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

Eugene District Office
2890 Chad Drive
Eugene, Oregon 97440

November 1994

Eugene 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-94/33+1792

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eugene District Office
P.O. Box 10226
Eugene, Oregon 97440-2226

IN REPLY REFER TO:

Dear Public Land User:

Enclosed for your review and comment is the Proposed Resource Management Plan /Final Environmental Impact Statement (PRMP/FEIS) for the Eugene District, Oregon. 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 that was published in August 1992. However, you may find the Draft RMP/EIS to be a useful reference document; a copy is available for review in the District office at 2890 Chad Street, Eugene.

The public devoted a substantial effort to providing in-depth input on the Draft RMP/EIS. The Eugene District received 1,272 individual comment letters containing over 2,157 specific comments. The Planning Team 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 that 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 Don Wilbur at (503) 683-6994. Meetings to discuss and explain the proposed plan will be held November 28, 1994.

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 prior to the end of the protest period. Comments should be sent to:

District Manager Judy Ellen Nelson
Bureau of Land Management
Eugene District Office
2890 Chad Drive
Eugene, Oregon 97401-9336

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 (ROD) that 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 Eugene 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 that the Secretary has already directed to be adopted in BLM's new Resource Management Plans.

A protesting party may raise only those issues that 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. There is no provision in BLM's regulations for any extension of time. 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 that 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.

Before deciding to file a protest, I encourage you to contact me or Don Wilbur to determine if your concerns might be met in some way other than via a protest or to assist you in the protest process if it is appropriate.

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

Sincerely,

District Manager

Enclosure

Proposed Resource Management Plan
and
Final Environmental Impact Statement

November 1994

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

Prepared by
Eugene District Office
Oregon

Elaine Zielinski
State Director, Oregon/Washington

Judy Ellen Nelson
District Manager, Eugene District

Abstract

PRMP/FEIS
Department of the Interior
Bureau of Land Management

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

2. Abstract: This Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) addresses resource management on 316,592 acres of Federal land and 1,299 acres of reserved mineral estate administered by the Bureau of Land Management in the Eugene District. Seven alternatives including No Action (no change in the existing plan) were analyzed in the PRMP/FEIS. These alternatives ranged in emphasis from high production of timber and economically important values to management and enhancement of values such as biological diversity, spotted owl habitat, old growth forests, dispersed recreation opportunities, and scenic resources.

The Proposed Resource Management Plan would provide for a planned annual timber sale level of 6.1 mmcf (36.1 mmbf, Scribner Short Log), while maintaining water quality in all watersheds. Old growth forest acreage would be reduced by about 500 acres (1 percent) in the short-term, 7 additional Areas of Critical Environmental Concern (ACECs) would be designated, and 3 segments of river would be found suitable for designation under the Wild and Scenic Rivers Act.

3. The comment/protest period will end 30 days after the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of Final Environmental Impact Statement concerning the Proposed RMP.

4. For further information contact:
   Don Wilbur
   RMP/EIS Team Leader
   Bureau of Land Management
   Eugene District Office
   2890 Chad Drive
   P. O. Box 10226
   Eugene, Oregon 97440

User's Guide

Summary

The Summary presents a synopsis of the Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS). It summarizes all alternatives but presents more detail for the Proposed Plan (PRMP). It also summarizes the land use allocations for all issues, and includes brief descriptions of environmental consequences, monitoring, consistency with other government entities, and public involvement.

Chapter 1 - Introduction to the Planning Area

Introduction to the PRMP/FEIS. This chapter includes a description of the planning area and the purpose and need for preparing the PRMP/FEIS. It also includes a discussion of the PRMP relationship to BLM policies, programs, and other plans, and describes the planning process and planning criteria. Finally, it identifies the issues or concerns to be addressed in the PRMP/FEIS process.

Chapter 2 - Description of the Alternatives including the Proposed Resource Management Plan (PRMP)

This chapter is divided into four sections:

- The first section is the PRMP and consistency language tieing the PRMP to the SEIS/ROD followed by a description of the objectives, major land use allocations, and management actions/ direction for the Proposed Resource Management Plan.
- Second section is Objectives, Land Use Allocations, and Management Actions/Direction by Resource.
- Third section is Management Direction Common to Alternatives A through E and Management Direction by Alternative
- Fourth Section is guidance for miscellaneous topics such as Consultation and Coordination, Use of the Completed Plan, Costs of Management, Research, etc.

The alternatives provide a mixture of uses and actions, which could resolve the issues. This chapter includes a tabular summary of the alternatives so they can be compared (see Table 2-1).

Chapter 3 - Affected Environment

Describes the existing environment that could be affected or changed by implementing the PRMP or any of the alternatives. This chapter includes a description of the environmental factors (water resources, vegetation, wildlife habitat, visual resources, etc.) and major uses (recreation, timber, etc.) related to the issues.

Chapter 4 - Environmental Consequences

Describes potential impacts and changes to the affected environment if the PRMP or any of the alternatives were implemented. It includes an overview of each alternative's relationship to plans and programs of other government agencies.

Chapter 5 - Consultation and Coordination

This chapter identifies agencies and organizations BLM has worked with during the preparation of the draft RMP/EIS and this final PRMP/FEIS. It discusses relevant relationships with other agencies and summarizes public involvement, and comments received on the draft RMP/EIS.

Other Specific Guidance for Reviewers of the PRMP/FEIS

- This document in its entirety is the Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS). The preferred alternative in the draft RMP/EIS is now referred to as the Proposed Plan or PRMP in this document. The PRMP/FEIS has been revised to reflect consistency with the SEIS/FEMAT Report (President's Plan) and the SEIS/ROD (see Appendix LL). Also see first section in Chapter 2.

- Acronyms are used throughout this PRMP/FEIS. When an acronym is first used in a specific section of this document, it will be spelled out and followed by the acronym in capital letters, i.e., Environmental Impact Statement (EIS). Thereafter only the acronym such as EIS will be used in each specific document. An acronym list is provided at the beginning of the PRMP/FEIS document for the reader's convenience.

- All acres in the PRMP/FEIS are Automated Resource Data-Geographic Information System (ARD-GIS) unless otherwise noted.

- There is a Table of Contents in each volume of the PRMP/FEIS for the reader's convenience.

- The Summary of Major Changes in each chapter documents all changes to the draft RMP/EIS, which have been incorporated into this PRMP/FEIS.

- Tables are located in the text following the first reference to the table, except in Chapter 2 where they are located at the end of the chapter.

The location of tables in the PRMP/FEIS, as described above, assumes we have met all scheduled due dates for publication. If our scheduled publication dates are not met, there is a possibility that tables and figures may be inserted at the end of the text for all chapters (see Table of Contents).

- The Glossary has been revised to reflect consistency with definitions used in the Supplemental EIS/FEMAT Report.

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	Jackscn 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

Acronymns

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

Summary of Major Changes

The Proposed Resource Management Plan (PRMP), which is consistent with the SEIS/ROD, replaces the Draft RMP Preferred Alternative.

The description of the PRMP includes objectives, land-use allocations, and management actions/ direction in one location for reader convenience.

Introduction

The Summary provides a brief overview of the alternatives and impacts associated with implementing any of the alternatives. This section is required by the National Environmental Policy Act (NEPA). While there is a brief explanation of all alternatives described in detail, the majority of this section summarizes the PRMP. Table S-1 is a summary comparison of allocations and management actions by alternative. Major allocations from the Preferred Alternative of the Draft RMP/EIS are presented only in Table S-1 and only for comparative purposes. Table S-2 summarizes environmental consequences by alternative.

The Eugene District Resource Management Plan (RMP) will establish guidelines for the management of BLM administered land in the Eugene District for at least the next 10 years. It will supersede and replace the 1983 Eugene District Management Framework Plans (MFP), and the 1983 Eugene District Timber Management EIS covering the same general area. The PRMP/FEIS has been prepared in accordance with the BLM planning regulations issued under authority of the Federal Land Policy and Management Act (FLPMA) and written in accordance with Council on Environmental Quality (CEQ) regulations issued under authority of the National Environmental Policy Act (NEPA).

There are approximately 316,700 acres of BLM administered land in the planning area of which 307,200 acres are revested Oregon and California (O&C) grant land, and 9,500 acres Public Domain (PD) land.

Alternatives

Seven alternatives have been developed to provide a range of responses to the 11 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 (RIA). Of particular interest is whether or not to harvest the remaining old growth forests and the related effects harvest could have 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, will provide land use allocations and management 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 direction and guidelines identified in the PRMP.

Selected land use or resource allocations of the alternatives are compared in Table S-1. Analysis of effects of each alternative, except the No Action (NA) alternative, has been facilitated by development of 10-year representative timber management scenarios. These scenarios (designed only for analytical purposes) reflect possible timber harvest units, road locations, and timber management practices. The scenarios include different levels of forest management practices. Anticipated environmental consequences of the alternatives are summarized in Table S-2.

A summary of the No Action alternative, Alternatives A, B, C, D, E, and the Proposed Resource Management Plan follows. Maps of Alternatives NA-E and the Preferred Alternative from the Draft are not reproduced in this document. If you received only this Summary, rather than the full PRMP/EIS, only the PRMP strategy maps are enclosed.

No Action

This alternative would involve 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). It would emphasize timber production to contribute to community stability, consistent with the variety of other land uses. Blocks of mature and old growth forests would be retained in a system to provide for habitat diversity and contribute to ecological functions important for timber productivity. Habitat of threatened and endangered species and species proposed for such status would be protected. Timber harvest would not be planned in riparian areas of 3rd order or larger streams, or streams used for domestic water sources. Seven Areas of Critical Environmental Concern (ACEC) including 4 Research Natural Areas (RNA) would be retained. No rivers would be found suitable for designation as wild, scenic, or recreational. Scenic resources along the McKenzie River would be managed so that activities such as timber harvesting and road construction would not be visually evident. Recreation management would provide a wide variety of developed and dispersed recreational uses.

Alternative A

This alternative would emphasize a high production of timber and other economically important values on all lands, to 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, and protect habitats of other species with high potential for listing known only to exist on BLM administered lands. Two Areas of Critical Environmental Concern (ACEC) would be designated. No rivers would be found suitable for designation as wild, scenic, or recreational. To meet legal requirements for protection of wetlands and water quality, as well as protect 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 and trails of high use and dispersed motorized recreation uses.

Alternative B

This alternative would emphasize timber production to contribute to community stability, consistent with the variety of other land uses, on O&C lands. Public domain lands having greater importance for nontimber values and uses than for timber production, however, 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 species of related concern would be protected to the extent consistent with high timber production. Timber harvest would not be planned in Riparian Zones of perennial streams and other waters. All existing Areas of Critical Environmental Concern (ACEC) would be retained and 4 new ones designated. One river would be found suitable for designation as recreational. 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. Special forest management practices would be applied in Rural Interface Areas (RIA), which include lands zoned for 1 to 5-acre residential lots.

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, species with a high potential for Federal listing would be protected, and 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. All existing ACECs would be retained and 9 new ones would be designated. One river would be found suitable for designation as recreational. Scenic resources would be managed in selected special status and high-use areas, with particular emphasis on protection in existing and proposed wild and scenic river corridors. Recreation management would provide for a wide range of recreation opportunities, emphasizing dispersed use. Special forest management practices would be applied in RIAs, which include lands zoned for 1 to 20-acre residential lots.

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. Species with a high potential for Federal listing as threatened or endangered would be protected. Timber harvest would not be planned in or adjacent to Riparian Zones of important waters or their immediate tributaries. All existing ACECs would be retained and 16 new ones designated. One river would be found suitable for designation as recreational. All identified scenic resources would be managed. Recreation management would emphasize dispersed nonmotorized opportunities. Special timber harvest and forest management practices would be applied in RIAs, which include lands zoned for 1 to 20-acre residential lots.

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. There would be a sustained yield of timber consistent with 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 species of related concern would be protected. Timber harvest would not be planned in or adjacent to Riparian Zones. All existing ACECs would be retained and 16 new ones designated. Three rivers would be found suitable for designation as recreational. 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 RIAs.

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 the Record of Decision (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
- BLM 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, referred to as 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 that 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 (VRM) 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. Additional land-use allocations include a variety of special purpose management areas, such as recreation sites, wild and scenic rivers, and VRM areas. The major land-use allocations are displayed in Table S-1.

Each land-use allocation will 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 2 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 PRMP 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 PRMP will contribute to these 2 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 will protect salmon and steelhead 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 flood plains, 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 flood plain 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

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

There are approximately 173,000 acres of Riparian Reserves in the District. Calculation of these acres is based on interim widths and estimated miles of stream in the various categories described in the SEIS/ROD. These 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 widths 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 flood plain; 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 2 site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel)

Permanently flowing nonfish-bearing streams: equal to the height of 1 site-potential tree, or 150 feet slope distance

Seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas: equal to the height of 1 site-potential tree, or 100 foot 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 1 acre: equal to the height of 1 site-potential tree, or to 150 feet slope distance from the edge of a wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs

Lakes and Natural Ponds: equal to the height of 2 site-potential trees, or 300 foot 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 fuelwood cutting, will be precluded in Riparian Reserves, with the 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.

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 watersheds 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 2 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 for 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. There are no Tier 2 Key Watersheds within the planning area. Key Watersheds in the District are as follows:

Key Watershed Name	Tier	BLM Acres	Total Acres
Bear/Marten Creeks	1	8,282	14,377
N. Fork Smith River	1	162	43,916
Steamboat Creek	1	290	145,257
Upper Lobster Creek	1	1,426	26,415
Upper Smith River	1	2,475	50,870
Total		12,635	280,835

Key Watersheds overlay portions of all 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 analytical tools 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 documentation 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.

Late-Successional Reserves

Late-Successional Reserves would 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 136,500 acres of mapped Late-Successional Reserves of which 85,000 acres are Riparian Reserves in the District. The 5 components of this reserve system are:

1. Mapped Late-Successional Reserves: These 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

4. 100 acres around known spotted owl activity centers (as of January 1, 1994)

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

See Map 2-1 for locations of Late-Successional Reserves. Known spotted owl activity centers 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 would 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 10 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.

District Designated Reserves

District Designated Reserves are other identified land-use allocations that have been set aside for specific values. These areas include Bald Eagle Habitat Areas, and Relic Forest Islands amounting to 3,000 acres of which 1,800 acres are Riparian Reserves.

Adaptive Management Areas (AMA)

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. The District manages 16,200 acres of land in the Central Cascades AMA, of which 10,700 acres are Riparian Reserves.

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 Late-Successional and younger forests.
- provide 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 (e.g., down logs, snags, and large trees).
- provide Early-Successional habitat.

In the Matrix, there are approximately 40,100 acres of BLM administered land in the General Forest Management Area and 23,800 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 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 would reflect the species mix of the original stand.

Green trees and snags will be retained throughout the northern General Forest Management Area, including 6 to 8 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 3 decades) snag deficit. These trees do not count toward green-tree retention requirements. This PRMP provides for Connectivity/Diversity Blocks as currently spaced, that are managed on 150 year rotation. When an area is cut, 12 to 18 green trees per acre will be retained. There would be 25 to 30 percent of each block in Late-Successional forest at any given time. Riparian Reserves and other allocations with Late-Successional forest contribute toward this percentage.

A summary of major land-use allocations and acres of projected old growth in the PRMP is shown in Figure S-1 and S-2.

Air Quality

Efforts to meet National Ambient Air Quality Standards, Prevention of Significant Deterioration goals, and the visibility protection plan will continue. Activities would be conducted 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 to meet State targets for reduction from historical levels. This would be accomplished 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. that reduce the need to burn would be developed and used. The selected methods will be as consistent with ecosystem management objectives as possible. The potential for wildfire emissions will be reduced through the use of prescribed fire and other fuels management techniques.

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 (OHV) 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 Non-Point Source (NPS) 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 (BMP) that protect beneficial uses of water will also continue.

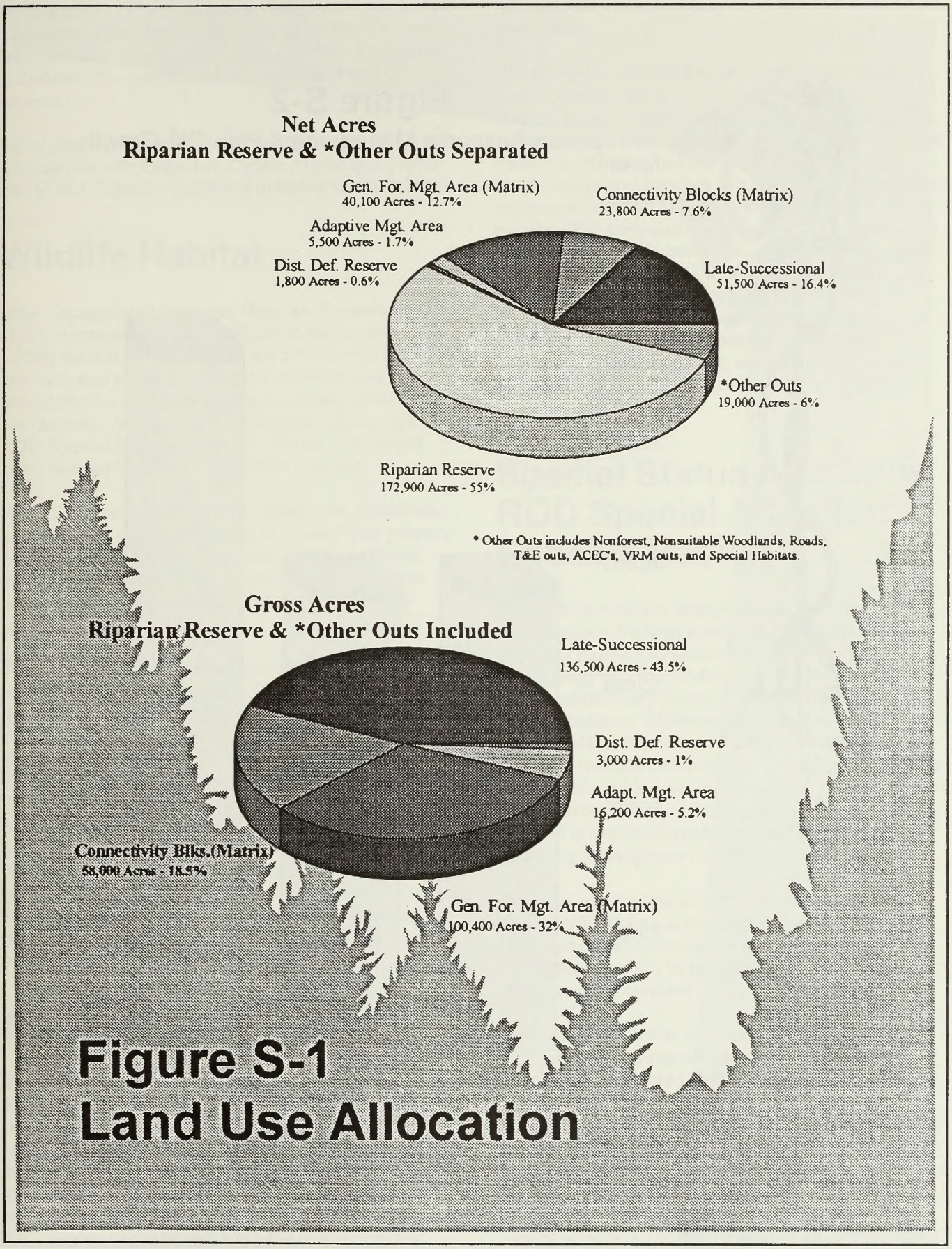


Figure S-1. *Land Use Allocation*

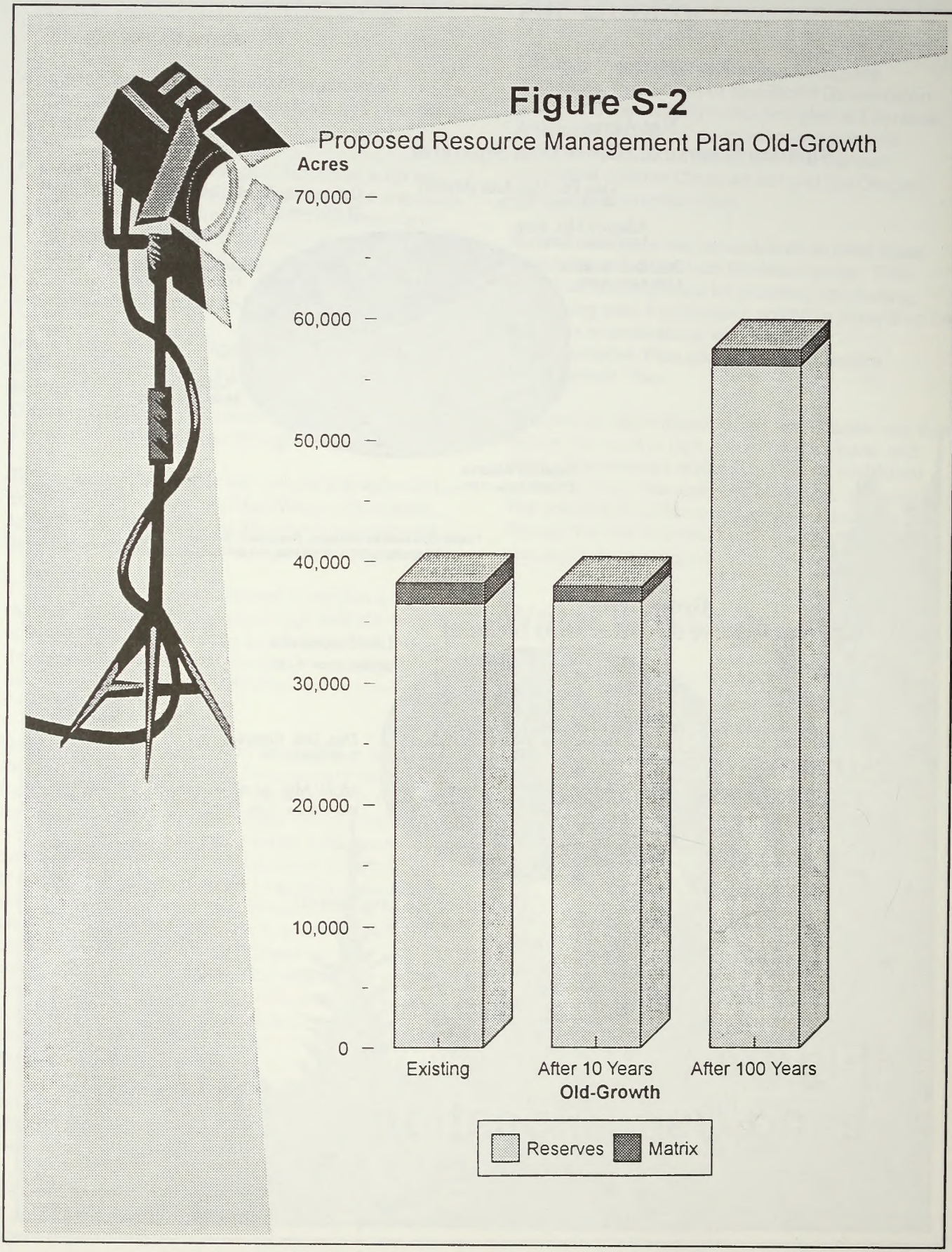


Figure S-2. *Proposed Resource Management Plan Old-Growth*

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.

Special habitats, such as cave entrances, meadows, and wetlands will be managed to protect their primary wildlife habitat values. They may also be buffered from 100 to 320 feet from timber harvest and other surface-disturbing activities, depending upon site-specific characteristics.

The habitat of elk and other species will be protected through Off Highway Vehicle (OHV) designations and the closure of certain roads to the public to minimize disturbance. To help meet population goals of the Oregon Department of Fish and Wildlife, forage plants will be seeded where appropriate. This will be done following timber harvest in big game management areas where big game forage is considered deficient and where seeding will be compatible with other resource objectives. Such seeding is expected to maintain habitat conditions on BLM administered lands. Various types of habitat development work would occur, including vegetation treatment, planting, and snag creation.

Fish Habitat

The Aquatic Conservation Strategy is the thrust for 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 at-risk fish stocks 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. Actions will be taken to rehabilitate streams and other waters to enhance natural populations of anadromous and resident fish. Possible rehabilitation measures could 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; riparian rehabilitation to establish or release existing coniferous trees; improvement of roads that contribute to sedimentation; and rehabilitation of other upland areas that contribute to deteriorated instream conditions.

Special Status And SEIS/ 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 will be managed so as to not elevate their status to any higher level of concern. ROD special attention species would 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 would be maintained or restored.

BLM will consult with or request technical assistance (for Federal Candidate or Bureau Sensitive Species) from the U.S. Fish and Wildlife Service (USF&WS) or National Marine Fisheries Service (NMFS) for any proposed action that may affect Federal listed or proposed species or their critical or essential habitat. Based on the results of consultation or technical

assistance, the proposed action will be modified, relocated, or abandoned.

Table 2-5a 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.

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.

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 bird's behavior indicates occupation, will be protected.

To support the Pacific Bald Eagle Recovery Plan, 3 existing nest sites will be protected plus 2 communal winter roost sites. An additional 5,584 acres will be managed to maintain or develop future potential nest sites.

To support the Peregrine Falcon Recovery Plan, the District will coordinate with Oregon Department of Fish and Wildlife and the U.S. Fish and Wildlife Service to determine if historical peregrine falcon eyries exist in the District.

Special Areas

All 7 existing Areas of Critical Environmental Concern (ACEC), including ACEC/RNAs, would be retained. One existing Environmental Education Areas would be retained. An additional 7 areas will be designated as ACEC. This will include 1 new Research Natural Area (RNA) that is already designated an ACEC, increasing the number of RNAs on BLM administered land in the planning area to 5.

Cultural Resources including Native American Values

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

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

Visual Resources

To retain scenic quality, 4,471 acres of other highly sensitive land for recreation facilities and river corridors will be managed as Class II so that landscape alterations caused by management will not attract attention. To partially retain scenic quality, 13,130 acres of visually sensitive lands will be managed as Class III, so that landscape alterations will not dominate the view.

Wild and Scenic Rivers

There are 3 river segments covering 70 miles that were found suitable for possible designation by Congress under the Wild and Scenic Rivers System. These segments are identified in Table S-4 at the end of this summary. If designated by Congress, These will be added to the National Wild and Scenic Rivers System. There are 6 river segments (consisting of 36 miles) that were first found eligible for designation, were studied by BLM, and found not suitable for such designation.

Rural Interface Areas

VRM Class III management will be applied on approximately 6,800 acres of BLM administered lands within a quarter mile of private lands where county zoning allows for development on 1 to 20-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. Management will also continue to provide amenity values (e.g., recreation facilities, protected special areas, and high quality fisheries) that enhance communities as places to live and work.

Recreation

Management will 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 programs that benefit both short and long-term implementation.

Thirteen existing recreation sites and 6 trails will remain open, or available to reopen. Twenty-six additional recreation sites and 20 additional trails will be developed when funding becomes available. The emphasis of facility management and development will be to accommodate the increasing demand for recreation opportunities within the planning area. In addition to the 1 existing Special Recreation Management Area, 6 additional areas will be designated. There will be 9 new Back Country Byways, as components of the National Scenic Back Country Byway System.

As part of management of the use of Off Highway Vehicles (OHV), 3,120 acres would be closed either seasonally or year-round to vehicle use. Use for administrative purposes and authorized removal of commercial commodities, such as timber, would be excepted. The remainder of the planning area would be designated as limited. Off Highway Vehicle use will be specifically provided for in the Resource Areas.

Demand for all recreation activities is expected to increase during the life of the PRMP. Expected demand will be adequately met for all recreational use categories with facility developments except winter sports and nonmotorized boating.

Additional emphasis will be placed on interpretive and informational signs and maps to support State and local strategies for encouraging tourism and to facilitate public use of BLM resource lands.

Timber Resources

Management will provide a sustainable supply of timber and other forest products and will seek to achieve a balance between wood volume production, quality of wood, and timber value at harvest.

Lands available for scheduled timber harvest are as follows:

Land Use Allocation	Approx. Gross Acres	Approx. Net Acres
Matrix	158,400	63,900
General Forest Management Areas[1]	100,400	40,100
Connectivity/Diversity Blocks	58,000	23,800
Central Cascade Adaptive Management Area (AMA)	16,200	5,500

[1]Includes Visual Resource Management Class II, Rural Interface Areas, and TPCC restricted

The annual Probable Sale Quantity (PSQ) from these allocations and the management planned for the Matrix (with extrapolation of management assumptions for the General Forest Management Area to the Central Cascade Adaptive Management Area) is 6.1 million cubic feet (36 million board feet). It is also projected that an additional 10 percent of this volume will be available as other wood.

The Probable Sale Quantity (PSQ) 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 PSQ, rather than Allowable Sale Quantity (ASQ) 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, and related forest resource protection.

The PSQ 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 PSQ. Potential variables are discussed in the Timber Resources section of Chapter 4. As inventory, watershed analysis, and site-specific planning proceed in conformance with that management direction, the knowledge gained will permit refinement of the ASQ to be declared when a plan decision is made.

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, for the successful retention of desired structure, and to meet 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 that produces maximum average annual growth over the lifetime of a timber stand. In the planning area, culmination for most regimes and sites occurs near 80 years of age. During the first decade, regeneration harvests would generally be scheduled in stands less than 100 years of age.

Silvicultural treatments and harvest designs will be based on the functional characteristics of the ecosystem and on the characteristics of forest stands and sites. 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 reduce the need for direct treatments. Herbicides will 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 included in the other wood estimate. Where hardwood trees became established following previous harvest of conifers, reestablishing a conifer stand on the site will be planned.

Unscheduled harvests may occur from thinning and salvage in Late-Successional Reserves and Riparian Reserves. Forest health operations that produce volume or biomass as a by-product may occur in any allocation, consistent with management objectives for that allocation.

Special Forest Products

BLM will manage Special Forest Products (SFP) for production and sale 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 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 land will remain available for mineral leasing (of oil and gas or geothermal resources) and exploration for and development of locatable mineral resources. But a variety of designations and allocations (such as Special Areas, Late-Successional Reserves, Riparian Reserves, and recreation sites) will restrict exploration and development activities.

Land Tenure Adjustments

Land tenure adjustments will emphasize exchanges to benefit multiple resource values. As a matter of practice, O&C forest lands allocated to timber management will only be exchanged for lands to be managed for multiple-use purposes. Any exchange involving O&C lands will be done in close consultation with the O&C Counties. Lands are categorized in 3 land tenure adjustment zones: Zone 1 land (approximately 78,175 acres) will be retained in BLM's administration; and Zone 2 land (approximately 238,398 acres), emphasis will be placed on retaining land under BLM administration; however, land may be blocked up in exchanges for other lands, transferred to other public agencies, or given some form of cooperative management. Zone 3 land (approximately 36 acres), which are scattered and difficult to manage, will be available for sale or exchange.

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.

Fire

Prescribed fire, including underburning will be used as a favored tool for site preparation, fuel hazard reduction, and to restore the natural role of fire in the ecosystem. It will also be used to facilitate meeting a number of resource objectives, including management for forest health, wildlife habitat, and special status species habitat. All burning will be done in accordance with the objectives of the Oregon Smoke Management Plan.

Monitoring the Resource Management Plan

Monitoring and evaluation of the Resource Management Plan will be carried out at appropriate intervals for the following purposes:

- ensure activities are occurring in conformance with the RMP
- determine if activities are producing the expected results
- determine if activities are causing the effects identified in the EIS

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 Native American groups, 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 with the following:

- possible cumulative effects of BLM and other landowners' activities in some watersheds 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 1 year required by the Oregon Forest Practices Act, due to the requirement for smoke management clearance before burning slash
- probable inconsistency with the Oregon Benchmarks for increasing standard of living, affordable housing, family stability, and stable home life
- inconsistency with Oregon statewide planning Goal 8 (Recreational Needs) due to failure to meet demand for Off Highway Vehicle use
- 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, and written letters and responses to comments. These efforts began in May 1986.

Subsequent mailers at least once a year, 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 that set the baseline for development of the RMP/EIS. Suggestions for formulation of the PRMP 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 PRMP or the analysis of environmental consequences. Any protests to the Director of BLM will be reviewed and addressed before a Record Of Decision (ROD) on the RMP is completed. Comments directly to the District Manager will also be considered in formulating the decision.

Table S-1 - Major Land Use or Resource Allocations and Planned and Assumed Actions on BLM Administered Lands by Alternative

Allocation/Action	PRMP[4]	PA[2]	NA[1]	A	B	C	D	E
1. Timber Management Allocations (thousand acres)								
Intensive Timber Production	42	89	260	274	249	0	0	100
Restricted Timber Production	27	30	12	0	1	207	151	38
Enhancement of Other Uses/Not Available	233	183	30	28	52	95	151	164
2. Probable Sale Quantity								
MMCF	6.1	19.9	35	53.8	49.8	14.8	17.2	17.2
MMBF	36	119	223	342	316	88	101	97
3. Timber Management Practices (assumed average annual acres unless noted, 1st decade)								
Regeneration Harvest	570	1,670	3,750	4,410	3,890	1,120	1,570	1,670
Commercial Thinning/Density Management Harvest	730	2,210	4,840	1,410	1,480	2,640	800	790
Prescribed Burning [6]	430[1]	1,720	2,950	3,160	2,800	910	1,170	1,260
Planting Regular Stock	0	0	2,130	2,960	2,310	0	0	0
Planting Genetically Improved Stock	680	2,200	2,580	2,580	2,580	1,530	1,960	2,120
Vegetation Control	340	1,110	2,780	3,280	2,860	50	1,080	1,180
Animal Damage Control	600	2,360	3,050	3,590	3,180	880	1,320	1,420
Precommercial Thinning	590	2,760	3,640	2,530	2,310	2,170	1,580	960
Fertilization	1,670	5,240	13,010	9,040	7,880	4,160	3,030	2,650
Road Construction (miles)	8	27	27	29	26	23	15	178
Pruning	630	0	0	0	0	0	0	0
4. Special Status Plant Species including T&E Species Habitat. Acres managed so as to not contribute to need to list.	1,044	538	538	14	17	17	538	538

Table S-1 - Major Land Use or Resource Allocations and Planned and Assumed Actions on BLM Administered Lands by Alternative (continued)

Allocation/Action	PRMP[4]	PA[2]	NA[1]	A	B	C	D	E
5. Areas of Critical Environmental Concern (ACECs):								
RNAs/ACECs - Numbers	5	5	4	0	5	5	5	5
RNAs/ACECs - Acres	1,367	1,367	939	0	1,367	1,367	1,367	1,367
Other ACECs - Numbers	9	7	3	2	6	11	18	18
Other ACECs - Acres	1,410	573	201	132	564	2,709	8,293	8,293
6. Visual Resource Management (acres)								
VRM Class I	-0-	1,390	400	1,120	1,120	1,120	1,120	5,703
VRM Class II	4,471	13,768	0	3,071	8,005	16,434	40,828	74,444
VRM Class III	33,130	29,413	300	6,705	19,256	31,798	72,658	234,905
VRM Class IV	277,451	270,481	314,352	304,156	286,671	265,700	200,446	0
7. Riparian Zones								
Riparian Reserves [5]	173,000	0	0	0	0	0	0	0
Riparian Management Areas excluded from planned timber harvest (acres)	–	21,836	8,675[3]	10,530	12,922	18,364	34,701	46,302
8. Recreation Resources								
Existing Sites Maintained (number)	13	13	10	10	12	13	13	13
Potential Sites Developed (number)	26	18	0	0	2	11	18	18
OHV Designations (acres)								
– Open	80	314,214	314,367	316,157	314,171	312,126	306,534	306,534
– Limited [7]	313,392	0	566	358	25	25	25	25
– Closed	3,120	2,378	1,659	77	2,396	4,441	10,033	10,033
Wild & Scenic Rivers (river segments found suitable)								
– Wild	0	0	0	0	0	0	0	0
– Scenic	0	0	0	0	0	0	0	0
– Recreational	3	3	0	0	1	1	1	3

Table S-1 - Major Land Use or Resource Allocations and Planned and Assumed Actions on BLM Administered Lands by Alternative (continued)

Allocation/Action	PRMP[4]	PA[2]	NA[1]	A	B	C	D	E
9. Mineral Resources								
Closed to Locatable Mineral Development	15,230	13,350	2,595	2,031	4,237	28,266	33,221	33,221
Open to Locatable Mineral Development	302,552	304,432	315,187	315,751	313,545	289,516	284,561	284,561
Closed to Leasable Mineral Development	52	52	98	52	52	52	52	52
Open to Leasable Mineral Development	317,730	317,730	317,684	317,730	317,730	317,730	317,730	317,730
10. Rural Interface Area Management (acres)								
Subject to VRM Class III Management	6,800	6,800	0	0	0	0	6,800	19,650
Where regen-harvest Herbicides and Prescribed Fire Excluded	6,800	6,800	0	0	0	0	6,800	19,650
Fire Excluded								

[1] NA - No Action Alternative
[2] PA - Preferred Alternative
[3] This number is low due to insufficient inventory data for the MFP
[4] PRMP - Proposed Resource Management Plan
[5] Includes Riparian Reserves inside the LSRs; RRs
[6] The PRMP estimates an additional 990 acres for habitat maintenance, restoration, and hazard reduction.
[7] Estimated

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

Effects	PRMP[8]	PA[2]	Baseline	NA[1]	Alternatives A	B	C	D	E
Air Quality (1,000s of tons of fuel burned[3] annually in prescribed fires, 10 years)	26	26	142	64	68	60	26	34	36
Water Quality (10 years)[4]									
No. of watersheds probably improving[5]	4	4	N/A	2	2	2	4	4	4
No. of watersheds probably declining	5	5	N/A	6	10	6	4	5	5
No. of watersheds with no significant change	4	4	N/A	5	1	5	5	4	4
Biological Diversity									
After 10 years (acres)									
– mature forest	28,106	28,574	23,759	[7]	22,573	16,685	31,280	29,933	31,824
– old growth forest	38,038	38,841	38,266	[7]	8,671	19,330	37,161	40,861	43,493
After 100 years (acres)									
– mature forest	198,334	132,441	23,759	[7]	15,825	24,690	169,202	94,797	134,429
– old growth forest	58,014	54,675	38,266	[7]	11,256	26,820	56,258	57,851	69,319
Riparian Trend (200 years: +, -, 0)	+	0		0	–	0	0	+	+
Woodpecker Populations (% of potential, 10 years)	49[9]	49	44	38	36	41	48	49	49
Elk Habitat (10 years)[5]									
No. of habitat areas improving	2	1	N/A	0	0	0	0	0	0
No. of habitat areas unchanged	3	4	N/A	0	0	0	0	2	5
No. of habitat areas declining	0	0	N/A	5	5	5	5	3	0
Fish Populations, 10 Years (+,-,0)	+	+		+	0	+	+	+	+
Threatened and Endangered Species									
Spotted Owl Habitat									
BLM land (100 years) (thousand acres)	235	173	N/A	35	21	48	274	143	151

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

Effects	PRMP[8]	PA[2]	Baseline	NA[1]	Alternatives A	B	C	D	E
Potential bald eagle breeding sites protected	10	10	10	10	10	10	10	10	10
Potential bald eagle winter roost sites protected	2	2	2	2	2	2	2	2	2
Known marbled murrelet sites protected [11]	12	12	12	12	12	12	12	12	12
Visual Resources (10 years; +, -, 0)	+	+	–	–	–	+	+	+	+
Wild and Scenic Rivers (assessed river segments, 10 years)									
Number of outstandingly remarkable values (ORVs) beneficially affected	7	7		11	0	0	5	7	14
Number of ORVs unaffected	7	7		3	7	8	9	7	0
Number of ORVs adversely affected	0	0		0	7	6	0	0	0
Recreation Use (capability to meet 10-year demand[6])									
Off-highway travel	4	4		5	5	5	4	4	3
Motorized travel	4	4		3	3	3	3	3	3
Nonmotorized travel	4	4		2	1	1	3	4	4
Camping	4	4		2	1	1	3	4	4
Hunting	3	3		2	2	2	3	3	4
Picnicking, studying nature, etc.	4	4		2	1	1	3	4	4
Fishing	4	4		3	2	2	4	4	4
Boating	3	3		2	1	1	3	3	3
Swimming, general waterplay	5	5		3	2	2	5	5	5
Winter sports	1	1		1	1	1	1	1	1
Snowmobiling	0	0		0	0	0	0	0	0

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

Effects	PRMP[8]	PA[2]	Baseline	Alternatives NA[1]	A	B	C	D	E
Socioeconomic Conditions (10 years)									
Average annual O&C receipts distributed to counties ($ million) in Western Oregon.	25.771	14.589	13.170	23.742	34.900	32.970	10.606	11.207	12.535
Estimated Total Dependent Personal Income	11.560			47.521	71.624	65.417	21.005	24.228	24.403
Estimated Total Dependent Employment	735			2,677	3,934	3,509	1,214	1,398	1,403

[1] NA = No Action Alternative
[2] PA = Preferred Alternative
[3] Tons of slash burned correlates directly with the level of omissions.
[4] Cumulative effects, all ownerships.
[5] The planning area was divided into 5 elk habitat areas - 5 of those, where BLM administers substantial acreage, were analyzed.
[6] 0 = no opportunity to meet demand, 1 = least able to meet demand, 5 = best able to meet demand
[7] Values are approximately between Alternatives A and B.
[8] PRMP - Proposed Resource Management Plan
[9] Population levels for the PRMP would exceed levels in the Draft RMP. Exact levels would depend upon the location of treatment units that will be decided through watershed analysis, and upon the degree of habitat enhancement that would occur under the PRMP in the short and long-term.
[10] Watershed restoration may mitigate some of these trends.
[11] Refers to either an activity center or nest.

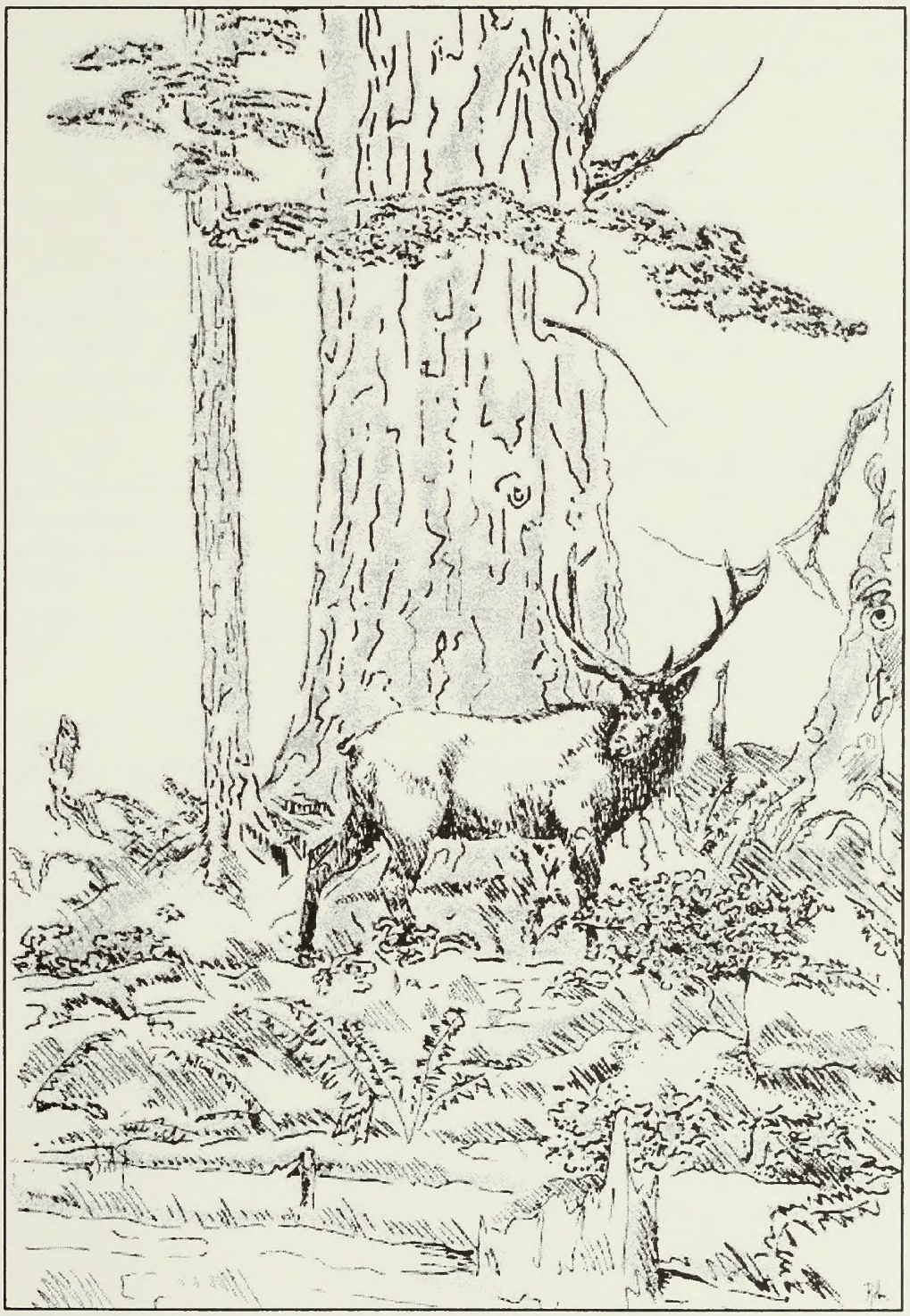
Table S-3 - Special Status Species Found on BLM Administered Lands

	Number of Plant Species	Number of Animal Species
Federal Threatened	0	2
Federal Endangered	1	1
Federal Proposed	0	2
Federal Candidate	3	9
State Listed	3	5
Bureau Sensitive	2	2
Bureau Assessment	4	12

Table S-4 - Suitable Wild and Scenic Rivers

River Name	Segment Length	Proposed Classification
McKenzie River, Segment A	11 miles	Recreation
Siuslaw River, Segment B	46 miles	Recreation
Siuslaw River, Segment C	13 miles	Recreation

Chapter 1
Introduction to the Planning Area



Summary of Major Changes

Sections in Chapter 1 have been updated and revised.

The Planning Area

This Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) analyzes impacts associated with managing 316,592 acres of land administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), Eugene District. Within the planning area there are also 1,299 acres of nonfederal land with Federal subsurface mineral estate administered by BLM.

Table 1-1 summarizes BLM administered land in the planning area by County.

The land is located in western Oregon as shown on Map 1-1. Land Status, Map 1-2, identifies lands administered by the Eugene District. The portions of the BLM administered lands in the planning area lie in the western foothills of the Cascade Range or in the Oregon Coast Range. They are predominately forested with stands of Douglas-fir, and drain into the McKenzie, Siuslaw, and Willamette Rivers. Population is centered in and near Eugene and Springfield.

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 PRMP responds to dual needs for forest habitat and for forest products.

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

The need for forest products from forest ecosystems is the requirement 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 stated 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

Table 1-1 - BLM Administered Land Acreage

				Acreage of			
County	**O&C**	**CBWR**	**PD**	**Acquired**	**Other**	**Total Surface**	**Reserved Minerals**
Benton	200	0	0	0	0	200	0
Douglas	20,199	0	1,228	0	0	21,427	0
Lane	269,936	0	7,472	362	40	277,810	1,291
Linn	16,855	0	300	1	0	17,155	8
Totals	**307,190**	**0**	**9,001**	**363**	**40**	**316,592**	**1,299**

O&C: Revested Oregon and California Railroad Lands
CBWR: Revested Coos Bay Wagon Road Lands
PD: Public Domain Lands
Acquired: Lands formerly in private ownership that have been acquired by the U.S. by donation or purchase with appropriated funds

The PRMP was developed under the requirements of the Federal Land Policy and Management Act (FLPMA) through the use of an interdisciplinary planning process. This RMP/EIS document is written in compliance with the National Environmental Policy Act (NEPA) 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 O&C lands is governed by a variety of statutes, including the O&C Lands Act, FLPMA, 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 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, supported 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 (ESA) 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 ESA 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 ESA. 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 RMP to BLM Policies, Programs and Other Plans

BLM in Oregon is developing 5 other PRMP/FEIS documents concurrently with development of this one. The 6 PRMP/FEIS documents together cover all BLM administered lands in western Oregon. Some lands administered by the Salem District to the north and the Roseburg and Coos Bay Districts to the south directly adjoin lands being addressed in this plan; on other lands administered by these Districts, there is shared management of certain resource or administrative features (e.g., watersheds, road

networks). 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 that arise from those directions. This Final EIS for the RMP incorporates the analysis in that Final SEIS.

This RMP/EIS is also tiered to the 1993 EIS, Pacific Yew, prepared by the U.S. Forest Service, with BLM as a cooperating agency, regarding analysis of impacts of harvest of Pacific yew. A copy of the key elements of the ROD for that EIS is included as Appendix F of this document. The decisions made in that ROD are not readdressed.

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 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.

Planning Process and Criteria

BLM's planning process involves 9 steps as shown below:

1. Identify issues, concerns, and opportunities
2. Develop planning criteria
3. Collect inventory data and information
4. Analyze the management situation
5. Formulate alternatives
6. Estimate effects of alternatives
7. Select the preferred alternative (and publish Draft RMP/EIS)
8. Select the Resource Management Plan
8a. Publish Proposed RMP/Final EIS
8b. Respond to any protests and publish RMP/ Record of Decision
9. Implement, monitor, and evaluate the RMP

Publication of this document constitutes completion of Step 8a. Public involvement has occurred at several steps in the process (see Appendix JJ, Summary of Scoping, and Appendix KK, Response to Public Comments).

The planning process is designed to help the BLM identify the uses of BLM administered lands desired by the public and consider those uses to the extent consistent with the laws established by Congress and the policies of the executive branch of the Federal government regarding management of those lands.

Where BLM manages only the subsurface mineral estate, the plan and EIS address only the management of BLM administered minerals.

Planning criteria were developed by BLM's Oregon State Director for the process of developing this PRMP and the other 5 western Oregon PRMP documents being developed concurrently. The development of those planning criteria is discussed in Appendix B, State Director Guidance for the RMP Process. The criteria for formulation of alternatives are published in their entirety in Appendix B.

Issues

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. These issues and concerns are as follows:

1. Timber Production Practices

Which forest lands will be available for intensive management of timber products or for restricted management to enhance other uses on BLM or nearby lands?

Will BLM use uneven-age silvicultural systems versus even-age (e.g., clear cut, shelterwood, etc.) to meet other timber production or resource objectives?

What logging practices will be applied to BLM lands?

To what extent will BLM maintain or alter the following practice on some or all commercial forest lands:

- precommercial thinning, commercial thinning, fertilization, brush field conversion, and genetics
- site preparation (manual, mechanical, herbicides, burning)
- vegetation control (manual, mechanical, herbicides)
- animal damage control (pesticides, trapping, tubing)

Should forest product quality objectives, including product diversity, influence forest management practices or minimum harvest age?

2. Old Growth Forests

Where and how much, if any, old growth and/or mature forest should be retained, maintained, or reestablished to meet various resource objectives?

What management should be applied to meet the resource objectives?

3. Habitat Diversity

What levels of habitat diversity should be provided to help meet wildlife goals?

To what extent, and where should BLM manage habitat necessary for populations of native wildlife species?

Where and how should unique habitats (e.g., cliffs, talus slopes, caves, meadows, wetlands, etc.) be managed?

4. Threatened and Endangered Species Habitat

What will BLM do to manage Federally listed threatened or endangered plants and animals?

What will BLM do to manage plants and animals to prevent their listing as Federally threatened or endangered species?

5. Special Areas

What areas on public lands need special management attention to protect and prevent irreparable damage to important historic, cultural or scenic values; botanical or fish and wildlife resources; other natural systems or processes; or to protect life and safety from natural hazards?

What are the goals and objectives for each of these areas?

Which of these areas should be formally designated as Areas of Critical Environmental Concern (ACEC)?

6. Visual Resources

Which, if any, areas of BLM lands should be managed to reduce visual impacts or visual (scenic) quality?

7. Watershed Management

What special management actions will be undertaken to comply with State water quality standards?

What will BLM be doing to manage for special watershed needs such as municipal, domestic, irrigation, and other uses?

How will unstable Tyee sandstone formations be protected?

8. Streams/Riparian Areas

Where and how will riparian areas be managed to protect and improve water quality, fisheries, and wildlife habitat?

9. Recreation Resources

What areas or sites will be designated and/or managed to protect or enhance a variety of recreational opportunities?

10. Land Tenure and Access

In what areas will BLM lands be sold, exchanged, or disposed of under other

authorities to improve management efficiency and benefit resource program objectives?

In what areas will BLM attempt to acquire lands to improve management efficiency and benefit resource program objectives?

11. Rural Residential Management Areas

What lands would receive special management consideration because of their location near rural residential areas (communities)?

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

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

- **Mineral resources** - Mineral development activity on BLM administered lands in the planning area has been of a small scale in recent years. Most future mining activity is expected to continue as individual operations involving in each case less than 5 acres of land.

Impacts to mineral exploration are shown as the number of acres in the planning area by management category, which are either "open," "open with no surface occupancy" (for leasable minerals), "open with standard requirements," "open with additional restrictions," or "closed" to mineral activities. This quantitative portrayal is required by BLM policy to be included in this PRMP.

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

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

- **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 Native American treaty rights or trust resources - No such treaty rights or trust resources involve BLM administered lands in the Eugene District.

Western Oregon Digital Database

To support the RMP process BLM developed the Western Oregon Digital Data Base (WODDB), Geographic Information Systems (GIS) digital (computer) database.

Due to the checkerboard pattern of land ownership, base thematic data was mapped on a total of 7 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 (ADS) 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.

Although the majority of western Oregon is covered within the planning area's 16 townships in the Eugene District, only minor acreage of BLM

administered land were excluded from the WODDB project.

BLM ownership is based on the Geographic Coordinate Database System and maps were generated from this information directly in ADS. As this ownership is computer generated, it may differ from scales displayed in other documents that were determined from BLM master title plats, based sometimes on old surveys that have never been updated.

BLM is using GIS technology based on the Map Overlay and Statistical System (MOSS) family of software on Prime computers in the 6 western Oregon Districts and the State Office in Portland. Many base and resource themes have database information associated with them. The database information is stored in attribute files that are, in turn, linked to the graphic files by a process called DBLINK.

To build the WODDB database, standards for each of the themes were developed and agreed upon by BLM's western Oregon Districts. The WODDB 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.

The WODDB database has been used in 3 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.

Chapter 2
Proposed Resource Management Plan

Summary of Major Changes

General

The Proposed Resource Management Plan, which is consistent with the SEIS/ROD, replaces the preferred alternative in the Draft RMP/EIS.

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 All Alternatives is located near the end of this chapter.

Air Quality

This is a new section added to this PRMP/FEIS.

Water and Soil Resources

Riparian reserves will replace Riparian Management Areas as a watershed and water quality management tool. The objectives for riparian reserves are described in Appendix LL under "Aquatic Conservation Strategy Objectives." Appendix LL references the SEIS/ROD.

Special Status and Special Attention Species (Animals)

This section has been revised from the Draft RMP to more clearly state the desired future condition and to address concerns expressed from public and professional comments.

The objective and management actions identified in the Special Status Species section are designed to be consistent with objectives and management actions identified under other resources to avoid conflicts between the several resources.

With some exceptions, these objectives and management actions are designed to fit within the more general objectives identified in the Draft Resource Management Plan. These objectives are consistent with those implied in the DRMP; however, more detail has been added.

Special Status and Special Attention Species (Plants)

Addition of new plants located on the District
Addition of new SEIS species and objectives
Deletion of Table 2-b; incorporated management objectives into text

Wildlife Habitat

Snag retention will be 40 percent in the Matrix in the PRMP/FEIS instead of 60 percent as proposed in the Draft RMP. Snag retention in riparian reserves will result in more than 40 percent retained across the landscape.

Special habitat names now coincide with the areas being identified by watershed analysis teams. Definitions are in Chapter 3. Required buffers from ROD are noted.

The SEIS/ROD language was incorporated into the PRMP.

