preclude the

need for state office or district office level agreements. Some national level agreements have local supplemental agreements between lower level units of agencies. In addition, the State Director has approved independent state level agreements, while the district manager has approved agreements with county governments. In general, these agreements deal with mechanisms for coordination, consultation, and documenting consistency and therefore do not constrain resource allocations or management direction unless they are nondiscretionary that is, mandated by federal law, executive order, or treaties. Some local agreements are very specific and involve techniques for managing public lands to meet detailed objectives for plant and animal habitat, research projects, big game transplants, or multi-purpose communication sites. Any agreement element which is discretionary can be modified as a consequence of the Resource Management Plan decision making process. Such agreements normally contain standard "escape clauses" that come into operation in the event of inadequate funding, discovery of contradiction with federal law, or the need to amend or revise the agreement due to newly approved plans, changes in resource condition, etc.

Relevant coordination occurs with the following agencies regarding the activities noted:

U.S. Forest Service - regarding plans, activities, and projects on adjacent lands.

U.S. Fish and Wildlife Service - regarding plans and activities that may affect a federal threatened, endangered, or proposed threatened or endangered species or its critical habitat, or a federal candidate species.

Bonneville Power Administration - regarding improvement of riparian zones and anadromous fish habitat as part of the Columbia Basin Fish and Wildlife Program of the Northwest Power Planning Council as authorized by the National Power Planning Act. Also regarding identification and evaluation of regional utility corridor options.

U.S. Army Corps of Engineers - regarding the Corps' authority, under the Clean Water Act, to regulate the discharge of dredged or fill materials into any estuary or wetland or stream with a flow in excess of five cubic feet per second.

National Marine Fisheries Service - regarding planning and activities which may affect marine, estuarine, anadromous fish resources, or Federal threatened, endangered, or proposed threatened or endangered anadromous fish.

Soil Conservation Service - regarding the National Cooperative Soil Survey.

National Park Service - regarding planning and activities that could affect an identified inventory or study river's ability to meet Wild and Scenic Rivers Act eligibility or classification criteria.

Oregon Department of Fish and Wildlife - regarding planning and activities affecting wildlife (including fish) habitat.

Oregon Department of Forestry - regarding BLM compliance with the Oregon Forest Practices Act in the conduct of timber harvest, reforestation, road construction and maintenance, chemical applications, and slash disposal. Also regarding BLM compliance with the statewide Smoke Management Plan and Visibility Protection Plan under the umbrella of the Federal Clean Air Act. And regarding fire protection, for which Oregon Department of Forestry is BLM's primary contractor in the planning area.

Oregon Department of Environmental Quality - regarding BLM compliance with the Statewide Water Quality Management Plan, under the umbrella of Section 208 of the Federal Clean Water Act. Also regarding treatment and control of water pollution sources where such may be associated with BLM facilities.

Oregon Energy Facility Siting Council - regarding any proposed power plant larger than 25 megawatts, proposed electric transmission line over 230 Kilovolts in capacity or proposed natural gas line at least 16 inches in diameter.

Oregon Dept. of Agriculture - regarding noxious weed control programs and the state endangered plant species program. BLM coordinates site-specific noxious weed control activities with local weed control districts.

Division of State Lands - regarding BLM compliance with Oregon's Removal-Fill law, which regulates removing and filling of materials from and in the waters of the state.

Highway Division, Oregon Dept. of Transportation - regarding road planning in the vicinity of federal and state highways. Similar cooperation takes place with county road departments regarding county road systems.

Oregon Department of Parks and Recreation - regarding management of BLM-administered land adjacent to state parks and state scenic waterways.

Oregon Department of Geology and Mineral Industries - regarding mined land reclamation on BLM-administered lands.

State Historic Preservation Office - regarding sites protected by National Historic Preservation Act regulations.

Land Conservation and Development Commission - through the Department of Land Conservation and Development - regarding consistency of BLM plans and activities with the Oregon Coastal Management Program, under the umbrella of the Federal Coastal Zone Management Act.

Counties - regarding consistency of BLM plans with acknowledged county comprehensive plans, as well as regarding a variety of BLM plans and activities that may affect county road systems, county parks, and county natural resource management activities. BLM also participates in review of county planning actions in order to alert counties to potential conflicts and inconsistencies with BLM forest management plans or other plans.

Public Involvement Summary

Public involvement and consultation with affected state and local governments is required at several points in the Resource Management Plan process. This consultation is essential so the final resource management plan will be as consistent as possible with state and local natural resource related plans, programs, and policies.

Public involvement has been an integral part of BLM's resource management planning process from the outset. To date public involvement activities have included a series of information mailers or brochures, public meetings, open houses, field trips, distribution of planning documents, document review and comment periods, informal contacts, group meetings, written letters and responses to comments. Our efforts began in May 1986 with a mailer that asked for comments on the type of public involvement activities that should be conducted in the planning process.

In September 1986, a district mailer outlined the overall planning schedule and requested comments on the first major planning step: Issue Identification. BLM invited the public to identify issues or concerns they believed should be addressed in the Resource Management Plan process. A news release announcing this step was distributed to the news media. During this planning step, each western Oregon district hosted an open house to help acquaint local citizens with the planning process and schedule and to discuss issues related to the planning process. On September 30, 1986, thirty-six people attended an open house in the Roseburg District Office.

Building on public comments received during the issue identification step, BLM prepared and distributed another district mailer in March 1987, summarizing publicly identified issues and concerns. The mailer also addressed the second and third planning steps: Development of Planning Criteria, including State Director Guidance, and Collection of Inventory Data. The mailer included a schedule of public meetings and/or field trips hosted by each district to review and discuss the technical elements of inventory collection, particularly forest inventory techniques. The mailer also disclosed a proposed element of planning criteria by identifying a proposed timber harvest computer model, and an opportunity for public comment on the model. The Roseburg District hosted two field trips to discuss forest inventory techniques and BLM forest land classification procedures. The first trip on May 14, 1987 to the northern portion of the district was attended by 24 people representing a variety of interests and organizations. The next day a similar trip to the southern portion of the district was attended by six people. Both trips included a look at a variety of forest land classifications which generated considerable discussion and interaction among participants over the procedures used in the classification process. The field trips provided a forum by which complicated technical procedures could be discussed and demonstrated, and land and resource features could be examined first hand in actual field situations, rather than discussed in an abstract sense in an office environment.

In August 1987, BLM distributed another mailer dealing with Planning Criteria and proposed State Director Guidance. This mailer requested comments on relevant topics for State Director Guidance and included a schedule for public demonstration of the proposed timber harvest computer model. Demonstrations were conducted in Roseburg and Portland in September 1987. Fourteen people attended the Roseburg demonstration of the proposed TRIM-Plus Allowable Harvest Model. The session included a comparative look and discussion of other harvest models with TRIM-Plus and a demonstration of how the model works.

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In January 1988 a mailer was distributed to inform the public of the upcoming availability of the State Director Guidance Document. Interested publics were asked to return a request to receive a copy of the document.

A draft State Director Guidance Document was mailed to all those who requested copies in May 1988. Additional copies were made available through all district offices, and open houses were held in each district and the state office. The Roseburg District held an open house attended by 22 people on June 9, 1988 to discuss the State Director Guidance Document. A comment period followed, with approximately 70 written responses sent to the state director by the end of August 1988. Proposed revisions to some elements of that guidance and responses to public comments were shared with the original respondents for further comment in several letters during 1989 and 1990.

The Roseburg District "Summary of the Management Situation" was published in February 1991. The Roseburg District held an open house to help explain and discuss the Analysis of the Management Situation. The Roseburg District received 33 public comment forms and letters containing 37 signatures in response to the Analysis of the Management Situation. The comments received by the public were used by the district Resource Management Plan team in developing the Preferred Alternative. In March 1992, the Roseburg District sent out about 900 newsletters to individuals and organizations summarizing the public comments that were received on the Analysis of the Management Situation, informing them of the status of the planning process, and requesting a response from those who desired to receive either a full Draft Resource Management Plan/Environmental Impact Statement document or summary document of the Draft Resource Management Plan/Environmental Impact Statement.

The Roseburg Draft Resource Management Plan/ Environmental Impact Statement was published in August 1992. A public comment period of 120 days was held from August to December 1992. During the public comment period the Roseburg District held open house meetings, met with interest groups, industry and organizations, and was interviewed by various radio and television stations, and newspapers in Roseburg, Eugene, and Medford. In addition, District personnel actively met with individuals to answer questions and promote understanding of the RMP. A team of BLM managers and specialists also held a series of briefings for groups and individuals that covered all six western Oregon Draft RMPs. The Roseburg District held 31 meetings or briefings in Douglas County with approximately 400 people in attendance. An additional 37 meetings or briefings were conducted in Oregon and Washington D.C. concerning all six western Oregon RMPs.

A total of 1348 comment letters containing over 9,000 specific comments were received on the Roseburg Draft RMP/EIS. Comments were evaluated and some substantive recommendations led to changes in the Proposed RMP and to the analysis of environmental consequences. A list of individuals and organizations who commented on the Draft Resource Management Plan/Environmental Impact Statement is shown in Tables 5-1 and 5-2. Further information concerning public involvement may be found in Appendix G, Summary of Scoping; Appendix H, Comment Letters from Federal, State, and Local Government; and Appendix I, Response to Comments.

The completion of the Roseburg District Proposed Resource Management Plan/Final Environmental Impact Statement was delayed during the development and publication of the SEIS. The SEIS analyzed ten alternatives and received approximately 102,000 comment letters. The public involvement in the SEIS is summarized in the Final SEIS and in the SEIS ROD.

The mailing list for this Proposed Resource Management Plan/Final Environmental Impact Statement represents all those individuals and organizations who requested copies of the Proposed RMP/Final EIS. Each person and organization who submitted comments during the public comment period for the Draft RMP/EIS was contacted as to whether or not they desired a copy of the Proposed RMP/Final EIS.

Any protests to the director of the BLM will be reviewed and addressed before a Record of Decision on the RMP is completed. Comments directly to the District Manager will also be considered in formulating the decision.