Specific District Wildlife Objectives from the Draft Eugene Fish and Wildlife 2000 have been included. Management activities and guidelines on where, how, and to what extent these objectives will be implemented will be covered under the Eugene District Fish and Wildlife 2000 activity plan that is scheduled for completion by December 31, 1994.

Recreation

Off Highway Vehicles (OHV):

Most of the District lands designated "open" in the Draft RMP/EIS are now designated "limited." See Appendix T for discussion and rationale.

Proposed Special Recreation Management Areas (SRMA):

Lower Lake Creek SRMA has been added to the PRMP.

Sharps Creek SRMA has been renamed to Row River SRMA and has been expanded to include the Row River Trail and adjoining lands.

Proposed Recreation sites:

The proposed Row River site has been dropped from the Proposed Resource Management Plan (PRMP) because of botany concerns. *Aster vialis* has been located within the site.

Proposed Cannery Dunes ACEC/ONA site has been dropped from the PRMP due to management decision to lease or transfer this tract of land to the City of Florence under the R&PP.

Several proposed trailheads have been added: Blachly-Lane Flume, Overland, Culp Creek, Disston, Mosby Creek, and Red Bridge.

Hiking Trails:

The ROW River Trail, and Whittaker Creek Old Growth Ridge Trail has been completed and is now in existing status.

Row River Overlook Trail has been dropped from the PRMP due to botanical concerns.

Tyrrell Forest Succession Interpretive Trail is partially completed and could be finished prior to publication; therefore, the trail has been placed in existing status.

The following proposed trails have been added to the PRMP: Overland, Blachly-Lane Flume, and Row River Expansion.

Special Areas

Addition of descriptions of all proposed ACEC
Addition of management direction for potential ACEC

Visual Resources

VRM Class III will be the objective for Rural Interface Areas (RIA) in the PRMP instead of Class II.

The proposed Row River SRMA (formerly named Sharps Creek SRMA) has been reclassified as VRM III in the PRMP instead of Class II.

Reclassified Eugene District administered lands. There are no VRM I lands on the District.

Shotgun Recreation Site was changed from VRM I to VRM II.

Existing Areas of Critical Environmental Concern listed in the Draft RMP in VRM Class I have been reclassified as Class IV except for the Lake Creek Falls. Lake Creek Falls ACEC is VRM Class III because it is within the Lower Lake Creek SRMA boundary.

Socioeconomics

This is a new section added to this PRMP/FEIS.

Timber Resources

Dropped the Old Growth and Mature Forest section.

Special Forest Products

This is a new section added to this PRMP/FEIS.

Livestock Grazing

Program has been dropped due to non-utilization of permits and/or inadquate forage or inappropriate habitat.

Rural Interface Areas

VRM Class III will be the objective for Rural Interface Areas (RIA) in the PRMP instead of Class II.

Fire

Table 2-13 has been added to clarify the fire management categories and how they would be used on the Eugene District.

A refined definition of "Fire Use Areas" and "Fire Fuels Management Areas"

Adjusted the acreage of 1,800 acres of underburning to 700 acres of underburning to better meet Air Quality objectives.

Land Tenure

Language was added to clarify that exchanges will be the preferred method of land acquisition in order to minimize adverse impacts on the local tax base.

Language was added providing that future land tenure adjustments should emphasize opportunities that conserve biological diversity or enhance timber management opportunities.

Management direction for land tenure management within Riparian Reserves and Late Successional Reserves was added, consistent with the provisions of the SEIS/ROD.

With regard to acquisitions, a statement was added to provide that "Where the Bureau's objectives can be met with less than fee ownership, conservation easements may be considered and acquired. Acquisitions of lands and interests in lands may be made anywhere within Land Tenure Zones 1 and 2 when consistent with management objectives. Where directed by Congress, including through the appropriation of Land and Water Conservation Funds, lands and interests in land may be acquired anywhere within the District."

A statement was added to provide direction to "reduce 'split estate' acreages by acquiring the reserved mineral interests for lands where the Bureau owns the surface estate only, or, when consistent with other resource values and regulatory requirements, disposing of reserved federal mineral interests to the owner of the surface estate."

A statement was added providing that "Acquisition of reserved mineral interests for lands where the Bureau owns the surface estate only may be by exchange, donation or other means available by law."

In acknowledgement of the Bureau's responsibility to meet the State of Oregon's entitlement to receive ownership of additional "in lieu" lands, a statement was added providing that "In order to accommodate the entitlement of the State of Oregon to select additional lands to fulfill the grant made upon its entry into the Union in 1859 as provided in a 1992 court decision, public domain lands in Land Tenure Zones 2 and 3 would be available for 'in lieu' selection by the Division of State Lands. Selection applications would be processed in accordance with the procedures and policy specified in Bureau Manual 2621 and would be given favorable consideration to the greatest extent possible within the constraints of applicable law. Any selected lands containing threatened or endangered species or their critical habitat for which the U.S. Fish and Wildlife Service renders a jeopardy opinion upon consultation would be found unsuitable for transfer to the State."

One 40-acre tract in Section 15, T. 18 S., R. 12 W., W.M. (Cannery Dunes parcel) is specifically identified as suitable for transfer to the City of Florence under the R&PP Act.

Language was revised to specify that all lands may be considered for the issuance of permits and leases under Section 302 of the Federal Land Management and Policy Act, the Recreation and Public Purposes Act and special recreation permits, removing the exclusion of available commercial forest lands from such consideration.

Rights-of-Way

Management direction for right-of-way management within Riparian Reserves and Late Successional Reserves was added, consistent with the provisions of the SEIS/ROD.

Recreational Rivers (suitable and designated) were added to the list of right-of-way avoidance areas.

Access

Wording has been added to clarify that easements may be acquired for such facilities as trails, boat ramps, and in-stream fisheries enhancement structures, as well as roads.

A statement has been added that conservation easements will be considered in implementing the provisions of this plan where the Bureau's objectives can be met with less than fee ownership. Such easements may be appropriate to protect populations of special status plants and animals, important wetlands, and other special resources.

Direction has been added that easements, including fee easements, to provide legal and physical access (administrative and/or public) to Bureau administered land may be acquired anywhere within the District. Other easements, including conservation easements, may be acquired anywhere within Land Tenure Zones 1 and 2 when consistent with management objectives. Where directed by Congress, including through the appropriation of Land and Water Conservation Funds, easements of any type may be acquired anywhere within the District.

Noxious Weeds

This is a new section added to the PRMP/FEIS.

Chapter 2 Appendices

Summary of Major Changes

Appendix T

Off Highway Vehicle Designations is a new appendix added to this PRMP/FEIS.

Appendix GG

Leasable Minerals

Special Status Species (Federal Threatened and Endangered, Proposed Federal Threatened and Endangered, Federal Candidate, Bureau Sensitive, and State Threatened and Endangered) would be protected by a special stipulation which would be attached to all mineral leases on BLM land in the Eugene District.

The regulation in 43 CFR 3101.1-2 permits the BLM to require relocation of proposed oil and gas operations up to 200 meters, so No Surface Occupancy leasing stipulations are not necessary to protect Regional Forest Nutritional Research Study Installations, progeny test sites, bald eagle nest and roost sites and associated habitat, and marbled murrelet nest sites.

A Controlled Surface Use special stipulation was added to protect Suitable and Eligible Recreational Rivers.

A No Surface Occupancy special stipulation was added to protect Riparian Reserves.

A Controlled Surface Use special stipulation was added to protect Late-Successional Reserves.

Because the VRM Class I classification has been dropped in the PRMP, the No Surface Occupancy special stipulation for that land classification has been deleted.

Appendix HH

Locatable Minerals

Some of the current State requirements for mining were added to this appendix to help clarify for the mining operator which agencies require certain permits or authorizations.

Permanent and temporary structures, and conditions for their use in conjunction with mining and exploration activities, were described and closely follow the proposed regulations for 43 CFR 3710.

Dogs and cats must be kept under control (rather than mandatorily leashed) at camps associated with mineral related activities. Livestock will not be permitted at mine sites.

The PRMP clarifies the effect of the Endangered Species Act on Notice-level and Plan-level mining activities.

Mining claimants or operators will be required to identify in a Notice or Plan of Operations, the individuals proposing to occupy a mining site while operations are being conducted. Immediate family members (defined as spouses or minor children/ stepchildren) will not be required to mine, however the claimant and/or operator will be required to be engaged in a good faith, diligent effort in prospecting, exploration, or mining operation in order to warrant occupancy.

Filing either a Notice or Plan of Operations is required on all suction dredge operations where the dredge has a suction hose with an inside diameter greater than 4 inches in diameter, or where any suction dredge operator proposes occupancy on BLM land (in excess of 14 calendar days per year), the installation of structures of any kind, suction dredge operations involving more than one dredge (regardless of size), or trail or road construction. Generally the determination of the need for a Notice or Plan of Operations is determined on a case-by-case basis.

The need for a security guard shall be such that the person with those duties is required to be present at the site whenever the operation is shut down temporarily or at the end of the workday, or whenever the mining claimant, operator, or workers are not present on the site.

All mining equipment, vehicles, and structures must be removed from the public lands during periods of nonoperation in excess of 24 consecutive months.

In reclaiming roads used for mining activities, the roadbed should be ripped to a minimum depth of 18 inches to reduce compaction and provide a good seedbed. This depth coincides with reclamation requirements imposed on other users of the public lands.

Salable Minerals

No changes from the Draft RMP.

Appendix L

Same changes as Appendix GG.

Section 1 of Chapter 2

Proposed Resource Management Plan (Section 1)

Introduction

The purpose of this chapter is to describe the Eugene District Proposed Resource Management Plan (PRMP) and the other land and resource management alternatives that were analyzed by BLM. The chapter is divided into 4 sections. Descriptions of the 4 sections follow:

- The first section is the PRMP and consistency language tieing the PRMP to the SEIS/ROD followed by a description of the objectives, major land use allocations, and management actions/ direction for the Proposed Resource Management Plan.
- Second section: Objectives, Land Use Allocations, and Management Actions/Direction by Resource Topic for the Eugene District.
- Third section: Management Direction Common to Alternatives A through E & Management Direction by Alternative.
- Fourth section: Guidance for miscellaneous topics such as Consultation and Coordination, Use of the Completed Plan, Costs of Management, Research, etc.

Except for Table 2-1, the alternatives comparison tables in Chapter 2 of the Draft Resource Management Plan (DRMP) are not duplicated in this document. All Chapter 2 maps are located in the accompanying packet. For reader convenience, and due to the size of several Chapter 2 tables, all Chapter 2 tables are located at the end of the chapter.

Alternatives to be Analyzed and Alternatives Dropped from Detailed Study

The Summary includes brief descriptions of the PRMP and 6 alternatives for which impacts are analyzed in Chapter 4. A more detailed description of each alternative can be found in various sections of Chapter 2.

Allocations and management by alternative are compared in Table 2-1, which is located at the end of this chapter. Allocated acres in Table 2-1 overlap and partly duplicate.

In scoping the Plan, a number of alternatives or potential elements of alternatives were considered but eliminated from detailed analysis. These alternatives are discussed in Appendix JJ, Summary of Scoping.

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 PRMP are the Western Oregon Planning Strategy and the District Planning Strategy.

Vision

The Bureau of Land Management (BLM) 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 BLM 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, referred to as 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; and Matrix that includes General Forest Management Areas (GFMA) and Connectivity/ Diversity Blocks. These land-use allocations are located and configured in the landscape to support overall ecosystem functioning and to meet the vision for management of Federal lands in western Oregon. Other land-use allocations that also support this vision are a variety of special purposed management areas such as recreation sites, Wild & Scenic Rivers (W&SR), and Visual Resource Management (VRM) areas.

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 2 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 2 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 Appendix LL, which references 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 will protect salmon and steelhead 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 flood plains, wetlands, upslope 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 flood plain 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. Also see Figure 2-2 at the end of Chapter 2.

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 2 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 and District ownership within them:

Key Watershed Name	Tier	BLM Acres	Total Acres
Bear/Marten Creeks	1	8,282	14,377
N. Fork Smith River	1	162	43,916
Steamboat Creek	1	290	145,257
Upper Lobster Creek	1	1,426	26,415
Upper Smith River	1	2,475	50,870
Total		12,635	280,835

See Maps 2-1 and 2-19 for location of Key Watersheds.

Key Watersheds overlay portions of all land-use allocations in the District and place additional management requirements or emphasis on activities in those areas. The Bear/Marten watershed is the only Key Watershed that is entirely in the Eugene District. This watershed is part of the Central Cascade AMA and overlays both Matrix and Riparian Reserve Land-Use Allocations.

Management Actions/Direction

1. Prior to further resource management activity, including timber harvest, prepare watershed analyses in Key Watersheds. Until watershed analyses can be completed, proceed with minor activities, such as those categorically excluded under the National Environmental Policy Act (NEPA) 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 the SEIS/ROD (see Appendix LL) for requirements.

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 Watershed Analysis 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 the SEIS/ROD (see Appendix LL).

Land-Use Allocations and Resource Programs

This section provides a description of objectives, land-use allocations, and management actions/direction for this PRMP. The term "land-use allocations" is used in 2 ways. First, it pertains to the major land-use allocation categories derived from the SEIS and its ROD (e.g., Riparian Reserves and Late-Successional Reserves) and the still relevant allocations of the Eugene 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 rest of this Land-Use Allocations and Resource Programs section has 3 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 PRMP 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 PRMP 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 6 topics that apply to all land-use allocations. Guidance for 4 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 2 topics is described below.

All management actions/direction in this PRMP 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 Appendix LL, 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. Appendix O shows which species are covered by this provision, and which of the following 4 categories and management actions/ direction are to be applied to each.

1. Manage known sites (highest priority).

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

    b. In most cases, protect known sites. For some species, apply specific management treatments such as prescribed fire.

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

2. Survey prior to ground-disturbing 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 red tree voles. This survey will precede the design of all ground-disturbing activities implemented in 1997 or later.

    d. For the other species listed in Appendix O, begin development of survey protocols promptly 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 (REO).

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 classified as rare and endemic, bryophytes, and lichens.

b. Initiate these surveys no later than Fiscal Year 1996 and complete them within 10 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 O 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 PRMP. They are not described as separate land use allocations in this document.

There are no areas in the District that are Congressionally Reserved.

The types of administratively withdrawn areas, also known as District Designated Reserves, are Relict Forest Islands and Bald Eagle Habitat. Total acres of District Designated Reserves are 2,990, of which 1,160 are Riparian Reserve.

Riparian Reserves

The following material summarizes Riparian Reserve direction. Details regarding this direction are found in the SEIS/ROD, Appendix LL.

Objectives

See Aquatic Conservation Strategy objectives.

Provide habitat for Special Status Species, SEIS special attention, and other terrestrial species.

Land-Use Allocations

There are approximately 173,000 acres of Riparian Reserves in the District. The Riparian Reserve portion of the District's land-use allocations are as follows:

		Acres Riparian Reserve
1.	Mapped/unmapped Late-Successional Reserves	84,920
2.	Connectivity/Diversity Blocks	28,500
3.	General Forest Management Areas	51,140
4.	District Designated Reserves	1,160
5.	Adaptive Management Area	7,240

Calculation of these acres is based on prescribed widths and estimated miles of stream in the various

categories described in the SEIS/ROD. 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 flood plain; or to the outer edges of riparian vegetation; or to a distance equal to the height of 2 site-potential trees; or 300 foot slope distance (600 foot total, including both sides of the stream channel), whichever is greatest.

Permanently flowing nonfish-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 flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of 1 site-potential tree, or 150-foot 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-foot 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-foot 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.

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 2 site-potential trees; or 300-foot slope distance, whichever is greatest.

Riparian Reserves are illustrated in Figure 2-2.

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 (NEPA) 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 G.)

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

1. 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;
2. minimizing road and landing locations in Riparian Reserves;
3. preparing road design criteria, elements, and standards that govern construction and reconstruction;
4. preparing operation and maintenance criteria that govern road operation, maintenance, and management;
5. minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow;
6. restricting sidecasting, as necessary, to prevent the introduction of sediment to streams; and
7. 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

1. reconstructing roads and associated drainage features that pose a substantial risk;
2. prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected; and
3. 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 stream crossing structures 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 will 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 that 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. At 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
- Establishment of the purpose of each road by development of the Road Management objective

Grazing Management

Grazing program has been dropped due to non-utilization of permits and/or inadquate forage or inappropriate habitat. (See Summary of Major Changes in Chapter 3.) Authorization for future grazing on the District is described in Appendix BB.

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 & Scenic River and Wilderness management plans.

Minerals Management

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 (see Appendix LL) 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 will 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.

Allow some natural fires to burn under prescribed conditions. This decision will be based on additional analysis and planning.

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

Identify instream flows needed to maintain riparian resources, channel conditions, and fish passage.

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 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 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 1 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.

Fall trees in Riparian Reserves when they pose a safety risk. Keep felled trees on site when needed to meet coarse woody debris 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, State, and Native American wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives.

Cooperate with Federal, State, and Native American 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

The following summarizes Late-Successional Reserve direction. Details regarding this direction are found in the SEIS/ROD, see Appendix LL.

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 132,550 acres mapped of Late-Successional Reserves in the District. In addition, there are 3,904 unmapped acres. The 5 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 Map 2-18 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 (REO) 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 10 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.

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 pre-existing 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 (Facilities)

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, 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 an interdisciplinary team to ensure 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 that retains the amount of coarse woody debris determined through watershed analysis.

Allow some natural fires to burn under prescribed conditions. This decision will be based on additional analysis and planning.

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 Special/Temporary Use Permits

Consider access to nonfederal lands through Late-Successional Reserves and existing rights-of-way agreements, contracted rights, easements, and special/temporary use permits, as valid uses in Late-Successional Reserves.

For all new rights-of-way proposals, design mitigation measures to reduce adverse effects 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 special/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 non-native species is proposed, complete an assessment of impacts and avoid any introduction that will 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 inconsistent 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 (AMA) direction. Details regarding this direction are found in the SEIS/ROD, see Appendix LL.

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 16,214 acres of BLM administered land in the Central Cascades Adaptive Management Area.

Management Actions/Direction

Develop a plan for the Central Cascades Adaptive Management Area. See Management Assessments and Plans (toward the end of this chapter) for additional information. Develop and emphasize new approaches to public involvement that focus on developing partnerships in the design and development of plans and actions.

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

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 PRMP (see Fire section) until the AMA plan is completed and approved.

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

Conduct intensive research on ecosystem and landscape processes and its application to forest management in experiments and demonstrations at stand and watershed levels.

Develop approaches for integrating forest and stream management objectives and implications of natural disturbance regimes.

Identify additional areas in the AMA where management practices can accelerate the development of late-successional conditions.

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 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 37,900 acres of BLM administered land in the General Forest Management Area and 23,800 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 240 linear feet of logs per acre greater than or equal to 20 inches in diameter. Logs less than 20 feet in length will not be credited toward this goal. 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, apply the same basic management actions/direction, 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) that might otherwise destroy the integrity of the substrate.

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

1. Retain 6-8 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 3 decades) snag deficit. These trees do not count toward green-tree retention requirements.

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

1. Maintain 25-30 percent of each block in late-successional forest at any time. Riparian Reserves and other allocations with late-successional forest 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. Connectivity/Diversity Block standards or guidelines will be managed for 150-year area control rotations.

3. When an area is regeneration harvested, retain 12-18 green trees per acre.

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 5th 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. Additional information about Matrix management is found in the SEIS/ROD, see Appendix LL.

Section 2 of Chapter 2

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.

Promote burning of dry fuel wood by making available copies of Oregon Department of Environmental Quality publications to fuel wood purchasers.

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 Final SEIS for alternative treatments that may be considered during fuels management project design.

Water and Soils

Objectives

Meet Aquatic Conservation Strategy Objectives.

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 Mid Coast and Willamette basins.

Maintain or improve soil productivity.

Land Use Allocations

None specifically for water quality or soils. However, Riparian Reserves, Key Watershed provisions, and timber production capability classifications will assist in meeting water quality and soils management objectives.

Management Actions/Direction

Water

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

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

Continue coordination with the Oregon Department of Environmental Quality for implementation of Best Management Practices that 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 implement

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 G, 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 pesticides and other chemicals only if consistent with the 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.

Soils

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

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

Utilize 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 trails, will be planned to have insignificant growth-loss effect from compaction (2 percent or less of any treated unit area compacted after amelioration practices). Existing tractor trails would be used as much as possible and new trails would be limited to slopes less than 35 percent. Operation on these trails would minimize soil displacement and occur when soil moisture content provides the most resistance to compaction. Tractor trails, which could include those from previous entries, would be selectively tilled with a properly designed self-drafting winged subsoiler.

To help achieve the goal of insignificant growth-loss effects from compaction, use the following guidelines when using track-type equipment with a brush blade for mechanical site preparation: (1) restrict use to areas with suitable soil types and slopes less than 35 percent; (2) minimize piling of large woody material; (3) avoid displacing duff layers and topsoil into piles or windrows; (4) limit machine use to one round trip over the same area; and (5) operate at soil moistures that maximize resistance to compaction. A low ground pressure backhoe/loader grapple or other special equipment or techniques that would achieve the same insignificant soil compaction may be used instead of the preceding techniques. All areas compacted during site preparation would be tilled with properly designed equipment.

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

Wildlife Habitat

Objectives

See Late-Successional Reserve, Riparian Reserve, Special Status/SEIS Special Attention Species, and Matrix objectives.

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

BLM is directed to "ensure optimum populations and a natural abundance and diversity of wildlife resources on public lands by restoring, maintaining, and enhancing habitat conditions through management plans and actions integrated with other uses of public lands, through coordination with other programs, the States, by management initiatives, and through direct habitat improvement projects" (BLM Manual 6500.1).

Land Use Allocations

Wildlife habitat is provided across all land use allocations. The primary mechanism for the conservation of wildlife habitat will be through the application of ecosystem management principles to develop complex forest habitats under a variety of silvicultural prescriptions compatible with the objectives of each land use allocation.

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.

Manage late seral habitat within Late-Successional Reserves and all other land use allocations (to the extent compatible with objectives for those allocations) to maintain regionally viable populations of species associated with habitat and components of late seral forests. Delineate distributions and develop management strategies and silvicultural prescriptions to maintain and enhance habitats for late seral associated species. Management will be directed toward the sustained availability of snags, down woody debris, multicanopy and multi-layered forest stands, structurally-diverse trees and other components important to these species.

In any land use allocation where early or mid-seral habitat currently exists, manage for conditions in these younger age classes to benefit the special status and other priority wildlife that are associated with these species to the extent these management actions are consistent with the land use allocation and compatible with the desired future condition of managed stands in that land use allocation. Develop management strategies and silvicultural prescriptions towards the maintenance of snags; down woody debris; diverse communities of native shrubs and forbs; multi-layered, multi-canopied forest stands; and management for optimum configurations of patch/openings for the priority species identified. Utilize fire, vegetative manipulation techniques, road decommissioning, and planting to encourage high value forage areas, habitats that support prey species or highly diverse biological communities, or high populations of insects important to birds and mammals that feed in early seral forests.

Coordinate with the Oregon Department of Fish and Wildlife and other agencies and organizations during planning and implementation of wildlife habitat enhancement projects.

Cooperate with Tribal Governments and Federal 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.

Develop and implement plans to acquire lands for which significant populations or habitat enhancement opportunities exist, through conservation easements, purchase, or exchange.

Provide and maintain interpretive sites to facilitate wildlife and habitat viewing by the public. Actively participate in environmental education programs and develop public/agency partnerships to enhance wildlife habitat.

Assist other agencies and cooperators in regional and national efforts to survey and monitor neotropical migratory and resident nongame birds. Participate in regional and national initiatives following Partners in Flight priorities established for research, monitoring, habitat development, and public education. Develop strategies for the management and monitoring that emphasize species of concern and species indicating decline.

Cooperate with the Oregon Department of Fish and Wildlife to identify and maintain habitats significant to band-tailed pigeons and determine their potential for management. Develop cooperative strategies for management including habitat maintenance and

enhancement, population surveys, acquisition, and public outreach.

Conserve native plant and animal communities. Promote the recovery of adversely affected populations. Enhance biological resources for human values through the use of native species for ecosystem restoration, species recovery or other actions involving plant, fish, and wildlife introductions on the District. Identify and implement actions to mitigate resource damage, promote wildlife habitat, reestablish or enhance populations and communities to maintain native biological diversity.

Nonmerchantable down, dead woody material will be retained on areas from which timber is harvested to the extent compatible with the land use allocation, reforestation objectives, fire hazard reduction standards, special status habitat and Aquatic Conservation Strategy objectives. Gross yarding planned to meet these objectives will be constrained in accordance with the land use allocation to maintain dead and down woody debris. Salvage of down, dead material from other lands will also be constrained to meet appropriate land use allocation objectives for protection of dead & down woody debris.

Except where public safety is a concern, snags will be retained where they occur on lands not allocated to timber production. Unmerchantable snags will also be left in timber harvest units to the extent compatible with safety and other concerns such as fire hazard reduction needs and to meet or exceed minimal land use allocation objectives. Timber sale contracts will encourage loggers to retain all snags and nonmerchantable trees that can be left safely in timber harvest areas. In all land use allocations, guidelines will include retention of soft snags except where unacceptable for safety, logging systems, or burning considerations.

Where mature or late seral forests meet or exceed desired future conditions for down woody debris, snags and large green legacy trees and, if compatible with land use allocations and policy guiding such projects, individual trees may be cut and moved into aquatic or riparian systems deficient in large woody debris where such actions will benefit higher priority resources (such as special status species) and will not adversely affect the current or future desired condition for late successional species.

Develop road management plans that address solutions or mitigation for road/access problems related to the wildlife resource including disturbance, erosion, trash, poaching, shooting or Off Highway Vehicle (OHV) problems. Identify management recommendations to provide wildlife refugia; special and crucial habitats; seasonally or permanently-protected areas for species susceptible to disturbance, and alternatives for the public that wishes to enjoy wildlife viewing through nonmotorized means.

Wherever practical, new roads will avoid areas with high wildlife values. Access on spur roads unneeded for continued timber management will be controlled upon completion of logging and replanting. Some alternatives provide for additional access management to protect species sensitive to human intrusion. Close the roads identified under Off Highway Vehicle management (Appendix T) that were identified to meet wildlife objectives.

Implement long-term improvement and restoration of upland game bird habitat on BLM land (BLM Upland Game Bird Strategy 6500.1).

Identify wildlife enhancement opportunities in recreation plans (ideally in the design phase to preclude the need for mitigation), and plan Watchable Wildlife opportunities that minimize impacts to sensitive wildlife or its habitat.

Follow minerals management guidelines (Appendix GG and HH) to protect, maintain or reduce impacts to priority wildlife habitat.

Management Actions/Direction for Special Habitats

Using interdisciplinary teams, identify special habitat areas and determine relevancy 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.

Maintain, enhance, and acquire oak, oak-conifer woodlands, and pine stands for associated wildlife species. Identify and map oak, oak-conifer woodlands, and pine stands as special habitats on the GIS resource inventory system by 1996. Implement a strategy to maintain, enhance, or acquire these particular habitats and identify management strategies including planting oak or pine, underburning, competitive conifer control, and restricting livestock grazing in these high value

habitats. Manage the site within the range of known historical conditions.

Buffer special habitats as required by the SEIS/ROD as recommended to maintain climatic conditions (see Table 2-5 located at the end of Chapter 2). Manage these areas for the values that make them unique from the surrounding habitat types.

Special habitats such as cliffs, rock outcrops, talus slopes, meadows, ponds and wetlands will be managed to protect their primary habitat values to the extent consistent with alternative design features for buffers. Rock quarry development, and other activities, may occur on cliffs or talus slopes to the extent compatible with the protection of special status species.

Habitat Type/Enhancement Opportunities

Determine the desired current and future conditions necessary to maintain long-term viable populations of each priority species. Incorporate the silvicultural prescriptions, enhancement projects or other management actions that will produce these conditions into watershed analysis following priorities established through this document. Appropriate management techniques will be implemented where consistent with land use allocations, policy and law. All planned actions will be developed through an issue-identifying process involving interdisciplinary resource specialists. Projects will receive required interagency review (if any) and will comply with applicable NEPA procedures prior to implementation.

Management will be directed towards the sustained availability of snags; down woody debris; multi-species native mixes of trees, shrubs, and forbs; multicanopy/multilayer forest stands; structurally-diverse tree canopies high quality forage/feeding concentration areas (including prey concentrations); well-dispersed, clean, undisturbed water sources (for the species that require free water); well-distributed, undisturbed refugia, and crucial habitat areas; and optimum patch/opening habitat distributions/ configurations to benefit priority wildlife for which patch/edge recommendations are known.

A partial list of management techniques that may be used to meet these conditions will include tree girdling; topping; fungus injection; releasing selected trees from competition by removing adjacent trees (selective thinning); interplanting; pruning; seeding with natives; seedling protection treatments; creating potholes/wetlands/pools; incorporating gravel, burning, manual vegetation treatment; removal or control of exotic plants and/or animals; supplementing down wood by cutting trees and moving to down wood deficient areas; fertilizing; installing nest boxes or artificial structures for breeding or shelter; closing/decommissioning roads or otherwise restricting access; installing stream structures; restoring native species that have been extirpated from the watershed; and installing fencing or barriers. Approximately 15,000 to 20,000 of one or more of the above treatments may be implemented during the fiscal 10 years of this RMP, pending watershed analysis.

Protect or improve known habitat for prey and vegetative forage species of priority wildlife where compatible with other land use allocations and priorities. Incorporate fire, other disturbance techniques that simulate natural disturbance events, fertilization, density management, or seeding into areas where habitat enhancement for prey species or forage plants can benefit.

Roosevelt Elk, Bear, Mountain Lion, Deer, and other Big Game

Cooperate with the Oregon Department of Fish and Wildlife to develop and implement strategies identified in the Elk, Deer, Black Bear, and Mountain Lion Strategic Plans to the extent compatible with land allocation objectives, Bureau policy and law. Redefine the Eugene District elk emphasis areas identified in the BLM Fish and Wildlife 2000-Big Game Strategic Plan (6500.1) to reflect updated land use allocations and incorporate into the watershed analysis process. Identify, protect, and enhance crucial habitats such as denning, calving, foraging sites, major migration routes, and significant refugia to the extent possible under land allocation objectives.

In elk habitat areas, close and rehabilitate roads unneeded for continued resource management or use. A general target for roads open to motorized use is 1.5 miles or less per square mile. Avoid constructing roads in areas with high elk value such as breeding sites.

Use seasonal restrictions on public use and management activities where needed to minimize disturbance and harassment.

Conduct forage seeding in habitat areas with appropriate seed mixtures and where compatible with other management objectives.

Golden eagles, Owls, and other Raptors (excluding those of special status), Herons, Key Raptor Areas

(See also Special Status/SEIS Special Attention Species Habitat section for bald eagles, spotted owls, peregrine falcons and goshawks)

Contribute to regionally viable populations of all native raptor species consistent with BLM Fish and Wildlife 2000 (6500.1) and the Raptor Research Report # 8 (BLM, 1989). Maintain nests, centers of activity, prey concentrations or foraging areas, and roost sites through seasonal protection, yarding mitigation, and/or the distribution of snags/green retention trees and reserve areas to the extent compatible with land use allocations. Meet or exceed Oregon State Board of Forestry Forest Practices Rules for raptor and heron protection.

Install nesting platforms, nest boxes, and other structures to enhance habitat

Evaluate and, if necessary, redefine the Eugene District Key Raptor Areas (Raptor Research Report #8, 1989). Specific objectives and desired future conditions identified for each Key Raptor Area will be incorporated into the watershed analysis process to meet raptor objectives.

Until strategies are developed for Key Raptor Areas that may update these buffer guidelines, active raptor and heron nests will be managed to maintain site integrity and comply with the Migratory Bird Treaty Act as follows:

Restrict activities that may disturb or interfere with breeding within 0.25 miles of the nest site or line-of-site up to 0.5 mile during the crucial nesting period. Nesting dates vary by species, the date the bird initiated nesting, the likelihood of the species to renest if the first nest fails, and variations in weather conditions but generally fall within the following periods:

Golden eagles	Nest	January 1-August 31
Winter roosts		November 15-April 1
Owls, other raptors	Nest	March 1-September 30
Winter		NA
Herons	Nest	February 15-September 30
Winter		NA

Protect nests from disturbance by maintaining the seasonal restriction through the last date that species has been known to nest or renest (approximately June 15). Allow the action to proceed if field exam indicates that nest is inactive on or after that date.

If these protection guidelines cannot be provided, e.g., in the case of time-restricted rights-of-ways or mineral leases, and the take (generally the mortality of a bird or its eggs) of a migratory bird under the Migratory Bird Treaty Act (as amended) may result, confer with USFWS regarding take regulations and proceed as advised.

In addition to seasonal protection for the above species, protect an area approximately 0.25 mile around active golden eagle and great blue heron nest sites from any activity that will adversely affect the nest stand. Protection measures will include no habitat removal.

Protect nests and nest stands of other priority species where possible and to the extent compatible with the land use objectives, through scheduling of harvest activities across the landscape, clumping of retention trees, placement of unthinned stands in harvest/density management actions, and by avoiding road construction or yarding disturbance around nest sites when compatible with other resource values.

Management Actions/Direction for 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 Tribal Governments and Federal and State wildlife management agencies to identify and eliminate ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives.

Manage all riparian and wetland habitat consistent with land use objectives to maintain, restore, and improve riparian habitat consistent with the BLM Riparian Initiative (6400.1), Riparian Area

Management (BLM Technical Report 1737-11, 1994), and the 1987 Corps of Engineers Wetlands Manual. Manage riparian areas for a late seral stage unless watershed analysis identifies reasons for alternate objectives. Maintain the riparian/wetland conditions within the historic range of conditions as much as this can be determined. Identify and map wetlands and riparian areas on all lands within Eugene District watershed boundaries, incorporating remote sensing and GIS. Through watershed analysis evaluate the functional condition and beneficial uses of these areas and identify management actions to remedy areas in poor condition. Maintain and enhance beaver populations, dams, and habitats to the extent compatible with Aquatic Conservation Strategy Objectives.

Adaptive Management Process: Each implementation action will incorporate a monitoring plan that addresses consistency with Aquatic Conservation Strategy Objectives, BLM Riparian Initiative 6400.1, and specific watershed goals for the basin. The monitoring plan will address completion of the action, the effectiveness of the action in meeting the resource objective(s), and will address follow-up modifications to revise, maintain, or adapt the management action to address the results of the effectiveness monitoring.

Pursue lands through conservation agreements or acquisition that will facilitate rehabilitation of priority streams or riparian systems.

Management Actions/Direction for 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 will 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 that are inconsistent with Late-Successional Reserve objectives. Include an analysis of effects of implementing such programs on other species within Late-Successional Reserves.

Management Actions/Direction for the Matrix (General Forest Management Area)

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 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 6-8 green conifer trees per acre after regeneration harvest to provide 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 3 decades) snag deficit. These trees do not count toward green tree retention requirements.

Leave 240 linear feet of logs per acre greater than or equal to 20 inches in diameter. Logs less than 20 feet in length will not be credited toward this total. 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.

Manage for species and habitat within the Matrix-General Forest that are compatible with early seral stages up to 80 years old. Use the 15 percent of the fifth field watershed retained as older forest to serve as refugia for species that will later colonize the managed forest, and to serve as dispersal patches for older seral associated species.

Management Actions/Direction for the Matrix (Connectivity/Diversity Blocks)

Retain snags within a timber harvest unit at levels sufficient to support species of cavity-nesting birds at a minimum of 40 percent of potential cavity-dweller population levels. The number of trees necessary to meet the 40 percent level and the assumptions of the model used to calculate that number are described in Chapter 4. Meet the 40 percent minimum throughout the Matrix with per acre requirements met on average areas no larger than 40 acres. Retain all snags within the reserved portion of the Matrix-Connectivity block where compatible with the Aquatic Conservation Strategy and the SEIS/ROD objectives.

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 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 12-18 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 will be the recovery of old growth conditions in approximately 100 to 120 years.

3. Leave 240 linear feet of logs per acre greater than or equal to 20 inches in diameter. Logs less than 20 feet in length will not be credited toward this total. 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.

Fish Habitat

Objectives

See Aquatic Conservation Strategy objectives.

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

Promote the rehabilitation and protection of native aquatic vertebrate and invertebrate species, including fish stocks at risk.

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.

Cooperate with Federal, State, and Tribal 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.

Late-Successional Reserves

Design projects to improve conditions for fish if they provide Late-Successional habitat benefits or if their effect 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. Cooperate with appropriate Federal and State agencies in management of species listed as endangered or threatened, or in need of special management.

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.

To the extent funding is available, the District will implement the fisheries portion of the District Fish and Wildlife 2000 Plan. The Plan includes recommendations for the restoration and maintenance of habitat for resident and anadromous fish, and incorporates uncompleted projects from BLM's *A Five-Year Comprehensive Anadromous Fish Habitat Enhancement Plan for Oregon Coastal Rivers*, approved in 1985 and currently being updated. Elements of the fisheries portion of the FW 2000 Plan are summarized in Table 2-2.

Management of fish populations is a responsibility of the State of Oregon. BLM will continue to support State wild fish policies, and will cooperate with efforts at maintaining fish genetic diversity. 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. See Table 2-2 for a list of possible fish enhancement projects.

Stream channel integrity would be protected during all activities. All large woody debris and snags in the channel and riparian areas adjacent to fishery streams would be retained during routine operations. Riparian reserves will be managed to maintain and restore riparian vegetation communities, including the reestablishment of communities of predominantly large conifers. Stream crossing structures would be installed with the least alteration possible to the channel so that fish passage is not impeded. Debris will be retained in the channel unless it blocks passage in a major anadromous fish migratory route, there is a threat to downstream structures such as bridges, or when it has the potential to cause serious or long-term degradation of the stream channel.

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

Special Status and SEIS Special Attention Species Habitat

Introduction

Special Status Species include plants and animals needing special attention due to local or regional rarity, or due to the limited availability of suitable habitat, as defined by law and policy. BLM policy also mandates the agency to manage for the conservation of species listed as sensitive by State governments consistent with Federal laws. Special Status Species include:

> Those listed as threatened, endangered, proposed or candidate under the Endangered Species Act.
>
> Bureau Sensitive which includes species not currently being considered for listing under the Endangered Species Act, but for which there are management concerns and significant identifiable threats.
>
> Assessment species which receive special management consideration due to their population status.

SEIS special attention species are those covered under the SEIS/ROD Standards and Guidelines. Many of these species are also classified in other special status categories. Special attention species are noted with (SA) in Table 3-54.

Plants

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

All land use allocations in this plan are designed in part to benefit Special Status plant species and SEIS Special Attention Species.

Management Actions/Direction

Management Actions/Direction for Late-Successional Reserves/ Riparian Reserves

Special Status Plant Species

In most cases, management for Special Status plant species will be consistent with the management of other late seral and riparian species. If conflicts arise, management for Special Status plant species will take priority, but the planned actions will be designed, where possible, to reduce adverse impacts to other late seral species.

Actions needed to manage for Special Status plant species will generally be those management prescriptions designed to mimic or create historical conditions/processes that Special Status plant species evolved under and or were maintained by, such as the creation and maintenance of forest gaps, etc. Many of these activities will be consistent with the general objectives of creating and maintaining the structure, composition, and processes of Late-Successional forests within these physiographic provinces.

In areas where timber harvest is not the focus, such as in Late-Successional Reserves, emphasis will be to establish Botanical Reserve areas for Special Status plants, where all activities, such as adaptive management techniques, etc., will be consistent with the management of the species. The long-term objectives within these areas, however, should be to diminish the concept of "reserve" boundaries and will be to manage for the species within the context of the entire Land Use Allocation and not in isolated islands.

SEIS Special Attention Species

Management of SEIS Special Attention Species will be consistent with the Survey and Manage Guidelines/All Land Use Allocations as described later in this section (see Appendix O for a list of species to be considered).

Late-successional reserves/riparian reserves are designed to serve a number of purposes, including habitat for populations of species that are associated with Late-Successional forests and to help ensure that these species will be conserved (SEIS/ROD, 1994), including SEIS Special Attention Species. Actions carried out within these areas will focus on benefiting or, where necessary, mitigating impacts to SEIS Special Attention Species and associated habitat identified under the appropriate Survey and Manage Guidelines (Appendix O), such as silvicultural practices implemented to advance the development of Late-Successional forests and to restore riparian forest communities, etc.

Management Actions/Direction for Matrix

Special Status Plant Species

Where plant populations are located within Matrix lands or other areas with a timber emphasis,

objectives of management of Special Status plants will focus on protection, maintenance and enhancement of Botanical Reserve areas where these Special Status plant species are located. Maintenance of reserve integrity, adequate buffers to mitigate outside influences, and additional suitable habitat within reserve areas to maintain or recover species, will be primary objectives in these areas.

SEIS Special Attention Species

Management of SEIS Special Attention Species will be consistent with the Survey and Manage Guidelines/All Land Use Allocations as described later in this section (see Appendix O for a list of species to be considered).

Provisions such as 15 percent retention of late-successional forests in 5th field watersheds as well as 25 percent retention in Connectivity are designed to benefit SEIS Special Attention Species. Where analysis is done to determine which late-successional forests will be retained, SEIS Special Attention Species will be considered in this process.

Stand management within the matrix will identify opportunities to provide such structural components as retention trees, course woody debris, etc., that will benefit SEIS Special Attention Species and associated habitat. Location of green trees, for example, along ridgelines are optimal locations for lichen dispersal (SEIS/ROD, 1994).

Management Actions/Direction for All Land Use Allocations

Special Status Plant Species

Management direction for current or future sites of Special Status plant species will be consistent with BLM Oregon State Office Manual 6840 and Instruction Memoranda No. OR-91-57 that directs the BLM to conserve threatened and endangered species (or species proposed for listing as threatened or endangered) and the ecosystems on which they depend, and to ensure that actions authorized on BLM administered lands do not contribute to the need to list any Special Status plant species.

All BLM administered lands will be managed for the conservation and protection of known and future sites for all Federal Candidate 1 and 2 plant species, State Listed and Bureau Sensitive plant species and their habitats. BLM Assessment species as well as the above categories will be actively managed where needed to prevent the increase in status listing. BLM Tracking plant species will be tracked to accurately assess the distribution and abundance of these species and need for any special management attention.

Approximately 1,044 acres of Special Status species plant habitat has currently been identified on the Eugene District. See Table 2-5a, Sensitive Plant Protection by Species, at the end of Chapter 2 for a list of those species currently identified within the District. It is expected that future sites for Special Status plant species will be identified as inventory continues.

The following actions will be implemented and are consistent with the protection, maintenance, and enhancement of Special Status plant species and associated habitat:

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

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

Conduct field surveys prior to proposed actions according to protocols and other established procedures. This includes surveying during the proper season unless surveys are deemed unnecessary through watershed analysis, project planning, and Environmental Assessment. For example, 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 a new survey will, and the likelihood of potential habitat. The intensity of field surveys will also vary depending on the same factors.

Implement species specific inventories for Special Status plant species to determine the distribution, abundance and habitat requirements for these species; develop and implement inventory protocols for Special Status lichen, bryophyte and fungi where not yet developed.

Consult/Conference with the U.S. Fish and Wildlife Service (USFWS) for any proposed action that may effect Federal Listed or Proposed species or their critical or essential habitat. Based on the results of consultation/conference, modify, relocate, or abandon the proposed action.

Request Technical Assistance with USFWS on any action that may effect Federal Candidate or Bureau Sensitive species. Based on the results of Technical Assistance, modify, relocate, or abandon a proposed action to avoid contributing to the need to list Federal Candidate species or Bureau Sensitive species, or their critical or essential habitats.

Coordinate and cooperate with the State of Oregon to conserve State Listed species and State Candidates for listing.

Identify impacts of proposed actions to Special Status plant species as a whole and clearly describe impacts in environmental analyses. All Special Status plant species will be actively managed, including BLM Assessment species.

Coordinate with the USFWS and with other appropriate agencies and organizations and jointly endeavor to recover Federal listed and Proposed plant species and their habitats; coordinate on the management of Federal Candidate and Bureau Sensitive plant species and their habitats.

Retain under Federal management, or other appropriate management organization, habitat essential for the survival or recovery of Listed and Proposed species. Retain habitat of Proposed, Federal Candidate, or Bureau Sensitive species where disposal will contribute to the need to list the species.

Where appropriate, pursue opportunities to increase the number of populations of Special Status plant species under BLM's management authority, through land acquisition and/or species reintroduction. Where appropriate opportunities exist, acquire land through exchange or purchase, in coordination with other responsible agencies, to contribute to recovery, reduce the need to list, or enhance Special Status species habitat. Where acquisition is not possible pursue conservation easements.

Develop and implement Conservation Strategies/ Plans for all Special Status plant species that identify actions necessary for the protection, management and enhancement of the botanical resource, including recovery plans for Threatened and Endangered plant species; Develop and implement Botany 2000.

Coordinate with other agencies and groups in the management of species across landscapes. Coordination will be accomplished through Interagency Conservation Plans or similar agreements that identify actions to conserve single or multiple species and/or habitats. Such strategies could preclude the need for intensive inventories or modifications to some projects where the conservation plan provides adequate protection for the species and meets the intent of policy.

Where plans exist for species no longer on the Special Status plant species list, continue with the prescribed conservation actions if required 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 range-wide conditions and conservation management.

Develop a Public Outreach Program for botanical resources and pursue opportunities for public education about conservation of species; coordinate with U. S. Forest Service (USFS) in implementing Celebrating Wildflowers Program.

Identify and maintain adequate Botanical Reserves for the protection, maintenance and enhancement of Special Status plant resources. Implement only those activities within the botanical reserve areas that will be consistent with the conservation and management of these species.

Conservation and management measures for Special Status plant species will include, but will not be limited to, the following:

- Implement compliance, defensibility, ecological and management treatment monitoring where necessary to track, manage for, and maintain viable Special Status plant populations.
- Implement silvicultural treatments through adaptive management to maintain or enhance Special Status plant populations.
- Implement prescribed burning where needed and where possible to maintain or enhance Special Status plant species habitat.
- Establish a data management program for tracking Special Status plant species distribution, abundance and condition, using GIS and other relational and nonrelational databases; coordinate with other agencies in the development of these to assure consistency and to provide a mechanism for information sharing.
- Integrate Special Status plant species into Watershed Analysis to determine historical, existing and potential habitat; identify opportunities for current and future management of Special

Status plants, including protection, maintenance, and enhancement of populations.

- Collect seed/fruit for cryogenic seed storage for all Special Status plant species for long-term protection of the species, guarding against catastrophic events.
- Grazing by domesticated species will not be permitted within Botanical Reserve Areas unless identified as a viable tool in managing for a Special Status Plant species. Emphasis, however, will first be given to utilizing other means that duplicate natural processes for maintaining or enhancing plant populations and habitat, such as prescribed fire, etc.
- Herbicide use will not be permitted within Botanical Reserve Areas, unless identified as a viable tool in managing for a Special Status Plant species. Emphasis, however, will first be given to other means that utilize non-chemical methods for maintaining or enhancing plant populations and habitat, such as manual control, etc.
- Prohibit salvaging and other timber management activities within Botanical Reserve Areas unless otherwise prescribed for the management of the Special Status plant species.
- Prohibit the collection of Special Forest Products within Botanical Reserve Areas.
- Implement public access restrictions to protect Special Status species plant populations, including OHV restrictions (limited, closed), gate installation and maintenance, and road decommissioning.
- Implement dust abatement restrictions, where necessary, during critical pollination times.
- Implement road maintenance restrictions for plant species found along roads where access will not be restricted and where maintenance for public safety is ongoing, including restrictions on mowing and brushing (seasonal restrictions); restrictions on ditching and blading; herbicide use will be prohibited.
- Implement noxious or exotic weed control where these species threaten Special Status plant populations; emphasis will be on implementing nonchemical treatments such as manual control.
- Where populations are adjacent to private lands, work with adjacent landowners in identifying any activities occurring on private lands that could affect BLM populations and, where possible, seek through cooperative agreements with private landowners to mitigate these actions.
- Pursue negotiations with willing private parties involved in existing reciprocal right-of way agreements to protect Special Status plant species by removing public lands with populations of such plants from existing permits or by adding language to the agreements. Provide language protecting these plant resources in new reciprocal agreements.
- Identify and fill gaps in information and research that are needed for adequately managing Special Status plant species resource.
- Protect and manage for the variety of special habitat features on the District; such habitats have been defined as important for a variety of Special Status plant species.
- Leasable and locatable minerals will be managed consistent with the proposed management outlined in Appendix GG and HH. Salable minerals will be managed consistent with Appendix Attachment 2-K.2 in the DRMP.

SEIS Special Attention Species

Some species covered under SEIS Special Attention species will also be covered under the objectives and guidelines for Special Status plant species where these species are identified for management under BLM's Special Status Species Policy.

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 O 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).

   All species located on the Eugene District that are covered under this provision will be managed in the following manner:

   a. Acquire and manage information on these 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.

Species that have been identified to date as currently or historically occurring within the District that will be covered under these guidelines include: *Allotropa virgata* (Candy stick), *Aster vialis* (Wayside aster), *Cypripedium montanum* (Mountain lady's slipper), *Choiromyces venosus* (Rare Truffle), and *Buxbaumia viridis* (moss). Management of *Aster vialis* (wayside aster) will also be covered under Special Status plant species objectives. Other species may be identified as inventories are implemented.

2. Survey prior to ground-disturbing 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. For the other species listed in Appendix O, begin development of survey protocols promptly 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.

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

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

   f. 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 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 10 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 in Appendix O 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. Maintain a spatially explicit data base of all known sites.
4. Develop species or area management plans to be implemented under the guidance of regional botany programs.
5. Manage known habitat of Special Attention Species requiring protection buffers as follows and consistent with the SEIS/ROD for those species.
6. For newly discovered habitat of other Special Attention Species requiring protection buffers, apply the management actions/direction in the SEIS/ROD.

Nonvascular plants currently known to occur on the Eugene District covered under the protection buffer provision:

Buxbaumia viridis (Moss)

Maintain decay class 3, 4, and 5 logs and greater than 70 percent closed-canopy forest habitat for shade. Timber harvest including, shelterwood and thinning prescriptions will not be permitted. Implement survey and manage components 1 and 3 of SEIS/ROD for management of this species.

Listed and Proposed Endangered and Threatened Plant Species

General

Implement the land use allocations and management actions/direction of this Proposed Resource Management Plan that are designed to enhance and maintain habitat for all endangered and threatened species in all Land Use Allocations.

Bradshaw's lomatium (Lomatium bradshawii) (Federal endangered)

BLM will comply with implementing those actions identified in the 1993 Recovery Plan for *Lomatium bradshawii* (Bradshaw's lomatium). Specific management actions identified for BLM to implement will include:

Conserving Genetic Material:

Determine genetic variability of populations.
Determine impact of seed collection on populations.
Collect seeds and store them at established seed bank facility.

Establishing management areas:

Identify potential habitat in Southeastern recovery area for Lomatium.
Search potential habitat in Southeastern recovery area.
Assist USFWS in selecting recovery areas.
Delineate boundaries of the management areas.
Secure the habitat supporting each population.

Enhancing populations:

Examine secondary succession or potential habitat modification at each population.
Examine effects of competition within populations.
Examine effects of tree roots on hardpan maintenance on Lomatium habitat.
Determine impact of fungal diseases known to occur on Lomatium.
Determine insects impacts on Lomatium plants.
Determine human impacts on populations.
Determine herbicide impacts where appropriate.
Determine grazing impacts (geese, sheep and cattle) where appropriate.
Determine impacts of exotic plants on populations.
Determine hydrologic requirements of Lomatium.
Examine inbreeding depression.
Examine pollinator availability.
Examine seed viability of Lomatium.
Examine seed predators and parasites.
Determine microhabitat for germination and seedling establishment.
Write site-specific management plan for each management area.
Implement site-specific management plans.

Monitoring populations:

Establish permanent monitoring plots, photo points, and sampling techniques at Lomatium populations.
Conduct periodic monitoring.
Conduct demographic studies.

Management and implementation of this Recovery Plan will be in conjunction with other parties identified within the Recovery Plan, providing a consistent, integrated approach towards recovery of this species.

Animals

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.

Coordinate and cooperate with the State of Oregon to conserve State Listed 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 so as to not elevate their status to any higher level of concern.

Protect SEIS special attention species so as to not 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.

Protect bats in accordance with SEIS standards and guidelines.

Land Use Allocations

In all land use activities and under all land allocations avoid, protect or mitigate for Special Status Species populations and habitat so as to not contribute to the need to list the nonfederal listed species and to promote the recovery of Federal listed species.

The objectives for Special Status Species will apply to all land use allocations. Acres of special status species habitat designated on the District will change throughout the life of the plan as inventories are conducted and the status of species change.

Listed and proposed Federal Threatened and Endangered Species, Federal Candidate, State Listed, Bureau Sensitive and Assessment species will be managed across all Land Use Allocations, based on the presence of occupied and potential habitat. Management actions or objectives that are specific to a special status category are listed under that subheading.

The management within each land use allocation will be consistent with policy and law and the specific guidance in the SEIS/ROD, and RMP. Decisions of how, where, how much, and when to manage for special status species (and priority wildlife covered in the Wildlife Habitat section) will be determined through watershed analysis, consistent with law, policy, and land use allocations.

Management Actions/Direction

Management Actions/Direction for Late-Successional Reserves/ Riparian Reserves

Manage for the recovery of special status species consistent with management of late seral species when possible. If conflicts arise, management for the special status species should take priority but the planned actions should be designed to reduce adverse impacts to late seral species management to the degree possible.

Management emphasis in the Late-Successional Reserves and Riparian Reserves will be for those species whose preferred habitat is late seral stages, mature, and old growth forests. This allocation will retain mature and old growth habitat in these stands until younger forests develop the structural and functional components needed by species such as the spotted owl and marbled murrelet. The silvicultural prescriptions for younger aged stands that occur in the Late-Successional Reserve boundary are designed to develop more diverse structural characteristics and habitat components in a shorter time period than will occur under unmanaged conditions. Intermediate treatments in younger seral stages will improve habitat for special status species or priority wildlife associated with younger forest if the treatments are compatible with future desired conditions for the Late- Successional Reserves.

Protect and enhance Riparian Management Areas (including wetlands) to comply with the Aquatic Conservation Strategy so as to not adversely affect Special Status Species dependent on these habitats. Specific actions will be identified through the watershed analysis process.

Management Actions/Direction for Matrix-Connectivity/Matrix-General Forest Management

Within the Matrix-Connectivity Land Use Allocation, some harvest will occur in older forest stands. The 25 percent retention of the "best" habitat within the connectivity blocks and the retention of 12-18 green trees across the remaining block will help meet the needs of highly mobile species such as migratory birds and large mammals and will help provide refugia for the relatively nonmobile species such as invertebrates and small mammals. Within the Matrix-General Forest Land Use Allocation the 15 percent late successional retention of older forest within each fifth-field watershed (SEIS C-44) and the 6-8 green tree retention will be designed through watershed analysis to help meet the maintenance and recovery needs of special status species and other priority wildlife. Ecological function will be maintained as consistent with objectives of each of these land use allocations.

Management Actions/Direction for All Land Use Allocations

Determine the occurrence and distribution of all special status and SEIS special attention species on BLM administered lands and evaluate the significance of these lands for the conservation of these species.

The primary mechanism for the conservation of special status species will be through the application of ecosystem management principles to develop complex forest habitats under a variety of silvicultural prescriptions. These silvicultural prescriptions are designed to create a variety of habitat conditions, including retention of large down woody material, snags and decadent green trees, the development of multilayered forest canopies, the retention or enhancement of conifer and hardwood species of special importance to the ecology of special status species, the protection and restoration of special habitats, and the protection and enhancement of riparian and other wetland systems (see Habitat Enhancement, Wildlife, Chapter 2).

Screen all proposed actions, including those permitted by BLM through rights-of-way or other agreements, to determine if special status/SEIS special attention species or their habitat may be affected. Mitigate actions to reduce or eliminate impacts. Where mitigation cannot eliminate adverse effects, follow the formal or informal consultation requirements for each status group (See Federal Endangered and Threatened, Federal Candidate/ State Listed species/Bureau Sensitive, etc. below.) Mitigation may include, but is not limited to the following:

> Reroute/close/decommission roads or restrict access; reclaim habitat through native seeding or natural recovery; relocate parts or all of the project area; implement seasonal or other timing restrictions; implement silvicultural practices to develop desired components of wildlife habitat; develop timber harvest prescriptions and timetables to develop a desirable mix of seral stages for wildlife; select and space reserve trees in the silvicultural system to meet special needs; treat reserved trees to create snags or special structural conditions; modify buffer widths or leave buffers where they will not normally be required; install/ erect artificial nest structures; implement measures to minimize or correct stream siltation, substrate, or water quality; use prescribed fire or manual vegetative treatment to create desired conditions; implement special yarding stipulations and corridor placement to avoid crucial habitat or important components; implement appropriate Best Management Practices; fence or screen sensitive areas; control exotic plant or animal species; work with ODFW to direct or curtail hunting and trapping in selected areas; use devices to reduce wildlife conflicts or mortality in campgrounds, pumpchances, roadways etc; implement silviculture prescriptions within thinnings to create desired future conditions; retain priority forage species in road maintenance or vegetation/silvicultural treatment prescriptions

Take actions to promote the evaluation, conservation and recovery of all native species (BLM Manual 6500.1).

Retain under Federal management, or other appropriate management organization, habitat essential for the survival or recovery of listed and proposed species. Retain habitat of proposed, candidate, or Bureau Sensitive species where land transfer will 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. Pursue opportunities to increase the number or extent of special status species populations and habitat through land acquisition and/or species reintroduction.

Coordinate with appropriate agencies and landowners to develop conservation plans or agreements to conserve single species, groups of species, communities, or habitats. Such strategies could provide adequate protection for the species or habitat(s) of concern without the need for intensive survey or site-by-site project modification.

Pursue opportunities for public education about conservation of species and habitat.

Record field observations of special status species on or near BLM lands. Analyze impacts of proposed actions and monitor mitigation measures that were imposed as a means to increase the knowledge base about the distribution and ecology of these species. Data on the occurrence of special status species and their habitat will be shared across the range of the species with other agencies and project planners.

Management Actions/Direction Specific to Special Status Species Categories (All Land Use Allocations)

General objectives and management actions pertaining to Special Status Species and their habitats are presented below and are followed by management actions which are specific to particular species or habitats.

Listed and Proposed Threatened and Endangered Species

Evaluate ongoing management actions to ensure that conservation measures for threatened and endangered species are being met. Ensure that all management actions are consistent with recovery plan objectives.

Proposed project areas will be surveyed for occupancy by species listed as Federally threatened or endangered and species proposed for Federal listing, using the best scientific protocol, where habitat conditions indicate potential occupancy by these species. Field surveys may not be conducted in all cases depending on the number and timing of previous surveys conducted in the proposed action area and the amount or likelihood of potential habitat present. The intensity of field surveys will also vary depending on the same factors.

If a project may adversely affect any listed or proposed Federal threatened or endangered species or its critical habitat, effort will be made to modify, relocate, or abandon the project in order to obtain a "no effect" determination. In any case where BLM determines that such a project cannot be altered to eliminate the potential adverse effect, and abandonment of the project is not considered appropriate, consultation with the U.S. Fish and Wildlife Service/National Marine Fisheries Service will be initiated. The terms and conditions of the Biological Opinion will be followed.
Manage proposed endangered, threatened species and proposed critical habitat with the same level of protection provided for listed species and designated Critical Habitat.

Columbian white-tailed deer (Federal endangered species)

All actions will be consistent with the objectives in the Columbian White-tailed Deer Recovery Plan (USFWS 1983).

The District will initiate consultations with the USFWS and Oregon Department of Fish and Wildlife to assess the potential for reestablishing one or more experimental populations within the District in accordance with the intent to reintroduce Columbian white-tailed deer to areas having suitable habitat within their historical home range.

American peregrine falcon (Federal endangered species)

Comply with the Peregrine Falcon Recovery Plan including the American Peregrine Falcon Rocky Mountain/Southwest Population Recovery Plan (USFWS 1984), Pacific Coast Recovery Plan for the American Peregrine Falcon (USFWS, 1982), the Technical Draft Addendum to the Pacific and Rocky Mountain/Southwest (Peregrine Falcon) Recovery Plans (USFWS, 1991), and existing site-specific habitat management plans.

The District will coordinate with the USFWS and other land managers of lands covered by the Peregrine Recovery Plan to develop and implement specific management strategies for peregrine recovery. Together with these agencies/groups assess the importance of cliff and roosting sites on District lands in meeting peregrine recovery goals and identify which areas to protect or enhance. Coordinate with ODFW and USFWS to determine if reported historical aeries are still suitable for nesting. Following the establishment of specific peregrine recovery areas on the District (if any), manage these

sites to encourage peregrine occupancy and recovery.

If District sites qualify as potential recovery habitat, cliffs will be managed to provide for future population expansion. The cliffs themselves will be protected and enhanced if necessary. Protective actions may include restrictions on access, development, or other land uses. These potential nest sites will be retained under BLM administration.

Northern spotted owl (Federal threatened species)

Implement pertinent actions from the Final Draft Northern Spotted Owl Recovery Plan (USFWS 1992) to the extent that those actions are still valid. Emphasize owl recovery in Late-Successional Reserves. Continue to participate in regional research, monitoring, and management strategies for the northern spotted owl.

In the Matrix 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 on BLM land. These cores will be managed as Late-Successional Reserves throughout the life of the plan even if unoccupied. Consult with USFWS regarding all "may effect" determinations of owl pair, nest and single sites located after January 1, 1994.

General guidelines to avoid a "may effect" determination for northern spotted owls include:

A restriction of tree falling within one-quarter mile of all active northern spotted owl nest sites from approximately March 1 to September 30 to avoid disturbance and harm (incidental take) to young owls.

Human activities that could disturb owl nesting, especially use of large power equipment and explosives, will be prohibited within one-quarter mile of all active spotted owl nest sites from approximately March 1 to September 30.

Marbled murrelet (Federal threatened species)

Survey potential marbled murrelet habitat prior to any human disturbance. Follow USFWS protocol. Where 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), protect a 0.5 mile radius of all contiguous existing and recruitment habitat for marbled murrelets (i.e., stands that are capable of becoming marbled murrelet habitat within 25 years). These areas will be managed as Late-Successional Reserves.

Until completion of the Marbled Murrelet Recovery Plan, neither conduct nor allow harvest of timber within occupied marbled murrelet habitat if a "may effect" determination will result.

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

Reduce adverse impacts to nesting murrelets during the critical nesting period (April 15 - September 30) through seasonal restrictions of disturbing activities.

Upon completion of the recovery plan for marbled murrelets, incorporate conservation and management strategies in District plans and actions. Amend or revise management actions as appropriate.

Bald eagle (Federal threatened species)

Comply with the Pacific Bald Eagle Recovery and Implementation Plans and existing, site-specific habitat management plans. Cooperate with other landowners to help meet bald eagle objectives.

Write site plans for each Bald Eagle Habitat Area (BEHA) complex (see Chapter 3) in accordance with general recovery plan guidance and manage these areas as essential habitat for bald eagle recovery. Silvicultural prescriptions will be developed and implemented to promote the development of habitat conditions favorable to the species in and adjacent to these stands. The District proposes not to designate these stands as ACECs (Areas of Critical Environmental Concern) as suggested in the recovery plan. The District chooses to maintain flexibility for the management of BEHAs through proactive site-specific management actions designed to meet the needs of bald eagles and will manage these sites as critical bald eagle habitat, while recognizing the possibility of the eagles establishing nest and roost sites in stands other than those nominated for ACEC status. Develop site plans to cover nests, established perch sites, and winter roosts for occupied eagle habitat not in BEHAs. Follow USFWS Region 1 buffer zones as minimal guidance until site plans are completed (Recovery Objective 1.3331). Core areas will be designated fire fuel management areas to reduce the risk of loss during a wildfire. Fire control activities will be analyzed on a site-by-site basis to reduce disturbance to the site.

Manage the Coburg Hills Bald Eagle Complex consistent with recovery plan objectives. Address the following in a Habitat Management Plan:

Potential threats to the occupied bald eagle winter roost from public use of an existing road

Potential adverse impacts to the roost that may result from development on adjacent, intermingled lands in nonfederal ownership

Identification of key foraging areas for the wintering bald eagle.

Through interagency and cooperative actions, identify alternative food sources in the event of a change in the livestock-oriented agriculture that maintains the eagles using this site.

Exclude logging, construction, habitat improvement, and low level BLM aircraft operations within 400m (or 800m line of site) of nests and roosts during critical nesting and wintering periods. Nesting generally occurs between January 1 and August 31. Key wintering periods are generally from November 15 through April 1.

Oregon chub (Federal endangered species)
Coho salmon (proposed—under status review)
Steelhead trout (proposed—under status review)

The integrity of stream channels and ponds used by these fish and their associated riparian vegetation will be protected through implementation of the Aquatic Conservation Strategy. The District will continue to cooperate with Federal recovery and State management efforts for these species.

Federal Candidate, State Listed Species, Bureau Sensitive

Modify, relocate, or abandon potentially impacting proposed actions to avoid contributing to the need to list Federal Candidate species, State Listed species, Bureau Sensitive species, SEIS special attention species or their essential habitats. Coordinate with the USFWS, NMFS, and other appropriate agencies and organizations and jointly endeavor to recover Federal listed and proposed plant and animal species and their habitats and ecosystems.

Coordinate with appropriate agencies, landowners and managers in the region to assess the distribution, abundance, ecology and potential impacts of Candidate and Bureau Sensitive species and their habitat. Active management could include protection, acquisition, habitat enhancement, reintroduction, control of exotic species, and the development/ implementation of interagency cooperative plans. Continue with prescribed conservation actions for species dropped from the special status list (such as Federal C3 species) if Federal land management actions were a factor in considering the species no longer eligible for listing. Conservation plans for delisted species may be modified as needed based on adequacy of existing rangewide conditions and conservation management.

Management emphasis will be to accumulate ecological information and distributional data to enhance our ability to protect and manage these species in the future.

Bureau Assessment and Tracking

Assessment species will be considered in all Environmental Analyses where impacts will be clearly identified for the population and the species as a whole. As species conservation dictates, active management for assessment species will be undertaken to assure survival of these species in Oregon. They will be included in all field inventory and clearance work. All new locations will be documented.

Bureau policy (Oregon/Washington Special Status Species Policy - Extended) provides guidance for Tracking Species. These species, while not considered Special Status Species, are identified as species for which some management concerns are identified. These concerns primarily reflect the lack of substantial ecological and habitat information, and the fact that there are possible management impacts. The management emphasis for these species is to record observations of these species and review the scientific literature to better evaluate status and future planning options. For a complete list of Tracking Species, see Table 3-31.

Management Actions/Direction for SEIS Special Attention Species (All Land Use Allocations)

Survey and Manage

Implement the Survey and Manage Provision of the SEIS/ROD (page C-4 through C-6) throughout any land allocation but direct the Provision to the range of

the SEIS special attention species and the particular habitats that they are known to occupy. Appendix O shows the species covered by the four Survey and Manage categories. The standard and guideline contains 4 components. Priorities differ among them as noted.

1. Manage known sites (highest priority). All species located on the Eugene District that are covered under this provision will be managed in the following manner:

   a. Acquire and manage information on these 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.

2. Survey prior to ground-disturbing activities. Manage sites. (The red-tree vole is the only applicable wildlife species currently known to occur on the Eugene District under this Survey and Manage category.)

   a. Continue efforts to survey and manage rare and sensitive species habitat where such programs exist.

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

   c. Survey within the known or suspected ranges of the red tree vole and the habitat types of vegetation communities associated with the species. 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 O, begin development of survey protocols promptly 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. Manage sites. (There are no wildlife species thought to occur on the Eugene District under this Survey and Manage Category.)

4. Conduct general regional surveys. (There are no wildlife species thought to occur on the Eugene District under this Survey and Manage Category.)

Roosting Bats

Conduct surveys to determine 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 defined in the SEIS/ROD and in any subsequent revision 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. Consider the potential disturbance from road use and recreational activities

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.

Special Areas

Objectives

Retain existing Areas of Critical Environmental Concern (ACEC), including Research Natural Areas (RNA) that meet the criteria for designation. Retain other Special Areas including Environmental Education Areas (EEA). Provide new Special Areas

where needed to maintain or protect important values.

Maintain, protect, or restore relevant and important value(s) of ACEC and other Special Areas, including EEA.

Preserve, protect, or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial and aquatic cells) in ACEC. ACEC, especially RNA (Research Natural Areas), will be available for short or long-term scientific study, research, and education, and will serve as a baseline against which human impacts on natural systems can be measured.

Provide for recreation uses and environmental education in ACEC/Outstanding Natural Areas (ONA). Manage uses to prevent loss of outstanding values.

Provide and maintain environmental education opportunities in EEA. Control uses to minimize disturbance of educational values.

Provide management guidelines to protect human life and safety in those areas identified as safety or hazard ACEC.

Land Use Allocations

Identification of new Special Areas and the management of known Special Areas would occur in all Land Use Allocations.

See Map 2-14 for locations for the following Proposed Special Areas:

Descriptions of Proposed Special Areas

Areas of Critical Environmental Concern

Coburg Hills, Cottage Grove Lake and Dorena Lake Relict Forest Islands (RFI) ACEC (876) Acres

Relict Forest Islands provide examples of old growth and mature forest ecosystems on the fringes of the Willamette Valley, Oregon. The areas provide representative examples of mature and old growth plant communities found in low elevation forests adjacent to the Valley. The areas also provide Late-Successional refugia for species that may later recolonize adjacent lands managed for timber. The areas are also important habitats for various wildlife species, including several species of raptors.

Cougar Mountain Yew Grove ACEC (10 Acres)

Cougar Mountain Yew Grove exhibits a population of large *Taxus brevifolia* (Pacific yew) trees on the Eugene District. Because of the high interest in Pacific yew as a pharmaceutical, this area was identified as an important reserve for this species.

Grassy Mountain ACEC (74 Acres)

Grassy Mountain ACEC is one of the finest representative examples of a grassy bald on the western margin of the Cascades that remains today. The site has had very little disturbance, and is a fine example of a native *Festuca idahoensis* (Idaho fescue) grassland community with a variety of herb species adapted to seasonal moisture fluctuations. The ACEC also includes a *Pseudotsuga menziesii* (Douglas-fir) forest with mixed *Arbutus menziesii* (Pacific madrone) and associated shrubs and herbs.

Hult Marsh ACEC (167 Acres)

Hult Marsh ACEC, once an old log pond, now exhibits a botanically rich assemblage of aquatic, bog, marsh, and riparian vegetation, including habitat for 2 BLM Assessment plant species. Such uncommon aquatic plant species were probably transported into the lake by waterfowl, which utilize the area. The wetland supports a number of fish and wildlife species. Portions of Lake Creek within the ACEC are spawning areas for coho salmon and cutthroat trout. Osprey have nested in the area and bald eagles have also been observed in the area.

Long Tom Proposed ACEC (7 Acres)

The Long Tom ACEC was first designated an ACEC in 1984. The ACEC occurs within the Willamette Valley Physiographic Province. The area exhibits a small remnant of presettlement native plant community. Less than 1 percent of this plant community remains in existence today. Three different native plant communities are present:

> The *Deschampsia cespitosa* (tufted hairgrass) wet prairie community occupies a portion of the site. This type of grassland is considered one of the rarest and most endangered of all natural ecosystems in Oregon.

The *Quercus garryana* (Garry oak)/*Fraxinus latifolia* (Oregon ash) woodland, with various shrubs and herbs, is scattered throughout portions of the ACEC.

The third type of community identified on the tract includes *Fraxinus latifolia* (Oregon ash)/*Quercus garryana* (Garry oak)/*Carex obnupta* (slough sedge), which occurs in the low-lying areas within the ACEC, that flood in rainy weather.

The site has had extensive research on the use of prescribed fire for management of the native grassland and the associated Special Status plant species, which occur on this tract.

Areas of Critical Environmental Concern/ Research Natural Areas

Camas Swale ACEC/RNA (314 Acres)

The Camas Swale ACEC/RNA was first established in 1984 as a Research Natural Area to provide an example of a dry-site, mature *Pseudotsuga menziesii* (Douglas-fir) forest in the Willamette Valley foothills. This site also incorporates a small, xeric, meadow community that, in the absence of fire, is slowly being invaded by several shrub and tree species.

The site is dominated by *Pseudotsuga menziesii* (Douglas-fir). On north slopes, the forest has a closed canopy; on south and west slopes, the forest is more open, and trees of all age classes are present.

The major associate in this forest is *Calocedrus decurrens* (Incense cedar). Scattered large individuals occur on south and west exposures. A few individuals of *Pinus ponderosa* (ponderosa pine) are found at the driest sites in the northwest corner of the RNA. At the wettest sites a few *Abies grandis* (grand fir) are present. There is one gentle, wet slope where *Fraxinus latifolia* (Oregon ash) occurs (Curtis, 1986).

Fox Hollow ACEC/RNA (160 Acres)

Fox Hollow ACEC/RNA was first established as a Research Natural Area in 1984 to provide an example of dry-site, mature *Pseudotsuga menziesii*/ *Pinus ponderosa* (Douglas-fir/ponderosa pine) forest in the Willamette Valley foothills.

The mature forest at Fox Hollow ACEC/RNA is dominated by large *Pseudotsuga menziesii* (Douglas-fir). East-west ridges cross the ACEC/RNA, produce an alternation of forest stands on south and north aspects. A mixed stand of *Pseudotsuga menziesii* (Douglas-fir) and *Pinus ponderosa* (ponderosa pine) occurs on the south slopes and ridgetops, with minor amounts of *Calocedrus decurrens* (incense cedar) and *Quercus garryana* (Garry oak). This forest was originally more open as illustrated by the scattered, open-grown old trees (Curtis, 1986).

Horse Rock Ridge ACEC/RNA (378 Acres)

Horse Rock Ridge ACEC/RNA was designated as an ACEC in 1984. The site has recently been nominated for RNA status. The area is located on a steep, south-facing slope in the Coburg Hills, which lies on the eastern edge of the Willamette Valley, Oregon.

There are two primary natural communities recognized at the ACEC/RNA, the grassland community and the forest community. Within each of these broadly defined communities, there exists a number of plant associations:

Grasslands occupy the south-facing slopes at Horse Rock Ridge, usually occurring in more shallow soils than the forested areas. The grassland community consists of 3 distinct plant associations: *Elymus glaucus* (blue wildrye) association; *Festuca idahoensis* (Idaho fescue) association; and *Stipa lemmonii*/*Rhacomitrium canescens* (Lemmon's needlegrass/moss) associations.

The forest community is classified as a *Pseudotsuga menziesii*/*Tsuga heterophylla* (Douglas-fir/western hemlock) association with an understory dominated by small *Berberis nervosa* (Oregon grape), *Gaultheria shallon* (salal), and *Symphoricarpos alba* (snowberry). The forest occurs on the deepest soils within the natural area (Vander Schaaf, 1993).

Mohawk ACEC/RNA (292 Acres)

Mohawk ACEC/RNA was first established in 1984 as a Research Natural Area to provide an example of old growth *Pseudotsuga menziesii* (Douglas-fir) and *Tsuga heterophylla* (western hemlock) forest in the Willamette Valley foothills. The site also incorporates several small marsh communities and areas that were previously logged, and now support a younger forest.

The northern and eastern portions of the ACEC/RNA consist of moderately sloping benches. Several

intermittent streams and tributaries of McGowan Creek flow through or originate in the ACEC/RNA. West of the benches is a steep slope with a small rock outcrop.

The ACEC/RNA is uniformly forested with large, old growth conifers and few deciduous trees (Curtis, 1986).

Upper Elk Meadows ACEC/RNA (223 Acres)

Upper Elk Meadows ACEC/RNA was first established in 1984 as a Research Natural Area to exemplify the diversity of species in the valleys and mountains of the Cascade Range and the Coast Range. The ACEC/RNA incorporates a remnant of the old growth forest that once was prevalent west of the Cascade Range in Oregon.

The ACEC/RNA is a mosaic of open and shrub covered wetlands surrounded by old growth forest. Open wet *Carex* (sedge) meadows occupy approximately 11 acres; wet *Alnus sinuata/Salix/ Crataegus douglasii* thickets occupy 30 acres; an open forest dominated by old growth *Abies amabilis/ Abies grandis* occupies 74 acres; and a closed old growth forest dominated by *Pseudotsuga menziesii* (Douglas-fir) occupies approximately 66 acres. In addition, there is a cutover area and a very small nonforested site (Curtis, 1986).

Areas of Critical Environmental Concern/ Outstanding Natural Areas

Heceta Sand Dunes ACEC/ONA (218 Acres)

Heceta Sand Dunes ACEC/ONA contains several plant communities representative of the Coastal Province of Oregon. Different stages of dune stabilization and vegetation succession are present. A portion of the tract is made up of dynamic dune formations. Here plant species adapted to shifting sand can be found. Species that are more tolerant of sand burial can be observed, including BLM Tracking species *Abronia latifolia* (yellow sandverbena). More heavily vegetated areas occur on stabilized areas such as deflation plains, where tree and shrub communities have become established.

A large portion of the tract is dominated by wetlands, both permanent and ephemeral. The site offers excellent opportunities for studying various aspects of dune ecology. BLM Assessment species, *Campylopus schmidii* (moss), also can be found on the ACEC/ONA.

Various wildlife, scenic, and recreational values have been identified on the tract.

Lake Creek Falls ACEC/ONA (58 Acres)

The Lake Creek Falls ACEC/ONA was first designated an ACEC in 1984. The area contains important recreational and scenic values. It is also the location of a natural hazard area along and within Lake Creek for which the area was designated. The area is visually appealing with the canyon walls rising from Lake Creek. Riparian vegetation and cascading water flowing over this boulder strewn stream course have been identified as key visual resources.

Water play and sunbathing activities are popular activities in the area. Swimming hazards, including unseen boulders in pools, were identified as serious public hazards needing special management attention through ACEC designation.

A fish ladder has been constructed in the area to provide upstream anadromous fish passage, making the area a popular attraction and interpretive facility.

Environmental Education Areas

McGowan Creek EEA (79 Acres)

McGowan Creek EEA is an excellent example of low-elevation old growth adjacent to and similar to Mohawk ACEC/RNA. (See description for Mohawk ACEC/RNA for description of area.) The area is adjacent to McGowan Creek and provides outstanding environmental education opportunities.

Potential Special Areas

The following nominations were received between the draft and final RMP. They have gone through BLM's internal review process and qualify for Special Area status. Because these areas have not gone through the required public review period, the areas will not be designated during this planning process but will be carried forward as Potential Special Areas. Interim management of these areas will be provided, where necessary, to protect the relevant and important values for which the areas were nominated.

Cottage Grove Old Growth Potential EEA (80 Acres)

Cottage Grove Old Growth potential EEA represents a predominantly *Pseudotsuga menziesii* (Douglas-fir) old growth stand separated by a small area of Columbus Day Storm blow down. Multiple canopy layers represent the Late-Successional stage of mesic Douglas-fir plant community with some existing older trees representing ages of 500 years old or more. The understory vegetation is a composite of a number of species including, moss, lichens, fungi, and flowering plants such as Federal Candidate plant species *Cimicifuga elata*. Large woody debris is numerous at this site. Cottage Grove School system has indicated a strong interest in developing the area for environmental education purposes.

Dorena Prairie Potential ACEC (8 Acres)

Dorena Prairie potential ACEC is considered a small remnant of native *Festuca rubra* (red fescue) bottomland habitat. The area has been classified as an *Agropyron caninum/Festuca rubra/Koeleria valley* grassland. It is thought that only a handful of sites remain today in what was once a grassland community that covered over 200,000 acres of bottomland and hillslope habitat within the Willamette Valley, Oregon.

The site is dominated by *Festuca rubra* (red fescue) and other native grasses including, *Danthonia californica* (California oatgrass), *Koeleria cristata* (junegrass) and *Poa scabrella* (rough bluegrass). Native forbs and shrubs are also present on the site (The Nature Conservancy, 1987).

Research is currently on-going to determine the quality of this grassland. Genetic information on the origin of the *Festuca rubra* (red fescue) at this site is in progress.

Lorane Ponderosa Pine Potential ACEC (106 Acres)

The Lorane Ponderosa Pine Potential ACEC was identified for the remnant population of native ponderosa pine within the Willamette Valley Physiographic Province. The Willamette Valley population of *Pinus ponderosa* (ponderosa pine) is considered a separate and distinct population from other ponderosa pine populations within Oregon. Historical logging of low elevation forests along the Valley margins and subsequent elimination of much of the Valley pine have pointed to the need to maintain and manage remaining naturally occurring populations of ponderosa pine within this mixed coniferous forest community.

The area will provide excellent baseline information to describe this type of plant community, not yet classified on the District; to study historic fire frequency of the area; and to implement experimental prescribed fires and other adaptive management techniques to enhance the native pine on the site.

Low Elevation Headwaters of the McKenzie River Potential ACEC (7650 Acres)

The Low Elevation Headwaters of the McKenzie River potential ACEC is a large block of minimally disturbed forests in late and mature seral stages with small, scattered patches of old growth islands. The area supports habitat essential for maintaining endangered, threatened, and sensitive fish and wildlife species. The area also includes an intact low elevation, watershed, representing excellent conditions for water quality and other riparian values.

Management Actions/Direction

All existing Special Areas will be retained (1,511 acres). Additions to 4 existing Special Areas (Camas Swale ACEC/RNA, Upper Elk Meadows ACEC/RNA, Horse Rock Ridge ACEC, and Lake Creek Falls ACEC/ONA) will be implemented, totalling an additional 292 acres. Horse Rock Ridge ACEC, which is proposed for RNA status, will be designated as such. McGowan Creek EEA will be reduced to 79 acres to better define the primary values of the area. Seven proposed Special Areas will be designated under the Proposed Alternative (1,344 acres), including Coburg Hills RFI (Relic Forest Island) ACEC; Cottage Grove Reservoir RFI ACEC; Cougar Mountain Yew Grove ACEC; Dorena Reservoir RFI ACEC; Grassy Mountain ACEC; Heceta Sand Dunes ACEC; and Hult Marsh ACEC. The proposed Cougar Mountain Yew Grove ACEC will be adjusted to 10 acres and the boundaries of the Relict Forest Islands will be adjusted to better define the relevant and important values.

Four potential Special Areas (Cottage Grove Old Growth EEA; Lorane Ponderosa Pine ACEC; Low Elevation Headwaters of the McKenzie River ACEC; and Dorena Prairie ACEC) will not be designated in this planning process but will be carried forward as potential Special Areas until a plan amendment is implemented or until a new planning process is initiated. Interim management will be provided for these areas, where necessary, to protect the relevant

and important values for which the areas were nominated, including, but not limited to, actions outlined in Table 2-6 located at the end of Chapter 2, Management of Proposed Special Areas. Where needed, interim management plans will be developed to provide guidelines for resource protection and management.

Proposed Bald Eagle Habitat Areas ACEC will not be designated under the PRMP but will be managed in accordance with the Bald Eagle Recovery Plan (See Special Status Species/Wildlife). Row River EEA will not be designated under the proposed alternative, but will be managed for Special Status plants. Vik Road EEA (58 acres) will be dropped from EEA consideration. Cannery Dunes will be considered for transfer to the City of Florence, Oregon. Fawn Creek, Coburg Hill, and Bunker Hill did not qualify for ACEC status and were dropped from Special Area consideration.

Areas dropped from further consideration as Special Areas will be managed under various land use allocation(s). See Appendix S, Proposed Management of Candidate Special Areas dropped from Special Area Consideration, for a list of these areas and the Land Use Allocations under which the areas will be managed.

All previous Special Areas will be managed in accordance with approved management plans and, where obsolete, new management plans will be prepared to more accurately reflect the management needs of these areas. All designated ACEC will be managed to maintain and/or enhance the primary resource value(s) for which the area has been designated. Management plans specific to ACEC that have been nominated as hazard areas will be developed or revised, where necessary, identifying specific actions to protect human health and safety. If management plans have not been prepared for previously designated areas, management will be in accordance with the guidelines in Table 2-6, Management of Proposed Special Areas. Additional interim management measures will also be implemented, where necessary, to protect the relevant and important values for which the areas were designated until new management plans are prepared.

Special Area management plans will be developed for new Special Areas as needed. Resource values will be protected in new Special Areas pending completion of management plans, including, but not limited to, implementation of those actions outlined in Table 2-6, Management of Proposed Special Areas.

Plans will identify where prescribed fire could enhance or maintain Special Area values. Fire suppression plans will be developed where it is determined that natural fire would diminish the resource values for which the area was designated, identifying the use and restrictions for fire suppression equipment within the Special Area.

Monitoring plans will be developed that address ecological, compliance, defensibility and management treatment monitoring where needed to track, protect, and manage for Special Area values.

Research needs will be identified for the management of Special Area values, and site-specific inventory needs will be identified and implemented where such inventories are incomplete to provide baseline information from which to monitor changes within these areas.

Public access will be regulated, where necessary, to maintain primary values within Special Areas. Gate closures, road closures or limits, and road decommissioning will be identified, implemented, and maintained to protect Special Area values. Public visits into Special Areas will be regulated if Special Area values are being negatively impacted.

Negotiations will be pursued with willing private parties involved in existing reciprocal right-of-way agreements to protect Special Areas by removing public lands with these sites from existing permits or by adding language to the agreements. Language protecting these areas will be added to new reciprocal agreements.

Public outreach opportunities will be addressed, focusing on educating the public on the importance of these areas for research and education; as genetic reserves for native species, and as baseline areas against which other human influenced landscapes can be compared.

Opportunities for research and education will be made available within Research Natural Areas. Education will be defined as primarily those activities associated with secondary/college-level projects; other public uses within RNA will in general be considered incompatible with the primary mandate for research and education unless such uses are otherwise shown not to degrade RNA values through site-specific monitoring designed to quantify these activities.

Noxious weed or other nonnative pest plants will be controlled so as to maintain or restore Special Area values.

Restoration of Special Area values will be implemented where needed, and genetically adapted native plant materials will be used.

Future potential for land acquisitions, exchanges, conservation easements, or donations to enhance or add to Special Area habitat/values will be identified and pursued where possible.

Collection of seed or other plant materials within Special Areas for use in restoration activities by BLM on Eugene District lands will be restricted and/or regulated where necessary to maintain primary values; where collection is permitted, guidelines for collection will be developed so as not to degrade Special Area values.

Special Forest Products removal will not be permitted within RNA. Collection of Special Forest Products within other Special Areas will be prohibited in those areas where vegetation and plant communities have been identified as relevant and important values.

Grazing and the use of herbicides would be prohibited in RNA. Grazing and herbicide use in other Special Areas would not be permitted unless such activities were being used to maintain or enhance the Special Area values that have been identified. Emphasis, however, would first be on using nonchemical and other natural processes, including fire and manual removal methods, to control such things as exotic or competing vegetation, etc.

Off Highway Vehicle, mineral withdrawals, and timber harvest will be consistent with Table 2-6 and plans will identify where adaptive management techniques will enhance or maintain Special Area values; no salvage logging will be permitted in Special Areas.

Special Status Plant or Animals species that occur within Special Areas, will be managed consistently with BLM's Special Status Species Policy; management of Special Area values will also be considered when identifying management actions needed for Special Status species so as not to degrade the primary values for which the Special Area was designated.

Inventories will be implemented to identify additional Special Areas where such values warrant Special Area protection/management, including Research Natural Areas, which will meet objectives for identifying representative examples of Oregon's ecosystem listed in the Oregon Natural Heritage Plan.

Existing Special Areas will be identified in the Watershed Analysis process for protection and management of the primary values for which the area was designated.

Coordination with other agencies in the protection and management of Research Natural Areas will continue.

Cultural Resources Including Native American Values

Objectives

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

Conserve and protect designated cultural 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.

Land Use Allocations

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.

The Eugene District manages two cultural resource sites eligible for inclusion on the National Register of Historic Places.

Management Action/Direction

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

Investigate landscape features such as bogs, ponds, and packrat middens, and 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,

Address the management of cultural resources through watershed analyses and project plans.

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 American Indian groups and other interested parties to accomplish cultural resource objectives.

Take appropriate law enforcement or other actions when necessary to protect cultural resources. [Such actions may include 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 include Confederated Tribes of Siletz, Confederated Tribes of Grand Ronde and Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians.

Acquire significant cultural resource properties for public, cultural heritage, and scientific purposes.

Visual Resources

Objectives

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

VRM Class I areas: Preserve the existing character of landscapes.

VRM Class II areas: Retain the existing character of landscapes.

VRM Class III areas: Partially retain the existing character of landscapes.

VRM Class IV areas: Allow major modifications of existing character of landscapes.

Emphasize management of scenic resources in selected high-use areas to retain or preserve scenic quality.

Land Use Allocations

VRM Class	Acres
I	0[1]
II	4,471[2]
III	33,130[2]
IV	rest of district

[1] refer to summary of major changes for Chapter 2

[2] GIS VRM acres

See Map 2-12 for the location of visual resource management classes. The following lists areas that are included in each VRM Class on the Eugene District:

VRM Class I:
none

VRM Class II:
Existing recreation sites: Clay Creek, Sharps Creek, and Whittaker Creek
All proposed recreation sites within their viewsheds. Refer to the proposed recreation sites listed in Table 2-7a at the end of Chapter 2.
Existing Shotgun Special Recreation Management Area (SRMA)
The proposed McKenzie River SRMA
The McKenzie River, Segment A corridor

VRM Class III:
Proposed SRMAs: Row River, Upper Lake Creek, Lower Lake Creek, Siuslaw River, and Gilkey Creek
Any BLM administered lands within a quarter of a mile of Rural Interface Areas (1-20 acre lots)
BLM administered land allocated to meet Rural Interface Area (RIA) objectives, unless lands within RIAs are already allocated to some other higher level of protection (e.g., Wild & Scenic Rivers, SRMAs, etc.).

VRM Class IV:
The remaining BLM lands

Management Actions/Direction

Address Visual Resource Management issues when conducting watershed analysis.

Use the visual resource contrast rating system during activity and/or project level planning to determine what and how proposed activities would meet VRM objectives. Use mitigation measures to reduce visual contrasts.

Manage VRM Class I areas to provide for natural ecological changes. Some very limited management activities may occur in these areas. The level of change to the characteristic landscape should 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 VRM 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 VRM 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. Refer to the Rural Interface section for management constraints.

Manage VRM 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 these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture. No specific timber management constraints would apply to lands managed for VRM Class IV objectives. However, mitigation of visual effects would be incorporated where consistent with efficient timber harvest or other management activities.

Wild and Scenic Rivers

Objectives

Manage designated segments 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.

Find important and manageable river segments suitable for designation where such designation would contribute to the National Wild and Scenic Rivers 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.

Land Use Allocations

River Segments Found Suitable for Inclusion in the National System

River Segment	Classification	Miles	BLM Acres
Siuslaw River, Segment B	Recreational	46	4,390
Siuslaw River, Segment C	Recreational	13	1,151
McKenzie River, Segment A	Recreational	11	1,194

See Maps 2-6, 2-7a, 2-7b, 2-8 and 2-13 for segment locations. Assessments for the above river segments found suitable for inclusion in the National Wild and Scenic Rivers System are located in Appendix Y. The corridor width for rivers found eligible or studied for suitability is generally defined as one-quarter mile on either side of the river (approximately one-half mile wide corridor). Technically these are not land use allocations at this time. If Congress passes legislation to designated them, they will be automatically added to the allocations of the resource management plan.

Several river segments were found eligible but not assessed for suitability. BLM ownership along these segments ranges from less than 1 percent to 14 percent. Management decided to place these segments in interim management rather than do assessments. These river segments are shown on

Map 3-9 and in Table 3-55 (Chapter 3) and are the following:

Fall Creek
Nelson Creek
Willamette River
South Fork Gate Creek
Lake Creek, Segment B
McKenzie River, Segment B
North Fork Gate Creek

Management Actions/Direction

Provide interim protective management on BLM administered land within the one-half mile corridor so that no actions would be authorized that would adversely effect the identified Outstandingly Remarkable Values, which resulted in rivers being found eligible/suitable. This interim protective management would also comply with the Aquatic Conservation Strategy. Interim protection on river segments found eligible or suitable for inclusion as components of the National Wild and Scenic Rivers System would include:

Exclude timber harvest in the Riparian Reserves
Restrict development of leasable and salable minerals
Protect the segment's free flowing values
Protect the segment's identified Outstandingly Remarkable Value(s)

Apply the standards set forth in the "Management Guidelines and Standards for National Wild and Scenic Rivers" to segments under interim management, which can be found in Appendix X.

Exploration and development of locatable minerals would be conducted in a manner that would prevent unnecessary and undue degradation on all river segments designated. Salable mineral development would not be allowed on designated river segments unless the Authorized Officer determines that impacts from a proposed development are acceptable or can be adequately mitigated. Leasable mineral activities would be subject to a controlled surface use special leasing stipulation.

Upon completion of the ROD for this Proposed Resource Management Plan, release from interim protection all river segments found not suitable for inclusion as components of the national system.

Wilderness and Wilderness Study Areas

There are no lands within the planning area that are eligible as Wilderness or as Wilderness Study Areas. A Recreation Opportunity Spectrum (ROS) inventory did not find any roadless areas of 5,000 acres or more or roadless islands that would qualify for wilderness characteristics within the District.

Rural Interface Areas

Objectives

Consider the interests of adjacent and nearby rural landowners, including residents, during analysis, planning, and monitoring related to managed Rural Interface Areas (RIA). These interests include personal health and safety, improvements to property,and quality of life. Determine how landowners might be or are affected by activities on BLM administered lands.

Land Use Allocations

Managed Rural Interface Areas encompass approximately 6,800 acres of BLM administered land within one-quarter mile of private lands zoned for 1-5 acre or 5-20 acre lots located throughout the District (refer to Table 3-22 for acres and Map 3-13 for locations in Chapter 3).

Management Actions/ Direction

Work with local governments to (1) improve the BLM database regarding private land planning/zoning designations and residential development near BLM administered land; (2) provide information to local planners regarding BLM land allocations in RIAs and the management objectives and guidelines for these lands; (3) develop design features and mitigation measures that will minimize the possibility of conflicts between private and Federal land management; and (4) monitor the effectiveness of design features and mitigation measures in RIAs.

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. Examples include different harvest regimes, hand application rather than aerial application of herbicides and pesticides, and hand piling slash for burning as opposed to broadcast burning. Monitor the effectiveness of design features and mitigation measures.

Eliminate or mitigate public hazards.

Manage Rural Interface Areas using Visual Resource Management Class III standards (unless an area is classified as Visual Resource Management Class I or II). This will allow moderate levels of change to the landscape without dominating the view of the casual observer.

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

Reduce natural fuel hazards on BLM-administered lands in Rural Interface Areas.

Forest management practices may be constrained within Rural Interface Areas as follows:

- Harvest regimes will leave 12-18 trees per acre, not evenly distributed, at final harvest
- Only hand piling and burning slash would be permitted
- Streams utilized for domestic water sources would be protected (see Water section in this chapter)

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 (GFMA) and Adaptive Management Area (AMA) 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; and (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

Provide a wide range of developed and dispersed recreation opportunities that contribute to meeting projected recreation demand within the planning area.

Manage scenic, natural, and cultural resources to enhance visitor recreation experience expectations and produce satisfied public land users.

Support locally sponsored tourism initiatives and community economic strategies by providing recreation projects and programs that benefit both short and long-term implementation.

Manage Off-Highway Vehicle use on BLM administered land to protect natural resources, provide visitor safety, and minimize conflicts among various users.

Enhance recreation opportunities provided by existing and proposed Watchable Wildlife areas and national Back Country Byways.

Continue to provide 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 BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation initiative.

Land Use Allocations

Recreation & Public Purpose Leases: There are currently four Recreation & Public Purpose Leases (R&PP) leases for recreational facilities within the District - two with Lane County, one with Linn County, and one with the State of Oregon. The two leases with Lane County, (Whitewater and Marten Rapids County Parks) may be relinquished in the near future, and if so would be managed as part of the McKenzie River Special Recreation Management Area (SRMA) in accordance with the provisions of the McKenzie River Recreation Area Management Plan (RAMP). Unanticipated events may lead to the development of other R&PP leases, in which case, they would be consistent with the other provisions of this PRMP.

Special Recreation Management Areas: In addition to the continuing management of the only existing SRMA, Shotgun Recreation Site, six new SRMAs would be designated. Unanticipated events may lead to the development of other SRMAs in which case, they would be consistent with the other provisions of this PRMP. Constraints and opportunities would be identified through the watershed analysis and would be consistent with the objectives of the Aquatic conservation strategy. The six new SRMAs are;

Upper Lake Creek	Gilkey Creek	McKenzie River
Lower Lake Creek	Row River	Siuslaw River

Recreation Sites/Facilities: Continue management of the existing sites listed on Table 2-7b. Five of these sites, Turner Creek, Lake Creek, Whitewater, Marten Rapids and Haight Creek are currently closed. These sites were closed during the early 80's due to vandalism, budget constraints, and isolated locations (in some instances). These sites were retained for future recreational opportunities when management conditions were favorable. All could be reopened except for Turner Creek, which will be returned to the land base. With other nearby recreation facilities, Turner Creek's location does not make it a valued choice for reopening. Development of 22 proposed additional recreational sites could be accomplished within management needs. These sites would meet a variety of different recreational needs. Refer to Table 2-7a for a list of proposed sites. All existing trails would remain and 26 proposed trails would be retained for future development. All proposed sites, and facilities are not limited to those listed in the tables. Unanticipated events may lead to the development of additional sites, and facilities, in which case they would be consistent with the other provisions of this PRMP. Constraints and opportunities would be identified through the watershed analysis and would be consistent with the objectives of the Aquatic conservation strategy. Refer to Maps 2-9, 2-10 and 2-11 for locations.

Back Country Byways: There are no existing Back Country Byways within the District but nine proposed Back Country Byways would be designated. Unanticipated events may lead to the development of additional sites, and facilities, in which case they would be consistent with the other provisions of this PRMP. Constraints and opportunities would be identified through the watershed analysis and would be consistent with the objectives of the Aquatic Conservation Strategy. These Byways are listed below under each respective Resource Area:

McKenzie RA	**Coast Range RA**	**South Valley RA**
Coburg Hills	Alsea	Calapooya Divide
Shotgun Creek	Oxbow	Blue Mountain
Lost Creek	Siuslaw River	
	Whittaker Creek Area	

Off-Highway Vehicle Use Areas: Existing OHV closures would continue within existing ACECs and in

the Shotgun Recreation SRMA to protect their resource values. Additional closures would occur in some proposed ACECs and in one environmental education area to also protect resource values. These closures would be determined upon completion of the District's OHV plan based upon watershed analysis and within the constraints of the Aquatic Conservation Strategy. Two 40 acre sand dune lots would be designated open and the rest of the District would be designated as limited. See Appendix T for more information.

Management Actions/Direction

Riparian Reserves: Design new recreational facilities within Riparian Reserves, including trails and dispersed sites to meet 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.

Late-Successional Reserves: Retain and maintain existing recreation developments consistent with other management actions/direction for Late-Successional Reserves.

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

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

Review on a case-by-case basis new recreation development proposals. They may be approved when adverse effects can be minimized and mitigated.

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

Remove hazard trees along trails and in developed recreation areas if mitigating measures (e.g., for wildlife tree) can not accomplish visitor safety.

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 & Public Purpose Leases (R&PP): Continue to manage current R&PP leases within the lease guidelines. The BLM lands within the State Willamette River Greenway would be managed to comply with the State's regulations. The County R&PP leases would be managed to comply with their stipulations. When existing leases expire, reevaluate their relevance, on a case-by-case basis in light of current BLM management objectives. Develop future R&PP leases when necessary within the guidelines of this PRMP.

Special Recreation Management Areas: Manage SRMAs in a manner consistent with BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation Initiative. Address special recreation management area issues and prioritized projects in watershed analyses. Prepare RAMPS or Activity Plans for the proposed SRMAs and related project plans as needed. Activity Plans could be developed for other recreation sites or areas on a resource areawide basis, a logical geographic area, or for individual sites/areas as appropriate.

Recreation Sites and Trails:

Continue to operate and maintain developed recreation sites/facilities and developed trails. Some sites/facilities and trails could be maintained and managed through partnerships or agreements with other agencies or groups. See Table 2-7b at the end of Chapter 2 for listings.

Develop potential sites/facilities and trails as funding becomes available. Develop these facilities and trails to minimize adverse effects to other resource values. See Table 2-7a at the end of Chapter 2 for listings.

Continue mining withdrawals for existing developed recreation sites and pursue new mining withdrawals for proposed recreation sites. Pursue revocation of existing withdrawal for Turner Creek site.

Manage timber within developed recreation sites for purposes of removing hazard or dead and dying

trees, providing space for additional facilities and activity areas, and providing desired regeneration of the forest canopy within the integration of management of other resources. A wildlife assessment will be considered prior to tree removal unless safety issues prevail.

Continue to provide nonmotorized recreation opportunities and create additional opportunities where consistent with other management objectives.

Extensive Recreation Management Areas: Manage ERMAs in a manner consistent with BLM's Recreation 2000 Implementation Plan and Oregon-Washington Public Lands Recreation Initiative. Through watershed analysis address extensive recreation management area issues and prioritized projects. Prepare project plans as needed.

Back Country Byways: Designate and facilitate use of nine new Back Country Byways. Coordinate management of Back Country Byways with County governments, chambers of commerce, regional tourism alliances and the U. S. Forest Service.

Off-Highway Vehicles: Work with OHV groups to develop areas specifically for OHV activity.

Develop an OHV plan which identifies areas, roads and trails for OHV use, following the approval of the PRMP. This OHV plan would be adopted through a formal designation action that will specify where, when, how and what types of OHVs may be used on the District's public lands. Impacts on special status species and wildlife habitats would be part of the development of the analysis pursued during the process. Watershed analysis and the Aquatic Conservation Strategy will also guide the development of this plan. BLM would seek active cooperation in the development of the plan from all affected public parties and other agencies. See Appendix T for more information.

Recreational Mining: The proposed Row River SRMA (formerly named Sharps Creek SRMA) would be formally withdrawn from future entry under the mining laws subject to valid existing rights. Lands within the proposed SRMA (shown on Map 2-9) not affected by valid mining claims will be available for recreational mining. A Recreation Area Management Plan will be prepared and will be available for public comment prior to establishment of the recreation facility. The portions of the Row River SRMA (formerly named Sharps Creek SRMA) that were proposed for withdrawal on the Draft RMP/EIS from future entry under the mining laws subject to valid existing rights, will be formally withdrawn. Lands within the proposed withdrawal area (shown on Map 2-9) not affected by valid mining claims will be available for recreational mining. A Recreation Area Management Plan will be prepared with public input and will be available for public comment prior to establishment of the recreation facility.

General: Enhance travel and recreation management through increased emphasis on interpretive and informational signs, maps and brochures to support State and local tourism strategies.

Manage recreation areas to mitigate disturbance to a number of fungus and lichen if species are known to occur within these areas. Follow survey and management actions/direction as stated in the Land Use Allocations and Resource Programs sections.

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

Land Use Allocation	Approx. Acres

Lands available for scheduled timber harvest are as follows:

Matrix	
General Forest Management Areas (including Visual Resource Management Class II, Rural Interface, TPCC restricted, and District Designated Reserves)	40,000
Connectivity/Diversity Blocks	23,700
Adaptive Management Area	5,500

Lands with no scheduled harvest are as follows:

Late-Successional Reserves (LSR)	(See discussion of these in the previous section, Silviculture Appendix, Wildlife section, and Special Status / SEIS Special Attention Habitat section)
Riparian Reserves	

Management Actions/Direction

Matrix (General Forest Management Area 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.

Maintain a well distributed pattern of early and mid-seral forest and plant communities/associations across the Matrix.

Apply silvicultural systems that are planned to produce, over time, forests that have desired species composition, structural characteristics, and distribution of seral or age classes. All silvicultural systems would be sustainable, economically practical, and capable of maintaining the long-term health and productivity of the forest ecosystem (see Appendix BB for discussion of silvicultural systems and harvest methods).

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 that produces maximum average annual growth over the lifetime of a timber stand. In the planning area, culmination occurs between 70 and 90 years of age. During the first decade, regeneration harvests may be scheduled in stands as young as 56 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 match historical stand conditions such as species composition. 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. Utilize genetically improved planting stock when available. Maintain long-term soil productivity and protect water and soil resources. Implement Eugene District's Best Management Practices (see Appendix G for a detailed discussion of BMP's).

Encourage full utilization of harvested timber while reserving structural components, such as snags and coarse woody debris, consistent with objectives for wildlife management, biological diversity, site productivity, and compatible with safety, fire concerns, and watershed objectives. Plan harvest of marketable hardwood stands in the same manner as conifer stands, if the land is not otherwise constrained from timber management. Volume from projected hardwood harvest would be included in the probable sale quantity estimate. Where hardwood trees became established following previous harvest of conifers, plan to reestablish a conifer stand on the site.

Retain late-successional forest patches in landscape areas where little late-successional forest persists. This management action/direction will be applied in 5th 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.

General Forest Management Area

Design silvicultural systems to meet a high level of timber production within a framework of mitigating measures and project design features which protect environmental quality, special status species and habitats, biological diversity, and wildlife habitat.

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 6-8 green conifer trees per acre after regeneration harvest to provide 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.

Perform commercial thinnings that are designed to maintain the volume productivity of stands (see Silvicultural Appendix BB).

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 3 decades) snag deficit. These trees do not count toward green-tree retention requirements.

Leave 240 linear feet of logs per acre greater than or equal to 20 inches in diameter. Logs less than 20 feet in length will not be credited toward this total. 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

Maintain 25 to 30 percent of each block in the best (generally the oldest) forest habitat at any time. The percentage of habitat will include habitat in other land use allocations, such as Riparian Reserves. Blocks may be comprised of contiguous or noncontiguous BLM administered land. To the extent possible, the size and arrangement of forest habitat within a block should provide effective and dispersal habitat for late successional species.

Plan to regeneration harvest at a rate of approximately 1/15 of the available acres in the connectivity part of a sustained yield unit per decade. Because of the limited size of operable areas within any given block, up to three decades of harvest could be removed at any one time from a single block in order to make viable harvest units. Eventually each connectivity block will have 4 to 5 different ten year age classes represented. The future desired condition across the entire sustained yield unit would have up to 15-16 different ten year age classes represented.

Perform density management thinnings that are designed to accelerate growth of trees which would later provide large-diameter snags and down logs, to promote development of understory vegetation and multiple canopy layers, to produce larger, more valuable logs, to harvest mortality of small trees as the stand develops, to maintain good crown ratios and stable, windfirm trees, or to manage species composition (see Silvicultural Appendix BB).

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.

Leave 240 linear feet of logs per acre greater than or equal to 20 inches in diameter. Logs less than 20 feet in length will not be credited toward this total. 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.

Central Cascades Adaptive Management Area

Manage for a level of timber harvest in accordance with an Adaptive Area Management Plan developed in an interagency setting with extensive public participation.

Manage young and mature stands to accelerate development of later successional conditions, particularly in an experimental or research setting.

Develop and test innovative and experimental sale and harvesting methods, and provide a geographic focus for demonstrating these techniques. As new techniques are proven, expand these to locations outside the Adaptive Management Area.

To the extent allowed by regulation, ensure local processing of timber resources to support local communities, providing social and economic benefits to these areas.

Mitigate the effects of reduced harvest levels to communities by encouraging the local development of innovative approaches to balancing economic and

social needs with management on a landscape or ecosystem basis.

For additional discussion of Eugene District AMAs in Chapter 2 locate Adaptive Management Area in the Table of Contents.

Special Forest Products

Objectives

Manage for the production and sale of Special Forest Products (SFP) 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.

Complete a watershed analysis on all use areas.

Land Use Allocations

No land use allocations are made specifically for Special Forest Products.

Management Actions/Direction

All Land Use Allocations

Allow harvest of SFPs throughout the District but complete a NEPA assessment to help determine if additional restrictions may be necessary for specific areas and species.

Establish specific guidelines for the management of individual SFPs using interdisciplinary review as needed. Management guidelines would be based on the ecological characteristics of the SFP 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 SFP management. Feasibility to harvest newly identified SFP species would receive interdisciplinary review.

In appropriate areas (e.g., the Matrix) manage natural hardwood stands for the continued production and sale of hardwood timber and products.

Riparian Reserves

Where catastrophic events result in degraded riparian conditions, allow fuelwood cutting consistent with 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 Products activities are extensive, evaluate whether they have significant effects on late-successional habitat. Restrictions may be appropriate in some cases.

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.

All Minerals - The reserved Federal mineral estate (Federal minerals underlying non-Federal surface estate) would continue to be open for mineral exploration and development.

Leasable Minerals - Lands under Fern Ridge and Lookout Point Reservoir would be opened to oil and gas and geothermal leasing. By law, all lands within city limits, including the Danebo Office site, other West Eugene Wetlands Project lands, and a 40 acre tract north of Florence, Oregon, would be closed to oil and gas leasing. The Dorena Seed Orchard and other acquired lands (including the Walton Maintenance Site) would be open to mineral leasing. All other lands in the operating area would be open for oil and gas or geothermal leasing.

Locatable Minerals - Lands under Fall Creek, Fern Ridge and Lookout Point Reservoirs, and the Oregon Islands National Wildlife Refuge (NWR) would remain closed to locatable mineral entry. Lands with acquired land status such as the Walton Maintenance Site and the Dorena Seed Orchard are closed to locatable mineral entry by law. The Tyrrell Seed Orchard, Danebo Office Site and other West Eugene Wetlands Project lands, Recreation & Public Purposes (R&PP) leases, existing and future Recreation Sites, Special Areas, the Whites Creek Maintenance Site, and McGowan Environmental Education Area (EEA) would also be closed to locatable mineral entry. Portions of the Row River Special Recreation Management Area (SRMA), Lower and Upper Lake Creek SRMAs, and McKenzie River SRMA would be closed to locatable mineral entry, subject to valid existing rights. All other lands in the operating area would be open for locatable mineral exploration and development.

Salable Minerals - Lands under Fall Creek, Fern Ridge and Lookout Point Reservoirs would be closed to salable mineral disposals. The Oregon Islands NWR, Danebo Office Site, Walton and Whites Creek Maintenance Sites, Tyrrell and Dorena Seed Orchards, progeny test sites, Regional Forest Nutritional Study Installations, R&PP leases, Recreation Sites, Special Areas (except Low Elevation Headwaters of the McKenzie River), great blue heron rookeries and osprey nest sites would also be closed to salable mineral development. All other lands in the operating area would be open for salable mineral development if such development did not conflict with directives requiring protection of other surface resources.

Management Actions/Direction

See Table 2-8, 2-9(a), and 2-9(b) for acres affected by the following Management Actions/Direction and for restrictions on energy and mineral activities. The acreages given in these tables are approximate. Overlapping restrictions from different land use allocations have been considered and where this occurs the most restrictive constraint was used. See Appendix GG for leasing stipulations and Appendix HH for operating standards pertinent to locatable minerals. Salable minerals will be managed consistent with Appendix Attachment 2-K.2 in the Draft RMP.

Management Actions/Direction for 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. The Standards and Guidelines from the SEIS/ROD are referenced in Appendix LL.

Any proposed locatable mining operation in Riparian Reserves, other than notice level or casual use, require the following actions by the operator to be 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 (ACS) 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 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 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.

Allow development of salable 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.

Management Actions/Direction for 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.