Table 5-1. Individuals Who Commented on the Draft Resource Management Plan

Gerald C. Ansell
David Briggs
Skip Brainard
David Haueter
Lloyd S. Hockema
John E. Lowe
Doug Nowak
Frank Good
Dorothy Stinnett
James Lemery
Betty Botz
Chuck Chappell
Talley R. Bell
Hal Westbrook
George McLean
William Brownsberger
Gary C. Briggs
R. Steven Amos
Larry J. Saxton
Darrell V. Reeves
Toni Jean Gibbons
Gudrun Fry
Rob Blickensderfer
Johanna Dillard
Katherine Wilson
Delana M. Peterson
Steven Tichenor
Arnold Beardsley
W.E. Sparks
Richard L. Pickett
Edward Vaught
Robert A. Nisbet
Daryl G. Hauser
Dr. David P. Turner
David Allaway
Thomas R. Wicks
Ronald S. Yockim
Marjorie M. Aust
Larry Aichele
Robert Carson
Sam Toueson
Tom Franklin
Robert Hubbs
Robert Dahne
Don Inge
Mavis Holcomb
Elaine Jones
Don Hughes
Jimmie Franklin
Robert Pendergast
Mark Dawson
Louise Barton
Everett Peterson
Roger Romans
Matt Dahlgreen
R.G. Lathrop
Steve Strecker
Dean Sebastian
Robert Murray
R.J. McCarthy
Arnold Reinhart
Blaine R. Lovemark
Barbara Roberts
Paula Lockhart
Shelia R. Murphy
Bob Wanless
Michelle & James Tollefson
Bob Powne
Marty Best
Bill Carter
Thomas A. Lawler
Tim Dowdy
Jonothan Spero
W.E. Von Pertz
Tim Lewis
Harry L. Cook
Robert D. Hills
Ken McCoy
Dr. Jim Burton
Christopher N. Roth
Steve Grieb
Oscar Potter
Suezell V. Carlile
Richard A. Ray
Dr. Keith Kale
Raymond H. Fischer
John Mancinelli
Judiann Surkamer
Julie Lewis
Cora Thompson
William A. Maule
John R. Swanson
Dick Sturdevant
David R. Stanton
Billy Frazier
Pat Miller
Wes Vinyard
Jenny Kluver
Eileen Slate
William A. Wheelan
Brian K. Smith
Mark Nichols
Kelly Brown
Darwin Trimnell
Stan Thompson
Roger Vrilahas
Dale A. Slate
Audrey Barnes
Bill Markham
Dowell and Mabel Martz
R.D. Harris
Lonny Bessett
John Ladd
David R. Monett
Troy Reinhart
Bruce Rice
Larry Kirkpatrick
Mikel L. Wise
Miguel Tejada-Flores
Robert D. Erickson
Kenneth L. Hebard
Jackie Lang
David Niessner
Eugene P. Bratsch
Ron Evans
Sharon Moore
R.A. Smith
Alan J. Peters
C.W. Heath
Larry and Sharon Bazor
Keith S. Bedard
Jacque Evernden
Ron Bilton
Terry Hanscam
Chris Meurer
Judy Holnigren
Jean B. Jennings
Lorne McCulloch
John R. Norberg
Donald H. Evanson
Paul R. Boehner
Mel Oberst
Priscilla Carlson
Doug Heiken
C.L. Bitner
Ole Bjelke
Larry Eck
R.F. Schaepe
William C. Townsend, Jr.
Jan Brookbank
Pete Rasmussen
Linda Fox
Ingrid Nilsson
Carol McLaughlin
Ricky L. Lambeet
Richard Middleton
Ron Van Handel
Max Kimmel
Dorothy Stratton
Jaysen Dunnavant
Candis L. Condo
Randy Crockett

Jerry Serfling
Werner R. Muir
Fern and John D.Hane
Gary Coelyn
Jon Vermouth
Eugene Surkamer
Joanne Cleland
Richard Biersteker
John A. Mignola
Bob Doppelt
John M. Keller
Russell J. Roth
Chris Nicholls
Price Webb
Ronnie Mays
Robert Imhoff
Jonpaul I. Harvey
W.J. Spencer
Alan Branson
Melvin Gowey, Jr.
Linda McGinnis
Richard Cummings
Elmer J. Clark
Dan Keller
Scott Greenwalt
Scott Story
Mike Gates
Richard Daniels
Carl Moseley
Finas McKnight
Evelyn Esterbrook
Ken Maurer
Guy Giffen
Stanley D. Butzer
John Morgan
Carl Richardson
Waino Holtti
James Day
Florence Stone
Joseph R. Coloma
John P. Fish
Frederick J. Vedder
Roy L. Duke, Jr.
Gerald L. Gallmeister
Gene Peterson
Paul Passien
Nick Yraguen
Erling E. Carnes
James Winfrey
Robert Thomas
Tom Burdge
Scott Quast
Kelly Churchill
Darryl Middleton
Bruce R. Craighead
Robert Searles
Samuel S. Skenzick
Eric Peterson

Daniel Elbaum
Jerry R. Neal
Eric Horvath
Glen J. McGuire
James C. McClellan
Phyllis M. Layman
David L. Bowden
Charlotte Touhey
Pat Washa
Daniel G. Crawford
Timothy L. Stevenson
Larry J. Sheirls
Robert Holmgren
Julia Keller
William Canfield
Gabriel Perrazd
Jesse Harvey
Michael Evans
Ron Jackson
Bryam Clark
Rodger D. Mann
Kirby Clark
Frank G. Weaver
Leonard Humphrey
Jeff McClung
Blane Keller
Jerry L. Clark
Patrick S. Kelley
Randolph J. Dickens
Joe C. Denney
Gary Wayman
Gisela Kinney
Lela B. Bentley
Ernest F. Carlson
Roger Vogelpohl
Art Thompson
Gerald Soderberg
Edward Coe
Harold Stanton
Glynda Black
Steve Fish
Gordon Vigue
R.T. Carlile
Delna Jones
Ray Heaton
Wes Anderson
Kristin L. Yraguen
Loren Johnson
Steve L. Collins
W.G. Payne
Gene Shelton
Rick Purvine
Gale Westbrook
Cris Blackert
Jaime Yraguen
Alice Massingale
Dave Sabala
Dennis Closson

Bhagwati Poddr
Bruce Kelly
Anne Olsofka
Merle D. Gors
Judy Mabry
Willow Denker
Juan Yraguen
Larry McCall
Roy Jones
Dale D. Beavers
Kenneth W. Mosley
Don Duquette
Bruce Wentworth
Ralph Rosera
John Ackerson
Wayne A. Powell
Kelly Rondeau
Gary Max
Gary R. Ogle
Roger D. Proctor
Robin Spencer
Edward A. Lowry
Tony Parker
Robert Long
Michael J. Blanchard
Leroy Laduke
Victor Swake
Kevin Kelley
Fred Oestman
Sandra Reese
Wayne Michael Lottinville
Danny Ceech
Gail Peterson
Jerry Winterbottom
Robert L. Nunes
Clyde Van Orman
Deborah L. Brown
Archer L. Hudson
James M. Smith
Chuck Hanson
Bonnie Fish
Sherri Fugate
Jeff Lowe
Tevis Dooley, Jr.
Joseph Pinard
Toby Schofield
Phil Voss
James Bakke
Ronald J. Patterson
Greg Gaston
Cheryl Bodine
Michael J. Renco
Eleanor A. Pugh
Laurence J. Saule
Robert Turner
Kathy Finley
Eric Thompson
Delmer R. Colbaugh

John W. Crouch
Harlan Ennis
Paul Denton
John W. Westwang
Tom Bissonnette
Timothy Kuyper
Frank Massingale
Irvin Syrie
Frank Moore
Larry E. Stumper
John Mooneyham
Kenneth L. Huse
Shelia Mosley
Dennis Anderson
Larry Pasley
Chane Johnson
Lonnie L. Shields
James Gray
Robert Applegate
James H. Fry
Scott McCloskey
Jason Miller
Benney L. Langston
Joe R. Brown
Brian Hunnicutt
Wally Eaton
Jake Beam
Cheryl Kinney
Barbara Evers
Gary Robinson
Ronnie F. Alexander
Bethanne Beisner
Roxanne Jones
Theresa Davis
Nathan Sharp
Lisa Davis
Ozella Rose
Marilyn Whisenhunt
Anthony Anderson
Dianne Case
Jim W. Fields
Mike Stewart
Randolph Lee Garrison
Charles Kissinger
Ronnie D. Alexander
David A. Gregory
Larry F. Holland
Mitch Spires
Brian Laurance
Gary Johnson
Matt Knisht
Dolph D. Boyer
Jerry Christenson
Helen Fields
William E. Barter
Greg Holmes
Dean Sanders
Eugene Anderson

Dave Beavers
Charles W. Dunn,III
Donald F. Maddux
Emma Keller
Jon F. Ballard
George B. Thomas
Roy Lee Snyder
Larry A. Martin
Michael H. Hambrick
Wayne Cox
Glenn D. Webb
Albert D. Ragan
Joe Roberts, Jr.
Morris Van Deventer
Donald W. Abercrombie
Mike D. Rasmussen
Mike Kvistad
Donald Mitchell
John N. McCormick
Jerry Largent
Bill Blankenship
Jason Chrisenberry
Kirk Tolliver
David Mack
Tyson Eaton
Aaron Eaton
Letha Woods
Richard King
Howard Sohn
Ronald W. Anes
David E. Cox
Angie Jones
Ross Kinney
Jim Davis
Connie Gibson
Angela M. Walter
Terry D. Rose
Jeff L. Davis
Sherri Parrish
Robbin Oxford
John Parrish
Daniel R. Still
Debbie Yraguen
Dale Mutschler
Bonnie Beaulieu
Stacy Lemings
Regina Spires
Donald C. Carlson
Tina Laurance
Marlys Johnson
Harry Borland
Larry Coleman
Blaine Perry
Donald G. Isakson
Ray Crowe
Laila Anderson
Kim Hiscott
Roy Layton

Jim Brock
Larry Merrill
Pat Johnston
Ruth M. Anderson
Rodney A. Thompson
Chuck Drew
Floyd A. Jenkins
Leroy G. Moore
Richard Pachero
Mattie Thompson
Johnie Ray McCracken
Curtis L. Huse, Jr.
G.L. Wheatley
Jose M. Garcia
David Roberts
Doris Fleming
Kevin Hamilton
Jeffry Asteen
Erik Lofquist
Dave Linder
Bill A. Crowl
Samuel L. Bailey
Brad Kortum
Dennis W. Cluff
Julie Eaton
Angie McDonald
Nellie R. Thomas
Jonathan Wenorski
Scott Spires
Glenda L. Alexander
Byron Lee Jones
Tara Laurance
Brent Kinney
Heather Gibson
Dexter Gibson
Jarred Malone
Angela M. Walter
Robert Thompson
Russell Hopkins
Gary Taylor
Sharon Duquette
David Beals
L. Gaston
Sherry Marqua
Don Hockett
Dwane Nederhood
Matt Spires
Tammy L. Beals
Brian P. Kieser
Jeremy Johnson
Kurt Eifert
Gerald Pynch
Mark J. Boyer
Elsie Isakson
Rubye Chadwick
Cindy Sanders
Gerald Radford
Marian Athey

Cecilia A. Layton
Bryon Beaulieu
Don Duquetts
Teresa D. Clark
Gary Tarpley
K.C. Owen
Charley Stringer
Memoriee Sconce
Janice M. Campbell
Curtis J. Sulffridge
Shirley J. Rummel
Ann Sohn
Gary Cave
Michele Hunnicutt
S.R. Desbiens
Lou Medley
Bob Waller
Dale Carpenter
Donald Lattin
Kelvin Crawford
Daniel Applebaker
Zora Woodcock
Ken Firnekas
Eugene Bliven
Jeff Bunnell
John Buchholz
Sean R. Frye
William Carney
James L. Hilburn, Jr.
Robert M. Freimark
Kile E. Snider
Roger F. Smith
Chris V. Ross
Mary Brennan
Lois J. Trento
Bert Young
Glenn Williams
Jerry D. Henson
Tammy McCool
Mary Haskins
Sherry D. McCarley
Elsie M. Paroz
Brenda Leonard
Brook Spears
Gene D. Silovsky
Nicole Rank
Tim Feely
Scott Radford
Shana Hebard
Beulah B. Carey
Patty Rust
James Hargraves
Phyllis Feely
Chad Feely
Rick A. Feely
Sonja Clark
Larry Holmes
Gene Radford