Management Actions/Direction for All Land Use Allocations

All Minerals - Conveyances of mineral estate owned by the United States where the surface is or will be in non-Federal ownership could be made to the existing or proposed owner of the surface estate consistent with FLPMA Section 209(b). This determination must find that there are no known mineral values in the land, or that the reservation of mineral rights in the United States would interfere with or preclude nonmineral development of the land, and that such development is a more beneficial use of the land than mineral development.

The consolidation of the surface and mineral estates on split estate lands would be pursued through exchange, purchase or any other legal means available.

Land obtained under future land exchanges, donations or other means of acquisition would be managed with regard to leasable, locatable and salable minerals in the same manner as those lands with comparable resource values.

Leasable Minerals - All lands open to mineral leasing would be subject to the standard lease terms, a lease notice for cultural resources, and the Special Status Species special leasing stipulation shown in Appendix GG.

Some areas would also be leased subject to additional special leasing stipulations. Appendix GG describes provisions for exceptions, modifications or waivers of these special leasing stipulations. No Surface Occupancy stipulations would be used rather than not leasing, on certain parcels where any surface disturbance would be unacceptable. Lands under Fern Ridge, Lookout Point, and Fall Creek Reservoirs, Oregon Islands NWR, the Tyrrell and Dorena Seed Orchards, Walton and Whites Creek Maintenance Sites, Land Use Authorizations, Recreation Sites, Special Areas, Riparian Reserves, great blue heron rookeries and osprey nest sites would be leased subject to no surface occupancy. A Timing stipulation would be utilized on a parcel with mineral springs utilized seasonally by the band-tailed pigeon. Controlled Surface Use stipulations would be used to prevent excessive soil erosion, control visual impacts, protect or restore old growth forest, or enhance recreational opportunities. Lands with fragile soils, VRM Class II lands, Special Recreation Management Areas, Late Successional Reserves, and Suitable and Eligible Recreational Rivers would be subject to the controlled surface use stipulations. A Controlled Surface Use stipulation is used instead of the more restrictive No Surface Occupancy stipulation because there are existing roads through these tracts and leasable mineral exploration and development could be conducted using these roads.

If Forest Management Research Sites are established, or lands are classified as VRM Class I in the future on BLM land, those areas would be leased subject to special leasing stipulations to be developed at that time.

Locatable Minerals - Mining activities on lands open to locatable mineral entry would be regulated under the regulations in 43 CFR 3809 to prevent unnecessary or undue degradation of the public lands. All surface disturbance from such operations would be reclaimed at the earliest feasible time. Operating standards for locatable mineral activities are described in Appendix HH.

If the McKenzie A, Siuslaw B and Siuslaw C river segments are designated as recreational rivers, locatable mineral operations will be required to be conducted to minimize unnecessary surface disturbance, sedimentation, pollution and visual impairment, based on guidance in BLM Manual 8351.5(c)(2)(d). Until these segments are designated, locatable mineral operations have to be conducted in a manner to prevent unnecessary and undue degradation, as required under the regulations in 43 CFR 3809.

Salable Minerals - The public demand for salable minerals would be met from the 12 existing designated community pits or the 63 other quarries not yet designated as community pits. New common use areas or community pits could be designated and developed if consistent with the management objectives of other resource values. Great blue heron rookeries, osprey nest sites, McKenzie A, Siuslaw B, and Siuslaw C river segments (if designated as recreational rivers) would be closed to salable mineral development unless the Authorized Officer determines that impacts from a proposed development are acceptable or can be adequately mitigated. Salable mineral resources within SRMAs and the Low Elevation Headwaters of the McKenzie River Special Area may be utilized if the impacts of the proposed use are acceptable to the Authorized Officer. Salable mineral resources in Riparian Reserves may be utilized if the impacts of the proposed development meet the Aquatic Conservation Strategy. Salable mineral resources within Late Successional Reserves may be utilized if the impacts from the proposed use are acceptable or can be adequately mitigated. Federally listed and proposed threatened and endangered, Federal Candidate, and Bureau Sensitive species would be protected at salable mineral sites. Seasonal restrictions would be utilized near mineral springs utilized by the band-tailed pigeon.

Contracts for mineral materials, including commercial use of petrified wood, would be issued pursuant to the 43 CFR 3604 or 3610 regulations where the disposal is deemed to be in the public interest. Free Use Permits (FUP) are considered on a case-by-case basis and issued at the discretion of the Authorized Officer. Free use of petrified wood for noncommercial purposes is permitted pursuant to the regulations in 43 CFR 3622.

Reclamation of salable mineral sites would be conducted at the earliest feasible time after the site is depleted of usable mineral materials.

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, the Recreation and Public Purposes Act, and special recreation permits.

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	78,175
Zone 2	238,398
Zone 3	36

See Map 2-17 for location of land tenure zones.
See Table 2-19 for legal descriptions of Zone 3 lands.

Management Actions/Direction

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.

Management Actions/Direction 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.

Management Actions/Direction 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 and interests in land 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 completing any exchange.

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 BLM administered land to other Federal agencies or acquisition of other Federal lands where consistent with public land management

policy and where improved management efficiency would result. Those tracts specifically identified for transfer to or from other Federal agencies are listed in Table 2-14. 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).

Prohibit disposal of Zone 2 lands through sales under Section 203(a) of FLPMA. Zone 2 lands may be transferred to other public agencies or managed under some form of cooperative agreement. Nonfederal lands and interests in land with high public resource values may be acquired in Zone 2. 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.

Dispose of Zone 3 lands through sale under Section 203(a) of FLPMA 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.

Acquire nonfederal mineral interests for lands where the Bureau owns the surface estate only by exchange, donation, or other means available by State law.

Where the Bureau's objectives can be met with less than fee ownership, conservation easements may be considered and acquired. Acquisitions of lands and interests in lands may be made anywhere within Land Tenure Zones 1 and 2 when consistent with management objectives. Where directed by Congress, including through the appropriation of Land and Water Conservation Funds, lands and interests in land may be acquired anywhere within the District.

Approve disposals under the Color-of-Title Act, as amended, when an applicant can establish that the legal requirements of the Act have been met for Class 1 claims in all zones. For Class 2 claims, approve disposals in Zones 2 and 3 when the requirements of the Act are met, unless important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values are identified during disposal clearance reviews for individual tracts.
Approve disposals under the Recreation and Public Purposes (R&PP) Act in Zones 2 and 3 based upon the site-specific application of the land ownership adjustment criteria, where the proposal is otherwise consistent with the provisions of the plan. One tract in Section 15, T. 18 S., R. 12 W., W.M. (Cannery Dunes parcel) is specifically identified as suitable for transfer to the City of Florence under the R&PP Act.

In order to accommodate the entitlement of the State of Oregon to select additional lands to fulfill the grant made upon its entry into the Union in 1859 as provided in a 1992 court decision, make public domain lands in Zones 2 and 3 available for "in lieu" selection by the Division of State Lands. Process selection applications in accordance with the procedures and policy specified in Bureau Manual 2621 and give them favorable consideration to the greatest extent possible within the constraints of applicable law. Find any selected lands containing threatened or endangered species or their critical habitat for which the U.S. Fish and Wildlife Service renders a jeopardy opinion upon consultation unsuitable for transfer to the State.

Approve new land use authorizations in all zones to resolve agricultural and occupancy trespasses provided that such authorizations would be consistent with other provisions of the plan and would not adversely impact important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values. Do not approve any other land use authorizations for agricultural or residential occupancy purposes.

Do not approve leases or permits under any authority for landfills or other solid waste disposal facilities, nor for any proposals involving the use, storage or disposal of hazardous materials.

Realign the Salem/Eugene District boundaries and sustained yield unit boundaries to administratively transfer jurisdiction of Salem District lands in the Lake Creek watershed to the Eugene District and Eugene District lands in the Lobster Creek watershed, as well as all Eugene District ownership in Sections 17 and 21 of Township 15 South, Range 8 West, to the Salem District.

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.

Rights-of-Way Corridors - The following areas are designated as right-of-way corridors (areas identified as the preferred locations for future right-of-way grants):

Utility/transportation routes for electric transmission lines and pipelines 10 inches in diameter or larger as shown on Map 2-2
Existing and potential communication sites as shown on Map 2-2
Existing railroads
Existing Federal, State, and Interstate highways

Nominal corridor width is 1,000 feet on each side of the centerline of the existing facilities unless constrained by exclusion areas.

Exclusion Areas - Subject to valid existing rights and with the exception of buried lines in rights-of-way of existing roads, exclude rights-of way in the following areas:

Exclusion Area	Acres
Research Natural Areas	1,367
Wild Rivers (suitable and designated)	0
Visual Resource Management Class I Areas	0

Avoidance Areas - With the exception of buried lines in rights-of-way of existing roads, avoid locating rights-of-way in the following areas:

Avoidance Area	Acres
Recreation Sites (existing and proposed)	1,220
Areas of Critical Environmental Concern (except Research Natural Areas)	1,410
Scenic and Recreational Rivers (suitable and designated)	6,735
Sensitive Species Habitat	1,044 (plants)
Visual Resource Management Class II Areas	4,471
Late-Successional Reserves	136,211

Future rights-of-way may be granted in avoidance areas when no feasible alternative route or designated right-of-way corridor is available. Acreages shown above include overlaps.

Management Actions/Direction

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.

Management Actions/Direction 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 effects on identified late-successional species.

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

Management Actions/Direction Other Land Use Allocations

Encourage location of major new right-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. All communication sites with approved communication site management plans would be managed according to the provisions of the plans.

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

This section provides direction for access acquisition. For direction regarding road management, see the Roads section of this chapter.

Acquire access by obtaining easements (including fee 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 right-of-way agreements through use supplements and amendments to the 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.

Acquire access when needed for such facilities as trails, boat ramps, and in-stream fisheries enhancement structures, as well as roads.

Consider acquisition of conservation easements where the Bureau's objectives can be met with less than fee ownership. Such easements may be appropriate to protect populations of special status plants and animals, important wetlands and other special resources.

Easements, including fee easements, to provide legal and physical access (administrative and/or public) to Bureau administered land may be acquired anywhere within the District. Other easements, including conservation easements, may be acquired anywhere within Land Tenure Zones 1 and 2 when consistent with management objectives. Where directed by Congress, including through the appropriation of Land and Water Conservation Funds, easements of any type may be acquired anywhere within the District.

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

Recommendations for revocation or modification of existing withdrawals are shown in Table 2-3 (see Table 2-3 at the end of Chapter 2). Those portions of the listed withdrawals not recommended for revocation or modification are recommended for continuation.

Recommendations for the establishment of new withdrawals are shown in Appendix L. In addition, new withdrawals from the public land laws, including location under the mining laws, but not leasing under the mineral leasing laws, are recommended for lands acquired in the future for the West Eugene Wetlands Land and Water Conservation Fund (LWCF) Project, for any other LWCF projects, for the extension of the Row River Trail eastward from Culp Creek to the Umpqua National Forest boundary and also for any lands acquired in the future for management primarily for recreation sites, Special Status Species, or SEIS Special Attention Species.

All existing classifications shown in Table 3-12 of Appendix K are recommended for continuation as long as the existing Recreation and Public Purposes Act leases are in effect.

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 duplicative 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.

Terminate the classification for any Recreation and Public Purposes Act lease that is relinquished or otherwise terminated in the future.

Upon the revocation, partial revocation, modification or termination of any existing withdrawal or classification shown in Table 3-12 of Appendix K, manage the lands released as provided elsewhere in this plan.

Upon the modification of existing withdrawals as shown in Table 2-3 to open them to leasing under the mineral leasing laws, open the lands for leasing, subject to the restrictions and stipulations specified elsewhere in this plan and also subject to the recommendations of the withdrawal agency.

Roads

Objectives

Develop and maintain a Transportation Plan that meets Aquatic Conservation Strategy objectives and also 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

There are 2,000 miles of roads on BLM administered land in the Eugene 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 as follows:

1. Complete 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;

2. Minimize road and landing locations in Riparian Reserves;

3. Prepare road design criteria, elements, and standards that govern construction and reconstruction;

4. Prepare operation and maintenance criteria that govern road operation, maintenance, and management;

5. Minimize disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow;

6. Restrict sidecasting as necessary to prevent the introduction of sediment to streams; and

7. Avoid 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:

1. reconstructing roads and associated drainage features that pose a substantial risk;

2. prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affects; and

3. 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 infeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hill slopes.

Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams (e.g., streams that 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:

1. Inspections and maintenance during storm events
2. Inspections and maintenance after storm events
3. Road operation and maintenance giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources
4. Traffic regulation during wet periods to prevent damage to riparian resources
5. Establish the purpose of each road by developing the road management objective.

Late-Successional Reserves

Road construction in Late-Successional Reserves for silvicultural, salvage, and other activities generally is not recommended unless potential benefits 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 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

The Management Actions/Direction listed under Riparian Reserves also apply to All Land Use Allocations.

Prepare a Districtwide 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, 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 in the watershed analysis process.

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 to reduce impacts to soils, sensitive resources, water quality, and fisheries. Stabilize existing roads where they contribute to significant adverse effects on these resources.

Locate, design, construct, and maintain roads to standards that meet management objectives in accordance with the District road management plan.

Site and schedule road construction to avoid mass movement of slopes.

Where appropriate to the anticipated use, surface roads to minimize sedimentation.

Vegetate cuts and fillslopes using native species capable of supporting vegetation to stabilize them prior to winter rains.

Stabilize temporary roads prior to winter rains and rehabilitate them after use.

Follow Best Management Practices (see Appendix G) for water quality and soil productivity to mitigate adverse effects on soils, water quality, fish, and riparian habitat during road construction and maintenance.

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.

Specifically address, in either the road management plan or in a watershed analysis, stabilizing existing roads located on fragile soils. These would include watersheds with water quality limited streams and other areas of the District where soil/water quality problems are known to exist.

Avoid road construction in special areas, e.g., ACECs and RNAs, and special habitats.

Noxious Weeds (includes nonnative plant concerns)

Objectives

Contain and/or reduce noxious weed infestations on BLM administered land using an integrated pest management approach. Some noxious weeds expected to be subject to control are:

Common Name	Scientific Name
meadow knapweed	*Centaurea jacea x nigra*
tansy ragwort	*Senecio jacobaeae*
Canada thistle	*Cirsium arvense*
St. Johnswort	*Hypericum perforatum*
Scotch broom	*Cytisus scoparius*
French broom	*Cytisus monspessulanus*
gorse	*Ulex europaeus*
diffuse knapweed	*Centaurea diffusa*
spotted knapweed	*Centaurea maculosa*
purple loosestrite	*Lythrum salicaria*
puncture vine	*Tribulus terrestris*
bull thistle	*Cirsium vulgare*
distaff thistle	*Carthamus lanatus*

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

Implement an integrated noxious weed control program. Develop a Prevention Plan and identification of Weed Free Areas. Site specific plans will be prepared for 5-year periods. The present site specific plans include biological, mechanical, and manual methods. Control methods or combinations of methods proposed are dependent upon size, location, species, and type of weed infestation.

Evaluate impacts of nonnative plants (weeds) growing in all landuse allocationns.

Develop plans and recommendations for eliminating or controlling nonnative plants (weeds) that adversely affect Objectives. Include an analysis of effects of implementing such programs on other species or habitats within reserves.

Continue to survey BLM administered land for noxious weed infestations, report infestations to the Oregon Department of Agriculture (ODA) and work with ODA to reduce infestations.

Use control methods that do not retard or prevent attainment of Aquatic Conservation Strategy (ACS) objectives.

Apply integrated pest management methods (e.g., chemical, mechanical, manual and/or biological) in accordance with BLM's multistate Environmental Impact Statement, Northwest Area Noxious Weed Control Program, 1985, as supplemented in 1987, and the related ROD.

Hazardous Materials

Objectives

Eliminate known hazardous materials on BLM administered lands.

Land Use Allocations

No allocations are made for hazardous material 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. 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.

Remove and replace, if appropriate, all existing underground storage tanks with above ground storage facilities following State and Federal regulations.

Until hazardous materials 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.

Continue fire suppression strategies to provide protection of life and property, and the safety of fire fighting personnel.

Determine the role of fire at the landscape level. Identify fire regime(s), protection standards required to meet resource objectives, the effects of fire exclusion, and the need to use prescribed fire. Minimize the impacts of wildfire suppression actions.

Develop landscape objectives for 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.

Identify the appropriate suppression responses to wildfires based on land use allocation objectives.

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 that may affect hazard reduction goals. Minimize the impacts of wildfire suppression actions.

Management Actions/Direction - 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.

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.

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 effects on riparian habitat and water quality as consistent with Aquatic Conservation Strategy objectives.

Management Actions/Direction - 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 ensure 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. Some natural fires may then 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 that retains the amount of coarse woody debris determined through watershed analysis.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Management Actions/Direction - 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.

Management Actions/Direction - 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

Management Actions/Direction - 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 non-Federal 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

Management of forest fuels is important for preventing and controlling wildfire. In managing forest lands this involves the manipulation of the forest fuels (vegetative materials) either by mechanical or manual methods, or through prescribed fire. Fuels treatment is an especially important consideration in the Rural Interface Areas where forest fuels are in close proximity to private dwellings, businesses, and other structures. Mechanical and manual methods would be used in these areas and in areas where air quality considerations require reduced smoke emissions. Partial entry of prescribed fire may be initiated into natural stands where severe natural fuels buildup would contribute to high intensity stand destroying wildfire.

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 in areas over a period of time to create a mosaic of stand conditions. Treatments should be site-specific 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 5 to 10 years).

Develop project level prescribed fire plans using an interdisciplinary team approach. Plans will address (1) adherence to smoke management and air quality standards; (2) meeting stated objectives for the land use allocations; (3) maintaining or restoring ecosystem processes or structure; and (4) the role of natural fire in specific landscapes, current ecosystem needs, and wildfire hazard analysis included in the fire management plan.

Prescribed fire is used to emulate the natural role of fire to achieve resource objectives for wildlife enhancement, plant species maintenance, forest land biodiversity, and site preparation. Prescribed underburning some proportion of homogeneous plant communities would be dependent on the type and amount of complexity that would be needed for any one plant community. The types of plant communities that may be targeted for underburning would be stands where extensive or connected old growth sites exist or where 50 to 80 year old contiguous monotypic stands are located in order to promote more diversity or heterogeneity. Fire would be the preferred method of disturbance for biological reasons, but other methods of disturbance may produce similar results, i.e., swamper burning or manipulation by machine.

In order to assure that resource objectives such as wildlife, and botanical species maintenance are met and that forest land biodiversity elements are perpetuated, it will be necessary for the Eugene District to employ applications of natural cycle related cool fires such as in understory burning. Understory burning is defined here as in under or near conifer, deciduous, and brush species.

There are approximately 200,000 acres of the District land base that could lend themselves to fire entry under prescription. It is reasonable to assume that at least an annual average of 700 acres of understory related burning may be necessary to meet resource objectives. This would assume an approximate 30 to 50-year rotation cycle on some sites throughout the 200,000 acre land base. It is not possible nor desirable to burn every acre on a 30 to 50-year cycle. Some sites would not benefit positively from the entry of either prescribed fire or wildfire. However, many would. Resource specialists must develop specific resource objectives and develop extensive activity plans to determine specific sites where benefits can occur. The need for prescribed fire varies for each resource. For example, botanical enhancement fires may need to be introduced on an annual basis on some sites. On other sites, such as under old growth stands, the rotational burning could be up to 60 plus years depending on the particular site, soil structure, or other mixed plant communities. As specific area studies are developed, the need for fire applications upon a particular site will be clearly defined and activity plans developed accordingly.

Factors other than ecological needs will also determine how many acres can be burned. The two most important factors are air quality and budget constraints. Air quality considerations are established through regulation and the Oregon Smoke Management Plan. Budget considerations are based on fiscal year considerations.

There has been a target established for the westside of Oregon to reduce total prescribed fire emissions by 50 percent of the baseline emissions by the year 2000. The Eugene District met the 50 percent reduction in 1991. In order to ensure that this reduction is maintained, it is not planned to introduce prescribed understory burning unless all air quality considerations can be met. It is reasonable to assume at this time that an average prescribed fire regime (see Table 2-12 at the end of Chapter 2) can be implemented so understory burning does not add or exceed established air quality standards.

The following figures represent past, present, and estimated future emissions release from burning practices on the Eugene District. The emission factor measurements are based on the latest research methods available. It is estimated that the hand pile burn emission estimates may be approximately 50

percent less than indicated on the emissions tables. The information presented in Tables 2-10, 2-11 and 2-12 (located at the end of this section) clearly shows that the Eugene District can meet the emission standards established for the year 2000, treat available sites for reforestation, and target towards 700 acres of prescribed burning to help meet resource objectives for biodiversity, wildlife, and forest fuel hazard abatement.

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 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.

Tables

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 (Riparian Reserve widths are not determined by stream order.) (Average width in feet each side of stream)[4]		
Stream Order: 1	[9]	
2	[9]	
3	[9]	105
4	[9]	150
5	[9]	210
6+	[9]	240
Lakes, ponds, and other waters	150	150
Acres in RMAs	173,000	21,836
Protection of Sensitive Soil Areas:		
Acres excluded from harvest or other ground disturbing activities (i.e., FGR acres in Alternative E)		14,300
Old Growth and Mature Forest Habitat		
Management Direction	Manage 70% of lands as late-successional or other reserves. Manage 7.5% of lands as connectivity for old growth associated species.	Manage 47% of the land as an old growth emphasis area. Manage 9% of land as connectivity area for old growth associated species.
Acres managed for retention and development of older forest.	224,400	183,000
Acres managed for maintenance of older forest characteristics, (connectivity).	23,800	30,000
Older Forest Retained, end of First decade.	78,400	67,000

No Action	A	B	C	D	E
					50
				60	60
60-90	75	75	105	140	200
90-140	75	100	150	200	200
120-200	75	140	210	280	280
140-270	75	160	240	320	320
	75	100	150	200	400
8,675[5]	10,530	12,922	18,364	34,701	46,302
14,300	14,300	14,300	14,300	14,300	47,700
		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 17% of the land in restoration and retention blocks.Acres managed for all	Manage as recommended by the 1990 Conservation 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.
30,000	28,000	52,000	95,000	151,000	164,000
0	0	0	207,000	0	28,000
33,000	31,000	35,000	68,000	70,000	75,000

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	42,000	89,000
Restricted	27,000	30,000
Enhancement of Other Uses or Not Available	233,000	183,000
Practices (assumed average annual acres for 1st decade):**		
Regeneration Harvest	570	1,670
Commercial Thinning/Density Management	730	2,210
Conversion	10	49
*Site Preparation Prescribed Fire	80	540
Other	350	1,180
*Planting, regular stock	0	0
*Planting, genetic stock	680	2,200
*Stand Maintenance	190	690
*Protection	600	2,360
*Stand Release	150	420
*Precommercial Thinning	590	2,760
*Pruning	630	
*Fertilization	1,670	5,240
Miles of New Road Construction	8	220
Harvest (MMCF)**	6.1	19.9
Harvest (MMBF)**	36.0	119
** These figures do not include any acres in the LSRs and Riparian Reserves since the areas to do these practices during the next decade will be determined after watershed analysis.		
* These figures represent only proposed future needs on operable lands. It does not inlcude existing practice needs.		
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.[10]	Manage habitats of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.
Special Status Plants (acres) Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species plants and animals	1,044	316,600
Wildlife (Including Fisheries)Habitat	316,600	
Buffer width, special habitats (feet)—One to two site trees or 300' slope distance[7]		100-200[7]
Fish habitat improvement (miles)	143	143

No Action	A	B	C	D	E
260,000	274,000	249,000	0	0	100,000
12,000	0	1,000	207,000	151,000	38,000
30,000	28,000	52,000	95,000	151,000	164,000
3,750	4,410	3,890	1,120	1,570	1,690
1,300	1,410	1,480	2,640	800	790
0	95	91	76	55	20
730	780	690	90	150	180
2,220	2,380	2,110	820	1,020	1,080
2,130	2,960	2,310	0	0	0
2,580	2,580	2,580	1,530	1,960	2,120
1,390	1,640	1,430	600	550	600
3,050	3,590	3,180	880	1,320	1,420
1,390	1,640	1,430	260	530	580
3,640	2,530	2,310	2,170	1,580	960
13,010	9,040	7,880	4,160	3,030	2,650
247	291	261	227	145	178
35.2	53.8	49.8	14.8	17.2	17.2
223	342	316	88	101	97

	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.
316,600	42,600	73,800	115,600		316,600
100	0	0	100-200	316,600 100-300	100-300
143	143	143	143	143	143

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Special Areas		
Existing RNA/ACECs retained (#/acres)	4/1,008[8]	4/1,008[8]
Other Existing ACECs retained (#/acres)	3/201	3/201
New RNA/ACECs designated (#/acres)	1/378	378
Other new ACECs designated (#/acres)	7/1,344	5/508
Environmental Education Areas (#/acres)	2/79	2/139
Recreation Resources		
Recreation sites		
Existing (# sites/acres)	13/94	13/92
New (# sites/acres)	26/1,171	18.1,160
Trails maintained		
Existing (# trails/acres)	6/23	3/6
New (# trails/acres)	20/79	19/71.5
Special Recreation Management Areas		
Existing (#/acres)	1/277	1/277
New (#/acres)	6/24,454*	5/22,297
Back Country Byways (#/miles)	9/186	9/186
Acres open to OHV use	80	314,214
Acres limited to OHV use	rest of District	0
Acres closed to OHV use	3,120	2,378
*These acres can increase due to land exchanges and acquisitions		
Wild and Scenic Rivers		
River segments found suitable for designation:		
As Recreational (#/miles)	3/70	3/70
As Scenic (#/miles)	0	0
As Wild (#/miles)	0	0

No Action	A	B	C	D	E
4/1,008[a]	4/1,008[a]	4/1,008[a]	4/1,008[a]	4/1,008[a]	4/1,008[a]
3/20l	1/3	3/201	3/201	3/201	3/201
0	0	378	378	378	378
0	1/74	4/499	9/2,644	16/8,228	16/8,228
3/432	0	3/432	3/432	3/432	3/432
10/67	10/67	12/91	13/92	13/92	13/92
0/0	0/0	2/258	11/845	18/1,151	18/1,151
3/6	3/6	3/6	3/6	3/6	3/6
			9/22.5	19/71.5	19/71.5
1/277	1/277	1/277	1/277	1/277	1/277
			5/22,297	5/22,297	5/22,297
0	0	0	0	0	0
314,367	316,157	314,171	312,126	306,534	306534
566	358	25	25	25	25
1,659	77	2,396	4,441	10,033	10,033
0	0	1/11	1/11	1/11	3/70
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 all existing ACECs as Class I. Manage existing and proposed Rec. sites (within their viewsheeds). Shotgun SRMA and McKenzie River SRMA and Seg. A corridor as Class II. Manage other proposed SRMAs on BLM lands within 1/4 mile of RIAs as Class III. All remaining lands manage as Class IV.	Manage all existing ACECs and Shotgun SRMA as Class I. Manage Sharps, McKenzie SRMAs and recreation sites within viewshed as Class II. Manage rest of SRMAs as Class III. Remaining lands manage as Class IV.
Acres managed VRM Class I	0	1,390
Acres managed VRM Class II (GIS acres)	4,471	13,768
Acres managed VRM Class III (GIS acres)	33,130	29,413
Acres managed VRM Class IV	remaining lands	270,481

No Action	A	B	C	D	E
Manage lands as VRM IV except for McKenzie Corridor (300 acres manage as Class III) and 400 acres of ACECs (managed as Class II).	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.
400[6]	1,120	1,120	1,120	1,120	5,703
0[6]	3,071	8,005	16,434	16,434	74,444
300[6]	6,705	19,256	31,798	31,798	234,905
314,352[6]	304,156	286,671	265,700	265,700	0

Table 2-1. Comparisons of Allocations and Management by Alternative[1] (continued)

Allocations/Management Actions by Alternative	PRMP[3]	PA[2]
Land Tenure		
	Make land tenure adjustments to benefit a variety of uses and values. O&C forest lands allocated to timber management would only be exchanged for lands to be managed for multiple use. Sell Public Domain and O&C lands not suitable for permanent forest management, meeting criteria of FLPMA Sec. 203(a). Lease Public Domain and O&C lands to accommodate other appropriate uses.	Make exchanges to benefit one or more of resources managed. Only public domain lands to be exchanged to support recovery of T&E Species. Sell public domain lands and O&C lands not suitable for permanent forest management, meeting criteria of FLPMA Sec. 203(a). Lease public domain and O&C lands other than available commercial forestlands to accommodate other appropriate uses.
Acres identified for retention (Zone 1).	78,175	78,095
Acres potentially eligible for exchange only (Zone 2).	238,462	238,462
Acres potentially eligible for sale or exchange (Zone 3).	35	35
Energy and Mineral Management		
Acres available for oil and gas and geothermal leasing.	317,730	317,730
Acres closed to oil, gas and geothermal lease.	52 (oil/gas only)	52 (oil/gas only)
Acres open to mining claim location and operation.	approximately 302,000	304,432
Acres closed to mining location.	15,800	13,350

No Action	A	B	C	D	E
Make exchanges to benefit one or more of resources managed. Sell public domain lands and O&C lands not suitable for permanent forest management, meeting criteria of FLPMA Sec. 203(a). make leases to accommodate other appropriate uses.	Make exchanges to enhance nondeclining timber harvest level on BLM administered land. Sell or lease no commercial timberland.	Make exchanges of O&C lands emphasizing opportunities primarily to enhance timber management opportunities. Exchanges of public domain lands could be made to acquire lands with nontimber values. 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 of O&C lands 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, or to resolve occupancy and agricultural trespasses.	Same as D.
0	78,095	78,095	78,095	78,095	78,095
316,576	238,462	238,462	238,462	238,462	238,462
16	35	35	35	35	35
317,684	317,730	317,730	317,730	317,730	317,730
98 52 are oil and gas only)	52 (oil/gas only)	52 (oil/gas only)	52 (oil/gas only)	52 (oil/gas only)	52 (oil/gas only)
315,187 2,595	315,751 2,031	313,545 4,237	289,516 28,266	284,561 33,221	284,561 33,221

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	6,800	6,800
Acres where clearcutting, herbicide spraying and prescribed burning excluded		
Acres managed for VRM Class II objectives	0	6,800
Acres managed for VRM Class III objectives	6,800	0

[1] See narrative for management direction common to all alternatives.
[2] Preferred Alternative (PA) as published in the Eugene District draft RMP/EIS (dated August 1992). This column is being republished in this PRMP/FEIS for reviewer comparison between the draft EIS and this final EIS.
[3] Proposed Resource Management Plan (PRMP).
[4] Order 1 and 2 perennial stream would have a 75-foot Riparian Management Area (RMA) under all alternatives (see Chapter 2 discussion). Order 1, 2, and 3 fish-bearing streams would have a 150-foot RMA for the Preferred Alternative.
[5] This is low due to insufficient inventory data for the Management Framework Plan (MFP).
[6] Acres for the NA Alternative are from the 1983 MFP.
[7] One to two site trees or 300 ft. slope distance (see wildlife buffers)
[8] Additional acres of Special Status Plant Habitat have been identified since publication of the draft RMP in August 1992.
[9] Permanent and intermittent streams and other waters would be allocated as Riparian Reserves with varying widths (see Chapter 2, Riparian Reserves)
[10] Under the PRMP, SEIS Special Attention Species will also be protected, (see Appendix O).

No Action	A	B	C	D	E
0	0	4,500	6,800	6,800	19,650
0	0	0	0	6,800	19,650
0	0	4,500	6,800	0	0

Table 2-2 - Fish Presence, Production Potential and Project Location

Stream	Potential[1] Rating	Anad[2] CH	Anad[2] CO	Anad[2] ST	Resident[3] CT	Resident[3] RB	Resident[3] Other	Current[4] Projects	Proposed Projects[5] Struct	Proposed Projects[5] Ripar	Proposed Projects[5] Other
Upper Siuslaw											
Douglas	3		X		X		X			X	X
Hawley	2	X	X	X					X		X
Kelly	3	X	X	X					X	X	
Tucker	3	X	X	X					X	X	
Row River											
Mosby	2		X	X	X	X			X	X	X
Smith	3				X	X			X	X	
Sharps	3				X	X			X	X	
Clark	3				X	X			X	X	
Coast Fork Willamette											
Big River	1				X	X	X		X	X	
Martin	3			X	X				X	X	
Boulder	2				X	X			X	X	
Middle Fork Willamette											
Hills Creek	2			X	X	X			X	X	
Little Fall Cr.	1		X	X	X	X	X	X	X	X	
Anthony	2			X	X				X		
Middle	2			X	X			X	X		
Guiley	3			X	X				X		
Lost	1		X	X	X	X	X		X	X	
Central Valley											
Ferguson	3			X	X				X	X	X
Owens	3			X	X				X	X	
Brush	2			X	X				X	X	X
Mohawk											
McGowan	3			X	X	X			X	X	X
Nebo	3			X	X				X	X	
Cash	2		X	X	X	X			X	X	X
Shotgun	1		X	X	X	X	X	X	X	X	X
McKenzie											
Trout	3			X	X				X	X	
Finn	3			X	X	X			X	X	X
Gale	2			X	X	X			X	X	
Marten	1		X	X	X	X	X			X	X
Deer	1		X	X	X	X	X		X	X	X
Toms	2			X	X	X			X	X	
Smith River											
N. Fk Sister	1	X	X	X	X				X	X	

Table 2-2 - Fish Presence, Production Potential and Project Location (cont.)

Stream	Potential[1] Rating	Anad[2] CH	CO	ST	Resident[3] CT	RB	Other	Current[4] Projects	Proposed Projects[5] Struct	Ripar	Other
South Fork Alsea											
No projects identified at this time											
Lake Creek											
Rock	2	X		X	X				X		
Alpha	3		X		X				X		
S.Fk. Bear	2		X	X	X				X		
Raleigh	2		X		X				X	X	
Nelson	1		X	X	X			X	X	X	X
Fish	1	X		X	X			X	X	X	X
Greenleaf	1		X	X	X			X	X	X	X
Swamp	2		X		X		X		X	X	X
Little Lake	3		X		X		X		X	X	X
Swartz	2		X		X		X		X	X	
Congdon	1		X	X	X		X	X	X	X	
Upper Lake	1		X	X	X		X		X	X	X
Lower Siuslaw											
Walker	2		X		X				X	X	X
Upper Wildcat	2		X		X				X	X	
Whittaker	1		X	X	X		X	X	X	X	
N. Fk Whittaker	1		X		X			X	X	X	
Bounds	1		X	X	X			X	X	X	
Big Canyon	2		X		X			X	X	X	X
Esmond	1		X	X	X			X	X	X	X
Leopold	1		X	X	X			X	X	X	X
Siuslaw	1		X	X	X		X	X	X	X	X
Knowles	3		X		X				X		
Middle Siuslaw											
Pugh	2	X		X	X				X	X	
Trail	3		X		X				X	X	X
North	2		X	X	X				X	X	
Collins	3		X		X				X		
Clay	2	X		X	X				X	X	
Edris	3		X		X				X	X	
Bierce	2		X		X				X	X	
Oxbow	1		X	X	X			X	X	X	
Bear	2	X			X			X	X	X	
Haight	1		X		X				X		
Dogwood	1		X	X	X			X	X	X	
Jean	2	X			X				X	X	X
Bottle	3		X		X				X	X	X
Buck	1	X		X	X			X	X	X	
Russel	2		X		X				X	X	
Smith	1		X	X	X				X	X	
Siuslaw	1		X	X	X		X	X	X	X	X

Table 2-2 - Fish Presence, Production Potential and Project Location (cont.)

Stream	Potential[1] Rating	Anad[2] CH	CO	ST	Resident[3] CT	RB	Other	Current[4] Projects	Proposed Projects[5] Struct	Ripar	Other
Wolf Creek											
Saleratus	2		X	X	X			X	X	X	X
Bill Lewis	3		X	X	X				X		
Pittenger	3		X	X	X				X	X	X
Gall	2		X	X	X				X	X	X
Oat	1	X	X	X	X			X	X	X	X
Grenshaw	2		X	X	X			X	X	X	X
Eames	1	X	X	X	X			X	X	X	
Swamp	3		X	X	X				X	X	
Swing Log	3		X	X	X			X	X	X	
Wolf	1	X	X	X	X		X	X	X	X	X

[1] Potential Rating: A subjective rating of current and potential productivity for selected District salmonid streams. Many streams are not included, either because their potential is unknown or because the current potential is low or not economically viable at this time. Ratings are based on the size of the stream, gradient, channel stability, water quality, presence of or potential for creation of spawning areas, and presence of or potential for creation of rearing habitat. A ONE rating is highest, with TWO and THREE being the next two lowest ratings.

[2] Anadromous Salmonids: CO = Coho salmon; CH = Chinook salmon; ST = Steelhead trout

[3] Resident Fish: CT = Cutthroat trout; RB = Rainbow trout; OTHER = Non-salmonid native and introduced fish species

[4] Current Projects: Streams with recent habitat projects in place

[5] Proposed Projects: Streams with identified habitat and riparian improvement projects. STRUCT = instream and channel structure modification or improvement; RIPAR = Riparian vegetation community modification; OTHER = Other habitat improvement opportunities, primarily fish migration passage improvements

Table 2-3 - Land Withdrawals and Recommendations to Continue or Revoke Withdrawals[1]

Authority[2]	Location	Acreage	Purpose/Name	Segregative Effect[3]	Surface Management Agency[4]	Recommendation to Continue or Revoke and Rationale
ANS 58-1[6]	T.15S., R.7W.	40.00	Air navigation/ Prairie Mtn.	A	FAA/BLM	Revoke 40 acres where only FAA facility is a road that can be protected by a right-of-way reservation. FAA concurs in revocation.
PLO 497	T.17S., R.5W. Sec. 27,28	5.27	Reservoir/ Fern Ridge	A	COE	Modify withdrawal to restore land to mineral leasing laws. Continue rest of withdrawal as it is still serving purpose for which withdrawn. Leasing is discretionary and leases may be conditioned or denied to protect COE improvements and resource values.
PLO 727	T.19S., R.1E. Sec. 34	1.37	Reservoir/ Lookout Pt.	A	COE	Modify withdrawal to restore land to mineral leasing laws. Continue rest of withdrawal as it is still serving purpose for which withdrawn. Leasing is discretionary and leases may be conditioned or denied to protect COE improvements and resource values.
PLO 3610	T.18S., R.1E. Sec. 31 T.19S., R.1E. Sec. 6	81.20	Reservoir/ Fall Creek	B	COE/BLM	Revoke 33.50 acres not used or needed for reservoir. Continue 44.70 acres still serving purpose for which withdrawn. COE concurs in partial revocation.
PLO 3869	T.16S., R.7W. Sec.19 T.18S., R.8W. Sec. 21 T.19S., R.7W. Sec. 19 Sec. 35 T.22S., R.1W. Sec. 15	440.12	Recreation Sites/ Lake Creek, Whittaker Creek, Turner Creek, Clay Creek, Haight Creek, Sharps Creek	B	BLM	Revoke 40.00 acres (Turner Creek) as site is no longer needed for recreation. Continue 400.12 acres as these lands are still being used for the purpose for for which they were withdrawn.
PLO 4395[6]	T.16S., R.12W. Sec. 33	1.00	Wildlife Refuge/ Oregon Islands	B	USFWS	Continue - Land is still needed for the purpose for which it was withdrawn.

Table 2-3 - Land Withdrawals and Recommendations to Continue or Revoke Withdrawals[1] (continued)

Authority[2]	Location	Acreage	Purpose/Name	Segregative Effect[3]	Surface Management Agency[4]	Recommendation to Continue or Revoke and Rationale
PLO 5229	T.15S., R.1W. Sec. 29-32	260.00	Recreation Site/ Shotgun Creek	B	BLM	Continue - Lands are still being used for the purpose for which they were withdrawn.
PLO 5490[6]	[5]	9,055.90	Reserved for Multiple Use Management	D	BLM	Continue - Reservation is still needed to assure Public Domain will not be subject to entry under agricultural land laws and will remain in public ownership for management with adjoining O&C lands.
PLO 6287[6]	T.16S., R.12W. Sec. 33	1.00	Wildlife Refuge/ Oregon Islands	B	USFWS	Continue - Land is still needed for the purpose for which it was withdrawn.
PLO 6662	T.20S., R.5W. Sec.9,15,21	832.50	Tyrrell Seed Orchard	B	BLM	Continue - Lands are still being used for the purpose for which it was withdrawn.
PSC 287	T.18S., R.6W. Sec. 5	120.00	Protect Electric Transmission Line	C	BLM/FERC	Revoke - Powerline has been removed. Land not needed for future hydropower development.

[1] Does not include withdrawals located within National Forest boundaries or powersite withdrawals that have not yet been reviewed under FLPMA withdrawal review authority. See Table 3-13 of Appendix L for complete listing of withdrawals affecting BLM lands in the Eugene District.
[2] Authority Abbreviations: ANS - Air Navigation Site; PLO - Public Land Order; PSC - Power Site Classification
[3] Segregative Effect:
A - Withdrawn from operation of the general land laws, the mining laws and the mineral leasing laws.
B - Withdrawn from operation of the general land laws and the mining laws.
C - Withdrawn from operation of the general land laws only.
D - Withdrawn from operation of the general land laws, but not from the R&PP Act, sales or exchanges.
[4] Agency Acronyms: FAA - Federal Aviation Administration; BLM - Bureau of Land Management; COE - U.S. Army Corp of Engineers; USFWS - U.S. Fish and Wildlife Service; FERC - Federal Energy Regulatory Commission.
[5] All public domain lands in and west of Range 8 East and all lands within that area that become public domain lands in the future.
[6] Location, acreage and recommendations shown pertain only to that portion of the withdrawal within the Eugene District.

Table 2-5 - Buffering of Special Habitats

Special Habitat	Buffer by Alternative (feet) PRMP
Natural Ponds/lakes/vernal pools/slump ponds	2 site trees or 300' slope distance (ROD, p. 9)
Constructed water bodies > 1 acre	1 site tree or 150' slope distance (ROD, C-30, p. 9)
Bogs, Swamps	1 site tree or 100' slope distance (ROD, C-31)
Mesic (wet) Meadows/Prairie	1 site tree or 100' slope distance (ROD, C-31)
Moist Rock Gardens	1 site tree or 100' slope distance (ROD, C-31)
Dry Rock Gardens, Dry Meadows/prairie	100' to 200'
Rock Outcrops, Talus habitats	100' to 200'
Caves, Rock Overhangs	250' (if occupied by bats) (SEIS, p. D-10) or 100-200'
Mines	250' (if occupied by bats) (SEIS, p. D-10) or 100-200'
Man-made structures (bridges, buildings)	250' (if occupied by bats) (SEIS, p. D-10) or 100-200'
Mineral deposits (e.g., mineral springs, salt licks, etc.)	100-200' (or as required under wetland in SEIS/ROD)

Other unique vegetative types, geological features and small patches of diverse habitat that occur within larger areas of more homogeneous habitat and that have special value to wildlife or plants (including sand dunes/ coastal deflation plains, ponderosa pine stands, oak and oak woodlands, ash swales, cottonwood patches, madrone woodlands, etc.) will be maintained throughout the landscape as compatible with land use objectives and special status species management. No inventories of these areas have been conducted with wildlife or plant requirements in mind, although TPCC areas have been delineated for timber purposes. As additional field work is conducted and unique areas are located, they will be identified as special habitats (BLM manual 6602.12D) and incorporated into watershed analysis. Although no standard buffer is recommended for these types, buffers are one of many management techniques that may be suggested through watershed analysis to maintain or protect the values that make these areas unique. See Chapter 3 description.

Table 2-5a - Sensitive Plant Reserve Protection by Species/Proposed Alternative in the Eugene District

Species	Category	Reserved Acres
Lomatium bradshawii	FE	17
Abronia umbellata	FC[2]	1
Aster vialis	FC[2]	493
Montia howellii	FC[2]	7
Erigeron decumbens var. *decumbens*	FC[2]	79
Aster curtus	FC[2]	79
Frasera umpquaensis	FC[2]	29
Horkelia congesta ssp. *congesta*	FC[2]	17
Cimicifuga elata	FC[2]	521
Lycopodiella inundata	AS	6
Cicendia quadrangularis	AS	10
Utricularia gibba	AS	6
Campylopus schmidii	AS	1
Total Acres		**1,044[1]**

FE = Federal Endangered
FC = Federal Candidate
BS = BLM Bureau Sensitive
AS = BLM Assessment Species

[1] All acres will not total up to 1044 when adding columns. Several species occur together at the same sites. These sites were not counted twice for the same acres.

[2] In most cases all Special Status Plant sites include adequate buffers to protect and to manage the species. Reserve acres are expected to change as new sites are located.

Table 2-6 - Management of Proposed Special Areas

Name	Acres	Off-Highway Vehicle Designation	Leasable Mineral Entry	Locatable Mineral Entry	Salable Mineral Entry	Timber Harvest
Camas Swale ACEC/RNA	314	Closed	Open - NSO	Closed	Closed	No
Coburg Hills RFI ACEC	804	Closed	Open - NSO	Closed	Closed	No
Cottage Grove[1] Old Growth EEA	80	Closed	Open - NSO	Closed	Closed	No
Cottage Grove Lake RFI ACEC	53	Closed	Open - NSO	Closed	Closed	No
Cougar Mountain Yew Grove ACEC	10	Closed	Open - NSO	Closed	Closed	No
Dorena[1] Prairie Potential ACEC	8	Closed	Open - NSO	Closed	Closed	NA[2]
Dorena Lake RFI ACEC	18	Closed	Open - NSO	Closed	Closed	No
Fox Hollow ACEC/RNA	160	Closed	Open - NSO	Closed	Closed	No
Grassy Mountain ACEC[1]	74	Closed	Open - NSO	Closed	Closed	No
Heceta Sand Dunes ACEC	218	Closed	Open - NSO	Closed	Closed	No
Horse Rock Ridge ACEC/RNA	378	Closed	Open - NSO	Closed	Closed	No
Hult Marsh ACEC	167	Closed[4]	Open - NSO	Closed	Closed	No
Lake Creek Falls ACEC/ ONA	58	Closed[4]	Open - NSO	Closed	Closed	No
Long Tom ACEC	7	Closed	Open - NSO	Closed	Closed	NA[2]

Table 2-6 - Management of Proposed Special Areas (continued)

Name	Acres	Off-Highway Vehicle Designation	Leasable Mineral Entry	Locatable Mineral Entry	Salable Mineral Entry	Timber Harvest
Lorane[1] Ponderosa Pine Potential ACEC	106	Closed	Open - NSO	Closed	Closed	Potential[3]
Low Elevation[1] Headwaters of the McKenzie River Potential ACEC	7,650	[5]	Open - NSO	Closed	Limited	Potential[3]
McGowan Creek EEA	79	Closed	Open - NSO	Closed	Closed	No
Mohawk ACEC/RNA	292	Closed	Open - NSO	Closed	Closed	No
Upper Elk Meadows ACEC/RNA	223	Closed	Open - NSO	Closed	Closed	No

[1] These ACEC nominations were received between the Draft and Final RMP. They have gone through the ACEC screening process and have been determined to quality as potential ACEC.

Because they have not gone through the required public review period, they will be carried forward as potential ACEC/EEA until a RMP ammendment is implemented or until a new planning process occurs. Areas will receive interim management where necessary to protect the relevant and important values until such a time as designation is possible.

[2] Some removal of conifers and hardwoods can occur in order to maintain the prairie conditions for which these areas were nominated.

[3] Any potential timber harvest within these areas will be permitted only it such actions are consistent with maintaining or enhancing the primary values of the ACEC nomination areas.

[4] See OHV Appendix T, Chapter 2 for further discussion.

[5] The Low Elevation Headwaters of the McKenzie River Potential ACEC will need further analysis during the OHV planning process before any designation can be assigned to provide interim management for this area.

Table 2-7a - Proposed Recreation Trails and Sites in the PRMP

Proposed Trail Name	Length of Trail	Comments
Blachly-Lane Flume	1.0 mile[1]	
Big Canyon	1.0 mile	
Clay Creek	1.0 mile	
Coburg Hills	23.0 miles	
Coburg Hills Connector	6.0 miles	
Deadwood-Windy Peak	6.0 miles	
Fish Creek	3.0 miles	
FS Trail (no number)	0.5 mile	(portion on BLM)
Greenleaf Creek	3.0 miles	
Haskins Creek	4.0 miles	
Hult Equestrian Loop	2.0+ miles	
Lake Creek	1.0 mile	
Overland	2.0 miles	
Marten Creek	4.0 miles	
South Bank McKenzie	6.0 miles	
Row River Expansion	5.0 miles	
Sharps Creek	1.0 mile	
Shotgun additions (2 trails)	1.5 miles	
Siuslaw River	2.0 miles	
Whittaker Creek Falls	3.0 miles	
Other Trails		Ongoing in all Resource Areas. Potential to develop additional trails that would be consistent with the other provisions of the PRMP.
Total: 20 trails (79 miles)		

Proposed SRMAs	Type of Site	Comments
Gilkey Creek	day use	
Lower Lake Creek	camping/day use	
McKenzie River	camping/day use	some PD lands
Row River	camping/day use	
Siuslaw River	camping/day use	
Upper Lake Creek	camping/day use	
Other SRMAs		Ongoing in all Resource Areas. Potential to develop additional SRMAs that would be consistent with the other provisions of the PRMP.
Total: 6 SRMAs		

Table 2-7a - Proposed Recreation Trails and Sites in the PRMP (continued)

Proposed SRMAs	Type of Site	Comments
Blachly-Lane Flume Trailhead	day use	
Culp Creek Trailhead	day use	
Disston Trailhead	day use	
Doe Creek	day use	
Esmond Lake	camping	
Edwards Creek	camping/day use	
Fall Creek Reservoir	day use	
Fall Creek	day use	
Frying Pan	camping	
Haight Creek*	camping/day use	
Heceta Sand Dunes	day use (PD lands)	proposed ACEC/ONA
Homestead	camping	
Hult Pond	camping/day use	
Lake Creek*	camping/day use	
Marten Rapids*	day use	R&PP lease
Mosby Creek Trailhead	day use	
N. Fork Gate Creek	camping/day use	
Oxbow	camping	
Overland Trailhead	day use	
Red Bridge Trailhead	day use	
Saleratus	day use	
Sharps Creek Expansion	camping/day use	
Sidog	camping/day use	
Siuslaw Bend	camping/day use	
Whitewater Park*	day use	R&PP lease
Wolf Creek Falls	day use	
Other recreation sites		Ongoing in all Resource Areas. Potential to develop additional recreation sites that would be consistent with the other provisions of the PRMP.

Total: 26 sites

Note: Cannery Dunes ACEC/ONA, Mohawk Wayside, and Row River Environmental Education Area were all dropped as proposed recreation sites in the PRMP.

[1] Miles are rounded from GIS calculations, and reflect total trail miles on BLM and private land. The type of trail, hiking, nonmechanical, etc. would be deterimined when preparing the trail plan.

* These sites are also listed on Table 2-7b because they have been operational in the past. Refer to the text.

Table 2-7b - Existing Recreation Trails and Sites in the PRMP

Existing Trails	Type of Trail
Eagle's Rest	Hiking (0.7 mile[1])
FS Trail #3462 (portion on BLM)	Hiking (0.2 mile)
Row River	Hiking/bicycling/equestrian (14 miles)
Shotgun Trail System	Hiking (5.7 miles)
Tyrrell Forest Succession Interpretive	Hiking (1 mile)
Whittaker Creek Old Growth Ridge	Hiking (1 mile)

Total: 6 trails (23 miles)

Existing SRMA	Type of Site
Shotgun Recreation Site	day use

Existing Sites/Areas	Type of Site
Clay Creek Campground	camp/day use
Willamette Greenway Tract (leased to State)	Greenway use (R&PP lease)
Haight Creek Campground*	camp/day use (closed)
Lake Creek Campground*	camp/day use (closed)
McKercher Park (County Park)	day use (R&PP lease)
Marten Rapids (County Park)*	day use (closed, R&PP lease)
Rennie Landing	boat landing
Sharps Creek Campground	camp/day use
Silver Creek Landing	boat landing
Taylor Landing	boat landing
Whitewater Park (County Park)*	day use (closed, R&PP lease)
Whittaker Creek Campground	camp/day use
Whittaker Creek Landing	boat landing

Total: 13 sites

Note: It was decided to keep Turner Creek closed for the PRMP and return it back to the land base. Therefore it is not listed here.

[1] Miles are rounded from GIS calculations, and reflect total trail miles on BLM and private land

* Also on Table 2-7a as these sites are currently not maintained and closed, and are proposed to be reopened. Refer to the text.

Table 2-8 - Oil and Gas and Geothermal Lease Restrictions (1000 Acres)

Restriction	Acres
Closed - Nondiscretionary [1]	<0.1
Closed - Discretionary	0
Open - No Surface Occupancy [2]	177
Open - With Standard Lease Terms	0
Open - With Additional Restrictions [3]	139

[1]Lands within city limits (oil and gas only).
[2] Fall Creek Reservoir, Fern Ridge Reservoir, Lookout Point Reservoir, Oregon Islands NWR, Tyrrell and Dorena Seed Orchards, Walton and Whites Creek Maintenance Sites, Land Use Authorizations, Recreation Sites, Special Areas, Riparian Reserves, great blue heron rookeries, osprey nest sites.
[3] Special Recreation Management Areas, Suitable and Eligible Recreational Rivers, Powersite Withdrawals, Corps of Engineers Withdrawals, VRM Class II lands, Fragile Slopes, mineral springs utilized by band-tailed pigeons, Federal Mineral Estate Only (add 47 acres across all alternatives for oil and gas), Late-Successional Reserves, Special Status Species.

Table 2-9(a) - Locatable Mineral Restrictions (1000 Acres)

Restriction	Acres
Closed - Nondiscretionary [1]	<0.4
Closed - Discretionary [2]	15
Open - Standard Requirements	291
Open - With Additional Restrictions [3]	10

[1] Fall Creek Reservoir, Fern Ridge Reservoir, Lookout Point Reservoir, Oregon Islands NWR, Dorena Seed Orchard, Walton Maintenance Site, Other Lands with Acquired Land Status.
[2] Pending BLM applications for withdrawal, R&PP classifications, Danebo Office Site, Tyrrell Seed Orchard, Recreation Sites, Special Areas, Whites Creek Maintenance Site.
[3] Progeny Test Sites, Regional Forest Nutritional Study Installations, Community Pits, Designated Recreational River Segments, Threatened and Endangered Species, Federal Mineral Estate Only, Powersite Classifications (placer operations only).

Table 2-9(b) - Salable Mineral Restrictions (1000 Acres)

Restriction	Acres
Closed - Nondiscretionary [1]	<0.1
Closed - Discretionary [2]	9
Open - Standard Requirements	<0.1
Open - With Additional Restrictions [3]	307

[1] Fall Creek Reservoir, Fern Ridge Reservoir, Lookout Point Reservoir, Oregon Islands NWR.
[2] Danebo Office Site, Tyrrell and Dorena Seed Orchards, Walton and Whites Creek Maintenance Sites, Progeny Test Sites, Regional Forest Nutritional Study Installations, R&PP Classifications, Recreation Sites, Special Areas (except Low Elevation Headwaters of the McKenzie River), great blue heron rookeries, osprey nest sites.
[3] Federal Mineral Estate Only, Special Recreation Management Areas, VRM Class II Lands, Mineral Springs utilized by the band-tailed pigeon, Special Status Species, Suitable and Eligible Recreational Rivers, Riparian Reserves, Late-Successional Reserves.