Robert G. Rose
Donald Roque
Linda Anderson
Jackie Parret
Paula Jean tarpley
Trena Stringer
Walburga Stringer
Fred Black, M.D.
Leo Struthers
Richard D. Bumcrot
Dennis Haney
Ruth Coblentz
Billy J. Ledbetter
Jennifer Hunnicutt
James Colmer
James Whited
Tom Reed
Brian Johnson
Steven Ledford
Frank X. Condon
Roger Leach
Jaycee Owens
Russell Cox
William Goodson
Calvin Clack
Walter L. Tinker
Mike Blankenship
Steve Torres
Doris Wadsworth
Todd Burkholder
Stephen J. Evans
Mike D. Burrell
Byron Rendar
Ray Budel
Thomas R. Schmidt
Machella V. Williams
Stewart Laney
Lori Prentice
Jeannie L. Weakley
Darrell Neet
Willie R. McCarley
Janet Hartman
Donald Wynegar
T. Buck
Jenny James
Dennis Gregory
Alishya Clark
Joseph McGurrin
Howard Saul
Laura Higdon
Dorothy Lemen
Guy Weakley
Norman Lemen
Jack Lemen
Peggy Feely
John H. Thomas
Joan Feely
Jerry L. Wilson

Summer Rose
T.L. Waltenspeil
Louis Anderson
Shawn Parret
Kenneth E. Clark
Lloyd R. Van Doren
Larry Sharp
Walter Gile
Richard Bement
Bill Hastings
Robert Coblentz
Judy Cave
Dennis Kinney
Steve Hunnicutt
Brian D. Privette
Rick Murphy
Ernest Dunlap
Marty Garren
Gerald R. Parker
Gary Page
John Cot
Mark Owens
Michael Hines
Roland G. Charles
Mary Buchholz
Larry Adams
Terry Osborne
Sherri A. Wilcox
Mark E. Phillips
Scott R. Keep
Ane Tilford
Bill Lang
Bill Dryden
Vickie Budel
Vera Parker
Sandy Perkins
Eric King
Kathy Henderson
Edward P. Weakley, Jr.
Mike R. McCarley
Thelma McCarley
Casey Chamberlin
Scott E. Murders
C. Wesley Jackson
Brandy Davis
Don O. Lemen
Mykel Clark
Grace E. Bakke
Harvey Saul
Debi Gilbert
Jake Kercher
Kasie Feely
Derek Feely
Dustin Feely
Jason Feely
Ruby F. Thomas
Jay Feely
Sue Thompson

David Thompson
Venna Doyle
William L. Tylar
Susan Saily
Tammi Williams
Edna Strong
Roger H. Caba
Lara Newcomb
Gary Nichols
John J. Andlando
Ron Iugles
Byron Donner
Jarrod Chandler
Glenn Wittur
Donald R. Lakin
Vernon Jones
Brian Folletz
Rose Kuntz
Buddy Wiggins
Richard Nugent
Donal A. Kuester
Anne W. Squier
Alan J. Baumann
James R. Kauppila
Joel F. Mizell
David & Barbara Adams
Gary Kish
James F. Moore, Jr.
Gene Wickersham
Thomas Chrestman
Gordon Culbertson
Jeffery Forester
Joni Fosbenner
Bob Powne
Larry Phillips
Chris Bowers
Burce Ellis
Kelli R. Zenchenko
James E. Coulter
Jeremy Anderson
Gary Cumpston
Norman J. Richards, Jr.
Freddie D. Wilson
Lee R.C. Green, Jr.
Tim Hinson
Blaine E. Garman
Brigid A. Kennaday
Charles N. Crumb
Doris C. Fleming
Donna M. Rogers
John F. Kerby
Brad A. Hatley
James P. Davis
James L. Morris
Dennis Moore
Ernest J. Smith
Douglas W. Simpson
Jason D. Rucker

Deb Radford
Delores Elliott
Juan Ricon
Tami Dunn
Trina Moore
Larry Strong
Sherry Barnes
Patricia K. Cole
Butch Stevens
Grover Wardwell
Wayne Christensen
Janet O'Neil
Phillip Cassell
William Fish
George Insley
Lizzie Lucille Shoultz
David Lines
Dale Ingram
John Hatton
Brian Watson
Gary Powell
Sue Bowers
Jerry Becker
Wendell Wood
Bill May
Richard H. Sommer
Darrell Hester
Curtis D. Byrd
Barbara Becker
Leonard Gondek
Abigail Klips
Clifton T. Smith
Robbie Earon
James R. Fourtner
Albert D. Applegate, Jr.
Brian Tumlinson
Ted L. Schlacht
John A. Elrod
Cherly A. Carney
David L. Stewart
Patricia A. Smith
M.D. Blankenship
Robin M. Whitmore
Stanley D. Booth
Olaf A. Myhre
Eric A. Pulver
Mark Tugman
Arthur Brown
John A. Boone
Craig S. Barke
Michael W. Hankins
James Hess
Rodney B. Gray
Daniel L. Forrest
Tom J. Wilson
Danny C. Green
Gary B. Schroeder
Robert C. Rightbower

Doug Radford
Holly E. Brown
Karen Loughridge
Pearleen Bennett
Brian C. Moore
Suezanna Robinson
Edna Lois Oppelt
Cherly Schermezhon
Patrick O'Malley
Jack Kruger
Scott Crook
Mitch Myers
Jeff Elst
Marilyn Lackin
Kyle Pettibone
Connie Jones
Connie Brown
Judy L. Fields
Carl Johnson
Larry Alford
Bear Tamez
James E. McAuley
Rod Greene
Bill Dryden
A. Angelica Adams
Art & Monet Skach
Richard Rogers
Steve Skenzick
Gene Timms
Carlin Williams
Ron Pio
Ervan B. Smith
Sherman D. Anderson
Dick Vander Schaff
Kevin A. Parazoo
Jody O. Mincher
Brian S. Jenks
Alan M. Stringer
Gary J. Beebe
Dennis Tarditi
Joseph D. Milton
Darrel Zuleger
Darwin A. Meacham
Jason R. Budel
Wayne Barnes
Michael D. Dick
Kenneth C. Shepherd
Michael S. Field
Mitchell E. Knuckles
Blake L. Doud
Richard L. Hannigan
Robert L. Jenks
Renee S. Hetland
D.W. Justin Cox
Jimmie W. Smith
Reed J. Gross, Jr.
Randy A. Russell
Julie D. Premo

Arthur W. Phelps
Rick D. Navarro
Henry H. Moore
Donald R. McFarland
Day Snyder
John W. Wensorski
William A. Glampe
Mark A. Delamater
Faith L. Dimmick
Thomas D. Cornell
Lawrence G. Carney
Steven T. Brown
Paul H. Beck
Gladys Allen
Maynard H. Hoff
Delmar R. Looper
John M. Leach
Tony L. Kateley
Arther D. Johnson
Julio Iparraguirre
Cherly Kolander
Karen L. Smith
Jeff Smith
Lance R. Clark
Jeanette Phelan
Leanne Kaupplia
David Parker
Maclean A. Campbell
Bobby A. Lanoy
Tracy Osborne
L.T. Hill
Tim Zuck
Ray C. Juares
Nick Lehrback
Lawrence Stephens
Carl Snodgrass
Robert L. Allen
Lance Cathcart
Jim McGovern
Karen Scott
James Lee
Joe Scevers
Dale L. Foster
Marlene Allen
Leland Nelson
Betty Davis
Mike S. Fairchild
Richard L. Ballard
Brad Keitzman
Phillip D. Coblentz
Patricia Stewart
Michael A. Smith
B. Flynn
Travis Smith
Sheryl L. Smith
Rick Smith
Arlene Thomas
Donald B. Lee

Norman D. Nisly
John Navarro
Thomas B. Mehl
Kyle McElmurry
Richard L. Terry
Sam Westin
Rex C. Maddux
Marilyn J. Dean
Anthony R. Darling
David W. Colmer
Fredrick Carney
Ken Brinkerhoff
Howard J. Barlow
Donna M. Ahlvers
Patrick M. Huffman
Theodore L. Lewis
Ann Laferrier
Sandra L. Justice
Jim L. Jenks
Kenneth D. Ingraham
Pollyana Lind
Ross Wootan
Ellis Antrim
Steven J. Witten
Mark Hubbard
Robert Allen
Richard F. Winters
Randy Farmer
Adrian D. Sittser
Tom W. Meyer
Michael Plybon
Earl Esler
Allan S. Arter
Bruce W. George
Ronald H. Groves
Edward B. Schattenkerk
Vern Cathcart
Stephen D. Blum, Jr.
L. Giustina
James R. Drew, Jr.
Debra Lee
Connie Robinson
Todd Bryson
Henry L. Felber
Ken Wilson
Paula Stribling
Raymond R. Osborne
Tommy D. Adair
Roy D. Garren
R.B. White
Kay Edmonson
Franki Shearer
Steve Fitzgerald
Darlene Smith
Bob Warmack
Trudy Warmack
Darlene Stutzman
Cathy Williams

Sean G. Negherbon
Jerry R. Morgan
Thomas W. McNamara
Samuel L. Smith
Michael A. Towne
Floyd E. Godsey
Kelly R. Glampe
Edward R. Dimmick
Darren Cupp
Lonnie J. Carroll
Jackie L. Byrd
James A. Blankenship
Keith A. Bare
Clint K. Allen
Michael A. Lorenz
Kris Lewis
David L. Kindle
Kenneth V. Johnson
Michael D. Jameson
Frank A. Maddux
Eric Ricohermoso
Jemma T. Crae
Maury H. Hudson
Larry A. Phelan
John P. Bajas
Patrick Starnes
Michael J. Bartz
Trina M. Koch
Randy Labranche
Kenneth R. Wostenberg
Kathleen Morey
M.W. Dyer
Ralph & Lucille Craw
Daniel R. Tracy
Sonja Lindbloom
Mary Jones
Andy Kahn
Valerie Mataya
Lawrence J. Long
Dusty E. Dodd
Michael J. Wilson
Todd Christensen
Michael Bryson
James W. Strer
Frances E. Malone
Donald L. Cooper
Raymond L. Carleton
Verlon Phillips
Julie Booth
Larry Johnson
Buster R. Stutzman
Trevor Oliver
Brenda Fitzgerald
Sandra Deles
Chris Smith
Kenneth Sisco
Elnor Lee
Mindy Cathcart