Table 2-10 - Average Emission Factors (lb. PM emission per ton of fuel consumed)

Type of Burn	Particulate Matter(PM)
Broadcast	34 lbs/ton
Tractor Pile	20
Handpile	12
Underburn	29

Table 2-11 - Average Consumption Rates (in tons per acre)

Broadcast Burning	
Baseline (1976-1979)	63.6
Current	28.0
Pile Burning	
Tractor Pile	25.0
Hand Pile	12.0
Underburning	14.0

Table 2-12 - Acres by Treatment Method

	Baseline	PRMP
Method:		
Tractor Pile	65	360
Broadcast	2,238	190
Underburn	0	550
Handpile	0	320
Consumption:		
Total Tons	**143,962**	**25,860**
PM Emission:		
Total Tons	**2436**	**370**

Table 2-14 - Lands Recommended for Transfer To or From Other Public Agencies

Township	Agency Range	Agency Section	Public Subdivision	From	To	Acres
14S	2E	11	S½	USFS	BLM	320.00
14S	2E	15	NE¼SE¼	USFS	BLM	40.00
14S	2E	21	S½NE¼,SE¼NW¼,NE¼SW¼	USFS	BLM	160.00
16S	2E	25	NE¼NW¼	USFS	BLM	40.00
16S	9W	35	S½NE¼NE¼SE¼, N¼SE¼NE¼SE¼, SE¼SE¼NE¼SE¼, S¼SW¼SE¼, SW¼NE¼SE¼SE¼, NE¼NW¼SE¼SE¼, S½NW¼SE¼SE¼, SW¼SE¼SE¼, W½SE¼SE¼SE¼	USFS	BLM	57.50
17S	9W	3	Portion of Lot 1 lying East of Deadwood County Road	USFS	BLM	40.00[1]
17S	11W	19	Lot 1	BLM	USFS	44.82
18S	10W	3	Lot 5	BLM	USFS	39.12
18S	10W	10	S½SW¼	BLM	USFS	80.00
18S	10W	14	SW¼SW¼	BLM	USFS	40.00
20S	1E	17	SE¼NE¼, NE¼SE¼	BLM	USFS	80.00
20S	2W	31	M&B in DLC 39	BLM	USFS	75.69[1]
20S	2W	32	M&B in DLC 38, DLC 39	BLM	USFS	95.07[1]
20S	2W	32	M&B in DLC 39	BLM	COE	1.00[2]
20S	2W	32	M&B in DLC 39	COE	BLM	1.00[2]
21S	2W	5	M&B in DLC 38, DLC 39 and Lot 5	BLM	USFS	119.51[1]
21S	2W	6	M&B in DLC 39	BLM	USFS	45.87[1]

[1] Actual acreage transferred may be less than the full tract.
[2] Acreage is approximate. May also be transferred to USFS.
Abbreviation Key:
M&B = Metes and Bounds
DLC = Donation Land Claim
USFS = U.S. Forest Service
COE = U.S. Army Corp of Engineers

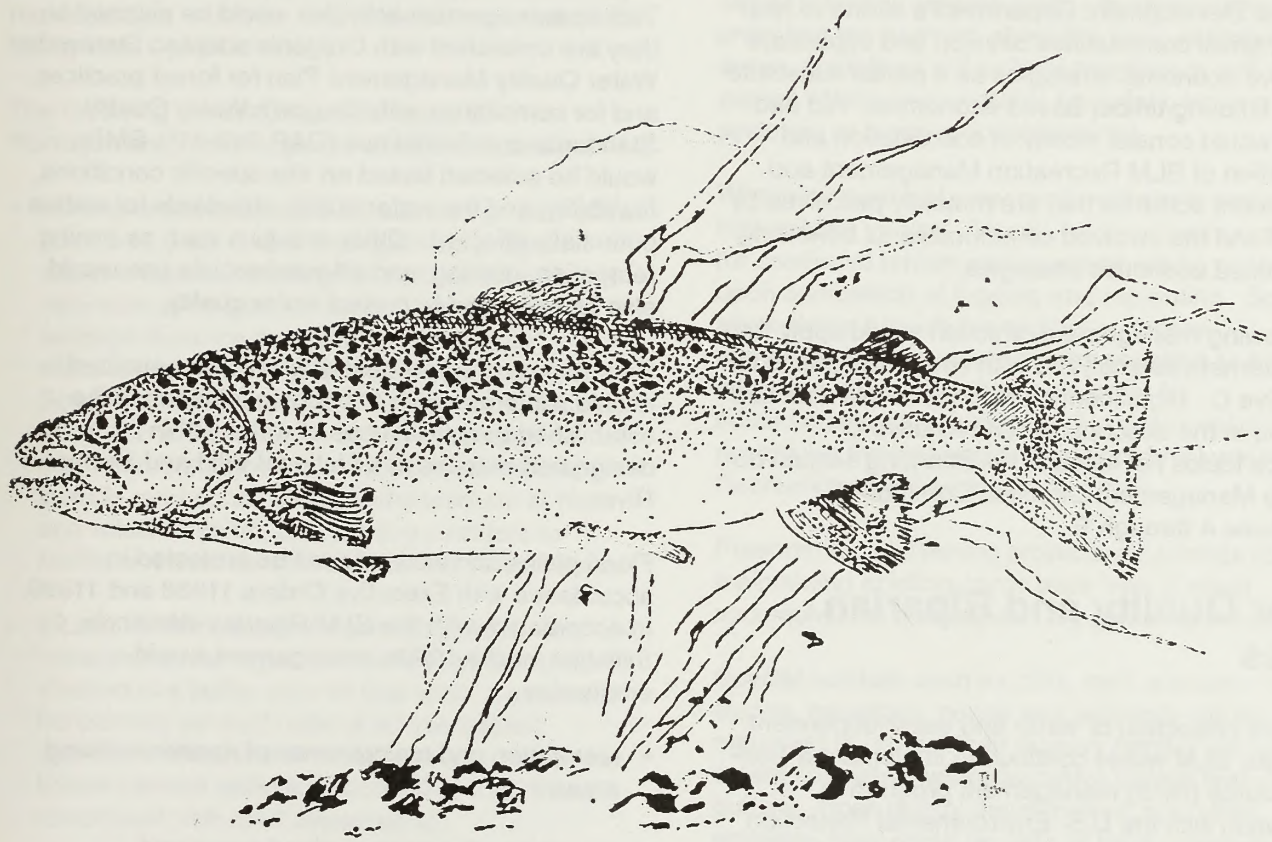
Table 2-19 - Land Tenure Zone 3 Lands

Township	Range	Section	Subdivision	Status	County	Public Acres
14S	2W	13	Lots 4-5 (part)[2]	O&C	Linn	2.00[1]
15S	3W	15	Lot 6	O&C	Lane	0.87[3]
16S	5W	33	Lots 4-8	O&C	Lane	6.57
17S	1W	3	NW¼NW¼ (part)	O&C	Lane	1.00[1]
18S	1W	5	Lot 8 (part)	O&C	Lane	0.50[1]
18S	1W	26	Lots 7-10	PD	Lane	2.89
18S	7W	11	NE¼NE¼(part)	O&C	Lane	3.00[1]
18S	10W	11	Lot 9	PD	Lane	6.24
19S	3W	35	Lot 3[2]	O&C	Lane	2.79
19S	4W	29	NE¼SW¼ (part)	O&C	Lane	0.36[1]
21S	1W	31	Tract 37, Lot 6 (part)	O&C	Lane	9.94[1]
21S	1W	35	Lot 2	O&C	Lane	0.28

[1] Acreage is approximate until cadastral survey is completed.
[2] Tract may be sold only to current R&PP lessee so long as lease is in effect.
[3] Acreage and legal description may change upon completion of cadastral survey.

All tracts specified meet the sale criteria at 43 CFR 2710.0-3(a)(3) that "Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the public lands and is not suitable for management by another Federal department or agency."
In addition, all O&C tracts specified are not ". . . more suitable for management and administration for permanent forest protection and other purposes as provided for in the Acts of August 28, 1937 (50 Stat. 874; 43 U.S.C. 1181(a); May 24, 1939 (53 Stat. 753); and Section 701(b) of the . . ." Federal Land Policy and Management Act of 1976, and are thus not excepted from sale eligibility by 43 CFR 2710.0-8(a)(1).

Section 3 of Chapter 2



Management Direction Common to Alternatives A Through E by Resource Topic (Section 3)

General

Inherent in all management practices is a goal of maintaining long-term site productivity. However, losses in productivity are anticipated due to surface disturbances caused by management activities. By implementing Best Management Practices (BMP) (see Appendix G) and minimizing disturbance of fragile areas, these losses would be kept to a minimum.

The BLM would aid and support the State of Oregon Economic Development Department's efforts to help isolated, small communities develop and implement alternative economic strategies as a partial substitute for their faltering timber based economies. Aid and support would consist mostly of coordination and prioritization of BLM Recreation Management and development activities that are mutually perceived by the BLM and the involved communities as benefiting the identified economic strategies.

The following management direction would apply fully to the alternatives analyzed with some exceptions for Alternative C. Significant exceptions to this direction are noted in the description of Alternative C. Resource topics not listed in the following section do not have Management Direction Common to Alternatives A through E.

Water Quality and Riparian Zones

To assure protection of water and water-dependent resources, BLM would continue to implement a Non-Point Source (NPS) management program in cooperation with the U.S. Environmental Protection Agency (EPA) and the Oregon Department of Environmental Quality (DEQ).

Section 319 of the Clean Water Act directs the States to prepare a Statewide management plan that outlines a NPS pollution control program. Oregon's NPS management program includes 2 goals for NPS prevention and control efforts: (1) the protection, in every water body, 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 and maintain water quality necessary to protect identified beneficial uses.

The Oregon NPS management plan requires BLM to continue coordination with DEQ for implementation of Best Management Practices (BMP), which protect the beneficial uses of water. The State of Oregon has identified beneficial uses and applicable water quality criteria for the Mid Coast (OAR 340-41-242 and OAR 340-41-245) and Willamette Basins (OAR 340-41-442 and OAR 41-445). Policy and guidelines, including antidegradation, generally applicable to all Basins are listed in OAR 340-41-026(1)(A). BMPs are those land and resource management techniques designed to maximize beneficial results and minimize detrimental results. BMPs are listed in Appendix G.

Timber management activities would be planned so they are consistent with Oregon's adopted Statewide Water Quality Management Plan for forest practices, and for compliance with Oregon's Water Quality Standards and Guidelines (OAR 340-41). BMPs would be selected based on site-specific conditions, feasibility, and the water quality standards for waters potentially affected. Other activities such as mining, recreation, grazing, and off-road vehicle use would also be regulated to protect water quality.

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 a National Wild and Scenic River.

Flood plains and wetlands will be protected in accordance with Executive Orders 11988 and 11990. In accordance with the *BLM Riparian-Wetlands Initiative for the 1990s*, management would emphasize:

- restoration and maintenance of riparian-wetland areas
- protection of riparian-wetland areas and associated uplands

- partnership and cooperative restoration and management of riparian-wetland areas

Riparian Management Areas (RMA) would be established on each side of all streams, lakes, ponds, and other waters that will meet or exceed Oregon Forest Practice Act requirements and Oregon water quality standards (see Figure 2-2 at the end of this chapter).

The exclusion of fragile nonsuitable sites from the timber production base through the Timber Production Capability Classification (TPCC) process, and the commitment in the Resource Management Plan (RMP) 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 watershed in the Environmental Impact Statement (EIS) for this RMP 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).

The management goal in watersheds providing surface water used by public water systems serving municipalities would be to provide treatable water at the system's point of intake.

The following constraints would apply to management in and adjacent to riparian zones:

- No timber harvest would 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, varying by alternative, on each side of perennial 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, and yarding corridors to facilitate timber harvest outside the 50-foot zone.

- Brush, hardwoods, and nonmerchantable and noncommercial vegetation would not be cut or slashed in a buffer strip 25 feet wide, measured horizontally on each side of all intermittent (generally 1st and 2nd order) streams, whenever timber harvest activities occur other than those associated with road construction.

- Standards that would be followed in riparian management areas are listed in Appendix G.

Wildlife (including Fish) Habitat

Nonmerchantable dead and down woody material will be retained on areas from which timber is harvested to the extent compatible with alternative design features relative to reforestation objectives, fire hazard reduction standards, and watershed protection objectives. Gross yarding planned to meet these objectives will be constrained in accordance with alternative design features to maintain dead and down woody debris. Salvage of down, dead material from other lands will also be constrained to meet alternative design features for protection of dead and down woody debris.

Except where public safety is a concern, snags will be retained where they occur on lands not allocated to timber production. Unmerchantable snags will also be left in timber harvest units to the extent compatible with safety and other concerns such as fire hazard reduction needs. Where opportunities exist to provide habitat for woodpecker and secondary cavity users, 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 encourage loggers to retain all snags and nonmerchantable trees that can be left safely in timber harvest areas. In alternatives providing for retention of wildlife trees in timber sale areas, guidelines will include retention of soft snags except where unacceptable for safety, logging systems, or burning considerations.

Wherever practical, new roads will avoid areas with high wildlife values. Access on spur roads unneeded for continued timber management will be controlled upon completion of logging and replanting. Some alternatives provide for additional access management to protect species sensitive to human intrusion. All roads will remain open for administrative use, forest products removal, and access for mineral exploration and development (see Recreation direction for more detail).

Precommercial thinning projects will provide for maintaining existing game trails free of slash accumulations that impede big game movement.

Special habitats such as cliffs, rock outcrops, talus slopes, meadows, ponds and wetlands will be managed to protect their primary habitat values to the extent consistent with alternative design features for buffers. Rock quarry development, and other activities, may occur on cliffs or talus slopes to the extent compatible with alternative design features for protection of special status species.

Seedings to provide forage for elk will be done in timber harvest areas within the ODFW elk emphasis areas to the extent compatible with continued timber production if forage is in short supply, e.g., less than 20 percent of all forest lands within a drainage is in the early seral stage.

Any leasable or salable mineral exploration and development activities will be conducted to avoid degrading special habitats.

Special Status and SEIS Special Attention Species Habitat (Plants)

Federally Listed plant species, and proposed threatened or endangered plant species and associated habitats, will be protected, monitored and managed in accordance with the Endangered Species Act as legally required for self-sustaining species survival. Prior to any vegetative or ground manipulation, or any disposal of O&C or Public Domain land, a review of the affected site or tract(s) will be conducted for Special Status plants. Consultation or conference with the U.S. Fish and Wildlife Service will be initiated on all "may affect" determinations.

If a project might affect any Federal threatened or endangered plant species or its critical habitat, the project will be modified, relocated or abandoned in order to obtain a "no effect" determination. No discretionary activities will be undertaken or permitted that will jeopardize populations of Federally Listed threatened or endangered plants or species officially proposed for such listing. Nondiscretionary activities such as locatable mineral exploration or development, which might jeopardize Federally Listed threatened or endangered plants, may have to be resolved between the BLM, USFWS, and the claimants.

Where plants are protected under a given alternative, adequate buffers will be established where biologically appropriate to protect Special Status Plant Species. Management tools could be used to enhance Special Status Plant Species and associated habitats such as in the use of prescribed fire.

Habitat Management Plans will be written and implemented for all Special Status Plant Species. Systematic inventories and studies will be conducted on Special Status Plant Species where baseline information is currently lacking.

Acquisitions for Special Status plant sites may be made through exchange, purchase, conservation easements, or donations to enhance or acquire priority plant sites. This will depend on a variety of criteria including the preference of a landowner and on the method of acquisition allowable under a given alternative. See Table 2-5a for Special Status Plant Species Protection by Alternative.

Special Status and SEIS Special Attention Species Habitat (Animals)

All actions relative to the habitats of Federally listed or proposed threatened or endangered species will be thoroughly planned, analyzed, and implemented as required by law. Prior to any vegetative or ground manipulation, or any disposal of BLM administered land, a review of the affected site or tract(s) will be conducted for such plants and animals. The alternatives do not assume that required levels of protection of listed or proposed species are known unless there was a recovery plan in effect before the alternatives were formulated. Thus, for instance, some alternatives provide no specific allocation of lands for protection of spotted owls, although most alternatives include allocations that provide some protection for spotted owl sites.

If a project might affect any Federal threatened or endangered species or its critical habitat, effort will be made to modify, relocate, or abandon the project in order to obtain a "no effect" determination. In any case where BLM determines that such a project cannot be altered to eliminate the potential effect, and abandonment of the project is not considered appropriate, consultation with the U.S. Fish and Wildlife Service will be initiated. No activities will be undertaken or permitted that will jeopardize populations of Federally listed threatened or endangered plants or animals, or species officially proposed for such listing.

All actions will be consistent with the Pacific Bald Eagle Recovery Plan. Known habitat sites and potential sites identified in the Recovery Plan Implementation Plan will be protected.

Habitat Management Plans (HMP) will be written and implemented, incorporating the responsible BLM management actions identified in all Recovery Plans.

Rock quarry development, and other activities, may occur on cliffs or talus slopes to the extent compatible

with alternative design features for protection of special status species.

As funding permits, systematic inventories and studies will be conducted on special status species where baseline information is currently lacking.

Stream channel and pond integrity with associated riparian areas will be protected during all activities to conserve the Oregon chub.

Special Areas

Any areas considered appropriate for Research Natural Area (RNA) status or Outstanding Natural Area (ONA) status would also be designated as Areas of Critical Environmental Concern (ACEC). Existing Areas of Critical Environmental Concern (ACEC) that are selected for continued management as ACEC would be managed in accordance with existing guidelines (i.e., ACEC management plan guidelines or guidelines equivalent to those in the current land use plan for ACEC without approved ACEC management plans). All designated ACEC would be managed to maintain and/or enhance the primary resource value for which the area has been designated. Site specific management plans would be prepared and implemented for newly designated areas and may be modified for existing special areas where management objectives have changed.

Fire suppression plans would be developed where it is determined that natural fire would diminish the resource values for which the area was designated. Fire suppression tactics will be determined in the site-specific management plans, including the use of fire suppression equipment. Prescribed fire could be used to achieve management objectives. Special Areas would be withdrawn from locatable mineral entry and would be closed to salable mineral development. Mineral leasing in these areas would be subject to the very restrictive no surface occupancy stipulation.

No timber harvesting would be allowed in ACEC. Off-Highway Vehicle (OHV) use would not be permitted in ACEC. Acquisitions may be through exchange, purchase, conservation easements, or donations to enhance or acquire special area habitat, and the method of acquisition allowable under a given alternative could vary according to the alternative. This would depend upon the preference of a landowner. Special Forest Products removal would be prohibited.

Some candidate ACEC were dropped from ACEC consideration through interdisciplinary team analysis because they did not meet BLM eligibility criteria. These areas would be managed in a variety of ways, depending on the alternative selected.

Visual Resources

Management approaches to VRM II objectives would be determined on a site-specific basis. Examples of how timber harvests in certain high visual impact situations could be planned and designed are:

Single tree selection
Uneven-aged harvest
Retention of shelterwood overstory trees
Leave trees in selected areas to block views of harvest units

Management approaches to VRM III objectives would be determined on a site-specific basis. The changes caused by management activities may be evident, but should remain subordinate to the existing characteristic landscape. Examples of how timber sales in certain high visual impact situations could be planned and designed are:

Design regeneration harvest to mimic natural openings

Dispose of debris; seed disturbed areas with grass and forbs; fertilize disturbed areas; and plant large nursery stock

Leave some trees to block views of harvested units

No specific timber management constraints would apply to lands managed for VRM Class IV objectives. However, mitigation of visual effects would be incorporated where consistent with efficient timber harvest or other management activities.

Wild and Scenic Rivers

The BLM uses a three-step Wild and Scenic Rivers study process. The first two steps, determining eligibility and potential classification, were completed in the summer of 1990. The third step, determining suitability, has been done through this planning process. Final decisions concerning the designation of Wild and Scenic Rivers is made by Congress. The Eugene District does not have any designated rivers.

Files used to document eligibility and potential classification are maintained in the Eugene District Office. Guidelines for determining river eligibility and classification can be found in Federal Register, Vol. 174, September 7, 1982, and BLM Instruction Memorandum OR-89-632.

The corridor width for all rivers found eligible or studied for suitability is defined as a quarter-mile on either side of the high water mark of the river constituting a half-mile wide corridor.

Interim management of BLM administered land within the half-mile corridor would be provided to protect Outstandingly Remarkable Values for all streams found eligible but not studied by BLM in this RMP (generally, those segments where BLM administers less than 40 percent of the land base within the half-mile corridor), and all streams studied and found suitable. Management guidelines and standards for designated National Wild and Scenic Rivers, which also apply to segments under interim management, are described in Appendix X. Exploration and development of locatable minerals would be conducted in a manner that would prevent unnecessary and undue degradation Salable mineral development would not be allowed on designated river segments unless the authorized Officer determines that impacts from a proposed development are acceptable or can be adequately mitigated. Leasable mineral activities would be subject to a controlled surface use special leasing stipulation.

Interim protective management for potential **recreational** segments would:
- Exclude timber harvest in the Riparian Reserves
- Protect the segment's free flowing values
- Protect the segment's identified Outstandingly Remarkable Value(s)

Interim protective management for potential **scenic** river segments would:
- Exclude timber harvest in the Riparian Reserves
- Provide VRM Class II management in the one-half mile wide corridor
- Protect the segment's free flowing values
- Protect the segment's identified Outstandingly Remarkable Value(s)

Interim protective management for potential **wild** river segments would:
- Exclude timber harvest and other disturbing activities within the one-half mile wide corridor
- Provide VRM Class I management in the one-half mile wide corridor
- Protect the segment's free flowing values
- Protect the segment's identified Outstandingly Remarkable Value(s)

Seven eligible river corridor segments, which have not been assessed for suitability, would receive interim management to protect their Outstandingly Remarkable Values, and have a tentative classification of recreational. They are: Fall Creek, North and South Gate Creeks, Nelson Creek, Lake Creek (Segment B), McKenzie River (Segment B), and Willamette River.

Recreation

Most BLM administered lands in the planning area will be designated as Extensive Recreation Management Areas (ERMA). The lands will be available for dispersed recreation activities, including hunting, fishing, sightseeing, horseback riding, mountain biking, hiking, and rafting consistent with land use allocations. Provision for opportunities accessible by car and close to population centers will be emphasized. Most BLM administered lands will be open to recreational mineral collection (casual use) unless formally withdrawn or subject to prior rights, such as mining claims. Except for Turner Creek Recreation Site, which will be permanently closed, the following existing recreation facilities, Special Recreation Management Areas (SRMA), trails, boat landings and Recreation and Public Purpose leases (R&PP) will be maintained and managed through all alternatives:

Special Recreation Management Area (SRMA)
- Shotgun Creek - day use only

Recreation Sites - camping and day use
- Whittaker Creek
- Clay Creek
- Sharps Creek

Recreation and Public Purpose leases (R&PP)
- Willamette Greenway Tract (State)
- McKercher Park (Linn County)
- Marten Rapids Park (Lane County)
- Whitewater Park (Lane County)

Boat landings
- Rennie
- Silver Creek
- Taylor Creek
- Whittaker Creek

Hiking trails
- Eagles Rest (0.7 mile)
- Shotgun trail system (5.7 miles)
- Forest Service trail #3462 (0.2 mile of right-of-way on BLM)
- Whittaker Creek Old Growth Ridge (1 mile)

Currently, the Eugene District does not have any established Back Country Byways, but is actively exploring areas for opportunities in this program. Nine routes have been proposed and would be part of all alternatives.

In all alternatives, 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. These regulations state, "the objectives of these regulations are to protect the resources of the public lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."

Increasing emphasis would be placed on interpretive and informational signing and maps to support State and local strategies for encouraging tourism. Increased emphasis would also be placed on accomplishing the goals and objectives of the BLM Recreation 2000 Implementation Plan, and the Oregon-Washington Special Recreation Management Area, and Extensive Recreation Management Area initiatives.

Timber

All silvicultural systems would be sustainable, economically practical, and capable of maintaining the long-term health and productivity of the forest ecosystem. Silvicultural systems are described in Appendix BB.

The Probable Sale Quantity (PSQ) for each alternative, except Alternative D, was calculated using a computer program called TRIM-PLUS. A separate simulation process was used in Alternative D. Stand yields were based on available inventory data or on the Stand Projection System (SPS) simulator when inventory data was unavailable. The sustainable PSQ was calculated in cubic feet and timber sales under the plan would be sold according to cubic foot measure. A process was designed to portray one possible implementation of the harvest, for the next ten years, for each alternative to allow analysis of environmental harvest impacts in the District's Geographic Information System (GIS). This process is entitled "ten-year representative timber management scenarios." Descriptions of the use of TRIM-PLUS and SPS, the PSQ calculation process for Alternative D, and the ten-year representative timber management scenarios are contained in Appendix AA.

Individual timber sales would be a result of activity planning at the level of drainages or individual timber sale areas. Any proposed harvesting would occur based on silvicultural prescriptions that would show how land use objectives would be met for specific sites and stands utilizing available knowledge and technology. All lands allocated to timber production are considered capable of being reforested within 5 years after harvest and of being managed without irreversible resource damage. Alternative C and the draft Preferred Alternative provide for trial harvest programs to test nontraditional forest management practices in a controlled research setting. Long-term management would be adapted to the results of the research.

Each sale plan, along with an associated Environmental Assessment (EA), would specifically address logging and transportation systems, site preparation and reforestation, and mitigating measures as well as consistency between the individual proposed actions and the Resource Management Plan.

Silvicultural treatments would occur under EAs or categorical exclusions, which would deal with site specific impacts and treatment issues.

Contracts, usually awarded on a competitive basis, are the means of accomplishing timber harvest and forest development practices. 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. The standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales.

Allocations for Timber Management: Forest lands considered under the RMP are in one of four allocation categories for timber management - 1) intensive management; 2) restricted management; 3) managed for enhancement of nontimber resources; or 4) not available for timber management. All land allocation categories, for which regeneration harvests, commercial thinnings or density management are planned, are included in the estimated PSQ for each alternative.

Management of Intensive Management Lands: Silvicultural systems for intensive management lands

would be designed principally to meet a high level of timber production, within a framework of mitigating measures and project design features, which protect environmental quality, biological diversity, and wildlife habitat. This framework varies between the alternatives. Genetically improved planting stock will be utilized where available and in amounts consistent with the alternative design. Growth enhancing practices, such as commercial thinning and forest fertilization, will be utilized where research data and economic analysis indicate such investments are warranted. Practices that enhance timber quality, including pruning, could be utilized.

Management of Restricted Lands: On lands available for restricted timber management, such as habitat connectivity areas, timber production would occur at lower levels than for intensive management lands. Silvicultural systems would be designed to meet the requirements of nontimber resource allocations and objectives, but practices that increase growth or timber quality would be used as consistent with the restriction. Generally, some merchantable volume would be retained during regeneration harvest to meet management objectives.

Management for Enhancement of Nontimber Resources: On lands actively managed for the enhancement of nontimber resources, such as old growth emphasis areas, biological reserve blocks, and Riparian Management Areas, harvesting or silvicultural manipulation would occur only as part of active management strategies aimed at the enhancement of the resource for which the allocation was established. Timber yields for lands allocated to enhancement of other resources are by-products of actions taken to meet the overall objective.

Harvest from Lands Not Available for Timber Management: Harvest from lands not available for planned timber harvest could occur for the following reasons:

1. To allow design of more logical management units or reduce road construction, thereby reducing overall cumulative effects;

2. To salvage timber killed or substantially damaged by fire, wind throw, insect infestation, or other natural events. Such harvest would be accomplished under site specific silvicultural prescriptions designed to meet the needs of non-timber allocations made on these lands;

3. To provide for the safety of forest users, including removing hazard trees along roads and trails, in campgrounds, in administrative sites, etc.;

4. To facilitate construction, operation, and maintenance of new facilities such as roads, trails, power lines, communication facilities, recreation or administrative facilities, etc.;

5. As part of designed research studies;

6. To isolate and release Douglas-fir test trees;

7. To develop, maintain or enhance fish and wildlife habitats;

8. To facilitate development of mines, quarries, or fluid mineral leases;
9. To meet management objectives for resources other than timber.

Harvests from these lands are not part of the planned timber management activities and are not included in the PSQ computation.

Features Common to all Timber Management Approaches: Lands allocated to intensive or restricted timber management would be managed for timber production consistent with the assumptions and concepts guiding the formulation of each plan alternative. Details of silvicultural systems and silvicultural treatments for these lands are given in Appendix BB.

Practices Based On Stand and Site Conditions: Harvesting regimes and other silvicultural practices will be based on the design of the alternatives, but would be adapted to meet the specific characteristics for individual stands and physical sites. Adaptation would consider vegetation composition and condition, localized natural ecological processes, treatment feasibility (e.g., logging, burning, etc.), site quality, economics, soils, topography, and opportunities for nontimber resources.

Water Quality and Site Productivity: Eugene District Best Management Practices (BMP) for soil and water resources (see Appendix G) would be utilized in the design of site specific silvicultural prescriptions consistent with the objectives of each plan alternative. Inherent in all silviculture systems is a goal of maintaining long-term site productivity of soils.

Transportation System: New roads would be kept to the minimum needed for management, and would 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 would 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) would be determined during the annual timber sale planning process.

Forest Access: The Eugene 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 would continue to provide all prospective purchasers of BLM timber with an equal opportunity of access when timber is offered for sale. This would 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 would 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 individual agreements and permits would 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, new reciprocal right-of-way agreements would have a clause requiring consultation under Sec. 7 of the Endangered Species Act by the BLM. Depending on the outcome of the consultation with the Fish and Wildlife Service, BLM could deny the right to construct a new road.

When the landowner does not need rights to cross BLM administered lands, BLM would gain 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.

Logging Systems: Harvesting methods and yarding systems would be selected based on suitability for the successful implementation of silvicultural systems, operational and economic practicality, and the ability of methods to protect site productivity and water quality. Timber harvest would be accomplished by a combination of aerial, cable or ground based yarding systems. The variety of logging systems and the degree of log suspension would be design features employed primarily to protect watersheds and residual vegetation and to minimize soil damage. BLM Oregon Manual Supplement H-5420-1 would guide selection of harvesting techniques for timber sale contracts.
In timber sales involving ground yarding systems, skid trails, including trails from previous harvest entries, would be planned to have insignificant (less than one percent per decade) growth-loss effect. Skid trails would affect less than 10 percent of the land. Existing skid trails would be used as much as possible and new skid trails would be limited to slopes less than 35 percent. Operation on these trails would minimize soil displacement and occur when soil moisture content provides the most resistance to compaction. Upon final harvest, all trails, including skid trails from previous entries, would be tilled with a properly-designed self-drafting winged subsoiler. For entries other than final harvest, skid trails would be selectively tilled.

Utilization Standards: The sale of forest products would be designed to encourage full utilization of harvested timber while reserving structural components, such as snags and coarse woody debris, consistent with objectives for wildlife habitat management, old growth management, biological diversity, and site productivity.

Salvage of Mortality: Salvage of individual tree or catastrophic mortality resulting from fire, insect attack, disease, windthrow, or other causes would occur where consistent with land use allocations and snag and down wood retention objectives. Salvage or other unplanned harvest would replace regular planned sale volume for the next decade.

Hardwood Management: All suitable lands available for timber management, but currently dominated by grass, shrubs or hardwoods, would be converted to merchantable conifer species if consistent with the land use allocation in each alternative. Hardwood stands on lands available for forest management that are not capable of being converted to conifer plantations would be actively managed to provide for the production of hardwood products, including: sawtimber, firewood, biofuels, wood for chemicals, and other forest products unless specifically prohibited by the design of the alternative.

Site Preparation and Stand Establishment: Site preparation, stand maintenance, and stand protection practices; including biological methods, prescribed burning, chemical treatments, and mechanical or manual treatments; would be utilized as required to meet plan objectives. Actions would emphasize the use of preventative or ecosystem based strategies within an integrated approach that considers all

available tools, natural ecological processes and timing, human health, economics, fire hazard, environmental quality, and the maintenance of site productivity.

Reforestation: All stands subject to regeneration harvest would be reforested utilizing planting or natural reforestation techniques. To achieve adequate reforestation as promptly as practical following timber harvest, harvested areas would be planted with indigenous commercial coniferous species (e.g., Douglas-fir, western hemlock and western red cedar) generally within one year of the completion of harvesting and site preparation. Identified root disease centers would be managed to favor indigenous resistant tree species or enhance biodiversity values.

Planting stock would be nursery grown from seed collected on sites and at elevations similar to the specific project area. Genetically selected stock also would be nursery grown and would be used to the extent available, in accordance with BLM's Western Oregon Tree Improvement Plan and in accordance with specific management plan objectives and limitations. Broad selection of parent trees for such stock is intended to maintain genetic diversity. See Appendix CC for a description of the tree improvement program.
Initial density of seedlings would be planned, in conjunction with planned thinning and control of competing vegetation to achieve target stocking. Target stocking levels cannot always be achieved by the initial planting. Post-treatment reforestation surveys would be conducted to determine the site occupancy by planted trees and the incidence of natural regeneration and when replanting or interplanting would be required to meet stocking standards.

Stand Growth: The density and species composition of commercial forest stands would be controlled through release treatments, precommercial and commercial thinnings, and density management designed to achieve desired levels of timber production, to maintain stand vigor, or to achieve desired stand characteristics. Fertilization would be used where it would be expected to provide the desired increase in stand growth or development of desired stand characteristics. The specifics of each of these treatments would be consistent with the design and theme of each alternative.

Energy and Minerals

All Minerals - Land obtained under future land exchanges, donations or other means of acquisition would be managed with regard to leasable, locatable and salable minerals in the same manner as those lands with comparable resource values.

Conveyances of mineral estate owned by the United States where the surface is or will be in nonfederal ownership could be made to the existing or proposed owner of the surface estate after a determination is made under Section 209(b) of FLPMA. This determination must find that there are no known mineral values in the land, or that the reservation of mineral rights in the United States would interfere with or preclude nonmineral development of the land, and that such development is a more beneficial use of the land than mineral development.

The consolidation of the surface and mineral estates on split estate lands would be pursued through exchange, purchase or any other legal means available.

Leasable Minerals - Several lease notices would be in effect for all lands in the operating area. They are: Cultural Resources, Northern Spotted Owl Nest and Roost Sites and Associated Habitat, American Peregrine Falcon Nest Sites and Nesting Habitat, Bald Eagle Nest and Roost Sites and Associated Habitat, Marbled Murrelet Nest Sites and Nesting Habitat, Other Threatened and Endangered Animal Species, Threatened and Endangered Plant Species, and Special Status Fish Species.

No surface occupancy would be allowed on Land Use Authorizations, Recreation Sites, Regional Forest Nutritional Research Study Installations, Special Areas, Progeny Test Sites, the Tyrrell and Dorena Seed Orchards, VRM Class I Areas, Bald Eagle Nest and Roost Sites and Associated Habitat, and Marbled Murrelet Nest Sites.

Controlled Surface Use stipulations would be used on lands with suspected unstable soils and VRM Class II areas.

If Forest Management Research Sites are established in the future on BLM land, those sites would be leased subject to a Controlled Surface Use special leasing stipulation.

Locatable Minerals - Mining activities on lands open to locatable mineral entry would be regulated under the regulations in 43 CFR 3809 to prevent

unnecessary or undue degradation of the public lands. All surface disturbance from such operations would be reclaimed at the earliest feasible time. Operating standards for locatable mineral activities are described in Appendix HH.

Salable Minerals - The public demand for salable minerals would be met from the 12 existing designated community pits or the 63 other quarries not yet designated as community pits. New common use areas or community pits would be designated and developed if consistent with the management objectives of other resource values.

Contracts for mineral materials, including commercial use of petrified wood, would be issued pursuant to the 43 CFR 3604 or 3610 regulations where the disposal is deemed to be in the public interest.

Mineral material Free Use Permits (FUP) would be considered on a case-by-case basis and issued at the discretion of the Area Manager. Free use of petrified wood for noncommercial purposes is permitted pursuant to the regulations in 43 CFR 3622.

Reclamation of salable mineral sites would be conducted at the earliest feasible time after the site is depleted of usable mineral materials.

Land Tenure

Land tenure adjustments are made through both acquisitions and disposals. Acquisitions may occur by land purchase, donation, exchange, or transfer of jurisdiction from another Federal agency. Disposals occur by sale, exchange, transfer of jurisdiction to another Federal agency and by infrequent sales or transfers under legal authorities such as the Color-of-Title Act, the Recreation and Public Purposes Act, and specific special acts of Congress.

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.

Land ownership adjustment criteria are identified in Appendix C, which also lists factors that will be considered in Environmental Assessments and Decision Records prepared for specific adjustment proposals.

Land tenure adjustments 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 that merit long-term public ownership. They do not meet the criteria for sale under FLPMA Section 203(a), and would 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 would not be sold under Section 203(a).

Zone 3 includes lands that are scattered and isolated with no known unique natural resource values. Zone 3 lands would be available for use in exchanges for private inholdings in Zone 1 (high priority) or Zone 2 (moderate priority). They are also potentially suitable for disposal through sale under FLPMA 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 would also be available for transfer to another agency or to local governments, as needed, to accommodate community expansion and other public purposes.

Lands in the three zones would be the same in all alternatives as shown on Map 2-1. Zone 3 lands are identified in Table 2-19.

Lands will be acquired where directed by Congress, including lands to be purchased with funds appropriated from the Land and Water Conservation Funds.

Lands having resource values warranting consideration for acquisition by BLM under one or more of the alternatives have been preliminarily identified and are shown on maps available for inspection in the District Office. Additional lands worthy of acquisition consideration may be identified over time and future investigation of specific parcels shown on the maps may result in some tracts being dropped from consideration. Acquisition of these lands, if it occurs, would be only from willing landowners by exchange (predominately), donation, or by purchase at fair market value when funding and purchase authority is available.

Exchanges will be made only 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.

Transfer to or acquisition from other public agencies will be considered where consistent with public land management policy and where improved management efficiency would result. Those tracts specifically identified for transfer to or from other public agencies are listed in Table 2-14. Minor adjustments involving sales or exchanges may be made based on site specific application of the land ownership adjustment criteria.

Sales: Most sales of BLM administered lands are conducted under the authority of Section 203 of the Federal Land Policy and Management Act of 1976 (FLPMA), which requires that one of the following conditions exist before land is offered for sale:

> 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
>
> Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or
>
> 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 would be served by maintaining such tract in Federal ownership.

In addition to these criteria, revested O&C lands must be found to not be suitable for management and administration for permanent forest production and other purposes as provided for in the Act of August 28, 1937 (O&C Act) before they can be offered for sale.

Additional small public land tracts that are presently unknown, primarily hiatuses between Donation Land Claims and the regular rectangular subdivisions of sections, may be discovered by future cadastral surveys. Where such tracts meet the legal sales criteria cited above, they will be considered to be automatically assigned to Zone 3.

It is further anticipated that future surveys will identify encroachments of residential improvements and agricultural development from adjoining private lands. Such encroachments usually occupy less than an acre of public land. Where the lands actually encroached upon are assigned to Zone 2, are not suitable for permanent forest management, one of the three conditions cited above exists, the encroachment is inadvertent, and the improvements are of more than nominal value and utility, the encroached lands will be considered to be automatically reassigned to Zone 3.

Disposals under the Color-of-Title Act, as amended, will be made when an applicant can establish that the legal requirements of the Act have been met for Class 1 claims in all zones. For Class 2 claims, disposals will be made in Zones 2 and 3 when the requirements of the Act are met, unless important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values are identified during disposal clearance reviews for individual tracts. No tracts with pending or potential Color-of-Title claims are presently known.

Disposals under the Recreation and Public Purposes (R&PP) Act, where otherwise consistent with the provisions of the plan, would be made based upon the site-specific application of the land ownership adjustment criteria. No lands are presently identified for disposal under the R&PP Act, although the City of Florence has expressed interest in acquiring title to one 40-acre tract in Section 15, T. 18 S., R. 12 W., W.M. (proposed Cannery Dunes ACEC).

No sales under authorities other than those discussed above are anticipated.

Leases and Permits: BLM administered lands would continue to be available for a wide variety of miscellaneous land uses through approval of leases and Temporary Use Permits authorized by Sec. 302 of FLPMA, leases authorized by the R&PP Act, and Special Recreation Permits. BLM will protect or enhance the various resource values when considering applications or requests for the use of BLM land. Prior to BLM approval of a lease or permit, the applicant would be required to submit plans, maps and other information related to the proposal for evaluation. Each lease or permit would be limited to the area necessary for operation and maintenance. Approvals would consider the protection of public safety, be consistent with the

RMP and provide for minimizing damage to the environment.

No areas for new leases under Section 302 of FLPMA or the R&PP Act are identified. Any future requests or applications for new leases or permits will be considered on a case-by-case basis.

New land use authorizations could be made in all zones to resolve agricultural and occupancy trespasses provided that such authorizations would be consistent with other provisions of the plan and would not adversely impact important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values. No other land use authorizations would be made for agricultural or residential occupancy purposes.

No leases or permits under any authority would be allowed for landfills or other solid waste disposal facilities, nor for any proposals involving the use, storage or disposal of hazardous materials.

Unauthorized Use: Unauthorized realty uses of BLM land include agricultural cultivation, occupancy, unlawful enclosures and exclosures, commercial use of Bureau-controlled roads without a permit, and right-of-way facilities such as roads, powerlines and pipelines. Unauthorized uses will be resolved in an expeditious manner and new cases of unauthorized use will be resolved immediately. Unauthorized users are responsible for fair market rental for current and past years of unauthorized use and full reimbursement for administrative costs, rehabilitation and stabilization.

Rights-of-Way

BLM administered lands would continue to be available for needed rights-of-way where consistent with local comprehensive plans and Oregon Statewide planning goals and rules. Applications outside of exclusion areas will be considered on a case-by-case basis. BLM will protect or enhance the various resource values when considering applications for new rights-of-way. Prior to BLM approval, the applicant would be required to submit plans, maps, and other information related to the proposal for evaluation. Each right-of-way grant would be limited to the area necessary for operation and maintenance, and would include appropriate stipulations from BLM Manual Handbook H-2801-1. Approvals would consider the protection of public safety, be consistent with the RMP, and provide for minimizing damage to the environment.

Utility/transportation routes (for electric transmission, as distinguished from distribution; facilities; pipelines 10 inches in diameter or larger; significant canals, ditches and conduits; railroads; aerial communication lines for interstate use; Federal and State Highways and major County roads) would be confined to existing and other designated corridors, which are shown on Map 2-2. All corridors shown on the map will be designated. 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 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 would be allowed on existing and potential communication sites, also shown on Map 2-2. All sites with approved communication site management plans will be managed according to the provisions of the plan. Communication facilities on sites other than those shown on Map 2-2 will be considered on a case-by-case basis. Where the applicant can demonstrate that use of a designated communication site is not technically feasible, and where the proposed facility would otherwise be consistent with the RMP and provide for minimizing damage to the environment, applications may be approved.

All Research Natural Areas (RNA), VRM Class I areas, and rivers suitable for wild status would be considered right-of-way exclusion areas (where future rights-of-way may be granted only when mandated by law), except for buried utility lines or pipelines located within the rights-of-way of existing roads.

All existing and proposed recreation sites, ACECs 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, would 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), except for buried utility lines or pipelines that can be installed within the rights-of-way of existing roads without adversely affecting the plant and animal species categories listed above. Areas identified for VRM Class II management would 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 hydropower development will not be approved on the streams listed by the Council. 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

Road easements for administrative and timber harvest purposes would be acquired where needed to support timber management or other programs. Perpetual Exclusive Easements will be negotiated with landowners whenever possible to provide public access to lands of the United States. Nonexclusive Easements, which do not provide access for the public, will be negotiated when consistent with management objectives. Temporary easements will only be utilized when no other options are available. Condemnation authority will be used when necessary.

Acquisitions will be completed utilizing procedures described in BLM Manual Handbook H-2101-1. There are currently numerous scattered tracts of public land within the District boundaries that have no legal access. As determinations are made for specific tracts as to management objectives and the type of access needed, access acquisition actions will be initiated.

Access across lands of private companies and individuals who are party (permittee) to existing reciprocal right-of-way agreements will continue to be obtained through use supplements and amendments of the agreements. Whenever landowners not party to a right-of-way agreement identify a need for access across lands of the United States, and the BLM needs access across lands of the landowner, new reciprocal right-of-way agreements will be negotiated.

Access rights gained by the United States under terms of reciprocal right-of-way agreements do not provide for public access via roads or lands owned by the permittee to roads or lands owned and controlled by the United States. Whenever a willing permittee is identified, negotiations will continue or be started to provide for the acquisition of exclusive easements granting road control, including the right of use by the general public, to the United States.

Acquisition of administrative and/or public access for other programs such as recreation, special status species, fisheries, water quality, or wildlife habitat will be completed as necessary. The type of access will be based on the program needs identified in the acquisition justification document. Access may be obtained for such facilities as trails, boat ramps, and in-stream fisheries enhancement structures, as well as roads.

Conservation easements will be considered in implementing the provisions of this plan where the Bureau's objectives can be met with less than fee ownership. Such easements may be appropriate to protect populations of special status plants and animals, important wetlands, and other special resources.

Easements, including fee easements, to provide legal and physical access (administrative and/or public) to Bureau administered land may be acquired anywhere within the District. Other easements, including conservation easements, may be acquired anywhere within Land Tenure Zones 1 and 2 when consistent with management objectives. Where directed by Congress, including through the appropriation of Land and Water Conservation Funds, easements of any type may be acquired anywhere within the District.

Withdrawals

Table 2-3 shows existing land classifications and withdrawals that have been reviewed and which are recommended for continuation, full or partial termination, revocation or modification, and the rationale for such recommendations. All lands recommended for modification would remain withdrawn from entry under the public land and mining laws and would continue to be under the jurisdiction of the Army Corps of Engineers. The lands would be opened for leasing under the mineral leasing laws, subject to the restrictions and stipulations specified elsewhere in this plan, and also subject to the recommendations of the withdrawal agency. Those lands recommended for revocation or termination would be managed by BLM for timber production, wildlife, recreation, and other resource values as provided elsewhere in this plan. Those portions of the listed classifications and withdrawals not recommended for revocation, termination, or modification are recommended for continuation.

Table 3-12 of Appendix K lists all existing land classifications and withdrawals except those located within National Forest boundaries. All the listed

classifications continue to meet the purposes for which they were established and are thus recommended for continuation. Should any of the existing Recreation and Public Purposes (R&PP) leases be relinquished or otherwise terminated in the future, the classification for that lease would be terminated.

The Power Site Reservations, Power Site Classifications, and Water Power Designations listed in Table 3-12 of Appendix K (with the exception of PSC 287) have not yet been reviewed. Reviews for these withdrawals will include site evaluations for water power potential and will consider the historical and current demand for water power at the individual sites, the size of the withdrawals in relation to the need for a reservoir or other facility, the water rights that may need to be established, and site feasibility studies. It is recommended that, upon completion of reviews of these withdrawals, they be continued as to those lands found to still be valuable for future hydropower development and revoked as to those lands that are found to no longer be valuable for future hydropower development.

Appendix L identifies lands where new withdrawals closing the lands to entry under the public land laws and mining laws, but not the mineral leasing laws, would be recommended under one or more of the alternatives and the rationale for such recommendations.

Management Direction by Alternative for Resource Topics

No Action Alternative

Water Quality and Riparian Zones

Riparian Management Areas (RMA) consisting of the total riparian zone would be established on each side of 3rd order and larger streams and on other waters. The following are expected average widths: 3rd order streams, 60 feet; 4th order, 100 feet; 5th order, 140 feet; 6th order, 160 feet; other waters (e.g., lakes), 100 feet. Actual RMA widths would be determined by on-the-ground riparian vegetation and stream characteristics.

Wildlife Habitat

At least one snag or green wildlife tree will be retained per acre following timber harvest on the 20 percent of the District land base that lies within the East-West Corridor. Elsewhere within the District, snags will be retained following logging where safety and fire management activities permit. Also, at least one 25-acre patch of dense second growth conifers will be maintained within each BLM section as nesting habitat for Coopers's and sharp-shinned hawks. Mature and old growth stands retained in extended rotation areas will provide some habitat for dependent species such as pileated woodpecker and saw-whet owl, and serve as thermal and emergency cover for elk. Road closures will be implemented to benefit species sensitive to human intrusion and associated disturbances.

Special Status and SEIS Special Attention Species Habitat (Plants)

Current management direction for special status plant species is given in BLM OSO Manual 6840. The BLM is directed to conserve threatened and endangered species (or species proposed for listing as threatened or endangered) and the ecosystems on which they depend, and to ensure that actions authorized on BLM administered lands do not contribute to the need to list any special status plant species including Federal Candidate 1 and 2 plant species and Bureau Sensitive species.

Field clearances, monitoring, protection, mitigation and management will be required for special status species.

Under the No Action Alternative, 538 acres of Special Status Plant Species will be protected.

Special Status and SEIS Special Attention Species Habitat (Animals)

All occupied bald eagle habitat, and previously identified suitable-but-unoccupied habitat will be protected from timber management practices that will degrade conditions essential for eagle nesting and roosting. Some habitat for other Federally listed threatened species, and species proposed for listing, and candidates, will be maintained in extended rotation areas. Other Special Status Species will be expected to occur in the same habitat. Snags

retained within timber harvest areas will provide some habitat for cavity-using species. Some habitat for species dependent upon or strongly oriented towards special habitat features will also be protected.

Special Areas

Current Management direction (BLM ORO Manual 1613) requires that priority be given to the designation and protection of special areas including ACEC, RNA, and ONA (RNA and ONA are a sub-designation of ACEC). Areas on BLM administered lands that meet ACEC criteria would be designated as ACEC if special management needs were identified. Present Special Areas (1,572 acres) would be retained. In presently designated Special Areas, 3 acres are withdrawn from locatable mineral entry, subject to no surface occupancy for mineral leasing, and are closed to salable mineral development.

Visual Resources

Acres classified VRM I-IV in the 1983 Management Framework Plan (MFP) would continue to be managed in accordance with the standards established in those plans. Those allocations are as follows:

Commercial forest lands located along the McKenzie River corridor would be managed to meet VRM Class III standards. A timber harvest rotation of approximately 120 years would be used in this location.

Special Areas of scenic resources would be managed as Class I. These areas are Upper Elk Meadows Area of Critical Environmental Concern/Research Natural Area (ACEC/RNA), and Horse Rock Ridge ACEC.

The remaining BLM lands would be managed as VRM Class IV.

Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

Continue current management direction. The Siuslaw River, identified in the Nationwide Rivers Inventory as a potential river addition to the National Wild and Scenic Rivers System, would be analyzed in Environmental Assessments prior to any resource activities.

Rural Interface Areas

There is no land use allocation or management prescription for this alternative.

Recreation

Continue current management direction. There would continue to be a variety of dispersed recreation uses and activities within the District. Among these activities would be camping, picnicking, hunting, fishing, hiking, horseback riding, and driving for pleasure. New developments identified in the Management Framework Plan (MFP) for trails and recreation sites could be constructed and closed sites such as Lake Creek and Haight Creek could be reopened.

Timber

In this alternative, the current management plan would be continued essentially unchanged. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 35.0 mmcf (223 MMBF Scribner short log).

Intensive Timber Management Lands: About 260,000 acres would be allocated to intensive timber management.

Restricted Timber Management Lands: About 12,000 acres would be allocated to restricted timber management. Most of the restricted acreage is contained within a corridor with an east-west alignment along the southern end of the District. Harvest on these acres would be constrained by a 350-year area control. About 400 acres of the restricted acreage is located along the McKenzie River. This land would be managed on a 120-year area control to limit visual impacts.

Lands Managed For Enhancement of Nontimber Resources: About 9,000 acres of land in riparian management areas would be managed primarily for fisheries, wildlife and water quality.

Lands Not Available for Timber Management: Forest lands in the TPCC category of Woodland would not be subject to planned harvest. Other forest lands allocated for recreation sites, for Areas of Critical Environmental Concern (ACEC) and Research Natural Areas (RNA) and for bald eagle

recovery sites would also not be subject to planned harvest. These forest lands total about 21,000 acres.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to lease notices protecting Special Status Plant and Animal Species on all BLM land in the planning area.

No Surface Occupancy special stipulations would be used to protect great blue heron rookeries and osprey nest sites.

Timing special stipulations would be used to protect elk concentration areas and mineral springs utilized by the band-tailed pigeon.

Special Recreation Management Areas would be leased subject to a Controlled Surface Use special stipulation.

Locatable Minerals - Lands within ACECs would be subject to additional restrictions under regulations found in 43 CFR 3809.

Salable Minerals - Salable mineral development would not be permitted in great blue heron rookeries, or where osprey nest sites would be disturbed or destroyed by the excavation activity.

SRMAs would be open to salable mineral development if the impacts from the proposed development are acceptable.

Federal Candidate and Bureau Sensitive species would be protected at salable mineral sites.

Seasonal operating constraints would be imposed in elk concentration areas and near mineral springs utilized by the band-tailed pigeon.

Rights-of-Way

No separate provisions specific to this alternative.

Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Alternative A

Water Quality and Riparian Zones

Riparian Management Areas (RMA) would be established averaging 75 feet in width on each side of perennial (generally 3rd order and larger) streams and other waters (e.g., lakes). Actual RMA widths would be determined by on-the-ground riparian vegetation, terrain and stream characteristics.

Wildlife Habitat

Emphasis will be on habitat for species that are adapted to use early and mid seral stages that have relatively low structural and vegetative species diversity.

Special Status and SEIS Special Attention Species Habitat (Plants)

Special status plant species will be managed for their conservation, and actions will be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive plant species where such actions will not diminish commercial use such as timber production. Under Alternative A, 14 acres of special status plant species will be protected.

Special Status and SEIS Special Attention Species Habitat (Animals)

BLM management and permitting actions will be designed to protect habitat of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive species where such actions will not diminish commercial use such as timber production.

Special Areas

Potential ACEC that meet ACEC criteria would be designated only if the relevant values are not protected by other authorities (e.g., Wild River designation, and The Endangered Species Act). Existing ACEC and potential ACEC that meet the preceding standard, including RNA and proposed RNA, would be retained or designated on nonforest lands or nonsuitable woodlands. Two Special Areas would be designated under Alternative A (132 acres), Lake Creek Falls ACEC (proposed ONA) and Grassy Mountain proposed ACEC. These 132 acres would be withdrawn from locatable mineral entry, subject to the no surface occupancy leasing stipulation and closed to salable mineral development. Other existing ACEC and RNA would be revoked.

Visual Resources

Forest lands available for planned timber harvest would be managed as VRM Class IV. The remaining lands would be managed as inventoried. Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

No rivers would be found suitable for Federal designation as Wild, Scenic or Recreational (see State Director's Guidance, Appendix B). See Table 2-4 for comparisons of proposed Wild and Scenic River designations.

Rural Interface Areas

No special management would be provided in Rural Interface Areas (RIA).

Recreation

The following would be maintained and managed:

Recreation sites/facilities:
10 Existing recreation sites
1 Existing SRMA (Shotgun)
11 Total sites

5 Existing trails (totalling 8 miles)

Two currently closed recreation sites, Haight Creek and Lake Creek, would remain undeveloped use areas while retaining their natural settings. See Tables 2-7a and 2-7b in the Draft RMP for comparison of sites and trails.

OHV:
Acres — Vehicle use other than for administrative purposes and commercial commodity extraction would be closed year-round on 77 acres. OHV use would be limited on 358 acres, and open on the remaining District land.

Roads — No roads would be limited or closed.

See Table 2-1 for comparisons of Off-Highway Vehicle and road closures.

Timber

This alternative emphasizes a high production of timber. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 53.8 mmcf (342 MMBF Scribner short log). An additional average annual 0.03 mmcf (0.19 MMBF) would be expected to be sold based on experimental harvest from about 2,000 acres of suitable woodlands managed according to area regulation. Of the probable sale quantity, 30.7 mmcf is attributable to the base program (site preparation, planting including genetically improved stock, protecting seedlings and plantation release). The balance of 23.1 mmcf is attributable to intensive management practices (fertilization, precommercial thinning, commercial thinning, and brush and hardwood conversion). This 53.8 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 58.6 mmcf.

Intensive Timber Management Lands: In this alternative, about 274,000 acres would be allocated to intensive timber management.

Lands Managed For Enhancement of Nontimber Resources: About 9,000 acres of land in riparian management areas would be managed primarily for fisheries, wildlife and water quality.