Esther Bennett
Pam Simlevess
Breanna Linville
M. Williams
Joseph W. McCracken
Chris Hammerschmith
Marty J. Steele
Katrina Rank
Andrea Horton
James Horton
Steve Cartwright
Stan McHugill
Charles F. Wilde
Cindy Garcia
D. Johnson
Dwight N. Clark
Marjorie Rehm
James M. Lee
David Robison
Kate Dwire
Virgil Morris
Roger & Sally Scheusner
Neil Hart
Jan Wroncy
Dorothy Galas
Trent Mefferd
Eleanor A. Hayes
William L. Pitner
Johnnie Carleton
Jacqueline Rathbun
Shirley Duncan
Bobby G. Hughes
Duke Hayes
Sandra B. Lamb
Kris Filer
Joyce A. Pitner
Lillian Watson
Fae E. Kratzuyn
Linda Thompson
Leland K. Buffington
Judy Muller
Mike Sustaire
Charles Mooney
Kelley Landout
Gerald A. Beard
Douglas L. Croy
Ron Singleton
Ernest M. Beaber
Chris Winslow
Wn. Earl lape
Dale Pitner
Rudy Brand
Jerry Larsen
Charles F. Ketchum
Jack Filer
E.Clay Firestone
Linda L. Wilson
Florence Holter

Paul D. Gregory
Corky Simlevess
Jeremy Slifer
Ed Dimock
Daniel Klauda
Leroy D. Davis
Bob Simlevess
Hector Garcia
Kris Stewart
Robert Williams
Millie Humphries
Shelly K. Smith
Pam Scevers
Steve J. White
Virginia B. Good
Bruce Hanner
Penny K. Cook
Martin Jack desmond
Robert H. McKellar
John and Penny Lind
Mike Madias
Dennis Gillen
Donald Vredenburg
Mark A. Dvorscak
Leland H. Powers
Helen Carter
Frank W. Hayes, Sr.
A.A. Rehm
Frank Davis
Everett Earl Rathbun
Teresa Buckbee
Ron Kobernik
Roy B. Allen
Z.B. Frazier
Linda Plaskett
James R. Pitner
Gaylord Bradley
Regina McMaster
Carol Ray
Jerry Boynton
Frank Norton
Steven Holmgren
Brandi Helmgren
Earl E. Lee
Zelma A. Beard
Craig Hummel
Barbara J. Admas
Lori Martine
Robert L. Carter
Ruth Essig
Richard L. Close
Sharon Kirkman
Jennie Roberts
Shirley J. Ketchum
Darrell R. Jones
Jody Martin
Shannon Pickett
R. Tucker

Raymond Greenwalt
Justin Railey
Richard Scott
Linda Greenwalt
Janice R. Wilson
Michael Skrip
Larry Bowers
Robert Jackson
Linda Cook
Jon Williams
Dana McHugill
Mark Smith
Cliff Humphries
Harold T. Braun
Erma N. Clark
R.M. McHenry
Dixie Braun
Hal Hushbeck
Richard M. Chasm
Jerry O. Esterby
Gwen Bates
Pat Johnsrud
Carol Vredenburg
William Waugh
Scott Cameron
Alta Hayes
Jon Cowan
Pat Greer
Karen Moore
Cheryl Bright
Garry Hendricks
Frank Hayes, Jr.
Floyd G. Lamb
Orville V. Bundeson
Deric Plaskett
David McMaster
John W. Beam
Henry Muller
Wesley Fox
Ken Hopper
Larry Harnsberger
Gwen Holmgren
Bob H. McDonald
Ron Toman
Don Pols
Thomas P. Nutt
John R. Stenfelt
Joan R. Esterby
Adeline Simmons
Craig Kerr
Willie Close
Suzanna E. Jones
Cathy Rathbun
Millie M. Baker
Jaudale Duncan
E.L. Frazier
Tim Pickett
A.J. Alexander

C.E. Hutchins
Janet Branton
Danny Gesink
Dale Roberts
Mark Lindberg
Curtis W. Brown
Michael Boyce
Michael Jackson
June Lovaas
Patsy Lillard
Stanley G. Adams
Dwyla J. McGuire
June Atkinson
Thor Jellison
Allen Gilbert
Melissa Cox
Meredith Smith
Stuart Richert
Dean Puckett
Sheri Robert
Bill Fredricks
Robert Ragon
Anita Smith
David O'Bannon
Tom Hudson
James B. Linderman
Donald P. Taylor
Sharon & Marvin Zuber
Joan Sandford
John West
Lloyd Jo Ann King
Della Neavell
Charles Neavoll
Frank Sulinsky
S.A. Harrington
Dan Newton
Richard F. Sohn
Melvin E. McGinley
Marvin W. Mizell
Rhea M. Arthur
Sarah E. Greene
Philip Howell
Ted Dauber, Jr.
Bob Hissong
Stephen W. Kaser
Bradley K. Witt
Tom Varley
Michael W. Wiedeman
Larry Tuttle
Dennis Eisenberger
Quinton Powell
Jim Geisinger
Chuck Williams
Barbara Helo
Judy L. Hutchins
Stoney Collins
Bobbie Pitner
Patrick D. Kelly
David Wilson
Jennifer Jackson
Brenda Kay boyce
Gary White
Deanne White
Annette Finnie
Chandry Landolt
Ronald Oilar
Frank R. Waiter
Martin Pierce
Angela Gilbert
Eric Muller
Bill Puckett
Kirsty Landout
Sandy Schneck
Dave Schenck
Sandy Erwin
Violet A. Tranberg
Bob L. Fry
Walter H. Lewis
Lee L. Cunnie
Francis J. Stohosky
Blake S. Rowe
David Jackson
George M. Colin
Glen M. Good
Lawrence G. King
T. Bruggeman
Chris Weaver
Jack C. Manfredo
Bill Heup
Robert F. Newbold
Larry L. Irwin
Charles E. Findley
Steve Erickson
Robbin Lacy
Paul Ketcham
Tony Kuhn
Arnold Weston
Daniel Davis
Eleanor Wynn
Josh Maltsberger
Rober D. Hostetter
Tom Harris
Donald P. White
Larry Boysen
Rocky McVay
Beverly and Donald Beck
Roxanna J. Williams
Dick Lee
Karl Herzberg
Marnie Cruson
Jerry Parsons
Uriel Calvin
Gloria Roberts
Stanley Jackson
Gail E. Jackson
Lynn Meyers
Ray Lillard
Naomi Ragon
Cari J. Roberts
Lynette Fugate
Anna Standifer
Kelly Sinmie
Leah Muller
Don Smith
Gene Landout
Tanya Kuyper
Kevin Thompson
Floyd Ray Stewart
Royce Puckett
Debra Leber
Janie O'Bannon
Lee Gatzke
Geraldine Runyan
Jon Howell
Peter C. Quast
Sean Kelley
Ryan G. Quimby
Darryl Defea
Buddy E. Smith
Dianna Weaver
Steve Weaver
Steve Johnson
Richard T. Brown
John Sajo
Betty C. Anderson
Dw Foster
Roger E. Vorderstrasse
C. Mehlhoff
Oris W. Beucks
Gerald Ragon
Joseph L. Merchep
Brian J. Greber
Oscar R. Nealy
E. Zahn
Lee O. Hunt
Tom Kitchar
Wm. Ivan cross
Richard Anderson
Michael J. Skyes
Wanda Dobson
Steve Helo

Table 5-2. Organizations That Commented on the Draft Resource Management Plan

National Audubon Society
Douglas County Farm Bureau
Fir Springs Tree Farm
City of Roseburg
Canyonville City Council
Winston-Dillard Public Schools
Eastmoreland Hospital
DEJA, Incorporated
Winston-Dillard Chamber of Commerce
Park Place Real Estate
Longview Fibre Company
Public Lands Foundation
Public Lands Foundation
HPS
T.R.E.E.S.
Roseburg Area Chamber of Commerce
Douglas County Board of Commissioners
The Wilderness Society
Steamboaters
Boise Cascasde
Weyerhaeuser
Umpqua Afseee
Douglas Timber Operators, Inc.
Umpqua Valley Audubon Society
Hps Electrical Apparatus
Mazamas
Specialty Wood Products Coop/SW Oregon
Wilderness Research Foundation
City of Yoncalla
Umpqua Chapter, Izaak Walton League
American Forests
Northwest Reforestation Contractors Assoc.
Oregon Forest Products Transportation Assoc.
J.O. Esterby, Inc.
NCASI
Fish And Wildlife Service
Audubon Society of Portland
The Pacific Rivers Council
Umpqua Fisherman's Association
Oregon State University
Oregon Department of Geology And Mineral
D.R. Johnson Lumber Company
Citizens Natural Resources Group
The Wilderness Society
Association of O & C Counties
City of Drain
Oregon Logging Conference
Trout Unlimited
American Fisheries Society
House of Representatives
Forest Service
House of Representatives, District 46
Confed Tribes/Coos, Lower Umpqua & Siuslaw
City of Canyonville
Sutherlin School District 130
Umpqua River Navagation Company
Coos-Curry-Douglas Business Develop Corp.
Bureau of Mines
W.O.O.D.
Winchester Wood Products
Douglas County Chambers of Commerce
Lower Umpqua Hospital
Basco Logging, Inc.
Zoleggi Insurance Agency
City of Drain
City of Yoncalla
Thompson Timber Co.
Association of O & C Counties
Defenders of Wildlife
Munnell & Sherrill, Inc.
State of Oregon
Associated Oregon Loggers, Inc.
Conservation Affairs Committee
Oregon Natural Resources Council
Timber And Wood Products Division
Mama D.O.C., Inc.
Oregon Logging Conference
Roseburg Forest Products
The Nature Conservancy
Elkton Public Schools
Douglas County Title Company
Oregon Natural Resources Council
Sierra Club
Native Plant Society of Oregon
National Wildlife Federation
EPA
Pacific Northwest Research Station
Glendale School District
Evergreen Forest Products
Lower Umpqua Chamber of Commerce
Parsons Lee & Kaser PC
Oregon AFL-CIO
Fir Springs Tree Farm
Pacific Northwest 4-Wheel Drive Assoc.
Defenders of Wildlife
Northwest Forest Resource Council
Oregon State Senate
Western Forest Industries Association
The Wildlife Society Oregon Chapter
State of Oregon
The Pacific Rivers Council

Glossary

Activity Plan - A document which describes management objectives, actions, and projects to implement decisions of the RMP or other planning documents. Usually prepared for one or more resources in a specific area.

Adaptive Management Areas - Landscape units designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives.

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Airshed - A geographical area which shares the same air mass due to topography, meteorology, and climate.

Allowable Cut Effect (ACE) - The expected contribution to the Probable Sale Quantity resulting from future management decisions.

Allowable Sale Quantity (ASQ) - The gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period of time in accordance with the management plan. Formerly referred to as "allowable cut."

Anadromous Fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

Analysis of the Management Situation (AMS) - A document that summarizes important information about existing resource conditions, uses and demands, as well as existing management activities. It provides the baseline for subsequent steps in the planning process, such as the design of alternatives and affected environment.

Analytical Watershed - For planning purposes, a drainage basin subdivision of the planning area used for analyzing cumulative impacts on resources.

Animal Damage -Injuries inflicted upon forest tree seed, seedlings, and young trees through seed foraging, browsing, cutting, rubbing, or trampling; usually by mammals and birds.