Lands Not Available for Timber Management: Forest lands in the TPCC category of Nonsuitable Woodland would not be subject to planned harvest. Other forest lands allocated for recreation sites, and for bald eagle recovery sites would also not be subject to planned harvest. These lands total about 19,000 acres.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to a Controlled Surface Use special stipulation protecting Riparian Management Areas.

Locatable Minerals - Designated Special Areas and recreation sites would be closed to locatable mineral entry.

Salable Minerals - Riparian Management Areas would be closed to salable mineral development unless the impacts from a proposed use is deemed acceptable or can be adequately mitigated.

Land Tenure Adjustments

Exchanges would be made to acquire lands that would enhance the nondeclining harvest level of the commercial forest land managed by BLM, by improving age class distribution or other harvest level determination factors. Factors to be considered include site quality, access to public forest land, logical logging units, and management of public forest land to facilitate timber harvest. No exchanges would be made to acquire lands more valuable for nontimber uses. No commercial timberland would be sold or leased. No leases or conveyance of commercial timberland would be made under the Recreation and Public Purposes Act.

Rights-of-Way

No separate provisions specific to this alternative.

Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Alternative B

Water Quality and Riparian Zones

Riparian Management Areas (RMA) consisting of the total riparian zone would be established on each side of perennial streams and other waters. The following are expected average widths: 3rd order streams, 75 feet; 4th order, 100 feet; 5th order, 140 feet; 6th order, 160 feet; other waters (e.g., lakes), 100 feet. Actual RMA widths would be determined by on-the-ground riparian vegetation and stream characteristics.

Wildlife Habitat

During timber sale planning, suitable wildlife trees will be identified for retention in numbers adequate to retain at least three snags and green culls (nonmerchantable) per acre.

Special Status and SEIS Special Attention Species Habitat (Plants)

Special status plant species will be managed for their conservation, and actions will be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive species where such actions will not diminish commercial use such as timber production. Habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive Species will be protected to the full extent on Public Domain land, and habitats of Federal Candidate 1 and 2 species, known only to occur on O&C lands, will be protected to the extent considered necessary to prevent their Federal listing. Under Alternative B, 17 acres of special status plant species will be protected.

Special Status and SEIS Special Attention Species Habitat (Animals)

BLM and BLM permitted activities will be constrained or modified to the extent considered necessary to prevent Federal listing of Federal Candidate (Category 1 and 2) species known only to occur on BLM administered lands. BLM management and permitting actions will also be designed to protect habitats of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive species on O&C lands where such actions will not diminish commercial use such as timber production and to protect habitats of all such species on public domain lands. If any of the cited species are suspected to be present on public domain land in an area proposed for a specific site-disturbing activity, field survey will focus on those species.

Special Areas

All existing Special Areas would be retained (1,572 acres). Potential ACEC that meet ACEC criteria would be designated only if the relevant values are not protected by other authorities (e.g., Wild River designation, and the Endangered Species Act). Under Alternative B, 791 acres would be allocated for new Special Area management. New RNA would not be allocated on available O&C land if a similar feature can be protected on a National Forest. All potential special areas on Public Domain lands nonforest lands, nonsuitable woodlands, and other lands allocated to nontimber use would be designated. Special Areas consisting of 2,363 acres would be withdrawn from locatable mineral entry; mineral leases in these areas would be subject to no surface occupancy and the areas would be closed to salable mineral development.

Visual Resources

Available forest land adjacent to (within a quarter-mile) developed recreation sites, State and Federal highways, State scenic waterways, and rivers designated under the Federal Wild and Scenic Rivers Act would be managed as inventoried.

BLM lands within a quarter-mile of 1-5 acre private lots would be managed as VRM III (see Rural Interface Area section in this chapter).

All forest land available for planned timber harvest would be managed as VRM Class IV.

The remaining lands (nonforest, nonsuitable woodland, suitable woodland - low site, and lands allocated for uses other than timber production) would be managed as inventoried.
Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Willamette National Forest boundary to Goodpasture Bridge, would be found suitable for potential designation as Recreational in the National Wild and Scenic River System. See Table 2-4 for comparisons of proposed Wild and Scenic River designations.

Rural Interface Areas

Approximately 4,500 acres of BLM administered lands within a quarter mile of private land in identified Rural Interface Areas (zoned for 1 to 5-acre lots) would be managed for VRM Class III objectives. Timber management practices within these Rural Interface Areas would be restricted, where feasible, and consistent with sustained yield timber management as follows:

- Hand application rather than aerial application of herbicides and pesticides
- Inclusion of additional buffers for domestic water sources
- Hand piling of slash for burning as opposed to broadcast burning

Recreation

The following would be maintained and managed:

Recreation sites/facilities:

10 Existing open recreation sites
2 Existing closed sites could be reopened (Haight Creek and Lake Creek)
2 Additional recreation areas on Public Domain lands could be developed: Heceta Sand Dunes (217 acres), and Cannery Dunes (40 acres), both north of Florence and nominated as ACEC/ONAs could be developed.
1 Existing SRMA (Shotgun)
15 Total Sites

5 Existing trails (totaling 8 miles)

See Tables 2-7a and 2-7b in the Draft RMP for comparison of sites and trails.

OHV:

Acres — Vehicle use other than for administrative purposes and commercial commodity extraction would be closed year-round on 2,396 acres. OHV use would be limited on 25 acres and open on the remaining District lands.

Roads — No roads would be closed or limited.

See Table 2-1 for comparisons of Off-Highway Vehicle and road closures.

Timber

This alternative emphasizes timber production while providing a system of mature and old growth forest blocks to contribute to habitat diversity. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 49.8 mmcf (316 MMBF Scribner short log). An additional average annual 0.03 mmcf (0.19 MMBF) would be expected to be sold based on experimental harvest from about 2,000 acres of suitable woodlands managed according to area regulation.

Intensive Timber Management Lands: In this alternative, 249,000 acres would be allocated to intensive timber management.

Restricted Timber Management Lands: About 1,000 acres would be allocated to restricted timber management for visual resource management.

Lands Managed for Enhancement of Nontimber Resources: About 10,000 acres of land in riparian

management areas would be managed primarily for fisheries, wildlife and water quality.
About 20,000 acres of forest land would be managed to provide habitat diversity by providing mature and old growth forest. These lands are aggregated in large blocks of approximately 640 acres and small blocks of approximately 80 acres distributed in a corridor system, along the southern end of the District, by seed zone and elevation. Some of the blocks incorporate lands excluded from harvest for other purposes as noted in the preceding paragraph. Emphasis on inclusion of public domain lands led to inclusion of about 2,000 acres of such lands in the blocks.

Lands Not Available for Timber Management: Forest lands in the TPCC categories of Nonsuitable Woodland and Suitable Woodland-Low Site would not be subject to planned harvest. Other forest lands allocated for recreation sites, for threatened and endangered species recovery areas where timber harvest is prohibited, and for ACECs would also not be subject to planned harvest. These forest lands total about 22,000 acres.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to lease notices protecting Special Status Plant and Animal Species on Public Domain Lands in the planning area.

All oil and gas leases would be issued subject to Controlled Surface Use special stipulations protecting Riparian Management Areas, and Designated Mature and Old Growth Forest Blocks.

Locatable Minerals - Designated Special Areas and recreation sites would be closed to locatable mineral entry.

Salable Minerals - Riparian Management Areas would be closed to salable mineral development unless the impacts from a proposed use is deemed acceptable or can be adequately mitigated.

Quarry site expansion could be restricted in Designated Mature and Old Growth Forest Blocks if removal of mature or old growth trees wouid be necessary.

Federal Candidate and Bureau Sensitive species would be protected on public domain lands.

Land Tenure Adjustments

Exchanges of O&C lands would be made primarily to acquire lands that would enhance timber management opportunities. Exchanges of public domain lands would be made to benefit one or more of the resources managed, including nontimber values. Sale of O&C lands other than available commercial forest lands, and of public domain lands, would be made to dispose of lands that meet any of the criteria of FLPMA Section 203(a). Leases of such lands would be made to accommodate other uses. Leases or conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services.

Rights-of-Way

No separate provisions specific to this alternative.

Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Alternative C

Water Quality and Riparian Zones

Riparian Management Areas (RMA), which would be one and one-half times as wide as the riparian zone, would be established on each side of perennial streams and other waters. The following are expected average widths: 3rd order streams, 105 feet; 4th order, 150 feet; 5th order, 210 feet; 6th order, 240 feet; other waters (such as lakes), 150 feet. Actual RMA widths would be determined by on-the-ground riparian vegetation and stream characteristics.

Wildlife Habitat

Timber harvests will be designed to retain (where available) enough snags and dead and down material to meet Old Growth Definition Task Group standards, which vary according to plant-community series. For Douglas-fir stands on western hemlock sites (western hemlock series), the minimum standards are four conifer snags per acre, 20+ inches dbh and 15+ feet tall; and 15 tons of down logs per acre

including four pieces per acre 24+ inches in diameter and 50+ feet long.

Special habitats will be buffered from surface disturbance and harvest of timber. Table 2-5 shows buffering of special habitats by alternative.

Special Status and SEIS Special Attention Species Habitat (Plants)

Special status plant species will be managed for their conservation, and actions will be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive plant species where such actions will not diminish commercial use such as timber production. Habitats of Federal Candidate 1 and 2, State Listed, and Bureau Sensitive plant species will be protected to the full extent on Public Domain land, and habitats of Federal Candidates 1 and 2 plant species known only to occur on O&C lands will be protected to the extent considered necessary to prevent their Federal listing. In addition varying sized blocks of mature and old growth forests will be spatially distributed over O & C land, focusing on protection of identified areas where special status plants and animal species cluster. Under Alternative C, 17 acres of special status plant species will be protected.

Special Status and SEIS Special Attention Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, management of areas maintained to conserve biological diversity will focus on protection of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive species. BLM and BLM permitted activities will be constrained or modified to the extent considered necessary to prevent Federal listing of Federal Candidate (Category 1 and 2) species known only to occur on BLM administered lands. BLM management and permitting actions will also be designed to protect habitats of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive plant and animal species on other O&C lands where mitigation will not diminish commercial use such as timber production from land allocated to such use and on all public domain lands. If any of the cited species are suspected to be present on public domain land in an area proposed for a specific site-disturbing activity, field survey will focus on those species. If their presence is identified on public domain lands, their habitat will be protected.

Special Areas

All existing Special Areas would be retained (1,572 acres). Potential ACEC that meet ACEC criteria would be designated only if the relevant values are not protected by other authorities (e.g., Wild River designation, and the Endangered Species Act). Under Alternative C, 2,936 acres would be allocated for new Special Area management. Designation of the Special Areas result in the withdrawal of 4,508 acres from locatable mineral entry, and these acres would be subject to the no surface occupancy stipulation for mineral leasing, and closed to salable mineral development.

Visual Resources

Available forest land where Federal ownership consists of more than half of a viewshed and available forest land adjacent to (within a quarter-mile) developed recreation sites, State and Federal highways, proposed Back Country Byways, State Scenic Waterways, and rivers designated under the Federal Wild and Scenic Rivers Act would be managed as inventoried.

BLM lands within a quarter-mile of 1 to 20-acre private lots would be managed as VRM III (see Rural Interface Area Management).

Forest land available for planned timber harvest would be managed as VRM Class IV.

Remaining other lands would be managed as inventoried.

Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Willamette National Forest boundary to Goodpasture Bridge would be found suitable for potential designation as Recreational in the National Wild and Scenic River System. See Table 2-4 for comparisons of proposed wild and scenic river designations.

Rural Interface Areas

Approximately 6,800 acres of BLM administered lands within a quarter mile of private land in identified Rural Interface Areas (zoned for 1 to 20-acre lots) would be managed for VRM Class III objectives.

Retention of basal area, as described in the Timber section, would result in meeting VRM Class III objectives.

Timber management practices within these Rural Interface Areas would be restricted, where feasible, and consistent with sustained yield timber management as follows:

- Hand application rather than aerial application of herbicides and pesticides
- Inclusion of additional buffers for domestic water sources
- Hand piling slash for burning as opposed to broadcast burning

Recreation

The following would be maintained and managed:

Recreation sites/facilities:
13 Existing recreation sites
11 Proposed recreation sites
1 Existing SRMA (Shotgun)
6 Proposed SRMAs
31 Total Sites

5 Existing trails (totalling 8 miles)
8 Proposed trails (totalling 14.5 miles)
13 Total Sites

The six proposed Special Recreation Management Areas are: McKenzie River, Sharps Creek, Siuslaw River, Gilkey Creek, Lower Lake Creek, and Upper Lake Creek. See Tables 2-7a and 2-7b in the Draft RMP for comparison of sites and trails.

To retain options for future development of high value potential recreation sites, trails, and sightseeing opportunities, no timber sales other than salvage sales of dead and dying or hazard timber would be made in those areas during the period of the plan. An exception would be made in the event a natural catastrophe (e.g., fire, windstorm) destroyed the high value recreation potential of the area.

OHV:
Acres — Vehicle use other than for administrative purposes and commercial commodity extraction would be closed on 4,441 acres, limited on 25 acres, and open on the remaining District lands.

Roads — OHV use would be limited on 147 miles and closed on 67 miles of BLM roads due in part to wildlife concerns.

See Table 2-1 for comparisons of Off-Highway Vehicle and road closures.

Timber

This alternative emphasizes maintenance of biological diversity, a balance of seral stages, and management of wildlife habitat through a system of mature and old growth forest blocks, retention of old growth structural characteristics and enhancement of younger forest structural characteristics. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 14.8 mmcf (88 MMBF Scribner short log). 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.

Restricted Timber Management Lands: In this alternative, about 207,000 acres of forest land would be allocated to restricted timber management.

On about 139,000 acres of forest land, the regeneration harvest prescription would be designed to retain an average of 35-50 percent of the normal live conifer basal area for the site. This would be accomplished by harvesting about one third of any given stand in patches every 50 years with a high level of green tree retention in the harvested patches. The size of the patches would be only as large as needed to assure regeneration, normally not exceeding 1-8 acres. 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. The lands to be managed for a high level of green tree retention would be considered potential replacements for old growth restoration and retention areas (see lands managed for enhancement of nontimber resources below) lost to natural events. Many of the stands to be managed at this level of green tree retention and most of the old growth restoration and retention areas are located within biological connectivity corridors designed to provide linkage between the major reserved lands of the Willamette, Siuslaw, and Umpqua National Forests and the Salem, Coos Bay, Eugene, and Roseburg BLM Districts.

On about 68,000 acres of forest land, the regeneration harvest prescription would retain an

average of 15-20 percent of the normal live conifer basal area for the site. This would be accomplished by retaining a high level of green trees in a well-distributed pattern throughout the harvest units. This type of harvest would occur across entire harvest units so stands would not be patch cut as in the 35-50 percent retention described above.

Stands in both retention categories described above would be managed to rapidly reestablish and maintain old growth structural characteristics. This is expected to occur in an average of 120 years in the long-term.
Where road construction is needed, road density would not exceed that needed if clear cut harvesting were planned. It may be preferable to use more expensive logging techniques than to build additional roads, provided the sales could be sold above the cost of sale preparation. Access management, including closure, would be applied to reflect biodiversity and multiple use needs.

Lands Managed for Enhancement of Nontimber Resources: About 14,000 acres of land in Riparian Management Areas would be managed primarily for fisheries, wildlife and water quality.
About 52,000 acres of forest land are included in a system of old growth restoration and retention areas intended to retain and improve biological diversity. Of this land, 15,000 acres are currently old growth and 9,000 acres are mature forest. Density management would be used on stands that currently do not have old growth structural characteristics that could respond favorably to treatment. No regeneration harvest is planned for these areas. Agreements would 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.

Lands Not Available for Timber Management: Forest lands in the TPCC categories of Nonsuitable Woodland, Suitable Woodland—Low Site, and Suitable Woodland—Nonsuitable Commercial Forest Land would not be subject to planned harvest. Other forest lands allocated for recreation sites, for threatened and endangered species recovery areas where timber harvest is prohibited, and for ACECs would also not be subject to planned harvest. These forest lands total about 29,000 acres.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to lease notices protecting Special Status Plant and Animal Species on All BLM Administered Lands in the planning area.

No Surface Occupancy special stipulations would be used to protect great blue heron rookeries and osprey nest sites.

A Timing special stipulation would be used to protect mineral springs utilized by the band-tailed pigeon.

Controlled Surface Use special stipulations would be utilized within SRMAs, Riparian Management Areas, and Old Growth Restoration and Retention Blocks.

Locatable Minerals - Designated Special Areas and recreation sites would be closed to locatable mineral entry. Under this alternative, a portion of the Row River SRMA would be withdrawn from locatable mineral entry, subject to valid existing rights.

If McKenzie River, Segment A were designated as a recreational river, locatable mineral operations would be required to be conducted to minimize unnecessary surface disturbance, sedimentation, pollution and visual impairment.

Salable Minerals - Riparian Management Areas and McKenzie River, Segment A (if designated as a recreational river) would be closed to salable mineral development unless the impacts from a proposed use are deemed acceptable or can be adequately mitigated.

Salable mineral development would not be permitted in great blue heron rookeries, or where osprey nest sites would be disturbed or destroyed by the excavation activity.

SRMAs would be open to salable mineral development if the impacts from the proposed development are acceptable.
Federal Candidate and Bureau Sensitive species would be protected at salable mineral sites.

Seasonal operating constraints would be imposed near mineral springs utilized by the band-tailed pigeon.

Quarry site expansion could be restricted in Old Growth Restoration and Retention Blocks if removal of old growth trees would be necessary.

Land Tenure Adjustments

Exchanges of public domain lands would be made to benefit one or more of the resources managed,

including nontimber values. Exchanges of O&C lands would emphasize opportunities that would contribute to conservation of biological diversity or would enhance timber management opportunities. Sale of O&C lands other than available commercial forest lands and of public domain lands would be made to dispose of lands that meet any of the criteria of FLPMA Section 203(a). Leases of such lands would be made to accommodate other appropriate uses. Leases or conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services. Leases of land in all zones could be made to resolve occupancy or agricultural trespasses.

Rights-of-Way

No separate provisions specific to this alternative.

Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Alternative D

Water Quality and Riparian Zones

Riparian Management Areas (RMA), which would be twice as wide as the riparian zone, would be established on each side of 2nd order and larger streams and other waters. The following are expected average widths: 2nd order, 60 feet; 3rd order, 140 feet; 4th order, 200 feet; 5th order, 280 feet; 6th order, 320 feet; other waters (e.g., lakes), 200 feet. Actual RMA widths would be determined by on-the-ground vegetation and stream characteristics.

Wildlife Habitat

During timber sale planning, suitable wildlife trees will be identified for retention. The target will be retention of all soft snags consistent with safety standards, three hard snags per acre (larger than 20 inches dbh and 10 feet tall), and two green trees per acre, larger than 20 inches dbh.

Where available, 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 lots greater than 20 inches in diameter. Smaller material will be left on site unless removal is needed for tree planting.

Special habitats will be buffered from surface disturbance and harvest of timber. Table 2-5 shows buffering of special habitats by alternative.
Special Status and SEIS Special Attention Species Habitat (Plants)

All BLM administered lands will be managed for the conservation and protection of all Federal Candidate 1 and 2, State Listed, and Bureau Sensitive plant species and their habitats. The protection of BLM assessment, and BLM tracking species will be under management discretion. Under Alternative D, 538 acres of special status plant species will be protected.

Special Status and SEIS Special Attention Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, BLM management and permitting actions will also be designed to protect habitats of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive species. If any of these species are suspected to be present in an area proposed for a specific site-disturbing activity, field survey will focus on those species. If their presence is identified, their habitat will be protected.

Spotted owl Habitat Conservation Areas (HCA) 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 HCAs will take place only where no feasible alternative exists. When roads are constructed in HCAs, they will be located and engineered to minimize loss and alteration of spotted owl habitat, and will not be located within a quarter mile of the activity center of any spotted owl pair. Reforestation activities on cutover lands in HCAs will encourage a mix of species in the regenerating forest. In each quarter township, lands will be managed so that 50 percent of the forest matrix on BLM administered lands outside HCAs will have stands averaging 11 inches or more dbh with at least 40 percent canopy closure.

Special Areas

All existing Special Areas would be retained and all potential ACEC would be designated. Under Alternative D, 10,092 acres would be allocated for Special Area management. Designation of the Special Areas would result in the withdrawal of 10,092 acres from locatable mineral entry, and these acres would be subject to the no surface occupancy stipulation, and closed to salable mineral development.

Visual Resources

All BLM lands within a quarter-mile of 1 to 20-acre private lots would be managed as VRM II (see Rural Interface Area).

The remaining District land would be managed as inventoried.

Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Willamette National Forest boundary to Goodpasture Bridge would be found suitable for potential designation as Recreational in the National Wild and Scenic River System. See Table 2-4 for comparisons of proposed Wild and Scenic River designations.

Rural Interface Areas

Approximately 6,800 acres of BLM administered lands within a quarter mile of private land in Rural Interface Areas (zoned for 1 to 20-acre lots) would be managed for VRM Class II objectives. The following alternative timber management practices would be applied on those lands:

The primary harvest method would be the group selection system, where the openings would generally be 10 acres or less in size. Additionally, when necessary, wider buffers would be provided on streams used for domestic water sources, prescribed burning would not be utilized for site preparation, and herbicides would not be utilized in plantation maintenance or release treatments.

Recreation

The following would be maintained and managed:

Recreation sites/facilities:
- 13 Existing recreation sites
- 13 Proposed recreation sites
- 1 Existing SRMA (Shotgun)
- 6 Proposed SRMAs
- 33 Total Sites

- 5 Existing trails (totalling 8 miles)
- 20 Proposed trails (totalling 65 miles)
- 25 Total Sites

The six proposed Special Recreation Management Areas are: McKenzie River, Sharps Creek, Siuslaw River, Gilkey Creek, Lower Lake Creek, and Upper Lake Creek. See Tables 2-7a and 2-7b in the Draft RMP for comparison of sites and trails.

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 or hazard timber would be made in the above areas during the life of the plan. An exception would be made in the event a natural catastrophe (e.g., fire, windstorm) destroyed the high value recreation potential of the area.

OHV:

Acres — Vehicle use other than for administrative purposes and commercial commodity extraction would be closed year-round on 10,033 acres, limited on 25 acres, and open on the remaining District lands.

Roads — OHV use would be limited on 147 miles and closed on 84 miles of BLM roads due in part to wildlife and riparian concerns.

See Table 2-1 for comparisons of Off-Highway Vehicle and road closures.

Timber

This alternative emphasizes protection of the northern spotted owl by implementation of the Interagency Scientific Committee's (ISC) Conservation Strategy for the northern spotted owl. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 17.2 mmcf (101 MMBF Scribner short log).

Restricted Timber Management Lands: About 151,000 acres would be allocated to restricted management of forest products. About 123,000 acres would be restricted by the 50-11-40 rule feature of the ISC report. About 28,000 acres would be restricted by both the 50-11-40 rule and by management for Visual Resource Management Class II and Rural Interface Areas.

Lands Managed for Enhancement of Nontimber Resources: About 22,000 acres of land in riparian management areas would be managed primarily for fisheries, wildlife and water quality.

Lands Not Available for Timber Management: Forest lands in the TPCC categories of Nonsuitable Woodland and Suitable Woodland would not be subject to planned harvest. Other forest lands proposed for the recreation component of the National Wild and Scenic River System, for undisturbed protection of special status species and for ACECs would also not be subject to planned harvest. These forest lands total about 34,000 acres.

About 95,000 acres of forest land would be set aside from timber harvest and new road construction, for BLM management according to recommendations of the Interagency Scientific Committee's Conservation Strategy for the northern spotted owl. Of this land, about 23,000 acres are currently old growth and about 11,000 acres are mature forest. The following restrictions would apply within designated category 1, 2, and 3 Habitat Conservation Area's (HCA):

1. Timber harvest, timber salvage, or firewood sales would not be allowed;

2. Silvicultural and fuels treatments (underburning, planting, fertilization, precommercial thinning) would be utilized only to improve spotted owl habitat.

3. Road construction would take place only where no economically feasible alternative existed. When roads are constructed in HCAs, they would be located and engineered to minimize loss and alteration of spotted owl habitat, and would not be located within a quarter-mile of the activity center of any spotted owl pair.

The following restrictions would apply within designated category 4 HCAs:

1. Timber harvest or other habitat removal would be prohibited within an 80-acre core area around each known nest site or center of activity for pairs and territorial single owls. This core area would retain the best quality and most contiguous habitat available.

2. Firewood sales or timber salvage activities would not be allowed.

3. Road construction would take place only where no economically feasible alternative existed. If roads were to be constructed, they would be located and engineered to minimize loss and alteration of spotted owl habitat, and would not be located within a quarter-mile of the activity center.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to lease notices protecting Special Status Plant and Animal Species on All BLM Administered Lands in the planning area.

No Surface Occupancy special stipulations would be used to protect great blue heron rookeries and osprey nest sites.

A Timing special stipulation would be used to protect mineral springs utilized by the band-tailed pigeon.

Controlled Surface Use special stipulations would be utilized within Riparian Management Areas, SRMAs, and Habitat Conservation Areas for the Northern Spotted Owl.

Locatable Minerals - Designated Special Areas and recreation sites would be closed to locatable mineral entry. Under this alternative, a portion of the Row River SRMA would be withdrawn from locatable mineral entry, subject to valid existing rights.

If the McKenzie River, Segment A were designated as a recreational river, locatable mineral operations would be required to be conducted to minimize unnecessary surface disturbance, sedimentation, pollution and visual impairment.

Salable Minerals - Riparian Management Areas and McKenzie River Segment A (if designated as a recreational river) would be closed to salable mineral development unless the impacts from a proposed use are deemed acceptable or can be adequately mitigated.

Salable mineral development would not be permitted in great blue heron rookeries, or where osprey nest sites would be disturbed or destroyed by the excavation activity.

SRMAs would be open to salable mineral development if the impacts from the proposed development are acceptable.

Federal Candidate and Bureau Sensitive species would be protected at salable mineral sites.

Seasonal operating constraints would be imposed near mineral springs utilized by the band-tailed pigeon.

Land Tenure Adjustments

Exchanges would be made to benefit one or more of the resources managed. Exchanges involving disposal of timber to acquire lands containing greater nontimber values would be emphasized. Sales of lands other than available commercial forest lands would be made to dispose of lands that meet criteria (1) or (2) of FLPMA Sec. 203(a), which are:

1. Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the public lands and is not suitable for management by another Federal department or agency.

2. Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose.

No lands would be leased, except leases and conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services, and leases could be made in all zones to resolve occupancy and agricultural trespasses.

Rights-of-Way

No separate provisions specific to this alternative.

Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Alternative E

Water Quality and Riparian Zones

Riparian Management Areas (RMA), which would be twice as wide as the riparian zone, would be established on each side of all streams and other waters. The following are expected average widths: 1st order, 50 feet; 2nd order, 60 feet; 3rd order, 140 feet; 4th order, 200 feet; 5th order, 280 feet; 6th order, 320 feet; other waters (such as lakes), 200 feet. Actual RMA widths would be determined by on-the-ground vegetation and stream characteristics.

Wildlife Habitat

During timber sale planning, suitable wildlife trees would be identified for retention. The target will be retention of all soft snags consistent with safety standards, three hard snags per acre (larger than 20 inches dbh and 10 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 for cavity nester habitat in two-acre patches.

Where available, 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 greater than 20 inches in diameter. Smaller material will be left on site unless removal is needed for tree planting. Special habitats will be buffered from surface disturbance and harvest of timber as shown in Table 2-5.

Special Status and SEIS Special Attention Species Habitat (Plants)

Same as Alternative D

Special Status and SEIS Special Attention Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, BLM management and permitting actions will also be designed to protect habitats of Category 1 and 2 Federal Candidate, State Listed, and Bureau Sensitive species. If any of these species are suspected to be present in an area proposed for a specific site-disturbing activity, field survey will focus on those species. If their presence is identified, their habitat will be protected.

Special Areas

Same as Alternative D

Visual Resources

Land inventoried as Class I plus all BLM administered lands adjacent to (within a quarter-mile) developed recreation sites, State and Federal highways, State scenic waterways, and rivers designated under the Federal Wild and Scenic Rivers Act would be managed as Class I.

Land inventoried as Class II and for lands within a half-mile of Rural Interface Areas of 1 to 20-acre private lots (see Rural Interface Area section) would be managed as VRM II.

Land inventoried as VRM Class III and IV would be managed as Class III. There would be no Class IV VRM in this alternative.

Acres for each VRM class are summarized by alternative in Table 2-1.

Wild and Scenic Rivers

Seventy river miles would be found suitable for designation as Recreational. River segments would include the Siuslaw River, Segments B and C, and the McKenzie River, Segment A. See Table 2-4 for comparison of proposed Wild and Scenic Rivers designations for specific river segments.

Rural Interface Areas

Approximately 19,650 acres of BLM administered lands within a half mile of private lands in Rural Interface Areas (zoned for 1 to 20-acre lots) would be managed for VRM Class II objectives. Harvesting would employ multiple-aged or even-aged silvicultural systems where feasible from a logging and stand management perspective, and small (ten acres or smaller) clear cuts or shelterwoods elsewhere. The silvicultural systems employed would not include the use of prescribed fire or herbicides.

Recreation

Alternative E is the same as Alternative D except 250 miles of roads would be closed to OHV use due to fish, wildlife, and riparian concerns. See Chapter 4, Effects on Wildlife (roads) for details.

Timber

This alternative emphasizes the preservation of older forest stands (greater than 150 years old). Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The probable annual timber sale quantity for the expected 10-year life of the plan would be 17.2 mmcf (97 MMBF Scribner short log).

Intensive Timber Management Lands: In this alternative, about 100,000 acres would be allocated to intensive timber management.

Restricted Timber Management Lands: In this alternative, about 38,000 acres would be allocated to restricted timber management. These areas would be restricted by Visual Resource Management Class II and Rural Interface Area management.

Lands Managed for Enhancement of Nontimber Resources: About 37,000 acres of land in riparian management areas would be managed primarily for fisheries, wildlife and water quality.
About 29,000 acres of existing old growth forest stands plus 4,000 acres of mature forest over 150 years old would not be subject to planned harvest. About 33,000 acres of forest land within 400 feet of these older stands would not be subject to planned harvest, to assist in maintaining natural ecological elements, protect the older stands from edge effect and natural disaster, and interconnect them into a sustainable network.

About 17,000 acres of forest land not accounted for in previous categories, but lying within approximately two miles of spotted owl nests or habitat cores occupied in recent years, would also not be subject to planned harvest.

An additional 500 acres of forest land not accounted for in previous categories would not be subject to planned harvest, to provide for protection of a 40-acre block in each section where BLM administers at least half of the land, to provide habitat for amphibians and nesting for pileated woodpeckers.

Lands Not Available for Timber Management: Forest lands in the TPCC 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 TPCC category, would not be subject to planned harvest. Other forest lands proposed for the recreation component of the National Wild and Scenic River System, for undisturbed protection of special status

species, and for ACECs would also not be subject to planned harvest. These forest lands total about 44,000 acres.

Energy and Minerals

Leasable Minerals - All oil and gas leases would be issued subject to lease notices protecting Special Status Plant and Animal Species on All BLM Administered Lands in the planning area.

No Surface Occupancy special stipulations would be used to protect great blue heron rookeries and osprey nest sites.

A Timing special stipulation would be used to protect mineral springs utilized by the band-tailed pigeon.

A Controlled Surface Use special stipulation would be utilized within Riparian Management Areas, SRMAs, and Forest Stands Older than 150 Years.

Locatable Minerals - Designated Special Areas and recreation sites would be closed to locatable mineral entry. Under this alternative, a portion of the Row River SRMA would be withdrawn from locatable mineral entry, subject to valid existing rights.

If the McKenzie A, Siuslaw B, and Siuslaw C river segments were designated as recreational rivers, locatable mineral operations would be required to be conducted to minimize unnecessary surface disturbance, sedimentation, pollution and visual impairment.

Salable Minerals - Riparian Management Areas and the McKenzie A, Siuslaw B, and Siuslaw C river segments (if designated as recreational rivers) would be closed to salable mineral development unless the impacts from a proposed use are deemed acceptable or can be adequately mitigated.

Salable mineral development would not be permitted in great blue heron rookeries, or where osprey nest sites would be disturbed or destroyed by the excavation activity.

SRMAs would be open to salable mineral development if the impacts from the proposed development are acceptable.

Federal Candidate and Bureau Sensitive species would be protected at salable mineral sites.

Seasonal operating constraints would be imposed near mineral springs utilized by the band-tailed pigeon.

Quarry site expansion could be restricted in Forest Stands Older than 150 Years if removal of the forest stand protected in these areas would be necessary.

Land Tenure Adjustments

Exchanges would be made to benefit one or more of the resources managed. Exchanges involving disposal of timber to acquire lands containing greater nontimber values would be emphasized. Sales of lands other than available commercial forest lands would be made to dispose of lands that meet criteria (1) or (2) of FLPMA Sec. 203(a), which are:

1. Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the public lands and is not suitable for management by another Federal department or agency.

2. Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose.

No lands would be leased, except leases and conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services, and leases could be made in all zones to resolve occupancy and agricultural trespasses.

Rights-of-Way

No separate provisions specific to this alternative.

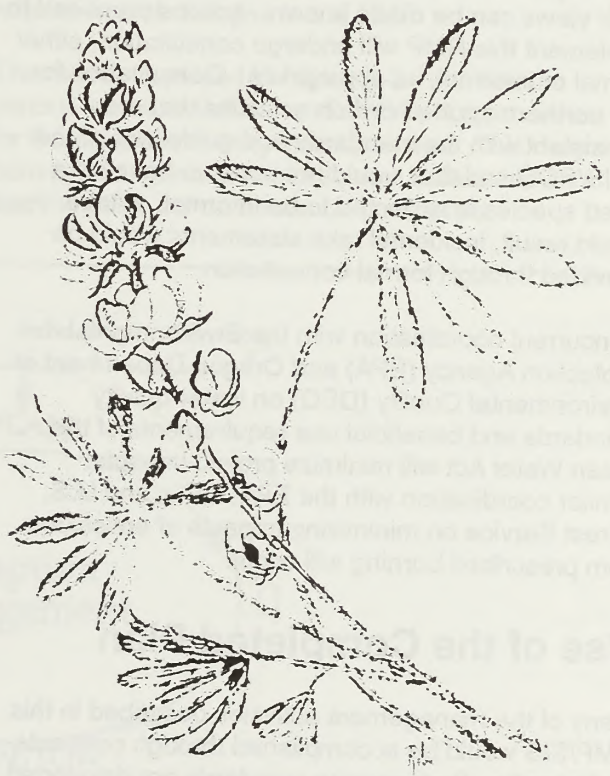
Access

No separate provisions specific to this alternative.

Withdrawals

No separate provisions specific to this alternative.

Section 4 of Chapter 2



Coordination and Consultation (Section 4)

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 (USDI), the Department of Agriculture (USDA), the Department of Commerce (DOC), and the Environmental Protection Agency (EPA). The Memorandum of Understanding created several interagency groups, including the Interagency Steering Committee (ISC), Regional Interagency Executive Committee (RIEC), and Regional Ecosystem Office (REO). 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 (USF&W) and the National Marine Fisheries Service (NMFS) 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 (EPA) and Oregon Department of Environmental Quality (DEQ) on water quality standards and beneficial use requirements of the Clean Water Act will minimize project impacts. Similar coordination with the EPA, DEQ, 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 (IDTs) will precede most on-the-ground management activities. IDTs are comprised of relevant resource management disciplines. The IDT 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 3rd 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 Native Americans) 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 3rd year evaluations, the Allowable Sale Quantity (ASQ) 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. See Figure 2-1 at the end of Chapter 2.

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 that could lead to such an adjustment might be an announcement of research findings clearly establishing that some of the plan's goals and objectives are unlikely to be met. The kind of unusual event that 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 that 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

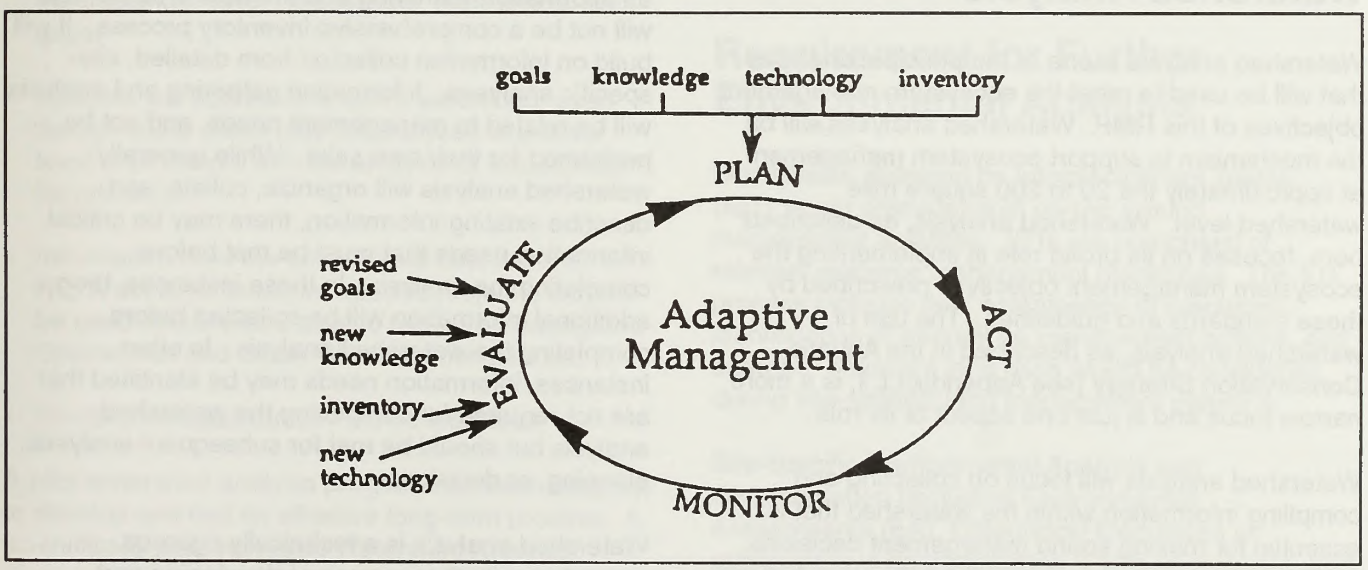


Figure 2-3. *Adaptive Management process*

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, to cite two examples that could have widespread application. 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 ACEC 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 ACECs, and would be subject to analysis in an Environmental Impact Statement (EIS) or Environmental Assessment (EA) 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 (see Appendix LL), 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 (FY 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 (BMP) for water quality protection. Monitoring and evaluating the effectiveness of BMPs 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 BMPs, 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 that 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 (BMPs) to determine if water quality goals have been met. Modification of nonpoint-source controls, including BMPs, 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 (IDT) would precede most on-the-ground management activities. IDTs are comprised of relevant resource management disciplines. The IDT 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 (EA), 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 EA 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 the 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 fire 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 nonttainment 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 (EIS). Tiering is used to prepare more specific documents without duplicating relevant parts of previously prepared general documents. The more specific EA 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 EA 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 EAs 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 EAs tiered to BLM's EIS, *Northwest Area Noxious Weed Control Program*, 1986 as supplemented in 1987.

Availability of EAs 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 Eugene District Office.
- Mailings to known interested/affected people, groups, Native Americans, governmental agencies, and businesses. These mailings may include, but are not limited to, District Program Periodic District 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 (AMA) will have a plan. An individual public, interagency approach to planning will be developed for the AMA. The plan should address or provide:

- A shared vision of the AMA (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 that includes social and political knowledge, not just biological and physical information.
- A strategy to guide implementation, restoration, monitoring, and experimental activities.
- A short-term (3 to 5-year) timber sale plan and long-term yield projections.
- Education of participants.
- A list of community strategies, and resources and partners being used.
- An inventory of community strategies, and 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 that 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 Eugene District's Fiscal Year 1993 budget, with slight adjustment for inflation, or approximately $10.6 million. 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 $12.3 million for the Eugene 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 (ASQ) 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 ASQ 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 D. 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 2nd 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 (RMP) 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 Eugene 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 ensure 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.

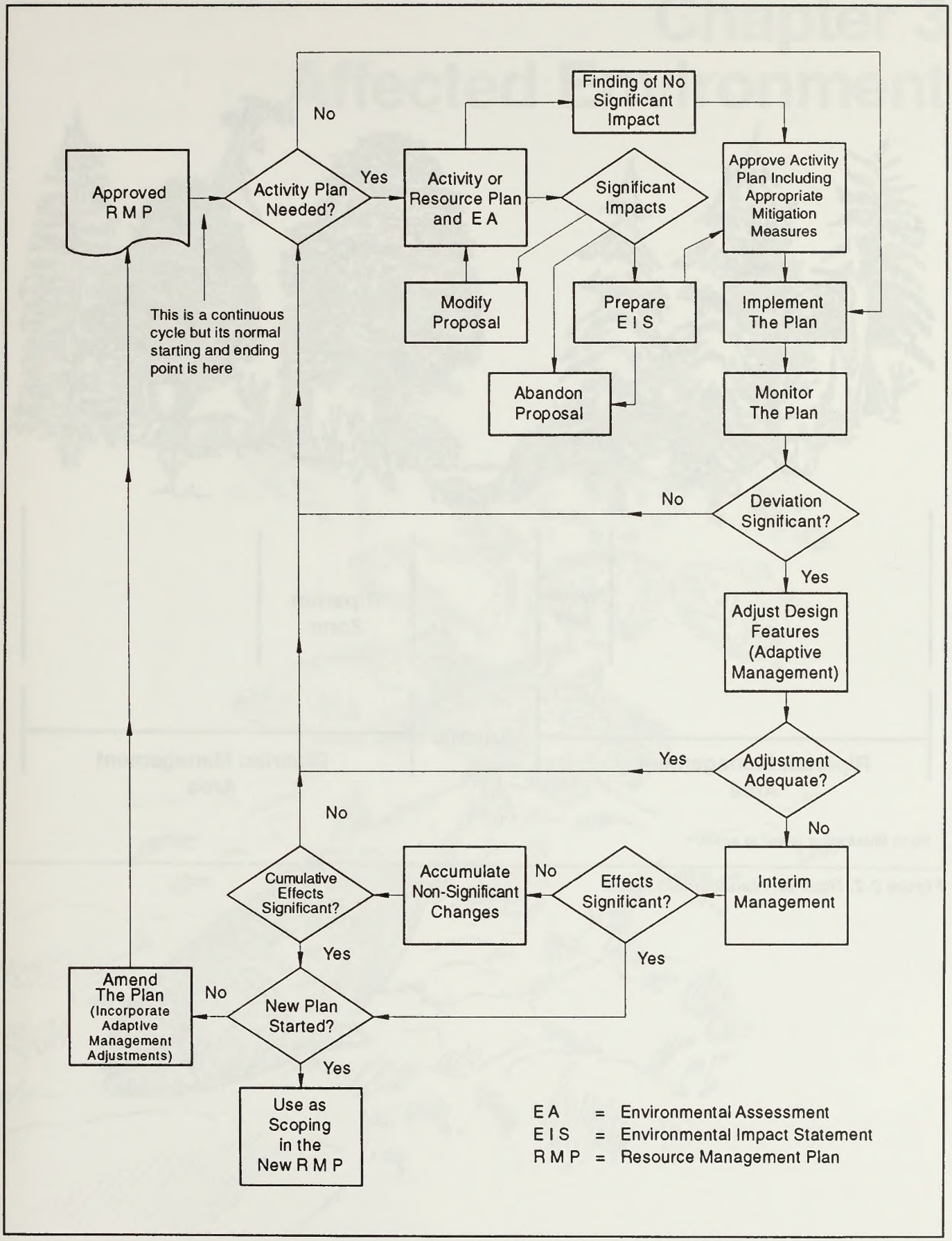


Figure 2-1. *Process for Changing the RMP*

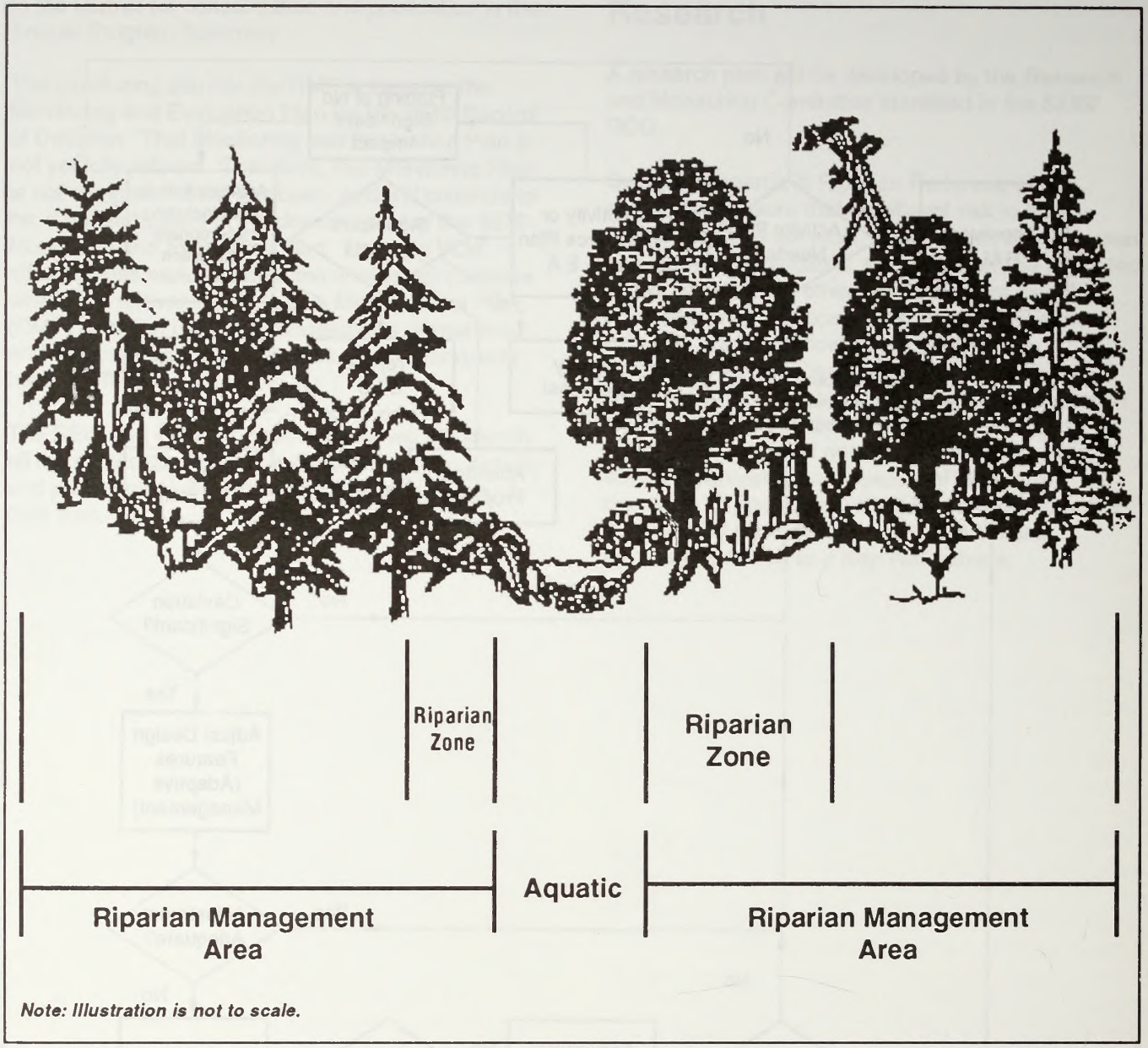


Figure 2-2. Riparian Management Areas

Chapter 3
Affected Environment

Chapter 3 Summary of Major Changes

Introduction

This document identifies major changes (additions and deletions) to the Draft RMP/EIS that have been incorporated into or deleted from Chapter 3 of this Proposed RMP Final EIS. All changes are grouped under each Resource Program subheader for reader/reviewer convenience. Resource Program subheaders not listed do not have major changes.

Changes to Appendices are also included in this document and are located following Resource Program subheaders.

Lands and Transportation

- **Land Status** - Mineral estate ownership totals 317,783 acres, of which 1,299 acres are reserved Federal mineral interests on land in nonfederal surface ownership. There are also 108 acres of BLM surface where the mineral estate is in nonfederal ownership. None of the split surface or mineral estate interests are owned by the State of Oregon.

- **Land Tenure** - No other applications for transfer of title under such authorities as the Recreation and Public Purposes and Color-of-Title Acts are presently on file, although the City of Florence has expressed its interest in obtaining ownership of two tracts of land north of Florence (Heceta Sand Dunes and Cannery Dunes parcels) under the Recreation and Public Purposes Act.

The District is currently processing two exchange proposals where the offered and selected lands have been defined that, if implemented, could result in the exchange of 3,095 acres of BLM administered land in the Eugene and Salem Districts for 4,466 acres of nonfederal land in the Eugene District planning area. A listing of the specific lands involved can be found in case files OR45978 (John Hancock Mutual Life Insurance Company) and OR48077 (Willamette Industries, Inc.) In addition to this proposal, several other possible exchanges are presently being discussed with the Oregon Department of Forestry and private landowners, but have not yet reached the point where all the lands involved can be delineated. Other inquiries and verbal proposals are received on a regular basis.

A longstanding dispute between BLM and the State of Oregon regarding the State's entitlement to select additional lands to fulfill the grant made to the State upon its entry into the Union in 1859 was finally settled in 1992. According to the final court decision, the State is entitled to select 5,202.29 acres of Public Domain land from BLM's current ownership. Most of the selections, called "In-lieu Lands," are expected to be made by the Division of State Lands in Western Oregon. Upon approval of a selection, title to the land would be conveyed to the State. It is expected that Eugene District Public Domain lands will be among those selected.

- **Navigability and State Ownership of Waterways** - State ownership of the beds and banks of navigable bodies of water was granted to Oregon in 1859 as an incidence of statehood and is an inherent attribute of state sovereignty protected by the U.S. Constitution. The beds and banks of nonnavigable bodies of water remain in the ownership of the United States or its grantees. The navigability of the lakes, streams and rivers within the District has not been established. Currently, both the State and Federal government may claim ownership of these waterways. This plan does not propose to address the navigability issue for any part of the District.

Under State law, the Division of State Lands (DSL) is responsible for the management of the beds and banks of navigable waters (ORS 274.005-274.590). DSL is the administrative arm of the State Land Board (the Board), composed of the Governor, Secretary of State, and State Treasurer. Under constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the greatest benefit of the people of the State, consistent with the conservation of this resource under sound techniques of land management. Protection of public trust values of navigation, fisheries, and public recreation are of paramount importance to DSL.

The original Federal test for determining navigability was established in the Daniel Ball case over 100 years ago. This U.S. Supreme Court admiralty case clarified that rivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce . . ." Interpreting this requirement, subsequent court

decisions have adopted this test for title purposes and have ruled that a body of water is navigable if it was capable of use, at the time of statehood, as a public highway for transporting goods or for travel in the customary modes of trade and travel on water.

DSL has determined that there is sufficient evidence to support a claim of navigability and state ownership for portions of the Siuslaw and Row Rivers. The position of the BLM is that the navigability of these waterways has not been established except in the case of the McKenzie River, Willamette River, and any tidal-influenced waterways.

For purposes of managing the waterways where navigability has not been established, any non-federal activities or land uses such as new utility or transportation corridors and boat ramps or other similar facilities that impose into or cross a waterway below ordinary high water will require an easement from the Division of State Lands. Existing nonfederal facilities will require an easement at such time as they undergo major structural alteration, replacement, or relocation. In addition, removal of sand and gravel requires a royalty lease from DSL and any nonfederal use that occupies an area of submerged or submersible land requires a waterway lease.

- **Access** - It is estimated that, due to the checkerboard nature of the BLM ownership, reciprocal right-of-way agreements provide legal access to an acreage of intermingled nonfederal lands that is approximately equivalent to the BLM acreage accessed by such agreements (i.e., about 160,000 acres) in the Eugene District.

Water Resources

- Table 3-40 - Eugene District Analytical Watersheds (added new information and totals)
- The Watershed Condition Index has been deleted.

Biological Diversity and Ecological Health

- The Biological Diversity and Ecological Health section in Chapter 3 has been expanded and revised for consistency with the Chapter 4 analysis section and in response to draft EIS comments. A discussion of Ecological Health has been added.

Vegetation

- Special Forest Products is a new section added to Vegetation.

Riparian Zones

- According to Campbell and Franklin (1979) and Franklin et al. (1981), the greatest structural diversity in riparian areas is provided by old growth forest. A method of evaluating the condition of riparian zones was developed based on this conclusion and the knowledge of BLM biologists. The method uses average tree size, which can be derived from the Operations Inventory (OI) database, as the indicator of riparian habitat condition. In some riparian areas, OI data has not been collected. An estimate of average tree size for these areas was made using inventory data from adjacent forest stands.

In western Oregon, riparian habitat with mature trees averaging greater than 21 inches dbh provides the greatest plant and structural diversity, a high level of animal diversity, and a high level of woody debris (Brown, 1985). Mature riparian zones also contribute a high level of aquatic diversity and provide primary habitat for several wildlife species.

Standing riparian vegetation helps regulate water temperature through shading. It also provides nesting, roosting, cover habitat, and food sources for a variety of terrestrial and aquatic animals (Brown, 1985). Mature riparian vegetation maintains water quality, lessens peak flood flows, controls erosion, and increases ground water recharge. Downed riparian vegetation in a flood plain, supplied by mature trees in the riparian zone, provides terrestrial animal cover and food, dissipates water energy, traps sediment, increases water storage, changes flow patterns, and maintains and improves aquatic habitat conditions.

- The livestock grazing program on the District has been cancelled since publication of the Draft RMP/EIS.

Fisheries

- Four stocks of anadromous salmonids in the District were included in the list of stocks of concern by the American Fisheries Society (Nehlsen et al., 1991), Willamette spring chinook, Siuslaw coho, Siuslaw winter steelhead, and coastal sea-run cutthroat trout. In addition, the District has identified two other stocks of concern - summer run Siuslaw chinook and steelhead, of concern. The District has conducted spawning ground counts on all these runs, except for sea-run cutthroat, and has identified major use areas on public lands. Management activities under the

current guidelines have not impacted the habitat of these stocks, and has contributed to an upwards trend in the habitat. In addition, efforts have been made to identify resident populations needing special management. The District has cooperated fully with Oregon Department of Fish and Wildlife efforts to protect these and other stocks of wild fish.

Improved riparian and stream channel protection on BLM administered lands over the last ten years has allowed recovery of riparian communities and stream channels to begin. Full recovery depends on the growth of large trees to provide instream structure, which is not expected for 200 years. As riparian and stream channels continue to improve, the productive potential of fish habitat will also improve. The District has implemented a program of instream habitat restoration (Table 2-2). These projects are expected to provide short-term habitat improvement until natural recovery occurs.

Two species of fish, coho salmon and coastal steelhead trout, are currently in status review for possible listing as threatened and endangered species. A third species, the Oregon chub, has been listed as an endangered species. While the chub is found within the boundaries of the District, no populations are known in habitat managed by the District. These three species are discussed in the Special Status Species section of Chapter 3.

Wildlife

- Table 3-54 has been added to the Wildlife section.
- Some additional discussion has been added under several of the subsections, to be more consistent with the analysis of effects in Chapter 4.
- Explanation of Key Raptor areas and their role in raptor management on the District has been added.

Special Status Species - Wildlife

- Status of each species following each species name has been moved to Chapter 3 from Chapter 4, where it is more appropriately located.
- Species referred to in the SEIS Special Attention Species (Plants and Animals) section are those that are not special status (by BLM policy), but may be mentioned in the SEIS/ROD as needing special management. Accounts of SEIS Special Attention Species has been added.
- A summary of species not covered by the plan, due to lack of occurrence on the district, or extirpation, is covered under the Introduction to chapter 3 Special Status Species. These were identified in the draft at the end of chapter 4 Special Status Species and have been moved because they are more appropriately identified here in Chapter 3.
- Coho salmon and steelhead trout narratives have been added to the Special Status Species/ Fisheries section.
- Species accounts have been updated to include the most recent data and literature.
- A discussion of stands nominated as Areas of Critical Environmental Concern for the conservation of bald eagles and other raptors (as well as late-successional forest processes) is added in the portion on the bald eagle.
- Species listed as Threatened, Proposed, Candidate, Oregon T&E, Bureau Sensitive, and Bureau Assessment Species have been added with accounts of their status and habitat.

Special Status Species - Plants:

- SEIS Special Attention Species section has been added.
- Special Status Plant List is updated.
- Acres/sites for all Special Status Plants were reassessed and updated.
- New plant species' descriptions were added.

Special Areas

- Information on new potential ACECs are added.
- Update on Special Area condition is updated.
- Information on changes to BEHA and RFI nominations have been made.
- Low-elevation Headwaters of the McKenzie River Proposed ACEC, Lorane Ponderosa Pine Proposed ACEC, Dorena Prairie Proposed ACEC and Cottage Grove Old Growth Proposed EEA were received during the internal review of the

draft RMP/EIS. These nominations have gone through an internal review and qualify as potential ACEC or EEA. Because these areas have not been part of the public review process, the BLM has decided to carry these areas forward into the Final RMP/EIS as potential ACEC or EEA until a plan amendment is implemented or until a new planning process is initiated. Potential ACEC will be managed to prevent any degradation to the relevant and important values for which the areas were nominated as per BLM Policy 1613.21, Areas of Critical Environmental Concern, until they are fully evaluated through a future resource management planning process.

Deberry Road Ponderosa Pine Proposed ACEC was received on April 1, 1992. At the time the proposal was received, the area of concern was within a timber sale that had already been sold and awarded. The area was not screened for relevance and importance because the area could no longer be considered for ACEC status. Some mitigation of the primary values for which the site was nominated did occur by leaving and replacing ponderosa pine trees within the harvest area.

The following revisions (additions) were made to Table 3-26 - Potential Special Areas:

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	ACEC Eligibility
Lorane Ponderosa Pine/Mixed Conifer Forest Community	ACEC	106	Plant Community: The area was nominated for its Willamette Valley Ponderosa Pine plant community.	Yes
Dorena Prairie	ACEC	8	Plant Community: The area was nominated for its remnant red fescue prairie grassland.	Yes
Cottage Grove Old Growth	ACEC	155	Plant Community/Wildlife/ Education: The area was nominated for the low elevation old growth forest in close proximity to Cottage Grove school system.	No

Recreation

The following revisions (additions) were made to Table 3-17 - Potential Recreation Sites:

Site	BLM Acres	Resource Area Location	Amenities
Blachly-Lane Flume Trailhead	<1	Coast Range 16-7W-19	Potential trailhead within the proposed Lower Lake Creek SRMA. Amenities would include sanitation, parking, and information for the proposed Blachly-Lane Flume trail.
Culp Creek Trailhead	2	South Valley 21-1W-31,32	Potential trailhead within the proposed Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot.
Disston Trailhead	3	South Valley 21-1W-35	Potential trailhead within the proposed Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot.

Mosby Creek Trailhead	3	South Valley 21-3W-01,02	Potential trailhead within the potential Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot.
Overland Trailhead	<1	Coast Range 16-7W-29	Potential trailhead with parking, sanitation, and information for the proposed Overland Trail. This facility would be within the proposed Lower Lake Creek SRMA.

The following revisions (additions) were made to Table 3-18 - Existing Recreation Trails:

Trail	Miles	Resource Area Location	Other Descriptive Information
Row River Trail	14.0	South Valley 20-2W-31,34 20-3W-36 21-1W-19,30-32 21-2W-2,3,11,13, 21-2W-14,24, 21-3W-1	A multi-model nonmotorized trail along Row River and Dorena Lake, between Cottage Grove and Culp Creek within the proposed Row River SRMA.
Tyrrell Forest Succession Interpretive Trail	1.0	South Valley 20-5W-15,21	An interpretive trail within the Tyrrell Seed Orchard near Lorane, Oregon.
Whittaker Creek Old Growth Ridge Trail	1	Coast Range 18-8W-21	A forested trail within diverse habitats on a ridge above Whittaker Creek Rec. Site. The area is included in the proposed Siuslaw River SRMA.

The following revisions (additions) were made to Table 3-19 - Potential Recreation Trails:

Trail	Miles	Resource Area Location	Other Descriptive Information
Blachly-Lane Flume Trail	1.0	Coast Range 16-7W-19	Potential trail within the proposed Lower Lake Creek SRMA, which would follow the old flume trail and overlook Lake Creek Falls.
Overland Trail	2	Coast Range 16-7W-19,29,30	Potential mountain bike trail that would connect Fish Lake Creek areas. The area is included in the proposed Lower Lake Creek SRMA.
Row River Trail Expansion	5.0	South Valley 21-1W, 32-36	Potential expansion of the Row River Trail system.

The following revisions (additions) were made to Table 3-20 - Existing and Potential Special Recreation Management Areas:

Potential SRMA	BLM Acres	Resource Area Location	Other Descriptive Information
Lower Lake Creek	2,000	Coast Range 16-7W-19,20, 27,29,30,33	The area includes Lake Creek Falls ACEC/ONA, the currently closed Lake Creek Recreation Site and Fish riparian area. Possible alterations to the landscape could occur to improve the safety and enjoyment of the area. Facilities, trails, and interpretation would be part of the proposed recreation project plan for this SRMA. The area would include 2,530 acres, if all identified lands are acquired.

Row River (formerly Sharps Creek)	10,000	South Valley 20-2W, 3W, 21-1W, 2W 22-1W	Potential SRMA includes the former proposed Sharps Creek SRMA.

The following was deleted from Table 3-19 - Potential Recreation Trails:

Trail	Miles	Resource Area Location	Other Descriptive Information
Whittaker Creek Old Growth Ridge Trail	1.0	Coast Range 18-8W-21	Potential forested trail in diverse habitats on a ridge above the Whittaker Creek Recreation Site. The area is included in the proposed Siuslaw River SRMA.

Timber Resources

- Tables 3-32, 3-33, 3-36, and 3-37 have had changes or have been updated.

Energy & Mineral Resources

- New mineral potential information was added to Map 3-12, and GIS acreage figures in Table 3-14 were modified to reflect this change.

Socioeconomic Conditions

- Added four new tables (3-59, 3-60, 3-61, and 3-62). Brief discussion of Special Forest Products added.

Soils

- A soil biology discussion has been added to the Soils section.

SUMMARY OF MAJOR CHANGES APPENDICES

Appendix V - Special Areas - Existing and Potential

The following addition was made to Table 3-28 - Present Condition of Existing and Potential Special Areas

Existing Special Areas	Present Condition
Dorena Prairie	This area remains in good condition. Noxious weed invasion is occurring on the site, but is currently being controlled.
Lorane Ponderosa Pine/ Forest Community	These sites remain in good condition. No negative Forest impacts Mixed Conifer have been identified at these sites.
Cottage Grove Old Growth	These sites remain in good condition. No negative impacts have been identified at these sites.

Introduction

This chapter describes the physical, biological and socioeconomic characteristics of the BLM administered lands as they now exist on the 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, with less important material summarized or 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 during normal working hours at the Eugene District Office, 2890 Chad Drive, Eugene, Oregon 97440. Other references are cited within the text by author and date of publication. A listing of these references appears in the Reference Cited section.

Preparation of this chapter is heavily dependent on the Bureau Automated Resource Data (ARD) and supporting Geographic Information System (GIS) technology. Acres used, unless otherwise noted, are derived from ARD/GIS. As they are computer generated, they may not be the same as shown on the Master Title Plats (MTP), which are computed from cadastral survey notes and represent "official" acres. Likewise, ARD acres may differ from previous published BLM statistics, inventory records, timber sale maps, or similar documents.

Climate

The planning area has a humid climate with a strong marine influence characterized by high precipitation, particularly during the winter months, and by moderate temperatures except at the higher elevations. The mountainous topography produces considerable local variations in climate.

The annual precipitation is 60 to 80 inches immediately along the coast and increases inland to over 100 inches at the crest of the Coast Range, then it decreases toward the Willamette Valley where it ranges from 35 to 45 inches. In the Cascade Range precipitation increases toward the crest where it ranges between 30 and 100 inches, depending on topography. Approximately 70 percent of the precipitation occurs from November through March often in moderate to heavy storms that produce up to 6 inches or more in a 24-hour period. The normal annual snowfall varies from a trace near the coast and in the Willamette Valley to over 500 inches in the Cascade Range. The percentage of normal annual precipitation that falls as snow increases at the rate of about 10 percent for each 1,000-foot increase in elevation above 4,000 feet where approximately one-third falls as snow. Summer precipitation is limited to occasional light rain storms, relatively rare thundershowers, and coastal fog.

The prevailing winds are generally from the west and northwest. During stormy periods, the prevailing wind is from the south and southwest and may reach destructive velocities. Continuous wind velocities of 15 to 25 miles per hour are common along the immediate coast. The wind velocities are more moderate in the inland valleys, but strong winds caused by daily and topographic temperature variations are common in narrow canyons and upper mountain slopes during the summer. Occasional short periods of strong easterly winds may occur at any time of the year.

High relative humidity is common all year except during the easterly wind period. Dense fog is common on the immediate coast and the inland valleys.

The winter temperatures are mild except in the high elevations. The summer temperatures are cool in the coastal fog belt but are fairly high further inland. Both annual and diurnal temperature ranges are relatively small. The recorded high is 110° F and the recorded low is -24° F.

The average frost-free season varies from around 250 days along the coast to about 130 days in the mountains. The average frost-free season in most of the agricultural area is 180 days or more.

Topography and Geology

The three distinctive physiographic provinces recognized in the operating area are the Coast Range, Willamette Valley, and the Cascades. Each province is characterized by a more or less unique rock type and topographic expression. The ability of rock to resist weathering and the competence of the material dictates the resulting terrain. Major rivers flowing through the District are the McKenzie, Willamette, and Siuslaw. Elevations in the operating area range from sea level to 4,754 feet at

Huckleberry Mountain. Slopes of 70 to 100 percent are common.

The Coast Range physiographic province consists of marine sedimentary rock formations that date back to the Paleocene and early Eocene Epochs (37-54 million years ago). The marine sediments (predominately of the Flournoy Formation) are widespread throughout much of the western half of the District. Most of the beds are rhythmically bedded, micaceous and arkosic sandstone and silty sandstone (Baldwin, 1976).

The Pleistocene Epoch (0.011 to 2-3 million years ago) was a time of high precipitation and, this fact coupled with uplift, has produced the steep walled narrow valleys of the Coast Range. These slopes are particularly vulnerable to landslides due to the steepness of the terrain, soil characteristics, and high winter precipitation. Some of the massive sedimentary rock has moved catastrophically in large blocks, which is the case in the formation of Triangle Lake near Blachly. Triangle Lake is blocked by a tilted mass of Flournoy sandstone that evidently came from high on the north slope of the valley. Lake Creek found its outlet against the south wall where it is incised in the bedrock rather than in the landslide deposit. Landscapes of the westernmost three-fourths of this province are characterized by highly dissected landforms. The eastern one-fourth of the Coast Range province is not as dissected or steep and the slopes are often broken by benches.

The Willamette Valley province lies between the Coast Range and the Cascades and extends southward to a point near Cottage Grove where the two ranges converge. The Valley is a structural depression with hills of moderate relief in places separating broad alluvial flats. The southern Willamette Valley is underlain by Eocene volcanic and sedimentary rocks, and the eastward extension of Coast Range formations that presumably go beneath the Valley almost to the margin of the Cascade Range. Marine sedimentary rocks deposited during the Oligocene Epoch (26-37 million years ago) are present along the eastern margin of the Valley. Alluvium deposited during recent geologic time is widespread along the streams. Intrusive rocks younger than the early Oligocene Epoch exist in the Willamette Valley and form most of the prominent landmarks in the area such as Spencer Butte, Skinner Butte, and Creswell Butte. These deposits are basaltic and display columnar jointing.

The Cascades province is comprised mostly of pyroclastic rocks and flows of basalt and andesite. Landscapes underlain by basalt and andesite typically have a parallel drainage pattern and long slopes that are steep on the upper portion while the lower portions have moderate gradients. Landscapes developed upon pyroclastic bedrock are characterized by benchy and hummocky relief, frequently exhibiting large areas of moderate topography (benches) bounded by short, steep slopes. In the Cascades province, the predominate geologic unit is the Little Butte Volcanic Series of Oligocene age. Pyroclastic deposits make up three-fourths of the series that include massive beds of lapilli tuff, less abundant flows of breccia of basalt and andesite, welded tuff, flows of dacite, rhyodacite, and rhyodacitic tuffs deposited by ash flows. Medium grained intrusives, areas of propylitic alteration, and metalliferous deposits are mostly limited to a narrow northward trending belt outside of the operating area to the east.

Northwest-trending faults are the major structural features of the southern part of the Cascade Range in the drainage basin of the Middle Fork of the Willamette River. In the northern and central parts of the Cascades, the structure is dominated by several major folds that trend northeasterly. Folding in the Cascade Range probably took place several times between the late Eocene and late Miocene (12-37 million years ago). All formations older than about 2 million years are folded. In the western foothills of the range, strata of the Little Butte Volcanic Series dip more steeply than the overlying flows of Columbia River Basalt to the north of the operating area and strata of the Sardine Formation of the High Cascades.

Lands and Transportation

Land Status

As shown on Map 1-2, BLM administered lands are primarily in a checkerboard ownership pattern. Table 3-10 displays the ownership by County within the planning area. The BLM ownership is ten percent of the planning area. Mineral estate ownership totals 317,790 acres, of which 1,299 acres are reserved Federal mineral interests on land in non-federal surface ownership. There are also 108 acres of BLM surface where the mineral estate is in nonfederal ownership. None of the split surface or mineral estate interests are owned by the State of Oregon.

Table 3-10 - BLM Administered Lands Within Planning Area by County and Land Status

County	Acreage[1] of O&C[2]	CBWR[3]	PD[4]	Acquired	Other	Total Surface	Reserved Minerals
Benton	200	0	0	0	0	200	0
Douglas	20,199	0	1,228	0	0	21,427	0
Lane	269,907	0	7,520	350	40	277,817	1,291
Linn	16,855	0	300	1	0	17,155	8
Totals	**307,161**	**0**	**9,048**	**351**	**40**	**316,599**	**1,299**

[1] Acreage based on most recent surveys taken from Master Title Plats.
[2] O&C: Oregon and California Act of 1937 (Revested Oregon and California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands
[3] CBWR (Coos Bay Wagon Road) - Not included by the Eugene District. As indicated by the name, they are located in Coos County.
[4] PD: Public Domain

Land Tenure

The District has had 25 land actions affecting BLM administered acreage since 1984. Lands have been acquired through exchanges and have been disposed of through exchange, sale, patent correction, and transfer under the Recreation and Public Purposes and Color-of-Title Acts. These land actions have resulted in the acquisition of 1,376 acres and disposal of 1,407 acres. The District currently has two documented sale proposals that, if implemented, would result in the sale of three acres of public land. One State Indemnity (In-Lieu) selection involving 180 acres of public domain land is also pending. No other applications for transfer of title under such authorities as the Recreation and Public Purposes and Color-of-Title Acts are presently on file, although the City of Florence has expressed its interest in obtaining ownership of two tracts of land north of Florence (Heceta Sand Dunes and Cannery Dunes parcels) under the Recreation and Public Purposes Act.

The District is currently processing three exchange proposals where the offered and selected lands have been defined that, if implemented, could result in the exchange of 3,174 acres of BLM administered land in the Eugene and Salem Districts for 4,633 acres of nonfederal land in the Eugene District planning area. A listing of the specific lands involved can be found in case files OR45978 (John Hancock Mutual Life Insurance Company), OR48077 (Willamette Industries, Inc.) and OR49847 (International Paper Company). In addition to this proposal, several other possible exchanges are presently being discussed with the Oregon Department of Forestry and private landowners, but have not yet reached the point where all the lands involved can be delineated. Other inquiries and verbal proposals are received on a regular basis.

Nonfederal lands, which BLM has specifically considered for acquisition in previous years are located at Hult Reservoir; within the West Eugene Wetlands Project Area; in the Coburg Hills Bald Eagle area; adjacent to the Tyrrell Seed Orchard; adjacent to the Long Tom ACEC; and adjoining the Whittaker Creek and Clay Creek Recreation Sites. Growing public and governmental emphasis in recent years on protecting and enhancing recreational, riparian, wetland, wildlife, and fisheries values is resulting in the identification of additional lands desirable for public acquisition. A number of new acquisition proposals are discussed elsewhere in this document.

A longstanding dispute between BLM and the State of Oregon regarding the State's entitlement to select additional lands to fulfill the grant made to the State upon its entry into the Union in 1859 was finally settled in 1992. According to the final court decision, the State is entitled to select 5,202.29 acres of Public Domain land from BLM's current ownership. Most of the selections, called "In-lieu Lands", are expected to be made by the Division of State Lands in Western Oregon. Upon approval of a selection, title to the land would be conveyed to the State. It is expected that Eugene District Public Domain lands (in addition to the 180 acres currently under application) will be among those selected.

Trespass

Realty trespass is not a significant problem within the planning area. At present, four encroachments of residential improvements totalling less than two acres are identified. Where the land occupied is nontimberland or otherwise not suitable for permanent forest management, the trespass is inadvertent, and the improvements are of more than nominal value and utility. These occupancy trespasses have usually been resolved by sale as this resolves the situation permanently and avoids future costs of administering permits and leases for small acreage with small rental returns.

Seven suspected agricultural trespasses totalling about 13 acres are presently identified. Where the land is nontimberland or not otherwise suitable for permanent forest production (e.g., an isolated corner of a tract separated from the remainder by a road or railroad right-of-way), the disposal criteria specified in 43 CFR 2710.0-3(a)(3) are usually met, and the preferred resolution has been by sale. In other situations, the land can eventually be returned to timber production, but permits or leases may be issued until the user's investment in fences or other improvements can be amortized and a new fence constructed along the property boundary.

Additional realty trespass cases are certain to be discovered by future surveying projects. There are few opportunities to resolve agricultural or occupancy trespasses through exchange since the acreages involved are usually small and most occur on the valley fringes where the unauthorized users are generally individual landowners who do not own property BLM would wish to acquire.

Withdrawals and Classifications

Withdrawals and classifications existing on the District are shown in Appendix K, Table 3-12. The acreage, types of withdrawals and segregative effects are summarized as follows:

Type	Acres	Segregative Effect
BLM Administrative Sites	1,533	Withdrawn from operation of the general land laws and mining laws.
Public Domain-Multiple Use	9,001	Withdrawn from operation of the general land laws, but not from the R&PP Act, sales or exchanges.
Other Agency	128	Withdrawn from operation of the general land laws and mining laws. Withdrawn from the mineral leasing laws on 47 acres only.
Powersites	8,566	Withdrawn from operation of the general land laws only.

Withdrawals generally segregate land from operations under the nondiscretionary general land laws, mining laws and sometimes the mineral leasing laws, but do not always affect BLM surface management. Classifications generally segregate the lands from all forms of appropriation under the public land laws, including the mining laws but not the mineral leasing laws. All withdrawals affecting lands that would be under BLM jurisdiction if the withdrawal were terminated, which existed in 1984, and that are subject to the review provisions of FLPMA 204 (l) have been reviewed and recommendations for continuance, termination, reduction in size or other modification have been forwarded to the Oregon State Office. One powersite classification has been reviewed and recommended for termination. All remaining powersite classification, power site reserve and water power designation withdrawals are scheduled to be reviewed under the authority of DM516 during the 1990s. All classifications existing in 1984 have also been reviewed and were found to still be needed. Pending withdrawal petition-applications, relinquishments, partial revocations, modifications, and proposed withdrawals are displayed in Appendix L. It is expected that new proposals for acquisition and development of special concern areas will arise over the next decade. Whenever existing regulations are not adequate to guarantee protection of the improvements or resources, or whenever additional lands are acquired to enlarge the size of existing special concern areas, a withdrawal should be considered.

Rights-of-Way Corridors, Major Rights-of-Way and Leases

Existing right-of-way corridors include Bonneville Power Administration and private utility transmission lines. These corridors are shown on Map 2-2. The Western Regional Corridor Study (July 1993) did not identify any potential new corridors that would affect BLM administered lands in the District. The future

upgrading of existing transmission lines is considered likely and may require additional right-of-way width.

There are no applications (permits) for Federal Energy Regulatory Commission (FERC) hydroelectric projects in the planning area that would affect BLM administered lands. Low summer stream flow due to lack of snowpack in the Coast Range makes hydroelectric generation marginal in the western half of the planning area. The same conditions apply in the low elevation western Cascades, making hydroelectric generation marginal on BLM administered lands in the eastern half of the planning area except along major streams. To date, solar and wind power electrical generation have 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.

Additional rights-of-way have been granted for logging roads, domestic and irrigation water lines, utility lines for servicing residences, etc. The vast majority are within or adjacent to road clearing limits.

Because public and private lands are intermingled within the District, each party must cross the lands of the other in order to access its lands. 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 50 on the District) are subject to the regulations that were in effect at the time they were executed or assigned.

Those lands presently leased to Lane County for Whitewater and Martin Rapids County Parks are only minimally developed and managed by the County. Upon expiration in 2007, these leases might not be renewed unless the County proposes substantial new development. When and if the leases terminate, the R&PP classification would be canceled and the lands could be managed in the same manner as adjoining BLM lands on the south bank of the McKenzie River.

Existing Recreation and Public Purposes (R&PP) leases OR905 (McKercher County Park) and OR37243 (Willamette Greenway) are suitable for lease renewal. It would be preferred, however, that the lands be sold to Linn County and the State of Oregon, respectively, due to the location and small acreage of the tracts. Existing lease ORE 012264 authorizes a solid waste transfer site at Low Pass. It is suitable for lease renewal if, at the time of lease expiration, renewal is permitted by BLM policy.

No proposals for new leases are pending, but opportunities for new leases are expected to develop in the future, particularly as a tool to eliminate land use trespasses.

Communication Sites

Seven existing communication sites are located in the District. Three are developed sites with numerous users occupying each site, and four are developed with one user on the site. Communication site management plans have been completed for Buck Mountain, Badger Mountain, and Huckleberry Mountain. Eleven potential new communication sites have also been identified. Locations are shown on Map 2-2. Throughout the upcoming decade, the need for communication sites is expected to increase. Existing developed sites are occupied by two-way, microwave, and low power relay type users. These uses are generally compatible on the same site. Mass media users with associated 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 high power users and to satisfy the demand expected to be created by new technology (satellite communications, cellular mobile, etc.). New sites, in addition to those shown on Map 2-2, may be needed for specific electronic communication applications.

Navigability and State Ownership of Waterways

State ownership of the beds and banks of navigable bodies of water was granted to Oregon in 1859 as an incidence of Statehood and is an inherent attribute of State sovereignty protected by the U.S. Constitution. The beds and banks of nonnavigable bodies of water remain in the ownership of the United States or its grantees. The navigability of the lakes, streams, and rivers within the District has not been established. Currently, both the State and Federal government may claim ownership of these waterways. This plan does not propose to address the navigability issue for any part of the District.

Under State law, the Division of State Lands (DSL) is responsible for the management of the beds and banks of navigable waters (ORS 274.005-274.590). DSL is the administrative arm of the State Land Board (the Board), composed of the Governor, Secretary of State, and State Treasurer. Under

constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the greatest benefit of the people of the State, consistent with the conservation of this resource under sound techniques of land management. Protection of public trust values of navigation, fisheries, and public recreation are of paramount importance to DSL.

The original Federal test for determining navigability was established in the Daniel Ball case over 100 years ago. This U.S. Supreme Court admiralty case clarified that rivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce . . ." Interpreting this requirement, subsequent court decisions have adopted this test for title purposes and have ruled that a body of water is navigable if it was capable of use, at the time of Statehood, as a public highway for transporting goods or for travel in the customary modes of trade and travel on water.

DSL has determined that there is sufficient evidence to support a claim of navigability and State ownership for portions of the Siuslaw and Row Rivers. The position of the BLM is that the navigability of these waterways has not been established except in the case of the McKenzie River, Willamette River, and any tidal-influenced waterways.

For purposes of managing the waterways where navigability has not been established, any nonfederal activities or land uses such as new utility or transportation corridors and boat ramps or other similar facilities that impose into or cross a waterway below ordinary high water will require an easement from the Division of State Lands. Existing nonfederal facilities will require an easement at such time as they undergo major structural alteration, replacement, or relocation. In addition, removal of sand and gravel requires a royalty lease from DSL and any nonfederal use that occupies an area of submerged or submersible land requires a waterway lease.

Access

Approximately 40 percent of the public land within the District is legally accessible to the general public by means of County roads, State highways, and BLM roads constructed across easements that grant control of the road to the United States and allow public access to lands managed by the United States. These lands and an additional 50 percent of the public land acreage are legally accessible for resource management purposes by BLM, its agents, and those authorized to conduct business on public lands. This administrative access to the additional acreage is by means of nonexclusive easements and 50 reciprocal right-of-way agreements that do not include access rights for the general public. Approximately 10 percent of District lands have no legal access. It is estimated that, under current management direction, approximately 30 exclusive and 100 nonexclusive easements would be required to provide administrative access to these scattered tracts.

It is estimated that, due to the checkerboard nature of the BLM ownership, reciprocal right-of-way agreements provide legal access to an acreage of intermingled nonfederal lands that is approximately equivalent to the BLM acreage accessed by such agreements (i.e., about 160,000 acres) in the Eugene District.

Roads

An average of 25 miles of road have been constructed and 1,100 miles of road maintained per year over the past five years in support of the timber management program. Table 3-11 displays the current inventory of BLM controlled roads. Existing roads occupy approximately 15,000 acres. Easements and/or reciprocal right-of-way agreements provide physical access to approximately 90 percent of District lands for forest management. The District has also developed 10 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.

Air Resources

The Clean Air Act: 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 fire and other activities. The National Ambient Air Quality Standards (NAAQS) are set to protect human health and welfare.

Table 3-11 - Current Road Inventory of BLM Controlled Roads

Surface Type (Standard)	Current Miles Functional Classification[1] and Standard Arterial (Double Lane)	Collector (Single Lane)	Local (Single Lane)
Natural Surface	0	0	244
Pit Run Surface	0	0	127
Grid Rolled Rock	0	0	0
Screened Base Course	0	0	0
Aggregate Base Course-Crushed	0	0	0
Aggregate Surface Course-crushed	0	1,322	0
Bituminous Surface Treatment	59	167	0
Crushed Sandstone	0	0	0
Totals	**59**	**1,489**	**371**

[1] Functional classifications are defined as follows: (Federal Highway Administration Manual - Highway Functional Classification Concepts, Criteria and Procedures).

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 standard 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 standard 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 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.

Pollutant concentrations that exceed the NAAQS endanger public health. Air pollutants for which Federal NAAQS have been established are called "criteria" air pollutants. They include Particulate Matter (PM10), sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, and lead.

State Implementation Plans: 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 NAAQS 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 NAAQS. 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 State of Oregon Department of Environmental Quality has a State Implementation Plan (SIP) that has been approved by the Environmental Protection Agency. The Oregon Smoke Management Plan (OSMP) identifies strategies for minimizing the impacts of smoke from prescribed burning on the densely populated, designated, nonattainment and smoke sensitive areas within western Oregon and the Bend area in central Oregon (see Map 3-2). This SIP addresses the criteria pollutants emitted from prescribed burning (PM10), visibility, and smoke management. Particulate Matter (PM) with a nominal size of 10 microns or less (PM10) is the specific pollutant addressed in the State implementation plans.

Prevention of Significant Deterioration (PSD) and Visibility Programs: The Clean Air Act established the Prevention of Significant Deterioration program that 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.

The visibility improvement plan, which is also part of the State implementation plans, considers the impacts smoke from prescribed fire may have on visibility within the Class I areas designated as Wilderness. These Class I areas are shown on Map 3-2 along with wilderness areas that are now designated Class II but may be designated Class I in the future.

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. Map 3-2 shows the Federal Class I areas and the designated areas within the range of the northern spotted owl.

Air Quality Related Values (AQRV): The Clean Air Act gives Federal land managers of Wilderness Areas (Class I) 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, which are necessary to be protected.

Air Quality Programs and Prescribed Fire: 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 fire into their plans.
Conformity: 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 NAAQS, 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 watershed level analyses, and project/site-specific analyses.

Health and Welfare Effects of Prescribed Burning Pollutants: 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 NAAQS 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 as 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 fire or wildfires have not been directly studied.

Focus on PM10 (Particulate Matter Smaller than 10 Micrometers): 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 NAAQS for PM10 because recent studies indicate that the current NAAQS may not be adequate to protect individuals with a greater

sensitivity to these particulates. Typical sources of PM10 include industrial processes, wood stoves, roads, agricultural practices, and prescribed fires and wildfires.

The air quality analysis in this EIS focuses primarily on the impacts of particulate matter from prescribed fires. 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, Grants Pass, Klamath Falls, LaGrande, Medford/Ashland, and Oakridge are currently in violation of the National ambient air quality standards for PM10 and are classified as nonattainment areas for this pollutant.

The nonattainment status of these communities is not attributable primarily to prescribed burning. Major sources of particulate matter within the Eugene/ Springfield nonattainment area is smoke from wood stoves. Dust and industrial sources are other contributors. The contribution to the nonattainment status of particulate matter from prescribed fire is less than 4 percent of the annual total for the Eugene/Springfield air quality management area. This airshed has recently been placed under regulated use of wood stoves and fireplaces.

Two other sources of pollution are directly attributable to land management activities: fugitive dust and aerosol herbicides.

The pollutant most associated with the Eugene District resource management activities is PM10 found in smoke produced by forest land prescribed fire, farm field burning, and wood stoves. Prescribed fire is used for site preparation, fuel hazard reduction, vegetation control, and to mimic natural disturbance processes. Broadcast fire is also used to eliminate grass seed straw from farm fields.

Meteorological Factors: 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 that 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 fire activities are coordinated with State and local air quality agencies to ensure that atmospheric stability and mixing heights are advantageous for dispersion.

Recent Prescribed Fire Use and Emissions: Prescribed fire use during the recent past was analyzed to assess the effect on air quality of implementing the alternatives in this EIS. 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 fires during the mid-to-late 1980s 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. 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.

The goal is to reduce particulate matter (PM10) emissions from forest land prescribed fires by 50 percent for all of western Oregon by the year 2000. Current data indicates particulate emissions have

been reduced approximately 42 percent since the baseline period was established (ODF, 1991). It is expected this trend will continue and prescribed fire smoke emissions will not be a consideration in meeting air quality standards for PM10 in western Oregon.

A primary reason for the emission reduction levels from the calculated baseline period of 1976 to 1979 is the steady decrease in the total tons per acre consumed (see Table 3-1). Average calculated baseline for the period 1976 to 1979 is 60.3 tons per acre. The present consumption for the planning area is 28 tons per acres.

Current total biomass consumption has been reduced by 62 percent from the 1984 to 1988 baseline period. The variation in acres burned and total emissions is a result of weather, smoke management restrictions, and the economic cycles that affect timber harvest.

When burning under springlike conditions, larger fuels are not consumed due to higher fuel moisture. Fuel consumption is lower, creating fewer emissions, with smoke dispersal easier to achieve under the general meteorological conditions that prevail at that time.

The use of advanced ignition techniques, such as rapid ignition, further reduces total emissions by accelerating the ignition period and reducing the total combustion process due to the reduction in the smoldering stage. The use of rapid ignition allows burning under wetter fuel conditions allowing less material to be burned, especially the soil-protecting duff layer, which also reduces total emissions.

Prescribed Burning Air Quality Impacts: The air quality impact of prescribed fires during the 1985 to 1992 time period is difficult to quantify. While burning forest residues can create large quantities of particulate matter and other pollutants, this burning usually takes place in relatively remote areas with intensities that vent smoke high into the atmosphere where it is widely dispersed.

Smoke entering a designated area from a prescribed fire is called an intrusion. Intrusions are classified from light to heavy. From 1987 to 1989, an average of 25 intrusions occurred per year in western Oregon. These intrusions were generally light to moderate in intensity and of short duration (ODF, 1991) No intrusions have occurred in the Eugene/Springfield designated area since 1987.

As one indicator of smoke impacts, Oregon Department of Forestry tracks smoke intrusions into designated areas (primarily population centers). An intrusion is defined as smoke from prescribed fires entering a designated area at ground level. Intrusions do not necessarily violate air quality standards, although they may cause public nuisances. The 1992 Oregon Smoke Management Annual Report displays the trend in intrusions over the 1985 to 1992 period. The area burned and the number of intrusions per year have both declined

Table 3-1 - Average Biomass Consumption Estimates

Category	Calculated Baseline 1976-79) Average Consumption (tons per acre)			Calculated 1980-84) Average Consumption (tons per acre)			Adjusted Planning Area Average Consumption (tons per acre)		
	High	Mid	Low	High	Mid	Low	High	Mid	Low
Duff [1]	32.3	29.3	26.4	30.0	21.3	15.0	7.5	5.3	3.7
Woody <3"	12.3	12.3	12.3	13.2	9.5	6.7	13.2	9.5	6.7
Woody >3"	16.3	16.0	15.7	14.5	11.0	8.2	14.5	11.0	8.2
Rotten	2.7	2.7	2.6	2.5	2.2	1.9	2.5	2.2	1.9
Total	**63.6**	**60.3**	**57.0**	**50.2**	**44.0**	**31.8**	**37.7**	**28.0**	**20.5**

[1] Sandberg's figures for an average forest duff layer of one inch in western Oregon is equal to 18.2 tons per acre. For the planning area, one inch of duff was estimated. This does not mean total consumption, which varies based on season of burn. It is expressed in the planning area adjusted consumption. (Sandberg et al., 1985; Oregon State Department of Forestry Fuels Inventory Audit, 1989; Supplemental SEIS, 1984).

Table 3-2 - Smoke Intrusions in the Eugene/Springfield Designated Area From All Landowners

	Number of Smoke Intrusions
1985	12
1986	1
1987	2
1988	0
1989	0
1990	0
1991	0
1992	0
Total	**16**

SOURCE: Oregon Department of Forestry

sharply in the early 1990's (Table 3-2). However, because only smoke intrusions into designated areas are reported, potential impacts in very small towns or rural areas close to forest lands may be overlooked. Increased use of fire for ecosystem management may increase the number of intrusions per year. In particular, intrusions may increase because it is difficult to vent smoke from underburning into the upper atmosphere because of the low-intensity burning required to protect the residual stand.

The 1991 and 1992 Oregon Smoke Management Annual Reports also show PM10 violations. The Oregon Department of Forestry analyzed burning and weather conditions for the dates of violations and concluded that forestry-related burning did not contribute to any violation in either year.

Prescribed fires can adversely impact visibility in Class I areas where excellent air quality is an important value. Special remote area monitoring in Oregon during 1982 to 1984 showed that prescribed fires contributed 48 percent of the particulate pollution at one Class I monitoring site and 41 percent at another, demonstrating that impacts can be significant. Prescribed fire use under any of the alternatives should follow State visibility requirements to minimize impacts. Whether prescribed natural fire from unplanned ignitions should be restricted for visibility protection is still under discussion by air quality agencies.

Hand and machine piling, and swamper burning of slash has allowed selective burning of woody debris during late fall and winter, but only under weather conditions that allow optimal smoke dispersion. Burning of properly piled material is generally a more efficient method of combustion, and allows for scheduling of burning when snow and adjacent water-saturated fuels reduce the risk of escaped fires.

Alternatives to burning have helped reduce emissions. These include removal of heavy boles and large limbs for use as secondary wood products, power generation, and firewood.

Historically, burning too late in the day, burning too many timber harvest units too close together, and inaccurate wind direction forecasts allow residual smoke to flow into the designated area. Not all timber harvest units require treatment by prescribed fire. Of the average annual slash acres created by timber harvest activities in the planning area, during the period 1984 to 1988 less than 50 percent of the total slash acres created were actually treated with some form of prescribed fire (see Table 3-3).

Table 3-3 - Summary of Acreage Burned by Prescribed Fire from 1984-1988

Year	Logging Slash Disposal/ Brush Control	Hazard Reduction	Wildlife Habitat Improvement	Total
1984	840	840	0	1,680
1985	1,063	1,063	0	2,126
1986	1,235	1,235	0	2,470
1987	960	960	0	1,920
1988	700	100	0	800
Totals	**4,798**	**4,198**	**0**	**9,096**

In some instances the only required treatment permitted for site preparation is by mechanical or physical means due to the concern for smoke impacts. However, no treatment, or mechanical treatment, does not necessarily reduce the amount of available fuel and results in a higher fuel hazard, which increases the risk of wildfire.

Emissions from wildfires are significantly higher than from prescribed fires. The wildfires in southern Oregon in 1987 emitted as much particulate matter as all the burning that occurred within the State that year.

Air quality impacts from wood heating in residential areas are different than those associated with prescribed fires of logging slash. Most of the wood that is burned as firewood comes from the surrounding forest land. As a consequence, air quality impacts shift from generally higher elevations, which are more favorable to smoke dispersion and remote from other air pollution sources, to lower elevations with less air movement and in closer proximity to other pollution sources. Wood stoves contribute to both health and visibility concerns. Smoke particles emitted from incomplete combustion of wood may have relatively high concentrations of known and suspected carcinogens.

Winter air stagnation causing air pollution from wood stoves is an increasing problem in the Eugene/ Springfield air quality management area. During the winter when colder air and temperature inversions occur, burning firewood traps and concentrates wood smoke in the valleys

Between November 15 and February 15, city wood stove curtailment programs restrict wood stove use on days when air stagnation exceeds established standards. All prescribed fires during these yellow and red days must be above the Valley inversion level and not contribute to the air pollution levels in the Valley. Temperature inversions that keep pollutants trapped within the Valley exclude prescribed smoke from entering from above.

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 Eugene District are dependent. The combined influences of time, parent material, climate, living organisms, and topography of a site interact to form soils with unique sets of characteristics that determine the productivity and management requirements of each soil.

Soils provide many functions such as storing and delivering water to streams and lakes, providing a medium for plant growth, and providing a medium/ habitat for populations of a myriad of soil organisms. 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.

Organisms living in soils form numerous diverse communities. These organisms and diverse communities can influence long-term productivity. Soil organisms can be grouped into 4 general trophic levels: plants, herbivores, predators of herbivores, and predators of the predators of herbivores (Ingham, 1994). The herbivores (e.g., fungi, bacteria, earthworms) decompose organic matter. The predators (e.g., mites, nematodes flagellates, amoebae, ciliates) prey upon, and release nutrients tied up in the bacteria and fungi. These nutrients, especially nitrogen, are released into the soil medium and are available for plant uptake. Soils in the Eugene District provide habitat for a great variety of herbivorous and predatory soil organisms, although very little is known about most of these organisms. Research has shown that a fungal-dominated system is typical of forested habitats, while a bacterial-dominated system is typical of grasslands (Ingham, 1994). Research has also shown that the balance of forest soil organisms can shift dramatically in response to fluctuations of chemical, environmental, and biotic factors caused by natural disturbance or management-related activities (Amaranthus, et al., 1989).

Soils information (distribution and characteristics) has been collected by the Soil Conservation Service (SCS) and BLM soil scientists and is available at the Eugene District office. The SCS has mapped soils on the Eugene District at a scale of 1:20,000. This scale permits mapping delineations to be as small as 5 acres although most for the operating area are considerably larger. Each delineation will contain some minor areas with soils different from that identified by the map symbol. The SCS has provided detailed soil characteristics (profile descriptions, texture classification, permeability, available water

capacity, pH, etc.) and interpretations by soil series. In addition, the District has developed detailed forest management interpretations for each soil series.

The SCS general soil map delineates 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-three soil associations occur on the District. The soil associations were mapped using information regarding soil, climate (temperature and precipitation), landform, and geologic data. A copy of the general soils map and other more detailed soils information are available at the District office.

For descriptive purposes, soils occurring in the operating area can be divided into 3 physiographic areas that encompass 6 soils groups (see Map 3-14). Descriptions of the 3 physiographic areas and 6 soils groups follow.

Coast Range Physiographic Area

The Coast Range physiographic area occupies the western part of the operating area. This area is dominated by a dendritic drainage pattern and steep, highly dissected landforms underlain by sedimentary bedrock (Flournoy/Tyee Formations). Slopes are typically short and steep with a relatively uniform gradient from near the ridgetop to the valley bottom. Ridgetops are relatively sharp and narrow. The landscape is sharply dissected by numerous drainages that often become extremely steep as they approach the ridgetop. Headwalls or hollows (bowl-shaped areas at the head of drainages with slope gradients often 90-100 percent) may be present in the upper reaches of drainages. Four igneous intrusions into the sedimentary bedrock form major east-west oriented ridges (Prairie Peak, Elk Mountain/Windy Peak, Walker Point, and Roman Nose). First and 2nd order streams are usually V-shaped with no alluvial soils. Third order and larger streams generally have an associated terrace with alluvial soils. Annual precipitation for this area ranges from 60-100 inches.

The Bohannon soils group, which has a udic moisture regime and mesic temperature regime, occurs in this physiographic area. Colluvial soils (e.g., Bohannon, Digger, Preacher) ranging from 20-60 inches deep occur on landforms with slope gradients ranging from 40-100 percent. These colluvial soils are brown, well-drained, gravelly (20-80 percent coarse fragments) loam with A horizons 10-20 inches deep. Relatively stable landforms with slopes less than 40 percent typically have well-drained residual soils (e.g., Honeygrove, Peavine) that are reddish clay loam containing less than 20 percent gravel and are 36-60+ inches deep. Alluvial soils are well to poorly-drained and are usually loam or clay loam.

Litter layers generally average one and one-half to two inches thick. Most soils in this area are highly productive due to their relatively high organic matter content and annual precipitation. Soils in this area have high infiltration and percolation rates. Therefore, when the litter layers are not totally removed, surface erosion hazard is slight, even on steep slopes. Due to the steep topography and frequency of intense storms, mass soil movement (landsliding) is a naturally occurring process. Landslides in this area are usually the shallow translational type. Many landslides (debris torrents) originate on steep slopes of headwalls or hollows where groundwater flow is converging and on contact areas of the sedimentary and intrusive igneous bedrock. These landslides often create a debris torrent that scours to bedrock the 1st and 2nd order stream channels and adjacent sideslopes.

Foothills Physiographic Area

The Foothills physiographic area occupies the hilly terrain between the Willamette Valley and the Coast Range to the west and between the Willamette Valley and the Western Cascades to the east. First and 2nd order streams typically are V-shaped with no alluvial terrace deposits. Third order and larger streams generally have associated terraces with alluvial deposits. Terrace deposits in this physiographic area are usually larger than terrace deposits for a comparable size stream in the Coast Range physiographic area. Annual precipitation for this physiographic area varies from 35-60 inches.

The most western portion of this physiographic area (Township Ranges 5 and 6 West of the operating area) is underlain by sedimentary bedrock (Flournoy/Tyee Formations) with landforms not as dissected or steep as those in the Coast Range physiographic area. Slope gradients generally range from 20-70 percent, and the longer slopes may be broken by benches. Ridgetops are broader and more rounded than those in the Coast Range physiographic area. The Jory soils group occurs in this portion of the

physiographic area and has a xeric moisture regime and a mesic temperature regime. Colluvial soils (e.g., Willakenzie) occur on slopes with gradients ranging from 20-70 percent; they are brown, gravelly (15-50 percent coarse fragments) loam between 20 and 50 inches deep. Bedrock beneath these soils usually is fractured and weathered so that there is a gradual transition from the soil into the massive bedrock. Residual soils (e.g., Jory, Bellpine) occur on the gentle slopes (5-30 percent) and are deep (often greater than 40 inches) and are typically reddish clay\clay loam containing less than 20 percent gravel.

The eastern and south-central portion of the Foothills physiographic area is underlain with pyroclastic (tuff and breccia) bedrock with lesser areas of basalt and andesite. The pyroclastic is relatively soft and weathers faster than the hard basalt and andesite. The landscape is hummocky and dominated by slopes that are interrupted by benches. Slope gradients range from 5 percent on the benches to 60 percent on adjacent sideslope landforms. Because the pyroclastic rock weathers relatively fast, many soils in this area have high clay contents. The Nekia soils group is predominant. The residual soils (e.g., Nekia, Dixonville) are moderately deep to deep (36-60+ inches) red or brown clays (clay content as high as 50 to 70 percent) with 5-20 percent soft gravel content. The colluvial soils (e.g., Ritner) are typically reddish-brown clay/clay loam with 10-60 percent coarse fragments and 25-50 inches deep.

Litter layers are generally one-inch thick. Productivity of the soils in this physiographic area is less than for the other two physiographic areas due in part to lower annual precipitation and heavier textured (more clay) soils. The pyroclastic bedrock and clayey (some montmorillinite) soils have low strengths and cannot form steep, long slopes. Landslides in this area are usually the deep rotational type that create hummocky and benchy terrain. While pyroclastic bedrock comes in a wide variety of colors, the greenish colored bedrock is more unstable than its reddish counterpart.

Western Cascades Physiographic Area

This physiographic area occupies the eastern and northeastern part of the operating area. It is comprised of landscapes underlain by basalt, andesite and pyroclastics. Landforms with basalt and andesite bedrock typically have long, steep (25-80 percent) slopes and a parallel drainage pattern. The upper slopes are frequently steep with shallow to moderately deep soils while the lower slopes have moderate gradients with deep soil mantles. Areas with pyroclastic bedrock have hummocky, broken terrain with steep slopes interrupted by benches. Annual precipitation for this physiographic area ranges from 55-90 inches.

Soils occurring in this physiographic area span an elevation range of 1,000 to 4,700 feet. Climate (growing season) is substantially different and productivity is lower at the upper elevations. Changes are gradual, but above about 3,000 feet the soil forming factors combine to develop a different grouping of soils (Keel soils group). These soils typically are not as deep and have more coarse fragments, coarser textures (less clay), lower organic matter contents and thicker (2-4 inches) litter layers than the lower elevation soils. Fire frequency will affect litter layer accumulation on a site specific level as evidenced on the ridgeline between Silica Mountain and Huckleberry Mountain where duff depths are less than half an inch thick.

For the lower elevations, litter layers are usually one half to two inches thick. The Klickitat soils group occurs over basalt and andesite bedrock while the Kinney soils group occurs over pyroclastic and interbedded pyroclastic, basalt and andesite bedrock. Colluvial soils forming over basalt and andesite are brown, gravelly (20-70 percent coarse fragments) loam with A horizons 10-20 inches thick. Colluvial soils developing over pyroclastics are brown, gravelly (10-50 percent gravel) clay loam ranging 30-50 inches deep. Residual soils over basalt and andesite usually are 36-60 inches deep with clay loam B horizons containing less than 20 percent gravel. Residual soils over pyroclastics are 36-60+ inches deep with clay/clay loam B horizons.

Most lower elevation soils in this physiographic area are highly productive due to their relatively high organic matter content and annual precipitation. High infiltration and percolation rates are characteristics of the soils in this area. Therefore, when the litter layers are not totally removed, surface erosion hazard is slight, even on steep slopes. Landsliding is naturally occurring. The basalt and andesite areas typically have shallow translation type landslides that commonly originate in the steep portions of drainages. Deep rotation type landslides that create hummocky, benchy topography are typical in the pyroclastic areas and areas with interbedded pyroclastic and basalt or andesite bedrock.

Timber Productivity Capability Classification (TPCC)

An intensive inventory known as the Timber Productivity Capability Classification (TPCC) has been completed for the District and provides site specific information concerning BLM administered lands (see Timber 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 Eugene District TPCC Manual Supplement (1986) and Oregon Handbook 5251-1 (1986).

Table 3-23 displays acreage of fragile forest sites. These sites are judged to be biologically and/or environmentally incapable of supporting a sustained yield of forest products. They are TPCC 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 there is no other feasible means of harvesting the adjacent commercial forest land. Lands that are out of the base because of critical slope gradients and mass movement potential receive protection from harvesting and site preparation activities.

Table 3-24 displays acreage of forest sites less fragile than the nonsuitable woodland acres displayed in Table 3-23. 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 BMPs And TPCC Fragile Restricted Guidance For Water Quality And Soil Productivity, Appendix G) are used to protect them.

Table 3-23 - Fragile Nonsuitable Woodland[1]

Classification of Woodland	Acres	% BLM Forest Land Base
Soil Moisture	4,568	1.2
Nutrient	0	0.0
Slope Gradient	7,727[2]	2.6
Mass Movement Potential	54	0.02
Surface Erosion Potentia	0	0.0
Groundwater	2,117	0.7
TOTAL	**14,466**	**4.8**

[1] Lands where the timber growing potential will be reduced even if special harvest and/or restrictive measures are applied due to inherent site factors such as 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 Eugene District TPCC Classification Manual Supplement (1986), Oregon Handbook 5251-1 (1986) for more detailed description.

[2] Includes estimated acreage of Coast Range Tyee and Flournoy Formations.

Long-Term Soil Productivity

Soil productivity varies widely due to varying characteristics such as soil depth, nutrient status, available water holding capacity, and site characteristics including elevation, aspect, and slope gradient. Current soil productivity reflects site-specific natural conditions and past management practices. The most productive soils for producing wood fiber are found in valley bottoms, toeslopes, benches, and broad ridgetops. Demands for maintaining a productive ecosystem create a need for maintaining long-term soil productivity. Management practices may affect the ability of soils to maintain

Table 3-24 - Fragile-Suitable, Restricted[1]

Classification	Acres	% BLM Forest Land Base
Soil Moisture	21,038	7.0
Nutrient	300	0.1
Slope Gradient	33,377	11.0
Mass Movement Potential	7,791	2.6
Surface Erosion Potential	0	0.0
Groundwater	2,748	0.9
TOTAL	**65,259**	**21.6**

[1] Lands where the timber growing potential will 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 Eugene District TPCC Manual Supplement (1986), Oregon Handbook 5251-1 (1986) for more detailed description.

productivity by influencing disturbances such as displacement, compaction, erosion, and alteration of organic matter and soil organisms levels. Soils occurring on the District differ in their degree of sensitivity to these disturbances. By properly identifying sites with soils limitations (TPCC) and by matching management practices to site and soil characteristics (utilizing BMPs, Interdisciplinary Teams, etc.), long-term productivity can be maintained.

Water Resources

Introduction

The Federal Water Quality Act of 1987 directs Federal agencies to comply with State water quality requirements to restore and maintain water quality necessary to protect identified beneficial uses. The State of Oregon has identified beneficial uses and applicable water quality criteria for the Mid Coast (OAR 340-41-242 and OAR-340-41-245) and Willamette Basins (OAR 340-41-442 and OAR-41-445). Policy and guidelines, including antidegradation, generally applicable to all Basins are listed in OAR 340-41-026 (1)(A).

The principal beneficial uses of water, which are related to land management activities in the planning area are rearing and spawning habitat for salmonids, domestic water supply, fishing, and water contact recreation. Maintenance of water quality is important for all of these uses. See Tables 3-51 and 3-52, Appendix N, for a complete listing of beneficial uses.

Forest hydrology is a collection of complex processes, which transform precipitation to stream flow and/or ground water. Appendix M discusses these processes and their relationship to forest management practices.

Existing Water Resources

The operating area has been divided into analytical watersheds to facilitate assessment of existing conditions and to analyze proposed management alternatives. Analytical watersheds were selected according to topography and basin size (see Map 3-3). The location of the analytical watersheds is shown on the analytical watershed map.

Table 3-40 identifies the analytical watersheds in the operating area and gives the area within each analytical watershed as well as the area of BLM managed land and the miles of stream by order. Table 3-41 gives stream flow information, and Table 3-42 lists the larger lakes and reservoirs within each watershed.

Ground water is used throughout the operating area for irrigation, domestic, and municipal use. Ground water supplies in the Willamette Basin are generally adequate to meet needs far into the future, due to rapid recharge of the volcanic aquifer of the Cascades. Ground water in the coastal watersheds is less reliable due to slow recharge in the sedimentary aquifers.

Ground water quality is very good in all watersheds, with the exception of a few localized problems with mineralized water, arsenic, saline water, and local pollution of shallow aquifers.

BLM administered lands have wells at 4 recreation sites and at the Tyrrell Seed Orchard. The North Florence Dunal Aquifer, which serves the city of Florence, has been designated as a "sole source aquifer" by the EPA. There are 294 acres of public domain land within this watershed, of which 218 acres are a proposed ACEC/ONA (see special areas section). There have not been any major land disturbing activities on this area.

Table 3-43 lists community water systems where BLM administered lands fall within the watershed serving that system. These watersheds are shown on the community watershed map (see Map 3-4). None of these community water systems have known water quality problems. In addition, numerous domestic and irrigation water rights are held on, and downstream from, BLM administered lands. Local watermasters maintain records of these water rights.

Sixteen river segments in the operating area have been identified as eligible for consideration for "wild and scenic" status under the Wild and Scenic Rivers Act and nine river segments will be assessed for suitability (see - Wild and Scenic Rivers). At present, however, there are no "outstanding natural resource waters" on the Eugene District.