Animal Unit Month (AUM) - The amount of forage necessary for the sustenance of one cow or its equivalent for one month.

Aquatic Ecosystem - Any body of water, such as a stream, lake, or estuary, and all organisms and nonliving components within it, functioning as a natural system.

Aquatic Habitat - Habitat that occurs in free water.

Archaeological Site - A geographic locale that contains the material remains of prehistoric and/or historic human activity.

Area of Critical Environmental Concern (ACEC) - An area of BLM-administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards. (Also see Potential Area of Critical Environmental Concern.)

Area of Critical Mineral Potential - An area nominated by the public as having mineral resources or potential important to the local, regional, or national economy.

Area Regulation - A method of scheduling timber harvest based on dividing the total acres by an assumed rotation.

Automated Resource Data (ARD) - Computerized map data used for the management of resources.

Available Forest Land - That portion of the forested acres for which timber production is planned and included within the acres contributing to the allowable sale quantity (ASQ). This includes both lands allocated primarily to timber production and lands on which timber production is a secondary objective.

Back Country Byway - A road segment designated as part of the National Scenic Byway System.

Basal Area - The area of the cross section of a tree stem near its base, generally at breast height, 4.5 feet above the ground and inclusive of bark.

Baseline - The starting point for analysis of environmental consequences; may be the conditions at a point in time (e.g., when inventory data is collected) or may be the average of a set of data collected over a specified period of years.

Basic Resource Unit (BRU) - A term used in TRIM-PLUS for the smallest unit of timberland that has been identified in the inventory.

Basin Programs - Sets of state administrative rules that establish types and amounts of water uses allowed in the state's major river basins and form the basis for issuing water rights.

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the state. Such uses include, but are not limited to, the following: instream, out of stream and groundwater uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMP) - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, Best Management Practices are applied as a system of practices rather than a single practice.

Big Game - Large mammals that are hunted, such as Roosevelt elk, black-tailed deer and black bear.

Biological Corridor - A habitat band linking areas reserved from substantial disturbance.

Biological Diversity - The variety of life and its processes.

Biological Legacies - Large trees, down logs, snags, and other components of the forest stand left after harvesting for the purpose of maintaining site productivity and providing structures and ecological functions in subsequent stands.

Board Foot (BF) - A unit of solid wood, one foot square and one inch thick.

Broadcast Burning - 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.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:

> Category 1. Taxa for which the Fish and Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.
>
> Category 2. Taxa for which the Fish and Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

Canopy - The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result.

Casual Use - Activities ordinarily resulting in negligible disturbance of federal lands and resources.

Cavity Excavator - A wildlife species that digs or chips out cavities in wood to provide a nesting, roosting, or foraging site.

Cavity Nester - Wildlife species, most frequently birds, that require cavities (holes) in trees for nesting and reproduction.

Characteristic Landscape - The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Class I (air quality) Areas - Special areas (i.e., national parks, certain wilderness areas) protected for their air quality related values.

Clearcut Harvest - A timber harvest method in which all trees are removed in a single entry from a designated area, with the exception of wildlife trees or snags, to create an even-aged stand.

Closed Discretionary - Areas closed to mineral exploration and development by authority of law or regulation, but where such lands can be opened by action of BLM without legislation, regulation change, Secretarial decision of Executive Order.

Closed Nondiscretionary - Areas specifically closed to mineral exploration and development by authority of law, regulation, Secretarial decision (including Public Land Orders), or Executive Order.

Coastal Oregon Productivity Enhancement Program (COPE) - A cooperative research and education program to identify and evaluate existing and new opportunities to enhance long-term productivity and economic/social benefits derived from the forest resources of coastal Oregon.

Commercial Forest Land - Land declared suitable for producing timber crops and not withdrawn from timber production for other reasons.

Commercial Thinning - The removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees.

Commercial Tree Species - Conifer species used to calculate the commercial forest land ASQ. They are typically utilized as saw timber and include species such as Douglas-fir, hemlock, spruce, fir, pine and cedar. (Also see Noncommercial Tree Species).

Commodity Resources - Goods or products of economic use or value.

Community Stability - The capacity of a community (incorporated town or county) to absorb and cope with change without major hardship to institutions or groups within the community.

Community Water System - See Public Water System.

Concern - A topic of management or public interest that is not well enough defined to become a planning issue, or does not involve controversy or dispute over resource management activities or land use allocations or lend itself to designating land use alternatives. A concern may be addressed in analysis, background documents, or procedures or in a noncontroversial decision.

Congressionally Reserved Areas - Areas that require Congressional enactment for their establishment, such as national parks, wilderness and wild and scenic rivers.

Connectivity - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Consistency - Under the Federal Land Policy and Management Act, the adherence of BLM resource management plans to the terms, conditions and decisions of officially approved and adopted resource related plans, or in their absence, with policies and programs of other federal agencies, state and local governments and Indian tribes, so long as the plans are also consistent with the purposes, policies and programs of federal laws and regulations applicable to BLM-administered lands. Under the Coastal Zone Management Act, the adherence to approved state management programs to the maximum extent practicable, of federal agency activities affecting the defined coastal zone.

Constrained Timber Production Base - Acreage managed for timber production at less than full intensity in consideration of non-timber resource management objectives.

Coos Bay Wagon Road (CBWR) Lands - Public lands granted to the Southern Oregon Company and subsequently reconveyed to the United States.

Core Area - That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

Cover - Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Crucial Habitat - Habitat which is basic to maintaining viable populations of fish or wildlife during certain seasons of the year or specific reproduction periods.

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Cubic Foot - A unit of solid wood, one foot square and one foot thick.

Cull - A tree or log which does not meet merchantable specifications.

Culmination of Mean Annual Increment (CMAI) - The peak of average yearly growth in volume of a forest stand (total volume divided by age of stand).

Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

Cumulative Effect - The impact which results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Debris Torrent - Rapid movement of a large quantity of materials (wood and sediment) down a stream channel during storms or floods. This generally occurs in smaller streams and results in scouring of streambed.

Density Management - Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

Departure (from even flow) - A timber sale level which deviates from sustainable sale levels through a planned temporary increase or decrease in the ASQ. Must be economically and biologically justified.

Designated Conservation Area - A contiguous area of habitat to be managed and conserved for spotted owls as described in the U.S. Fish and Wildlife Service's Final Draft Recovery Plan for the Northern Spotted Owl.

Designated Area - An area identified in the Oregon Smoke Management Plan as a principal population center requiring protection under state air quality laws or regulations.

Developed Recreation Site - A site developed with permanent facilities designed to accommodate recreation use.

Diameter At Breast Height (dbh) - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

District Defined Reserves - Areas designated for the protection of specific resources, flora and fauna, and other values. These areas are not included in other land use allocations nor in the calculation of the Probable Sale Quantity.

Dispersed Recreation - Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are primarily for access and protection of the environment rather than comfort or convenience of the user.

Domestic Water Supply - Water used for human consumption.

Dominant Use - The guiding principle for the management of all O&C lands inventoried as "suitable commercial forest land" whereby such lands are to be managed primarily for timber production on a sustained yield basis with due consideration for the other forest uses identified in the O&C Act and subject to any relevant requirements specified in subsequent legislation. (Examples of such subsequent legislation are the Endangered Species Act and the Federal Water Pollution Control Act).

Early Seral Stage - See Seral Stages.

Ecosystem Based Management - Management of lands and their resources to meet objectives based on their whole ecosystem function rather than on their character in isolation. Management objectives blend long-term needs of people and environmental values in such a way that the lands will support diverse, healthy, productive and sustainable ecosystems.

Ecological Forestry - A set of forest management concepts which seek to maintain or recreate timber stand and landscape biological diversity. Also termed "New Perspectives", "New Forestry" and "Sustainable Forestry."

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Ecological Health - The condition of an ecosystem in which processes and functions are adequate to maintain diversity of biotic communities commensurate with those initially found there.

Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.

Ecosystem Management - The management of lands and their resources to meet objectives based on their whole ecosystem function rather than on their character in isolation. Management objectives blend long-term needs of people and environmental values in such a way that the lands will support diverse, healthy, productive and sustainable ecosystems.

Economically Feasible - Having costs and revenues with a present net value greater than zero.

Edge Effect - An ecologically important biological effect which occurs in the transition zone where two plant communities or successional stages meet and mix.

Effective Old-Growth Habitat - Old-growth forest largely unmodified by external environmental influences (for example, wind, temperature, encroachment of nonresident species) from nearby, younger forest stands. Also referred to as interior habitat. For purposes of analysis, assumed to be at least 400 feet from an edge with an adjacent stand younger than age class 70.

Eligible River - A river or river segment found, through interdisciplinary team and, in some cases, interagency review, to meet Wild and Scenic River Act criteria of being free-flowing and possessing one or more outstandingly remarkable values.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with National Environmental Protection Agency when no Environmental Impact Statement is necessary.

Environmental Impact - The positive or negative effect of any action upon a given area or resource.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Ephemeral Stream - Streams that contain running water only sporadically, such as during and following storm events.

Established Stand - A reforestation unit of suitable trees which are past the time when considerable juvenile mortality occurs. The unit is no longer in need of measures to ensure survival but is evaluated for measures to enhance growth.

Even-Aged Management - A silvicultural system which creates forest stands that are primarily of a single age or limited range of ages.

Existing Stand Condition (ESC) - An artificial classification that groups forest stands with similar management potential into categories matched to tables expressing yield at various stand ages under various combinations of silvicultural treatment.

Extensive Recreation Management Areas (ERMA) - All BLM-administered lands outside Special Recreation Management Areas. These areas may include developed and primitive recreation sites with minimal facilities.

50-11-40 Rule - A proposed guideline requiring maintenance of adequate spotted owl dispersal habitat on lands outside designated "habitat conservation areas" for the Northern Spotted Owl. It would assure that, on the quarter township basis, 50 percent of the stands would have conifers averaging 11 inches dbh and a 40 percent canopy closure.

Forest Canopy - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forest Health - The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human-caused stresses such as drought, insect attack, disease, climatic changes, flood, resource management practices and resource demands.

Forest Land - Land that is now, or is capable of becoming, at least ten percent stocked with forest trees and that has not been developed for nontimber use.

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Forest Operations Inventory - See Operations Inventory.

Forest Succession - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

Fragile Nonsuitable - A Timber Production Capability Classification indication forest land having fragile conditions, which, if harvested, would result in reduced future productivity; even if special harvest or restrictive measures are applied. These fragile conditions are related to soils, geologic structure, topography, and ground water.

Full Log Suspension - Suspension of the entire log above the ground during yarding operations.

General Forest Management Area - Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

Genetic Diversity - The variety within populations of a species.

Green Tree Retention - A stand management practice in which live trees as well as snags and large down wood, are left as biological legacies within harvest units to provide habitat components over the next management cycle.

> **High Level** - A regeneration harvest designed to retain the highest level of live trees possible while still providing enough disturbance to allow regeneration and growth of the naturally occurring mixture of tree species. Such harvest should allow for the regeneration of intolerant and tolerant species. Harvest design would also retain cover and structural features necessary to provide foraging and dispersal habitat for mature and old growth dependant species.
>
> **Low Level** - A regeneration harvest designed to retain only enough green trees and other structural components (snag , coarse woody debris, etc.) to result in the development of stands which meet old growth definitions within 100 to 120 years after harvest entry, considering overstory mortality.

Gross Yarding - Removal of all woody material of specified size from a logging unit to a landing.

Gross Yarding - Removal of woody material of specified size.

Group Resource Unit (GRU) - A term used in TRIM-PLUS for each collection of current and future management instructions and data sources for the Basic Resource Units which are proposed to be managed to meet a particular set of management objectives.

Habitat Diversity - The number of different types of habitat within a given area.

Habitat Fragmentation - The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

Habitat Management Plan - See Activity Plan.

Hardwood Site - A forest site occupied by hardwoods that is unsuitable for the production of conifer species.

Hazardous Materials - Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed.

Hiding Cover - Generally, any vegetation used by wildlife for security or to escape from danger; however, more specifically, any vegetation capable of providing concealment (e.g. hiding 90 percent of an animal) from human view at a distance of 200 feet or less.

Historic Site - A cultural resource resulting from activities or events dating to the historic period (generally post AD 1830 in western Oregon).

Home Range - The area which an animal traverses in the scope of normal activities; not to be confused with territory which is the area an animal defends.

Hyporheic Zone - The area under the stream channel and floodplain that contributes to the stream.

Impact - A spatial or temporal change in the environment caused by human activity.

Improved Seed - Seed originated from a seed orchard or selected tree(s) whose genetic superiority in one or more characters important to forestry has been proven by tests conducted in specific environments.

Infiltration (soil) - The movement of water through the soil surface into the soil.

Intermittent Stream - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Instant Study Area - A natural area formally identified by BLM for accelerated wilderness review, by notice published before October 21, 1975.

Integrated Pest Management (IPM) - A systematic approach that uses a variety of techniques to reduce pest damage or unwanted vegetation to tolerable levels. Integrated Pest Management techniques may include natural predators and parasites, genetically resistant hosts, environmental modifications and, when necessary and appropriate, chemical pesticides or herbicides.

Integrated Vegetation Management - See Integrated Pest Management.

Intensive Forest Management Practices - The growth enhancing practices of release, precommercial thinning, commercial thinning, and fertilization, designed to obtain a high level of timber volume or quality.

Intensive Timber Production Base - All commercial forest land allocated to timber production and intensively managed to obtain a high level of timber volume or quality.

Intensively Managed Timber Stands - Forest stands managed to obtain a high level of timber volume or quality through investment in growth enhancing practices, such as precommercial thinning, commercial thinning, and fertilization. Not to be confused with the allocations of "lands available for intensive management of forest products."

Intermittent Stream - A stream which flows most of the time but occasionally is dry or reduced to pools.

Intermittent Stream - Streams that carry water most of the year and have defined channels, but may not flow during part of the summer.

Inventory River - A potential wild, scenic, or recreational river identified in the 1982 National Rivers Inventory published by the National Park Service.

Irreversible or Irretrievable Commitment of Resources - Effect of an action or inaction which cannot be reversed within a reasonable time.

Issue - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

Land Use Allocations - Allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles etc. Each allocation is associated with a specific management objective.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Landscape - A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

Landscape Block - A specific landscape unit used in analysis (example: a drainage).

Landscape Diversity - The size, shape and connectivity of different ecosystems across a large area.

Landscape Ecology - Principles and theories for understanding the structure, functioning, and change of landscapes over time. Specifically it considers (1) the development and dynamics of spatial heterogeneity, (2) interactions and exchanges across heterogeneous landscapes, (3) the influences of spatial heterogeneity on biotic and abiotic processes, and (4) the management of spatial heterogeneity. The consideration of spatial patterns distinguishes landscape ecology from traditional ecological studies, which frequently assume that systems are spatially homogeneous.

Landscape Extent - The size of a landscape block used in analysis (blocks of 20,000 acres).

Landscape Features - The land and water form, vegetation, and structures which compose the characteristic landscape.

Landscape Grain - The finest level of spatial resolution possible with a given data set or the smallest habitat unit significant for the study or analysis of a specific ecological processes. (Example: a spotted owl nest grove or an individual canopy gap.) Habitat grains are often referred to as "fine scale" or "broad scale".

Landscape Pattern - The number, frequency, size, and juxtaposition of landscape elements (patches) which are important to the determination or interpretation of ecological processes.

Landscape Scale - The spatial dimension of an object or process, characterized by both grain and extent (example: the scale used in this analysis consisted of landscape blocks of 20,000 acres in extent with the finest level of spatial resolution being canopy gaps of 1/4 acre in size).

Large Woody Debris - Pieces of wood larger than ten feet long and six inches in diameter, in a stream channel.

Large Woody Material - Logs on the forest floor in pieces at least 24 inches in diameter at the large end.

Late Seral Stage - See Seral Stages.

Late-Successional Forests - Forest seral stages which include mature and old-growth age classes.

Late-Successional Reserve - A forest in its mature and/or old-growth stages that has been reserved.

Leasable Minerals - Minerals which may be leased to private interests by the federal government. Includes oil, gas, geothermal resources, and coal.

Locatable Minerals - Minerals subject to exploration, development and disposal by staking mining claims as authorized by the Mining Law of I872 (as amended). This includes valuable deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Log Decomposition Class - Any of five stages of deterioration of logs in the forest; stages range from essentially sound (class 1) to almost total decomposition (class 5).

Long-Term - The period starting ten years following implementation of the Resource Management Plan. For most analyses, long-term impacts are defined as those existing 100 years after implementation.

Long-Term Soil Productivity - The capability of soil to sustain inherent, natural growth potential of plants and plant communities over time.

Long-Term Sustained Yield (LTSY) - Estimated timber harvest that can be maintained indefinitely, once all stands have been converted to a managed state under a specific management intensity.

Lumber and Wood Products, Except Furniture - An industrial classification which includes logging contractors engaged in cutting timber and pulpwood: merchant sawmills, lath mills, shingle mills, planing mills, plywood mills, and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes. Certain types of establishments producing wood products are classified elsewhere, e.g., furniture and office and store fixtures are in a different classification.

Major Plant Grouping - An aggregation of plant associations with similar management potential and with the same dominant late seral conifer species and the same major early seral species. Late seral rather than climax species are used because late seral species are usually present rather than climax communities and because most old-growth plant communities on BLM-administered lands are made up of late seral species rather than climax species in the upper canopy.

Management Actions/Direction - Measures planned to achieve the stated objective(s).

Management Activity - An activity undertaken for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Management Framework Plan (MFP) - A land use plan that established coordinated land use allocations for all resource and support activities for a specific land area within a BLM district. It established objectives and constraints for each resource and support activity and provided data for consideration in program planning. This process has been replaced by the Resource Management Planning process.

Management Intensity (MI) - An expression of a potential type of management for a Group Resource Unit in TRIM-PLUS, expressed as a yield table.

Mass Movement - The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not include surface erosion.

Master Title Plat - A graphic representation of each township showing all actions affecting title.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mature Seral Stage - See Seral Stages.

Micro*Storms - A micro-computer database system providing background information and recommended treatment for each operations inventory unit.

Mid Seral Stage - See Seral Stages.

Mineral Estate - The ownership of the minerals at or beneath the surface of the land.

Mineral Potential Classification System - Method for assessing the potential for the presence of a concentration of one or more energy and/or mineral resources.

Minimum Harvest Age - The lowest age of a forest stand to be scheduled for final harvest.

Minimum Stocking - Reforestation level lower than target stocking. Does not achieve full site occupancy in young stands but is capable of achieving optimal final harvest yield and reduced commercial thinning yield.

Minimum Streamflow - The quantity of water needed to maintain the existing and planned in-place uses of water in or along a stream channel or other water body and to maintain the natural character of the aquatic system and its dependent systems.

Mining Claims - Portions of public lands claimed for possession of locatable mineral deposits, by locating and recording under established rules and pursuant to the 1872 Mining Law.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Mortality Salvage - The harvest of dead and dying timber.

Multi-aged Stand - A forest stand which has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy - Forest stands with two or more distinct tree layers in the canopy; also called multi-storied stands.

Multiple Use - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. The use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife, fish, and natural scenic, scientific and historical values.

Mycorrhizal Fungi - Fungi with a symbiotic relationship with the roots of certain plants.

National Ambient Air Quality Standards (NAAQS) - Standards designed to protect public health and welfare, allowing an adequate margin of safety. For particulate matter less than ten microns in size (PM_{10}), 50 micrograms per cubic meter annual average and l50 micrograms per cubic meter, 24-hour average, not to be exceeded more than once per year.

National Register of Historic Places - A formal list established by the National Historic Preservation Act of l966 of cultural resources worthy of preservation. The Register is maintained by the National Park Service; and lists archaeological, historic, and architectural properties.

Nonattainment - Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

Nonattainment Area - A geographical area that has failed to attain or maintain compliance with air quality standards. Nonattainment area boundaries are commonly the same as city, standard metropolitan statistical area or county boundaries.

Nonchargeable Volume - Timber harvest not included in the allowable sale quantity calculations.

Noncommercial Forest Land - Land incapable of yielding at least 20 cubic feet of wood per acre per

year of commercial species; or land which is capable of producing only noncommercial tree species.

Noncommercial Tree Species - Minor conifer and hardwood species whose yields are not reflected in the commercial conifer forest land ASQ. Some species may be managed and sold under a suitable woodland ASQ and, therefore, may be commercial as a woodland species.

Nonforest Land - Land developed for nontimber uses or land incapable of being ten percent stocked with forest trees.

Nongame Wildlife - All wild vertebrate and invertebrate animals not subject to sport hunting.

Nonpoint Source Pollution - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

Nonsuitable Commercial Forest Land - Sites that would take longer than 15 years to meet or exceed minimum stocking levels of commercial species. Further classified as suitable woodland.

Nonsuitable Woodland - All fragile nonsuitable forest land.

Nonsuitable Woodland - All fragile nonsuitable forest land and sites that are not biologically and/or environmentally capable of supporting a sustained yield of forest products.

Noxious Plant - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

Noxious Weed - See Noxious Plant.

Nutrient Cycling - Circulation or exchange of elements such as nitrogen and carbon between nonliving and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.

Nutrient Depletion - Detrimental changes on a site in the total amount of nutrients and/or their rates of input, uptake, release, movement, transformation, or export.

O&C Lands - Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Objectives - Expressions of what are the desired end results of management efforts.

Obligate Species - A plant or animal that occurs only in a narrowly defined habitat such as tree cavity, rock cave, or wet meadow.

Off Highway Vehicle (OHV) - Any motorized vehicle capable of, or designed for, travel on land, water, or natural terrain. The term "Off Highway Vehicle" will be used in place of the term "Off Road Vehicle" to comply with the Purposes of Executive Orders 11644 and 11989. The definition for both terms is the same.

Off Highway Vehicle Designations:

> **Open Area** - An area where all types of vehicle use is permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in 43 CFR, subparts 8341 and 8342.
>
> **Limited Area** - An area restricted at certain times, in certain areas, and/or to certain vehicular use.
>
> **Closed Area** - An area where off-highway vehicle use is prohibited. Use may be allowed for certain reasons with the approval of the authorized officer.

Old-Growth Conifer Stand - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites which differ significantly from younger forests in structure, ecological function, and species composition. Old growth characteristics begin to appear in unmanaged forests at 175-250 years of age. These characteristics include (a) a patchy, multi-layered canopy with trees of several age classes; (b) the presence of large living trees; (c) the presence of larger standing dead trees (snags) and down woody debris, and (d) the presence of species and functional processes which are representative of the potential natural community.

For purposes of inventory, old-growth stands on BLM-administered lands are only identified if they are at least ten percent stocked with trees of 200 years or older and are ten acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions provided by Pacific Northwest Experiment Station publications 447 and GTR-285. This definition is

summarized from the 1986 interim definitions of the Old-Growth Definitions Task Group.

Old-Growth Seral Stage - See Seral Stages.

Old-Growth-Dependent Species - An animal species so adapted that it can exist only in old growth forests.

Old-Growth-Dependent Species - An animal species so adapted that it exists primarily in old growth forests or is dependent on certain attributes provided in older forests.

Open Additional Restrictions - Areas open to mineral exploration and development subject to additional restrictions that can be legally required by BLM pursuant to law, regulation, or other legal authority such as Area of Critical Environmental Concern designation, Off Highway Vehicle or other closure order, community pit designation, etc.

Open Standard Requirements - Areas open to mineral exploration and development subject only to requirements over which BLM has no discretionary control such s the Clean Air/Clean Water Acts, National Environmental Policy Act, Resource Conservation and Recovery Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, etc.

Operations Inventory (OI) (also Forest Operations Inventory - FOI) - An intensive, site-specific forest inventory of forest stand location, size, silvicultural needs, and recommended treatment based on individual stand conditions and productivity.

Operations Inventory Unit - An aggregation of trees occupying an area that is sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Optimal Cover - For elk, cover used to hide from predators and avoid disturbances, including man. It consists of a forest stand with four layers and an overstory canopy which can intercept and hold a substantial amount of snow, yet has dispersed, small openings. It is generally achieved when the dominant trees average 21 inches dbh or greater and have 70 percent or greater crown closure.

Outstanding Natural Area (ONA) - An area that contains unusual natural characteristics and is managed primarily for educational and recreational purposes.

Outstandingly Remarkable Values (ORV) - Values among those listed in Section 1 (b) of the Wild and Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values ..." Other similar values which may be considered include ecological, biological or botanical, paleontological, hydrological, scientific or research.

Overstory - That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Overstory Removal - The final stage of cutting where the remaining overstory trees are removed to allow the understory to grow. Overstory removal is generally accomplished three to five years after reforestation and when adequate stocking has been achieved.

Paper and Allied Products - An industrial classification which includes establishments primarily engaged in the manufacture of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes.

Partial Cutting - Removal of selected trees from a forest stand.

Partial Log Suspension - During yarding operations, suspension of one end of the log above the ground.

Particulates - Finely divided solid or liquid (other than water) particles in the air.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year round basis.

Perennial Stream - A stream that has running water on a year-round basis under normal climatic conditions.

Personal Income - The income received by all individuals in the economy from all sources. Made up of wages and salaries, proprietors income, rental income, dividends, personal interest income, and the difference between transfer payments (payouts) and personal contributions for social insurance.

Plan Amendment - A change in the terms, conditions or decisions of a resource management plan.

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Plan Maintenance - Any documented minor change which interprets, clarifies, or refines a decision within a resource management plan but does not change the scope or conditions of that decision.

Plan Revision - A new resource management plan prepared by following all steps required by the regulations for preparing an original resource management plan.

Planning Area - All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, BLM planning decisions apply only to BLM-administered lands and mineral estate.

Planning Issue - See Issue.

Plant Association - A plant community type based on land management potential, successional patterns, and species composition.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Plantation Maintenance- Actions in an unestablished forest stand to promote the survival of desired crop trees.

Plantation Release - All activities associated with promoting the dominance and/or growth of desired tree species within an established forest stand.

Pool/Riffle Ratio - The ratio of surface area or length of pools to the surface area or length of riffles in a given stream reach; frequently expressed as the relative percentage of each category. Used to describe fish habitat rearing quality.

Potential Area of Critical Environmental Concern - An area of BLM-administered land that meets the relevance and importance criteria for Area of Critical Environmental Concern designation, as follows:

> (1) Relevance. There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.
>
> (2) Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

Potential Natural Community - The community of plants and wild animals which would become established if all successional sequences were completed without interference by man under present environmental conditions. For forest communities, the potential natural community is an old-growth conifer stand.

Precommercial Thinning - The practice of removing some of the trees less than merchantable size from a stand so that remaining trees will grow faster.

Prescribed Fire - A fire burning under specified conditions that will accomplish certain planned objectives.

Prevention Strategy - The amelioration of conditions that cause or favor the presence of competing or unwanted vegetation.

Priority Animal Taxa - Species or subspecies having special significance for management. They include endangered, threatened and special status species; species of high economic or recreation value; and species of significant public interest.

Priority Habitats - Aquatic, wetland and riparian habitats, and habitats of priority animal taxa.

Probable Sale Quantity (PSQ) - Probable sale quantity estimates the allowable harvest levels for the various alternatives that could be maintained without decline over the long term if the schedule of harvests and regeneration were followed. "Allowable" was changed to "probable" to reflect uncertainty in the calculations for some alternatives. Probable sale quantity is otherwise comparable to allowable sale quantity (ASQ). However, probable sale quantity does not reflect a commitment to a specific cut level. Probable sale quantity includes only scheduled or regulated yields and does not include "other wood" or volume of cull and other products that are not normally part of allowable sale quantity calculations.

Progeny Test Site - A test area for evaluating parent seed trees by comparing the growth of their offspring seedlings.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service or National Marine Fisheries Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Public Domain Lands - Original holdings of the United States never granted or conveyed to other jurisdictions, or reacquired by exchange for other public domain lands.

Public Water System - A system providing piped water for public consumption. Such a system has at least fifteen service connections or regularly serves at least twenty-five individuals.

Rearing Habitat - Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Recovery Plan - A plan for the conservation and survival of an endangered species or a threatened species listed under the Endangered Species Act, to improve the status of the species to make continued listing unnecessary.

Recreational River - See Wild and Scenic River System.

Reforestation - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial stocking.

Regeneration Harvest - Timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished.

Regeneration Period - The time it takes to reforest an area to adequate stocking following a timber sale.

Regional Ecosystem Office (REO) - The main function of this office is to provide staff work and support to the Regional Interagency Executive Committee so the standards and guidelines in the forest management plan can be successfully implemented.

Regional Interagency Executive Committee (RIEC) - This group serves as the senior regional entity to assure the prompt, coordinated and successful implementation of the forest management plan standards and guidelines at the regional level.

Regulated Forest - A forest which comprises an even distribution of age classes or tree sizes, when the growth equals the cut (at the highest level sustainable) and when the level of growing stock remains relatively constant.

Representative Timber Management Scenario - A set of assumed timber harvest units, road locations and average annual levels of associated practices and intensive management practices for the decade of the expected life of the plan.

Research Natural Area (RNA) - An area that contains natural resource values of scientific interest and is managed primarily for research and educational purposes.

Reserved Federal Mineral Estate - Land on which the federal government has ownership of minerals but the surface estate is private or other nonfederal ownership.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Respending Effects - The jobs and income generated by the purchase of goods and services by businesses or employees in the sector being examined. Example: Purchases of legal services by wood products companies and their employees is a respending effect that creates jobs and income for lawyers.

Restoration and Retention Blocks - Ecological reserves managed to restore or retain old growth communities and respective plant communities.

Right-of-Way - A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, reservoirs, and the lands covered by such an easement or permit.

Right-of-Way - The right of a party to pass over the land of another party. Usually, an easement or permit for specific purposes, such as: roads, pipelines, telephone lines, electrical lines, etc.

Riparian Management Area - An area allocated in the plan primarily to protect the riparian and/or streamside zone.

Riparian Reserves - Designated riparian areas found outside Late-Successional Reserves.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are

products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots of young tree seedlings.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots, lower soil density, and increased microbial and invertebrate activity.

Road - A vehicle route which has been improved and maintained by mechanical means to ensure relatively regular and continuous use. A route maintained solely by the passage of vehicles does not constitute a road.

Rotation - The planned number of years between establishment of a forest stand and its regeneration harvest.

Rural Interface Areas - Areas where BLM-administered lands are adjacent to or intermingled with privately owned lands zoned for 1 to 20-acre lots or that already have residential development.

Salable Minerals - High volume, low value mineral resources including common varieties of rock, clay, decorative stone, sand, and gravel.

Scarification - Mechanical removal of competing vegetation or interfering debris prior to planting.

Scenic Quality - The relative worth of a landscape from a visual perception point of view.

Scenic Quality - The relative worth of a landscape from a visual perception point of view which is used in determining the Visual Resource Management Classification.

Scenic River - See Wild and Scenic River System.

Scribner Short Log - A log measurement rule constructed from diagrams which shows the number of 1-inch boards that can be drawn in a circle representing the small end of a 16-foot-long log, assumes a 1/4-inch saw kerf groove, makes a liberal allowance for slabs, and disregards log taper.

Sediment Yield - The quantity of soil, rock particles, organic matter or other debris transported through a cross-section of stream in a given period of time. Measured in dry weight or by volume. Consists of suspended sediment and bedload.

Seed Tree Cutting Method - An even-aged reproductive cutting method in which all mature timber from an area is harvested in one entry except for a small number of trees left as a seed source for the harvested area.

Seed Orchard - A plantation of clones or seedlings from selected trees; isolated to reduce pollination from outside sources, weeded of undesirables, and cultured for early and abundant production of seed.

Selection Cutting - A method of uneven-aged management involving the harvesting of single trees from stands (single-tree selection) or in groups (group selection) without harvesting the entire stand at any one time.

Sensitivity Analysis - A process of examining specific trade-offs which would result from making changes in single elements of a plan alternative.

Sensitivity Levels - Measures (e.g., high, medium, and low) of public concern for the maintenance of scenic quality.

Seral Stages - The series of relatively transitory plant communities which develop during ecological succession from bare ground to the climax stage.

There are five stages:

> **Early Seral Stage** - The period from disturbance to crown closure of conifer stands, usually occurring from 0-15 years. Grass, herbs,or brush are plentiful.
>
> **Mid Seral Stage** - The period in the life of a forest stand from crown closure to first merchantability. Usually ages 15 through 40. Due to stand density, brush, grass or herbs rapidly decrease in the stand. Hiding cover may be present.
>
> **Late Seral Stage** - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. This is under a regime including commercial thinning, or to 100 years of age, depending on wildlife habitat needs. During this period, stand diversity is minimal, except that conifer mortality rates

will be fairly rapid. Hiding and thermal cover may be present. Forage is minimal.

Mature Seral Stage - The period in the life of a forest stand from culmination of mean annual increment to an old-growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present.

Old-Growth - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. Depending on fire frequency and intensity, old-growth forests may have different structures, species composition and age distributions. In forests with longer periods between natural disturbance, the forest structure will be more even-aged at late mature or early old growth stages.

These definitions are used by BLM to separate age classes for analysis of impacts.

Shelterwood Cutting - A regeneration method under an even-aged silvicultural system. A portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration. The mature stand is removed in two or more cuttings.

Shelterwood Cutting - A regeneration method under an even-aged silvicultural system. With this method a portion of the mature stand is retained as a source of seed and/or protection during the regeneration period. The retained trees are usually removed in one or more cuttings. In the irregular shelterwood variation of this method, the retained trees are usually not removed until the end of the next harvest rotation.

Short-Term - The period of time during which the RMP will be implemented; assumed to be ten years.

Silvicultural Prescription - A professional plan for controlling the establishment, composition, constitution and growth of forests.

Silvicultural System - A planned sequence of treatments over the entire life of a forest stand needed to meet management objectives.

Site Class - A measure of an area's relative capacity for producing timber or other vegetation.

Site Index - A measure of forest productivity expressed as the height of the tallest trees in a stand at an index age.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions, using biological, mechanical, or manual clearing, prescribed burns, herbicides or a combination of methods.

Skid Trail - A pathway created by dragging logs to a landing (gathering point).

Skyline Yarding - A cable yarding system using one of the cables to support a carriage from which logs are suspended and then pulled to a landing.

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Slope Failure - See Mass Movement.

Smoke Management - Conducting a prescribed fire under suitable fuel moisture and meteorological conditions with firing techniques that keep smoke impact on the environment within designated limits.

Smoke Management Program - A program designed to ensure that smoke impacts on air quality from agricultural or forestry burning operations are minimized; that impacts do not exceed, or significantly contribute to, violations of air quality standards or visibility protection guidelines; and that necessary open burning can be accomplished to achieve land management goals.

Smoke Sensitive Area - An area identified by the Oregon Smoke Management Plan that may be negatively affected by smoke but is not classified as a designated area.

Snag - Any standing dead, partially-dead, or defective (cull) tree at least ten inches in diameter at breast height (dbh) and at least six feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Snag - Any standing dead tree at least ten inches in diameter at breast height (dbh) and at least six feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is

composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Snag Dependent Species - Birds and animals dependent on snags for nesting, roosting, or foraging habitat.

Soil Compaction - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Displacement - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

Soil Productivity - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Soil Series - A group of soils developed from a particular type of parent material; having naturally developed horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement of the profile.

Special Areas - Areas that may need special management, which may include management as an Area of Critical Environmental Concern, Research Natural Area, Outstanding Natural Area, Environmental Education Area, or other special category.

Special Forest Products - Firewood, shake bolts, mushrooms, ferns, floral greens, berries, mosses, bark, grasses etc., that could be harvested in accordance with the objectives and guidelines in the proposed resource management plan.

Special Habitat Features - Habitats of special importance due to their uniqueness or high value.

Special Habitat - A forested or nonforested habitat which contributes to overall biological diversity within the District. Special habitats may include: ponds, bogs, springs, sups, marshes, swamps, dunes, meadows, balds, cliffs, salt licks, and mineral springs.

Special Recreation Management Area (SRMA) - An area where a commitment has been to provide specific recreation activity and experience opportunities. These areas usually require a high level of recreation investment and/or management. They include recreation sites but recreation sites alone do not constitute Special Recreation Management Areas.

Special Status Species - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):

- Threatened or Endangered Species
- Proposed Threatened or Endangered Species
- Candidate Species
- State Listed Species
- Bureau Sensitive Species
- Bureau Assessment Species

Species Diversity - The number, different kinds, and relative abundance of species.

Split Estate - An area of land where the surface is nonfederally owned and the subsurface mineral resources are federally owned or vice versa.

Spotted Owl Habitat Sites - Sites monitored by BLM for spotted owl occupancy during some or all of the years 1985 through 1988, in accordance with BLM's spotted owl monitoring guidelines. These sites are known to have been inhabited by spotted owls at some time in the last dozen years, but not necessarily during the 1985-1988 period.

Stand (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

Stand Density - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stand-replacement Wildfire - A wildfire that kills nearly 100 percent of the stand.

State Historic Preservation Officer (SHPO) - The state official authorized to act as a liaison to the Secretary of the Interior for purposes of implementing the National Historic Preservation Act of 1966.

State Implementation Plan (SIP) - A state document, required by the Clean Air Act. It describes a comprehensive plan of action for achieving specified air quality objectives and standards for a particular locality or region within a specified time, as enforced by the state and approved by the Environmental Protection Agency.

State Listed Species - Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Statewide Comprehensive Outdoor Recreation Plan (SCORP) - A plan prepared by the state, which describes and analyzes the organization and function of the outdoor recreation system of the state. The plan provides an analysis of the roles and responsibilities of major outdoor recreation suppliers; an analysis of demand, supply and needs; issue discussions; an action program to address the issues; and a project selection process.

Stocked/Stocking - Related to the number and spacing of trees in a forest stand.

Strategic and Critical Minerals - Minerals which supply military, industrial and essential civilian needs of the United States during a national defense emergency. They are not found or produced in this country in sufficient quantities to meet such needs. Nickel, cobalt and chromium are examples of such minerals occurring in western Oregon.

Stream Class - A system of stream classification established in the Oregon Forest Practices Act. Class I streams are those which are significant for: 1) domestic use, 2) angling, 3) water dependent recreation, and 4) spawning, rearing or migration of anadromous or game fish. All other streams are Class II. Class II special protection streams (Class II SP) are Class II streams which have a significant summertime cooling influence on downstream Class I waters which are at or near a temperature at which production of anadromous or game fish is limited. Revised Forest Practices Act may have a new system within a year.

Stream Order - A hydrologic system of stream classification based on stream branching. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. Two second order streams join to form a third order stream and so forth.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 1/2 to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Structural Diversity - Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

Succession - A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities (called seral stages) following a major disturbance.

Suitable Commercial Forest Land - Commercial forest land capable of sustained long-term timber production.

Suitable River - A river segment found, through administrative study by an appropriate agency, to meet the criteria for designation as a component of the National Wild and Scenic Rivers system, specified in Section 4(a) of the Wild and Scenic Rivers Act,

Suitable Woodland - Forest land occupied by minor conifer and hardwood species not considered in the commercial forest land ASQ determination and referred to as noncommercial species. These species may be considered commercial for fuelwood, etc. under woodland management. Also included are low site and nonsuitable commercial forest land. These lands must be biologically and environmentally capable of supporting a sustained yield of forest products.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity.

Suspended Sediment - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Sustained Yield Unit (SYU) - An administrative division for which an allowable sale quantity is calculated.

Target Stocking - The desirable number of well-spaced trees per acre at age of first commercial thinning.

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Ten Percent Stocked - Stocking of tree seedlings and saplings (0.5 inches in diameter 4.5 feet above the ground) that are well distributed over the land and are more than 30 per acre in number. Or the stocking of trees larger than five inches in diameter with foliage that covers at least ten percent of the land surface area.

Texture (soil) - The relative proportion of sand, silt, and clay in a soil; grouped into standard classes and subclasses in the USDA Soil Survey Manual.

Thermal Cover - Cover used by animals to lessen the effects of weather. For elk, a stand of conifer trees which are 40 feet or more tall with an average crown closure of 70 percent or more. For deer, cover may include saplings, shrubs or trees at least five feet tall with 75 percent crown closure.

Threatened Species - Any species defined through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range and published in the Federal Register.

Tilling - See Ripping.

Timber Management Plan - An activity plan that specifically addresses procedures related to the offering and sale of timber volume consistent with the approved allowable sale quantity.

Timber Production Capability Classification (TPCC) - The process of partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis.

Total Suspended Particulates - All solid or semi-solid material found in the atmosphere.

Transportation System - Network of roads used to manage BLM-administered lands. Includes BLM controlled roads and some privately controlled roads. Does not include Oregon Department of Transportation, county and municipal roads.

Travel Corridor - A route used by animals along a belt or band of suitable cover or habitat.

Understocked - The condition when a plantation of trees fails to meet the minimum requirements for number of well spaced trees per acre.

Understory - That portion of trees or other woody vegetation which form the lower layer in a forest stand which consists of more than one distinct layer (canopy).

Uneven-aged Management - A combination of actions that simultaneously maintains continuous tall forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

Unique Ecosystems - Ecosystems embracing special habitat features such as beaches and dunes, talus slopes, meadows, and wetlands.

Unnecessary or Undue Degradation - Surface disturbance greater than what would normally result when a mineral exploration or development activity regulated under 43 CFR 3809 is being accomplished by a prudent operator in usual, customary and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, outside the area of operations. Failure to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas; or failure to prevent the creation of a nuisance, which may constitute unnecessary or undue degradation. Failure to comply with applicable environmental protection statutes and regulations thereunder will constitute unnecessary or undue degradation.

Utility Corridor - A linear strip of land identified for the present or future location of utility lines within its boundaries.

Viable Population - A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visibility Protection Plan - A plan that implements the requirements of the Clean Air Act by establishing programs for visibility monitoring; short and long term control strategies; and procedures for program review, coordination, and consultation.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Visual Resource Management Classes - Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed in the landscape.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Western Oregon Digital Data Base (WODDB) - A very high resolution (l"=400') geographic digital (computer) data base derived from aerial photography for BLM lands in western Oregon.

Wetlands or Wetland Habitat - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

Wet Meadows - Areas where grasses predominate. Normally waterlogged within a few inches of the ground surface.

Wild and Scenic River System - A national system of rivers or river segments that have been designated by Congress and the President as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968). Each designated river is classified as one of the following:

> **Wild River** - A river or section of a river free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Designated wild as part of the National Wild and Scenic Rivers System.
>
> **Scenic River** - A river or section of a river free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads. Designated scenic as part of the National Wild and Scenic Rivers System.
>
> **Recreational River** - A river or section of a river readily accessible by road or railroad, that may have some development along its shorelines, and that may have undergone some impoundment of diversion in the past. Designated recreational as part of the National Wild and Scenic Rivers System.

Wilderness Study Area (WSA) - A roadless area inventoried and found to be wilderness in character, having few human developments and providing outstanding opportunities for solitude and primitive recreation, as described in Section 603 of the Federal Land Policy and Management Act and in Section 2(c) of the Wilderness Act of l964.

Wildlife Tree - A live tree retained to become future snag habitat.

Wild River - See Wild and Scenic River System

Windthrow - A tree or trees uprooted or felled by the wind.

Withdrawal - A designation which restricts or closes public lands from the operation of land or mineral disposal laws.

Woodland - Forest land producing trees not typically used as saw timber products and not included in calculation of the commercial forest land ASQ.

Yarding - The act or process of moving logs to a landing.

Yield Table - A table of timber volumes expected to be produced under a certain set of conditions.

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