Existing Stream Channel Condition

The condition of the stream channel has a significant effect on downstream water quality and various beneficial uses. Because of the variety of beneficial uses within each analytical watershed, shown in Tables 3-51 and 3-52, Appendix N, there is no one

Table 3-40 - Eugene District Analytical Watersheds

Watershed Name	Analytical Watershed Acres	Percent BLM	Stream Order	Total Stream Miles	BLM Stream Miles
Lake Creek	107,942	33	1&2	584	229
			3	74	35
			4	42	18
			5	20	4
			6+	36	1
Wildcat Creek	42,501	38	1&2	259	106
			3	36	15
			4	18	5
			5	14	2
			6+	15	0.5
Upper Siuslaw River	42,645	33	1&2	198	6
			3	32	10
			4	31	7
			5	16	0.8
			6+	4	0.3
Middle Siuslaw River	59,837	49	1&2	392	128
			3	60	19
			4	41	10
			5	7	0.7
			6+	47	8
Wolf Creek	77,939	41	1&2	472	193
			3	71	30
			4	40	17
			5	20	5
			6+	36	9
Big River	84,956	28	1&2	256	61
			3	73	25
			4	37	11
			5	13	4
			6+	21	1
Row River	293,784	15	1&2	815	190
			3	143	38
			4	71	13
			5	15	4
			6+	59	7
Coast Fork Willamette River	102,257	7	1&2	296	31
			3	43	4
			4	20	0.8
			5	11	0
			6+	13	0
Middle Fork Willamette River	278,982	6	1&2	338	157
			3	37	29
			4	19	13
			5	23	5
			6+	12	0
McKenzie River	159,853	16	1&2	435	106
			3	82	26
			4	38	15
			5	20	5
			6+	28	0.82
Mohawk River	114,927	23	1&2	424	137
			3	82	22
			4	38	13
			5	20	2
			6+	28	0.02

Table 3-40 - Eugene District Analytical Watersheds (continued)

Watershed Name	Analytical Watershed Acres	Percent BLM	Stream Order	Total Stream Miles	BLM Stream Miles
Calapooia River	83,654	10	1&2	85	20
			3	20	8
			4	4	0.63
			5	1	0.14
			6+	0	0
Willamette River	429,174	16	1&2	670	139
			3	89	21
			4	43	7
			5	34	3
			6+	11	0
Total	**1,878,460**	**17**	**1&2**	**5,224**	**1,503**
			3	842	282
			4	442	130
			5	214	36
			6+	310	28
			All	**7,032**	**1,979**
Alsea River	140,000	1		See Salem District EIS	
Smith River	225,000	2		See Roseburg District EIS	
Umpqua River	2,357,120	<1		See Roseburg District EIS	

Table 3-41 - Water Yield

Stream	Avg. Annual Precip. (inches)	Annual Yield (inches)	Avg. Annual Flow (CFS)	25 Year Flood (CFS)	Avg. Minimum Flow (CFS)
Lake Creek	100	55.66	726	21,855	22.5
Wildcat Creek	90	77.03	376	12,678	8.6
Upper Siuslaw	50	34.47	170	4,789	5.5
Mid Siuslaw	80	68.06	469	12,488	15.8
Wolf Creek	90	68.06	611	16,159	20.4
Big River	50	35.91	349	17,886	20.4
Row River	50	37.87	1,044	[1]	16.0[2]
Coast Fork	45	34.90	410	10,124	10.0
Middle Fork	50	41.45	1,330	[1]	[1]
McKenzie River	65	60.09	1,104	17,831	264.0
Mohawk River	55	41.05	542	12,400	15.0
Calapooia River	65	56.91	547	15,260	24.0
Willamette River	55	32.67	2,008	[1]	[1]

[1] regulated flow
[2] above Dorena Reservoir

Table 3-42 - Lakes and Reservoirs

Watershed Name	Lakes/Reservoirs Size (acres)	Use[1]	
Willamette River	Fern Ridge Reservoir	10,400	R,I,F
	Noti Creek Reservoir	13	
	Carrol Reservoir	23	
	Bryant Lake	3	
	Goodman Lake	3	
	Hulbert Lake	10	
	Love Lake	5	
	Neil Lake	2	
	Smith Reservoir	2	
	Warner Lake	5	
McKenzie River	Leaburg Reservoir	160	R,P
	Walterville Reservoir	15	R,P
Middle Fork Willamette River	Fall Creek Reservoir	1,880	R,I,F,D
	Dexter Reservoir	1,025	R,I,F
	Lookout Point Reservoir	4,360	R,I,F,D,P
	Green Reservoir	3	
Coast Fork Willamette River	Cottage Grove Reservoir	1,158	R,I,F,P
	Garden Lake	17	I
Row River	Dorena Reservoir	1,840	R,I,F,P
Lake Creek	Triangle Lake	276	R
	Little Lake	5	
	Hult Reservoir	55	R
Middle Siuslaw River	Esmond Lake	18	

[1] Use Key: R = Recreation; F = Flood control; P = Power generation; I = Irrigation; D = Domestic water supply

Table 3-43 - Community Water Systems

Watershed Name	System Name	Population Served	Filtered (Y or N)	Watershed Area (Acres) BLM	Other	Total
McKenzie River	Eugene Water & Electric Board	84,750	Y	25,910	820,863	846,773
Layng Creek	City of Cottage Grove	8,000	Y	107	37,059	37,166
Row River	City of Cottage Grove	8,000	Y	37,209	160,503	197,712
Prather Creek	City of Cottage Grove	8,000	Y	0	3,737	3,737
Beaver Creek	London Water Co-op.	50	Y	211	524	735
Long Tom River	City of Monroe	485	Y	19,117	232,223	251,340

set of stream channel conditions that is best. Certain conditions, however, are almost always indicators of a healthy stream environment for most uses. These conditions include: stable stream banks and bottom; an abundance of stable large woody debris; and a healthy riparian ecosystem.

The stability of stream channels has been measured on several streams within the operating area. Many streams in all the watersheds are less stable than desired. Although extremely stable stream channels, such as bedrock channels, are not good for some beneficial uses (aquatic organisms), instability is the more pervasive problem in the operating area. Timber management operations usually decrease rather than increase the stability of streams. Best Management Practices have been shown to be effective in mitigating the increases.

The importance of large woody debris to the proper functioning of streams and rivers cannot be overstated. Besides providing habitat for aquatic organisms, this material regulates flow, reducing floods and increasing low flows; prevents erosion; and traps sediment. During the period of 1970 until the mid 1980s, it was policy to remove woody debris from streams in conjunction with logging operations. For this reason many of the streams in all watersheds are lacking enough large woody debris for adequate hydrologic or biologic functioning. In addition a decrease in beaver populations from historic levels has resulted in a loss of stream structure.

The effects of the Riparian Ecosystem on water resources are described in the riparian section of this chapter and in Appendix M. The relative condition of the riparian areas within each watershed, as measured by their age, indicates that Lake Creek has the largest portion of its riparian in good condition, followed by Mid Siuslaw River, McKenzie River, Coast Fork Willamette River, Mohawk River, Upper Siuslaw River, Willamette River, Wolf Creek, Calapooia River, Big River, Row River, Mid Willamette River, and Wildcat Creek.

There have been two events that have drastically affected stream channels. The first is debris torrents from landslides, which scour stream channels down to bedrock and destroy much of the riparian vegetation. The other was the use of splash dams around the turn of the century. Many streams have not recovered from splash damming. Table 3-44 lists some streams that are presently in poor condition from debris torrents or splash dams. This list is incomplete and is based on the personal knowledge of the District staff.

Placer mining is a practice that in some cases can significantly affect stream channels and/or ground water. As of June 1994 there is 1 mining notice on the Calapooia River, 1 on Anthony Creek and 13 notices on Sharps Creek. In addition there is a notice for silica mining on the North Florence Dunal Aquifer.

Existing Upland Condition

Portions of the Lake Creek, Wolf Creek, Mid Siuslaw and Wildcat Creek watersheds have a high landslide potential due to heavy rainfall and steep, highly dissected topography, which makes these areas particularly sensitive to surface disturbing activities. Some areas in the Big River, Row River, and McKenzie River watersheds also have high landslide potential, as well as high erosion potential, due to steep slopes and shallow soils. An intensive inventory has been completed in the Coast Range watersheds where approximately 5,500 acres have been identified as having high landslide potential (see Soils section). Critical areas in the Cascade Range are identified for each proposed timber sale or road.

Forest management activities, especially those that cause soil disturbance such as tractor logging, road construction and slash piling, can cause changes in stream flows that in turn can change sediment rates (see Appendix M). The duration and magnitude of peak flows (floods) are almost always increased by compaction. The amount of this increase, however, is difficult to predict and varies greatly depending on other conditions. Table 3-45 gives the percent of each watershed presently compacted by roads, landings, or skid trails. Some hydrologists and researchers use 15 percent as a breaking point where significantly higher peak flows occur.

Recreational activities, especially the use of Off Highway Vehicles (OHV), can cause compaction and sedimentation. Increases in sedimentation have occurred from heavy OHV use in the Willamette River and Mohawk River Watersheds.

Existing Water Quality Conditions

In 1988 the Oregon State Department of Environmental Quality (DEQ) did an extensive inventory of water quality problems in the State. The results are reported in the Non-point Pollution

Table 3-44 - Scoured Streams

Stream Name	Stream Order	Analytical Watershed	Date	Miles
		Debris Torrents		
Deer Creek	4	McKenzie River	1989	4.5
Knowles Creek	5	Wolf Creek	Many 1920-89	5.0
Mosby Creek	6	Row River	Many 1960-88	2.0
Johnson Creek	5	McKenzie River	1985	2.0
Congdon Creek	5	Lake Creek	1982 & 1986	3.5
Gale Creek	4	McKenzie River	1982 & 1985	2.5
Lost Creek	5	Middle Fork Willamette	1977 & 1988	2.0
Big River Trib.	3	Big River	1984	1.5
Bolder Creek	4	Big River	1964	3.0
		Splash Dams		
Mohawk River	3-6	Mohawk River		
Shotgun Creek	2-5	Mohawk River		
Mill Creek	2-5	Mohawk River		
Fall Creek	3-4	Middle Fork Willamette River		
Little Fall Creek	3-5	Middle Fork Willamette River		
Wolf Creek	3-4	Wolf Creek		
Lake Creek	2-5	Lake Creek		
Esmond Creek	3-5	Wolf Creek		
Knowles Creek	2-5	Wolf Creek		
Wildcat Creek	3-4	Wildcat Creek		
Siuslaw River Tribs.	2-4	Upper Siuslaw River		
Row River Tribs.	3-5	Row River		

Table 3-45 - Percent Compaction

Analytical Watershed	Percent	Analytical Watershed	Percent	Analytical Watershed	Percent	Analytical Watershed	Rating
Lake Creek	7	Wildcat Cr.	6	Upper Siuslaw	17	Mid Siuslaw	5
Wolf Creek	6	Big River	12	Row River	10	Coast Fork	11
Middle Fork Willamette R.	8	McKenzie R.	9	Mohawk River	14	Calapooia R.	13
	14						

Assessment Report and were updated in the 1992 Water Quality Status Assessment (305b) Report. Table 3-53 (Appendix N) shows the water quality problems that were reported in the Eugene District analytical watersheds. Streams with a severe impairment of one or more beneficial use are designated as A1. 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. Five streams in the planning unit were designated as A1 in the 1988 assessment report (Trail Creek, Calapooia River, Mohawk River, Coast Fork Willamette River and Amazon Creek). The 1992 (305b) report dropped Trail Creek from the list. Table 3-46 shows the streams on the Eugene District that have been designated as A1.

Streams or other water bodies with particularly persistent water quality problems, or where numerous beneficial uses are impaired, are required to have Total Maximum Daily Loads (TMDL) of pollutants set for them. These TMDL are the maximum amount of pollution a particular body of water can absorb in a day without exceeding established water quality standards, thereby becoming unhealthy or unusable for some beneficial use. TMDL and other limits on water pollution are essentially limits on human activities in a watershed. This means that setting TMDL can force reductions in, or even moratoriums on, home building, road construction, timber and crop harvesting, industrial development, as well as other activities in the affected watershed. The 1992 (305b) report lists the Willamette River-Coast Fork, Row River, Long Tom River and Calapooia River as "Water Quality Limited." Determination of TMDL is in progress for several segments of the Willamette River-Coast Fork.

Water quality has been monitored on selected streams in the operating area since 1984. The following observations are based upon data analysis completed to date:

Temperature - Most of the larger creeks and rivers on the District have maximum summer temperatures that are above Basin water quality criteria. These criteria do not allow any increases in temperature if the natural temperature is above 58_ F. in the Willamette Basin or 64_ F. in the Mid Coast Basin. Some of the maximum summer temperatures monitored are given in Table 3-47. These highs last for only a few hours and are far above the daily average. Monitoring of timber sales has not shown significant increases in water temperature due to logging activities.

Dissolved Solids - Conductivity is an indirect measure of dissolved solids. The maximum conductivity measured during the past 8 years was 84 microsiemens (uS). Conductivities of about 200 uS are optimum for aquatic productivity, and rates of about 2000 uS would indicate serious pollution. The low conductivity rates show that no standards for dissolved solids have been exceeded.

Acidity - The pH of District streams has been found to be within the State standards of 6.5-8.5. Four years of monitoring show a range of 6.8-7.9.

Bacteria - Coliform counts in the District streams fluctuate widely even in undisturbed streams where counts of 2/100 ml to 1000/100 ml have been found at different times. There is no evidence that management activities have had any affect on the count.

Turbidity and Sediment - Sediment rates and turbidities are relatively low in the Eugene District when no mass movement events occur. Table 3-48 shows turbidities, sediment rates and sediment yields on the Eugene District for water year 1988 (Oct. 1 - Sept.30). Sediment rates or yields from other places and other land uses are also listed for comparison.

The dominant process that causes high sediment and turbidity rates is mass soil movement (landslides). Although landslides and associated debris torrents may increase sediment yield for many years after the event, most of the sediment is delivered to the stream at the time of the landslide. Two streams were being monitored in the operating area when a landslide occurred within the watershed. Table 3-49 shows the average sediment rate before, immediately after, and one year after a slide. These averages are for one week periods with similar flow conditions.

Several landslides have produced large amounts of sediment for many years after the original event. These occurred on Leopold Creek, Hatchery Creek, Esmond Creek, Bolder Creek and Walker Creek. The landslide on Walker Creek occurred in 1985 and water monitoring was done for many years after. During low flows and clear days, the landslide produced little sediment; however, during storms high sediment rates, turbidities, and sedimentation occurred in Walker Creek, Wildcat Creek, and even the Siuslaw River six miles downstream. Table 3-50 gives some of results of the Walker Creek monitoring.

Bedload sediments were not monitored on the Eugene District. There is no State standard for suspended sediment. The criteria for turbidity allows no more than a 10 percent cumulative increase in

Table 3-46 - Oregon State Department of Environmental Quality Non-Point Source Pollution Assessment Report

	Turb	Low-DO	Temp	Nutr	Pest	B/V	Toxic	Solids	Sed	Eros	LowFlow	Debris	Struct	Plants	Other	Designation
Mid Coast Basin																
217 Trail Creek			S2										S2			A1
Willamette Basin																
73 Calapooia River	M1	M1	M1				M1			M1	M2	M1	M1			A1
151 Mohawk River	S2									M2	S2					A1
164 Willamette, Coast Fork		M2					M1	S1		M2		M2			S1	A1
181 Amazon Creek			S2	M1		S2	M1		S2	M1			S2	M1	S2	A1

Key:

Turb	Turbidity	Sed	Sedimentation
Low-DO	Low Dissolved Oxygen	Eros	Streambank Erosion
Temp	Elevated or Depressed Water	Lowflow	Decreased streamflow
Nutr	Nutrients	Debris	Excessive Debris Accumulation
Pest	Pesticides	Struct	Insufficient Stream Structure
Toxic	Toxics	Plants	Excessive Plant Growths
Salt	Salt Water Intrusion	Other	Other (specified in comments)
B/V	Bacteria/Viruses	Radio	Radioisotopes
Gases	Dissolved Gases Scum, Oily Slick or Film, Floating Solids	Solids	Objectionable Discoloration,

S1 = Severe problem, data
S2 = Severe problem, observation
S3 = Severe problem, perception

M1 = Moderate problem, data
M2 = Moderate problem, observation
M3 = Moderate problem, perception

A1: Those waterbodies in which serious NPS pollution problems are known to exist or have been reported without challenge.

A2: Those waterbodies in which moderate and/or serious NPS pollution problems have been reported by some sources but challenged by others.

B: Those waterbodies in which moderate NPS pollution problems are known to exist or have been reported without challenge.

Table 3-47 - Temperature Monitoring Results

Creek Name	Analytical Watershed	Maximum Temperature	Predicted [1] Temperature
Wolf Creek	Wolf Creek	68	
Shotgun Creek	Mohawk River	62	
Bear Creek	McKenzie River	60	
Bear Creek Tributary	McKenzie River	57	57
Little Fall Creek	M. Fork Willamette	60	67
Pony Creek	Row River	60	61
Shortridge Creek	Big River	58	
Greenleaf Creek	Lake Creek	61	61
Bear Creek	Lake Creek	69	
Alpha Creek	Middle Siuslaw River	58	
Camp Creek	McKenzie River	60	
Walker Creek	Wildcat Creek	61	61
Brownie Creek	Row River	58	59
Grenshaw Creek (open)	Wolf Creek	59	65
Grenshaw Creek (shade)	Wolf Creek	59	58

[1] Predicted temperatures were either measured above a harvest unit or the temperature was calculated as if no shade had been removed.

Table 3-48 - Sediment Rates

Stream	AWS	Turbidity (NTU)[3] MAX	Turbidity (NTU)[3] MIN	Sediment Rate (Mg/l) MAX	Sediment Rate (Mg/l) MIN	Sediment Yield (Tons/Mi2)
Shotgun Creek	Mohawk River	37	0.9	301	3	285
Greenleaf Cr.	Lake Creek	28	0.75	253	1	N/A
Bear Creek	Lake Creek	32	0.55	130	1	197
Bear Creek	McKenzie River	18	0.25	77	<1	85
Marten Creek	McKenzie River	6.5	0.3	248	<1	N/A
Pony Creek	Row River	72	1.1	200	1	203
Chickahominy Cr.	Wildcat Creek	38	0.8	500	1	313
Walker Creek	Wildcat Creek	22	0.62	112	2	89
Shafer Cr.[1] (mixed woods and farmland in Willamette AWS)					598	
Calapooia River[1] (grass seed)				565		
Northeastern Oregon Farmland[1]				9,125	215	
Umpqua River[2] (mixed forest and pasture)						270-1,000
Northern California[2] (all land use)						355-10,038

[1] Spycher et al., 1980
[2] Larson and Sidle, 1980
[3] NTU = Nephlometric Turbidity Units

Table 3-49 - Sediment Rates from Mass Wasting Events

	Preslide Avg. Sediment (Mg/L)	Immediately Postslide Average Sediment (Mg/L)	One Year Postslide Average Sediment (Mg/L)
Bear Creek	18	28	29
Marten Creek	35	216	26

Table 3-50 - Walker Creek Slide Monitoring Results

DATE	Walker Cr. Above Sed(MG/L)[1]	Turb(NTU)[2]	Walker Cr. Below Sed(MG/L)[1]	Turb(NTU)[2]	Wildcat Cr. Above Sed(MG/L)[1]	Turb(NTU)[2]	Wildcat Cr. Below SED(MG/L)[1]	TURB(NTU)[2]
02/14/86	16	1.8	54	60.0	36	7.5	56	17.0
03/07/86	21	4.0	84	63.0	63	20.0	67	32.0
05/07/86	10	9.8	18	5.0	10	1.2	10	3.5
09/23/86	3	2.0	1148	270.0	4	3.3	58	27.0
01/06/87	4	1.7	8	3.0	14	4.8	11	4.0
02/11/88	3	0.75	32	2.6	N/A[3]	N/A[3]	N/A[3]	N/A[3]
11/02/88	36	7.0	38	7.0	N/A[3]	N/A[3]	N/A[3]	N/A[3]

[1] MG/L = Milligrams per Liter
[2] NTU = Nephlometric Turbidity Units
[3] N/A = Not Applicable

natural stream turbidities, as measured relative to a control point immediately upstream of the turbidity causing activity.

General Watershed Condition

The general condition of a watershed refers to its ability to function in a way that will deliver a regulated amount of high quality water. There is no direct measure of watershed condition; however, certain parameters are generally accepted as necessary for proper functioning. These include such things as deep permeable soils, healthy riparian ecosystems, abundant vegetation, and a lack of pollution sources.

Urban and agricultural lands are usually in a much poorer watershed condition than forest lands. This is due to industrial waste, urban runoff, heavy use of agricultural pesticides, heavily compacted soils, agricultural and urban water withdrawals, paved land, sewerage, lack of vegetation, and the channelization of streams and rivers. The results of the poorer watershed conditions are increased flooding, less water in the summer, higher stream temperatures, and more sediment and more toxic pollution than on forest lands. Stream flows have been regulated in the Willamette Valley by the damming of most of the major rivers. Sedimentation (one of the major pollutants from forest lands) is even greater on nonforest lands where vegetation removal, and the disturbance of stream channels can cause high erosion rates (see Table 3-48). Toxic substances and sewage is seldom found on forest lands; however, nutrients, heavy metals, toxins, oil and grease, high sediments, and trash have all been a problem in the Eugene/Springfield area.

Watershed condition is poorest for those analytical watersheds with a high proportion of nonforest lands. Another common factor in poor condition watersheds is that gentle topography has allowed the use of tractors for logging, site preparation, and conversion of forests to pasture. This has led to soil compaction, which increases peak flows and erosion.

On the watersheds that are primarily forest lands, the watershed condition is most affected by topography and precipitation. Very steep slopes and heavy precipitation can cause landslides, especially when combined with road building and other forest management practices. The steep slopes and heavy precipitation also cause more flooding and, therefore, more erosion.

The Willamette Watershed is probably in the poorest condition due to a high percent of nonforest land uses, a high concentration of roads, and the very heavy use of tractors and other ground based systems for logging. The Middle Siuslaw may be in the best condition because it has relatively few roads. It is steep enough to restrict tractor logging and flat enough to produce relatively few landslides. The Middle Siuslaw Watershed also has less disturbance to riparian vegetation than any other analytical watershed except Lake Creek.

The condition of a watershed is not necessarily an indication of water quality. For example, the Mohawk River watershed is in relatively good condition because the forests have not been cut recently; the topography and soils are not highly prone to landslides; and flooding is less likely due to relatively low flows. At the same time, the Mohawk River has poor water quality because of low summer flows and high turbidity caused partly by land development in the flood plain.

Water quality and watershed conditions in the operating area are probably not as good as they were in the pristine condition; however, compared to many watersheds in other parts of the country, both water quality and watershed conditions are very good. The conditions discussed in this chapter are due to cumulative impacts both natural and man caused. BLM management activities have played a small part in creating these conditions because BLM administered lands only account for an average of 18 percent of the land in these analytical watersheds, and because BLM management practices are less disruptive.

Biological Diversity and Ecological Health

Introduction

Biological Diversity refers to the variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Keystone Center 1991). Biological Diversity develops in response to physical conditions over time. Species may develop locally, or may immigrate from adjoining areas. The plant and animal species adapt as communities across the landscape (Wilson and Peter, 1988). The planning area is in a geologically active area, one in which the plant and animal communities have shown an active pattern of change in response to physical changes and changes in the climate following the last ice age.

Ecological health, a closely allied concept, is defined in the Forest Ecosystem Management Assessment Team report (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.

Functional diversity as it relates to ecosystem health is a key concept. BLM ecosystems include a variety of processes that maintain healthy and productive forest and nonforest ecosystems. Waring and Schlesinger (1985) present a discussion of several of these processes, all of which occur in the Eugene District. These include the carbon balance of trees, including carbon uptake, respiration, storage of carbohydrates and the allocation of these compounds into forest structure; forest productivity and succession; tree and water relations including water uptake by roots, water storage, and transport; hydrology of forest ecosystems, including climatic variables and hydrology of a watershed; nutrient cycling through forests, including ecosystem inputs, biotic accumulation and storage, and ecosystem losses; decomposition and forest soil development; responses of forests to natural disturbance; terrestrial and aquatic ecosystem linkages; and global processes including climate changes. The health

and long-term stability of forest and nonforest systems depend on components. Human actions and natural changes in the environment all influence the functional diversity of landscapes in complex ways.

For most purposes, the best baseline for biological diversity analysis is the range of premanagement 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.

Human activity has always had an affect on the natural environment and in the past 150 years the effect has been greatly accelerated. Early human activity included the use of fire to control vegetation in order to maintain oak forests and grasslands, particularly in the valleys. Nonnative settlers initiated clearing of the land for agriculture and urban development. They introduced new species of plants and animals. Soon after settlement began, a logging industry developed. Logging first occurred at lower elevations and up river valleys. Beginning in the late 1800s, the history of logging has varied to the present, and forest lands in particular have been effected by logging and fire suppression.

Currently, there are approximately 67 percent of suitable commercial forest land on BLM administered land consisting of young even-aged stands less than 55 years old. This situation resulted from clear cutting, and one major fire over a significant portion of the Eugene District. Approximately 3 percent are commercially thinned stands and approximately 30 percent remain unentered. The change in the balance of seral stages and the reduction in old growth forest ecosystems has been significant (see the Vegetation section in this chapter).

This discussion of Biological Diversity, therefore, emphasizes forest land and specifically old growth. The discussion focuses on the concepts and components of biological diversity and their interrelationships. It covers the following focal components: genetic diversity, species diversity, ecosystem diversity, and landscape diversity.

Genetic Diversity

The number of genes within a species is large - estimated at 400,000+ in flowering plants (Wilson, 1988). Genes are the basic units of inheritance and control the characteristics of the species. Genetic diversity is maintained by having many members of plant and animal species living across a broad geographic area under a variety of conditions. Because conditions vary across the landscape, individual populations develop patterns of genes that make them better suited for localized conditions. Having a broad range of genes in a population makes the species more adaptable to a variety of locations and capable of surviving when habitat conditions change. By maintaining connectivity/diversity blocks among populations and individuals so genes can be exchanged, the species is able to keep a diversity of genes in the species gene pool and prevent isolation and loss of diversity.

Isolation reduces the flow of genes among the population. Fragmentation of habitat makes it difficult for different populations to interact, leading to fragmentation of a species into a series of small populations, reducing the overall gene pool, promoting inbreeding, and decreasing genetic viability. Active management of species through the use of nonnative plants and animals can also alter the gene pool from that found in natural conditions.

Genetic diversity in forest trees is defined as the variation within and among populations of a species. Differences among trees are the result of three things: genetic differences, differing environments where the trees grow, and interactions between these two (Zobel and Talbert, 1984). A population of trees is a dynamic system because gene frequencies and likewise the environment change over time.

Approximately 5,708 acres of BLM administered land have been planted with genetically selected trees, and it is projected that more planting will be done in the next decade. The use of genetically selected trees will impact tree genetic diversity. Planting any type of stock will change the genetic makeup of the local population that would have been there if natural seeding had occurred. For example, planting genetically selected disease resistant stock will increase the diversity by adding genes for resistance and the likelihood that the trees of that species will survive in the short-term, but it may reduce the diversity of other genes on that site. Planting nonlocal stock may change diversity but may reduce the ability of the trees to survive when compared to trees adapted to local conditions. Planting genetically selected stock with limited diversity will likely reduce the ability of the trees to withstand changing environmental conditions. To maintain genetic diversity, a tree improvement program must include concurrent strategies for managing gene resources, maintaining a broad genetic base, and improving the desired characteristics.

The level of genetic diversity of overstory trees within forest plantations or natural stands varies according to many factors. These factors include the number and diversity of the trees that were the seed source, the ratio of natural and planted seedlings that establish themselves in the stands, and the compatibility of the seed/stock within the site. Management strategy in the Northwest has been to work within local populations, e.g., reforestation seed is collected and used within local seed zones/ elevation bands, and tree improvement selection and testing are done within local breeding units. See Appendix CC for further discussion.

Species Diversity

Species diversity is the variety of living organisms found in a particular place. These organisms include terrestrial and aquatic plants, birds, mammals, reptiles, amphibians, insects, and less visible organisms such as soil mycorrhizal fungi. Maintenance of species diversity implies the long-term maintenance of viable populations of each species. Species diversity varies from place to place and changes over time in the same place. Because the complexity of species in any local place can change over time, viability requires maintenance of plant and animal species over a broad geographic region. Table 3-4 displays tree species composition by age strata by sustained yield unit.

Unmanaged natural forests are shaped by ecological processes such as wildfire, windthrow, insects, disease, and by climatic and geographical influences. These factors produce a variety of plant associations with a diversity of plant species. The plant species interact with the physical environment to influence factors such as hydrology, erosion, soil fertility, and precipitation patterns. Plant and animal species play different roles in the communities and change in abundance and diversity over time. The community of early plant and animal invaders in a disturbed area are different from the species found in a mature forest, and the processes they perform also change.

Animal species diversity varies in patterns similar to plant diversity. Many animal species are associated with specific plant communities; therefore, they vary geographically and over time with changes in plant community composition and age class. Because of the close relationship between plants and animals, changes in the diversity and distribution of plant communities lead to changes in animal communities.

In the Douglas-fir forests, plant species diversity within natural Douglas-fir stands and those under even-aged management varies by stand age and differs from one another in stand structure. In managed forests, diversity is also influenced by management activities such as species selection for planting, vegetation management, thinning, and fertilization. The acres of various major forest plant groupings occurring on BLM administered lands in the District are shown in Table 3-39 (see Vegetation section). Their distribution is shown on Map 3-16.

Native American cultures affected the distribution of plant and animal species through hunting and the use

Table 3-4 - Tree Species Composition by Age Class by Sustained Yield Unit (SYU) Species Composition by Basal Area (Percent)

SYU	Douglas-fir	Western Hemlock	Western Red Cedar	Incense Cedar	Other Conifer	Hardwoods
Upper Willamette						
Age 1 - 35	77.8%	8.9%	4.3%	0.0%	0.0%	9.0%
Age 36 - 75	86.7%	2.4%	3.7%	3.7%	1.4%	2.1%
Age 76 - 195	94.6%	1.1%	1.2%	2.1%	0.4%	0.7%
Age 196+	86.6%	2.8%	5.4%	4.6%	0.0%	0.5%
Siuslaw						
Age 1 - 35	83.9%	4.4%	6.1%	1.9%	0.0%	3.6%
Age 36 - 75	92.9%	2.0%	1.7%	0.0%	0.1%	3.4%
Age 76 - 195	97.0%	0.4%	1.3%	0.0%	0.0%	1.4%
Age 196+	92.5%	2.8%	3.2%	0.8%	0.1%	0.7%

of fire. Nonnative settlers also affected plant and animal species through these same activities and by agriculture practices, logging, and grazing. In addition to direct impacts, human activities introduced exotic plants, animals, diseases, and insects that have significantly affected the range and distribution of some species.

Ecosystem Diversity

Ecosystem diversity is the variety of species and ecological processes (both kind and number) that occur in different physical settings. Old growth forests and riparian areas are examples of ecotypes within a western hemlock/Douglas-fir ecosystem. Ecosystems can be subdivided into local communities. Communities represent an association of plants, fungi, and animals that interact. The primary producers, grazers, carnivores, and detritivores function to maintain the continuous flow of energy and nutrients through the ecosystem. Changes in the conditions may change the relationships or the patterns of interactions, but the basic processes continue to operate. At any time the ecosystem is a mosaic of different inter-related communities, although the mosaic changes in response to management actions or natural events.

To aid in the discussion of the ecosystem diversity in the planning area, BLM uses major plant groupings. Classification of communities into plant associations, however, is incomplete on BLM administered land but, for purposes of the PRMP/FEIS plant communities with similar characteristics, have been aggregated into major plant groupings (see Vegetation section in this chapter). Special and unique habitats provide other identifiable components of ecosystem diversity. These include wetlands as well as plant communities of rockland and talus slopes (see Vegetation, Wildlife, and Water sections in this chapter).

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. Early plant and animal invaders are often highly mobile, prolific, and adapted to a broad range of conditions. As succession progresses, the number of species decline and the species community changes. 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 at the old growth stage. Plants and animals associated with old growth are often much less mobil, less prolific, and more likely to be adapted to a comparatively narrow range of environmental conditions.

Under natural conditions, a diversity of communities occurs over the landscape. Each plant community has its associated animal community. Both change over time as the forest community progresses through its seral stages. Plants and animals may die out in an area as the seral stages progress and conditions change, but they are replaced by other species more tolerant of the developing conditions (see Vegetation section in this chapter for seral stage discussion). Proximity to the full range of seral stages facilitates such movements. Older communities serve as a reserve of plant and animal species from which the plants and animals can colonize areas where vegetation has been lost by fire or other environmental alterations.

The old growth seral stage has a greater structural diversity than even-aged, younger, closed-canopy seral stages. For purpose of interpretation of existing forest inventory, BLM has defined old growth as forest land that is at least 10 percent stocked with trees 200 years or older in stands 10 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 has been developed by U.S. Forest Service (USFS) researchers (Old Growth Definition Task Group, 1986). Definitions for individual series are currently being prepared. BLM has no specific mature/old growth inventory showing what stands meet the USFS old growth definition; however, an inventory has been initiated.

Vegetative structure in an ecosystem or community includes 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 that 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. This condition reduces the diversity among associated plant and animal species. Harvesting in recent decades left these components but at levels below those which would occur naturally.

Vertical diversity is provided by tree heights and canopy layers as shown in Table 3-5. Younger stands, particularly those without biological legacies, often have only one canopy layer. Those younger stands, which have reached canopy closure, have little understory. Structural diversity increases the potential for animal diversity. In younger closed stands, lack of adequate sunlight greatly reduces the diversity of the understory plant community and thus alters the diversity of the animal community.

The size and frequency of canopy gaps and the degree of canopy closure influence species composition, successional dynamics, nutrient cycling, and wildlife habitat. Canopy gap formation becomes significant in the mature seral stage and stands begin to develop multiple canopies as plants that prefer open sunlight colonize the gaps. This increases the diversity of both plant and animal species. 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), and become downed logs when they fall. Dead and down woody material provide habitat for many species including decomposers that are considered critical to the overall health of the forest. Average dead and down material is summarized in Table 3-6.

Downed logs are an important resource in maintaining soil moisture and long-term soil fertility. Some downed logs serve as nurse trees, providing nutrients to younger trees. As wood breaks down, it forms duff on the forest floor. The downed wood and duff help retain moisture thus facilitating its entry into the groundwater system and holding moisture in the soil during dry periods. The downed logs and duff provide the food supply and home for many invertebrates, fungi and micro-organisms. These, in

Table 3-5 - Structural Characteristics

Seral Stage	Average Diameter[1] (ages)	Average Diameter[2] (inches)	Average Trees Per Acre Over 30 inches
Upper Willamette			
Late (Ages 46-95)	15.1	12.0	2.5
Mature (Ages 96-195)	21.1	17.4	13.5
Old Growth (Age 196+)	23.6	14.9	18.7
Siuslaw SYU			
Late (Ages 46-95)	15.6	12.3	1.9
Mature (Ages 96-195)	24.3	16.9	10.5
Old Growth (Age 196+)	28.8	15.7	18.3

[1] = live conifer> = 7" dbh
[2] = all live trees

Table 3-6 - Dead and Down Material (Conifer Stands)

Age Class (Years)	Seral Stage	Down Logs by Diameter Class (Tons Per Acre) 7-17.9"	18-29.9"	30+"	Total
0 - 15	Early Seral	4.06	10.37	10.40	24.84
16 - 45	Mid Seral	5.62	11.78	12.48	29.88
46 - 95	Late Seral	4.71	11.18	9.71	25.65
96 - 195	Mature	4.05	7.73	11.44	23.22
196+	Old Growth	5.47	10.67	27.22	43.36

turn, help process the organic matter, releasing the nutrients and making it available for trees and other species, which aids in the growth of the forest.

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, tree disease, and geologic processes such as volcanoes and landslides. Fire has been the predominant event and has 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 200 years. Stand-replacing fires, such as those in the Coast Range and areas of the Cascade Range in the middle of the 19th century, burned over 200,000 acres each.

Fires did not kill all the forest. Instead, they left patches of unburned living forest that provided seed sources for recolonization of the burned-over areas. The patches helped to maintain the genetic diversity by retaining locally-adapted plants and animals across the landscape. Fires, and other stand-replacement events, frequently left a mosaic of such patches, helping to maintain forest communities while also contributing to the diversity of habitats. Replacement events left legacies, particularly snags and downed logs, which were important in maintaining habitat for wildlife species, and the long-term fertility of the forest.

Starting in the 1920s, fire suppression has progressively reduced the size of wildfire. In the last ten years, there have been no stand-replacing wildfires on BLM administered lands in the planning area. In some areas, 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).

Change is an important feature in ecosystem diversity. The ecosystem was a constantly changing mosaic of habitats and seral stages. These helped in maintaining the diversity and distribution of plants and animals. The variability also aided in the movement and colonization of species, and contributed to genetic diversity of individual species.

Disturbance events were also important in creating specialized habitats. Landslides created many of the lakes and wetlands. Erosion contributed to development of flood plain areas, and the creation of exposed rocky areas and nobs. Most of these were transitory, geologically appearing and then gradually disappearing over time. Their presence in the ecosystem reflected the pattern of constant change and renewal of habitat variability.

Landscape Diversity

Landscape diversity is the geography of the size, shape, and connectivity/diversity blocks of different ecosystems across a large area. For example, a landscape interspersed with grasslands, shrub lands, meadows, ponds, streams, wetlands, and forests has greater biological diversity than one with a broad expanse of grassland. Forest diversity may be described in terms of the arrangements of stands within a watershed or larger area, or across a region with varying elevation and climates.

Prior to non-native settlement in Western Oregon forest lands, older forests were intermixed with younger and mid-age forests in a continuous network of habitat. 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 foothill forests (Andrews and Cowlin, 1940). The location of existing mature and old growth stands are shown on Map 3-16. The mountains and valleys created a greater diversity of conditions and habitats, and a more variable gene pool. The Douglas-fir forest type was the dominant ecotype, but its composition varied considerably because of the differing conditions.

Harvesting has reduced the proportion of the forest that exists as later seral stages and fragmented older stands into a series of habitat islands separated by younger forests. The fragmentation is compounded by the checkerboard pattern of BLM administered lands. BLM clear cuts tend to be spread across the landscape and average 10 to 40 acres in size. These clear cuts reduced the diversity of the associated plants and animals, and altered many of the intermingled nonforest habitat types, such as riparian areas and wetlands.

The size, spacing, and shape 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, sunlight, temperature, colonization by introduced species, and predation by 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. 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 clear cuts.

The extent of fragmentation of older forest habitat on BLM administered lands is shown in Table 3-7. Interior habitat shown in that table is habitat at least 400 feet from adjacent lands with forest stands younger than 70 years on private lands. Distribution of the remaining old forest blocks is shown on Map 3-16 (Vegetation).

Fragmentation has also impacted other habitats, particularly riparian areas. Harris (1984) suggests that this habitat fragmentation has substantially reduced the population of forest interior animal species such as fishers and goshawks. Lehmkuhl and Ruggiero (1990), however, found vertebrate richness or abundance only weakly related to stand size and isolation in western forests though some negative effects were suggested for particular species.

Biological diversity in the planning area has been influenced at all levels by the intervention of civilization. The effect has been to impact in varying degrees the ability of the forest system to recover its biological diversity after this intervention. Many of the natural recovery elements of the system have been affected by isolation and fragmentation to the degree that restoration of biological diversity may be considerably delayed in comparison to what would occur after natural large scale disturbance. Sizeable

Table 3-7 - Existing Older Forest Block

Old Growth Block Size (acres)	Old Growth and (Age 200+)		Interior Old Growth Mature Combined		Habitat	
	No. of Total Blocks	Acres	No. of Total Blocks	Acres	No. of Total Blocks	Acres
20 - 79	293	11,900	388	15,500	85	3,400
80 - 299	125	18,600	144	20,600	26	3,800
300 - 599	14	5,900	27	11,000	0	0
600+	6	7,500	13	24,500	1	1,400

areas have been converted to other uses, especially in the larger valleys. Some habitat types, such as lakes and grasslands, have expanded considerably. A variety of plant and animal species have been introduced or have invaded to take advantage of altered conditions. The altered conditions have favored some species, particularly some of the exotic species, and considerably reduced the range and abundance of others. Restoration of the original forest across the entire landscape is not possible. Examples of most communities and species, which are present in sufficient numbers, suggest that a viable remnant of the original forest can be maintained.

Vegetation

Vegetation or natural plant communities occurring on the District exists within an ecosystem influenced by and influencing the earth and soils, water and air. The vegetation that occurs is the result of a broad range of interacting factors, including soils, moisture, temperature, nutrient availability, elevation, and aspect. Variations also occur because of disturbances, both natural (e.g., fire, windstorms), as well as human caused (e.g., logging).

For the purpose of this RMP/EIS, vegetation is generally described in terms of "zones" adapted from those identified by Franklin and Dyrness in *Natural Vegetation of Oregon and Washington* (1973).

The majority of the vegetation on the Eugene District falls within the western hemlock zone. This zone is the most important for timber production and represents average temperature and moisture conditions on the District. The major trees are Douglas-fir that is dominant in most existing stands, and western hemlock and western red cedar that are found in moist environments. Much of this zone has been logged or burned, or both, during the last 150 years. In old growth stands Douglas-fir still represents a major component.

For Bureau administered lands, upland plant communities within this zone have been classified into five major plant groupings. A major plant grouping is an aggregation of plant communities with similar management potentials, the same principal early seral species, and the same dominant late seral conifer species. These groupings, together with pertinent seral stages, provide the basis for descriptions of forest communities and wildlife habitat used in the planning and analysis process.

The following major upland plant groupings are found on the District:

Douglas-fir/Mixed Brush/Salal - (D/B/SA) - This group covers Eugene District lands on the west slope of the Cascade Range below 2,500 feet elevation. Forests are mainly Douglas-fir with western hemlock, bigleaf maple, western red cedar, and incense cedar associated. Shrubs include salal, vine maple, Oregon grape, and hazel. Herbs include swordfern and bracken fern. Regeneration is not difficult and tree growth is good. The primary competition for conifers in early and mid seral stages is from sprouting hardwoods and brush species.

Douglas-fir/Rhododendron-Ceanothus/Salal - (D/CE/SA) - This group covers Eugene District lands of the Cascade Range, lying above 2,500 feet elevation and north of the *Mixed Conifer/Madrone-Deciduous Brush/Salal* group, which is mapped in the Roseburg District. Douglas-fir predominates in conifer stands. Western hemlock, western red cedar, and sugar pine are associated. At higher elevations, the group changes into true fir-western white pine communities. Brush species include rhododendron and ceanothus. Salal is present in understories and in early seral stages, depending on the amount of disturbance occurring from site preparation. Golden leaf chinquapin exists in tree and brush forms and may be a significant competitor. Environmental conditions may be severe and soils may be nitrogen poor.

Douglas-fir/Ocean Spray/Herbs and Grasses - (D/OS/H) - These plant communities are found adjacent to the Valley floor on warm, dry sites at low elevations (less than 1,500 feet). Other tree species that may be present are incense cedar, ponderosa pine, grand fir, bigleaf maple, and madrone. The shrub layer consists of hazel, ocean spray, vine maple, Oregon grape, and poison oak. Following disturbance, various grasses become significant competitors and make regeneration difficult. Most of these sites have a higher than average fire occurrence on the District. Soils often are high in clay.

Douglas-fir/Red Alder/Vine Maple - (D/RA/VM) - In the Eugene District this grouping occurs on the drier sites on eastern slopes of the Coast Range. Following disturbance, competition from shrubs and hardwoods is moderate. Shrub species include evergreen huckleberry, blackberry, and salal. Red alder and bigleaf maple are usually present in varying densities. Red alder and bigleaf maple seed or sprout prolifically after site preparation. When present, the herb layer consists of swordfern and oxalis. Plant communities vary, depending on the presence of marine air flow across the Coast Range.

Dry sites will have more oceanspray and herbacious competitors than more moist sites.

Douglas-fir/Red Alder/Salmonberry - (D/RA/SM) - This group occurs on Coast Range sites west of the red alder/vine maple group and indicates a moist site. Douglas-fir and western hemlock are the main overstory species with red alder being the primary hardwood. Red alder may dominate sites for long periods. Shrubs include salmonberry, huckleberry, salal, and vine maple. Swordfern is the primary understory species. Early succession is generally characterized by fast shrub response and intense competition for light from alder and salmonberry.

Seral Stages

Five Seral Stages are described in the following paragraphs for each major plant grouping. The speed of seral changes varies somewhat within the District from better to poorer sites and between major plant groupings. For analytic purposes, changes are similar enough for all upland vegetation to have a common duration. The five seral stages are early seral, mid seral, late seral, mature seral, and old growth (see illustration in this chapter).

Early Seral Stage - This stage occurs from the time of disturbance exposing bare ground to the time when conifer or hardwood saplings dominate the site, and typically occurs between 0 and 15 years. For conifers, it is the time from disturbance to crown closure under the current forest management regime. During the first 2 to 5 years, grass and forbs dominate. This is quickly followed by a dominance of brush and, at times, hardwoods. Conifers develop slowly at first but gradually become dominant. Biomass is relatively low but rapidly increases throughout this stage. Species diversity is highest in this stage.

Mid Seral Stage - This stage occurs typically between 16 and 45 years, and is best characterized by a dominance of conifers (from the time of crown closure to the time of first merchantability). Sites are characterized by a dense conifer stand, a closed canopy, and a relatively low occurrence of understory vegetation. Species diversity decreases in most cases (Long, 1977).

Unlike natural (unmanaged) forests that existed prior to Euro-American settlement, early and mid seral stage islands created by timber management activities over the last 4 decades are essentially devoid of snags of all size and decay classes. Similarly, amounts of large, downed trees and logs, in all size and decay classes, are often absent in managed stands in comparison to natural conditions.

Late Seral Stage - This stage occurs typically between 46 and 95 years and is characterized by an opening of the canopy with a corresponding increase in forbs and shrubs. Species diversity, although minimal, is once again beginning to increase but at a slower rate than what occurred in the early seral stage. For conifer growth, it is the time of first merchantability to time of Culmination of Mean Annual Increment (CMAI). During this period, stand diversity is low.

Mature Seral Stage - This stage typically occurs between 96 and 195 years. Stand diversity is gradually increasing in response to openings in the canopy created by windthrow, disease, and insects. Biomass is still increasing but at a relatively slow rate. For conifers, it is the time from CMAI to an old growth state.

Old Growth Seral Stage - This stage typically occurs after 195 years and represents both climax and subclimax communities. The subclimax condition may, in fact, persist for centuries depending on the frequency of natural disturbances. Whether in the climax or subclimax condition, old growth is characterized by two or more tree species with a wide range of size and age including long-lived seral dominants, a deep multilayered canopy, and a significant amount of snags and downed logs (Spies and Franklin, 1988). More tolerant conifer or shrub species occur in the understory or in openings caused by windthrow or other disturbance. Old growth stands are optimum habitat for saprophytic plants, lichens, mosses and liverworts. Biomass reaches a maximum and species diversity approaches the level found in the early seral stages.

Acreage figures for various age classes show that an imbalance exists when comparing the early seral stage/mature seral stage with late seral stages. This also corresponds to greater vegetative diversity since typically late seral stand conditions have the lower amount of vegetative diversity when compared to early seral and old growth stages (Harris, 1984). In the future, as early seral stands grow vegetative diversity will change.

The orderly and directional progression of seral stages described above can be disrupted through natural or human disturbances. Natural disturbances include fire, windthrow, disease, and insect damage. Fire has had a major impact on the successional process in the area. Disturbances are at times intense enough to force succession back to the early

seral stage. At other times, they destroy only understory vegetation, leaving overstory tree species intact. The degree to which succession is disrupted is generally proportional to the intensity of the disturbance. Understory fires often burn in a mosaic fashion and contribute to the maintenance of a subclimax condition in the old growth seral stage.

Windthrow, disease, and insect damage affect smaller areas and have less impact on succession than fire. Wind velocities in western Oregon are relatively low, though intense low pressure centers have caused high winds and excessive windthrow on the northeast boundaries of existing clear cuts. One of the biggest events occurred on October 12, 1962 when hurricane force winds blew down 2.5 billion board feet of timber in western Oregon, of which half was on BLM lands.

Diseases such as black stain, Armillaria root rot, and laminated root rot, and insects such as the bud worm and pine beetle often affect localized areas. These diseases and treatments are described in the Timber Resource section of the Analysis of the Management Situation (AMS). At times, more than one type of natural disturbance will occur in a single location having synergistic effects on succession. Disturbances of these types can also influence the biotic diversity within the stand.

Human disturbance has had a much greater influence on succession and diversity than natural disturbance. Native Americans and early settlers were accustomed to lighting ground fires to facilitate hunting and gathering food, and to provide forage for livestock. Most of these fires were limited to the valleys and foothills. Early explorers recount in detail about riding or walking for miles without seeing anything but burnt grass. This activity had a profound effect on plant succession, producing vast grasslands and oak savannas though the climax community in much of the area is suspected to be a mixed conifer hardwood forest (Johannessen, 1971; Franklin and Dyrness, 1973).

Logging has a dramatic effect on the successional process. Depending on the silvicultural system used, logging has different effects on species composition and the structure of forest stands. Even-aged management results in the orderly replacement of ecologically diverse stands with homogenous stands of young trees. In the Cascades, when comparing practices of clear cutting and slash burning to clear cutting only, 35-40 years after treatment, the volume growth and number of shade-tolerant conifer species (western hemlock, western red cedar and Pacific silver fir) is less in burned treatments than unburned treatments (Miller and Seidel, 1990).

Mortality salvage removes selected trees (both dead and live trees) that are prone to attack by insects and disease, thus reducing the number of snags and downed logs. Silvicultural practices such as precommercial thinning, suppression of brush and hardwoods, and fertilization may hasten succession. Salvage removal can affect the biotic diversity of a stand by contributing to the simplification of habitat.

Exotic plant species can have a significant effect on species composition during the successional process. Exotic plants have become established accidentally and deliberately by seeding, mulching, road construction and maintenance, and livestock. Introduced grasses are especially competitive with conifers in the early seral stage. Other species have become significant agricultural pests.

Management for the production of other forest outputs, such as huckleberries, cascara bark, yew bark, salal, various species of mushrooms, ferns, moss, and seedlings of vine maple, bigleaf maple, alder, oaks, red cedar, Douglas-fir, dogwood, Oregon ash, and manzanita has been limited. Increased interest in other forest outputs may generate the need to more actively manage such products and monitor areas where removal occurs to determine associated impacts to local populations of certain species.

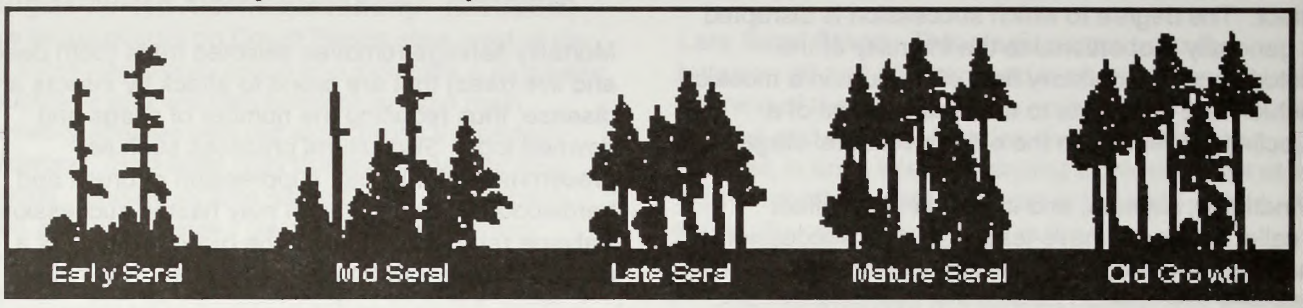
Introduced diseases and insects have affected both species composition and structure of forest communities in all seral stages. For example, Port Orford cedar root rot and white pine blister rust have had severe effects. Introduced defoliating insects such as the gypsy moth are a potential threat but have not yet caused significant impacts.

New Perspective of Seral Stages

Figure 3-1 illustrates successional seral stages that have been thought of as progressing from a grass-forb stage to a shrub-seedling stage and on toward old growth.

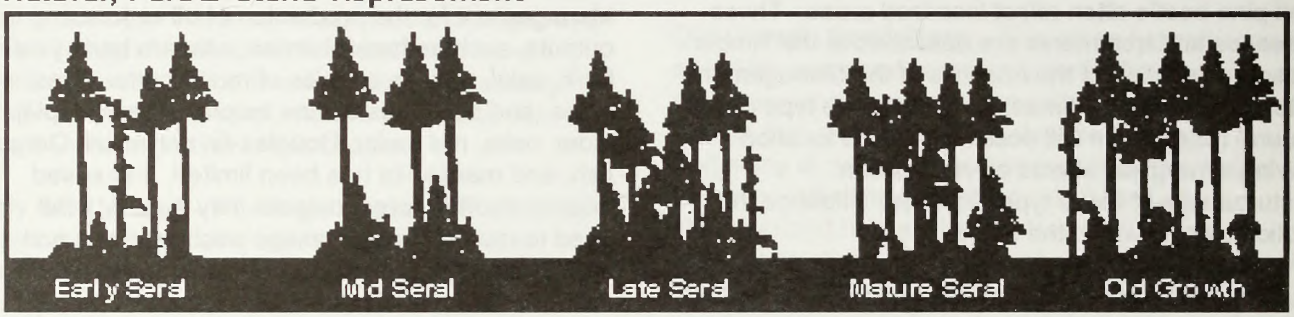
In recent years forest ecologists have pointed out that these stage definitions should be modified. For instance, after catastrophic fires, the first stage should include biological legacies of some surviving trees, snags, and down trees. As described in the

Natural, Catastrophic Stand Replacement



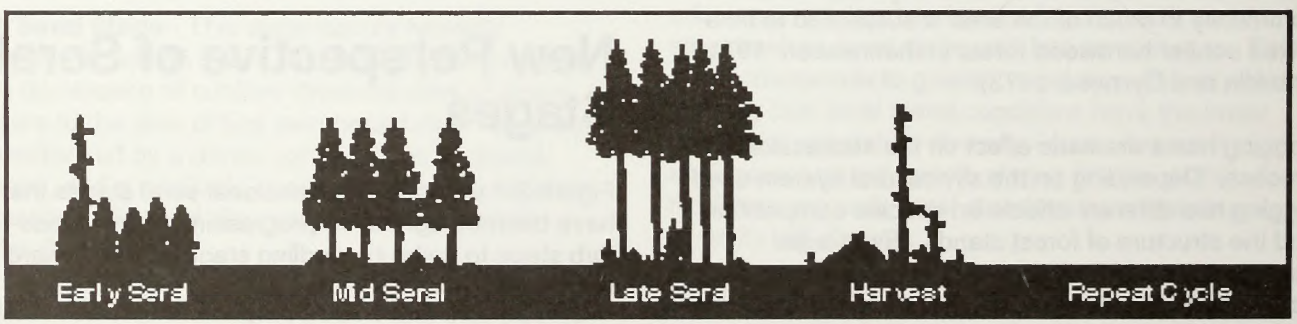
The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings (and very few living trees which serve as a seed source). Succession progresses in a more or less even-aged sequence, with vertical and fine grained diversity developing in the mature seral state and being fully 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. *New Perspective of Seral Stages*

Biodiversity Section, fire and other human activity have played a major role in plant succession. We also know that succession differs considerably, depending on the intensity of the disturbance event and the amount of green overstory, which survives that event. Examples of successional seral stages are described as follows:

Succession Following Natural Catastrophic Stand Replacement: The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings and a 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 stage and being fully expressed in the old growth stage.

Succession Following Natural partial Stand Replacement: This successional path is very common in southwestern Oregon and more common to the north than previously imagined. 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 openings, while overstory trees slowly die, turn into snags, and fall.

Succession Following Logging in a Conventional Management Scheme: This successional path begins after nearly complete removal of conifers 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.

Dominant seral vegetation for each grouping is shown in Table 3-38. Acres of major plant groupings and seral stages are shown in Table 3-39. Map 3-16 displays the major plant groupings and location of the mature and old growth seral stages.

Smaller vegetative communities may occur within the major upland plant groupings described above. These communities are associated with wetland or riparian areas (see Riparian Zone discussion), with grassy balds and/or meadows, or with rock cliffs or talus slopes. Individual plant species of these communities are adapted to the unique environmental or physical conditions present in those

Table 3-38 - Dominant Seral Vegetation by Plant Group

Plant Grouping[1] (years)	Early Seral[2] (0-15)	Mid Seral (16-45)	Late Seral (46-95)	Mature (96-195)	Old Growth (196+)
D/B/SA	Sh-He-Hd	C-Sh-Hd	C-Hd	C	C
D/CE/SA	Sh-He	C-Sh	C	C	C
D/OS/H	G-Sh-He	C-Hd-Sh	C-Hd	C	C
D/RA/VM	Sh-He-C	C-HD-Sh	C-Hd	C	C
D/RA/SM	Hd-Sh-He-C	Hd-Sh-C	C-Hd	C	C

[1] Plant Group Key: Refer to descriptions immediately preceding this table.
[2] Seral Vegetation Key: G = Grass, He = Herb, Sh = Shrub, Hd = Hardwood, C = Conifer.

Table 3-39 - Acres of Plant Groups in Each Seral Stage

Plant Grouping (0-15)	Early Seral (16-45)	Mid Seral (46-95)	Late Seral (96-195)	Mature (196+)	Old Growth	Total (years)
D/B/SA	23,618	44,248	35,474	13,268	8,480	125,088
D/CE/SA	4,511	1,720	459	5,511	3,150	15,351
D/OS/H	5,989	11,128	4,912	1,753	2,448	26,230
D/RA/VM	25,272	38,512	25,578	4,403	19,551	113,316
D/RA/SM	5,716	6,157	7,372	4,598	11,047	34,890
Total	**65,106**	**101,765**	**73,795**	**29,533**	**44,676**	**314,875**

locations, and may be considered unique ecosystems. The majority of the District's 11 special status plant species are found in these unique ecosystems.

Special Forest Products

Special Forest Products (SFP) are located throughout the District with numerous plant species actually used. A partial listing of existing or potential SFP and their possible uses is found in Table 3-57. Although qualitative information exists for most SFP, quantitative information for many of them is not available. Inventories of SFP have not been done to determine distribution and abundance.

Some plants identified as SFP have also been identified as vascular plant species closely associated with Late-Successional and old growth forests of the Pacific Northwest. These plants include wild ginger, prince's pine, skunk cabbage, beargrass, and numerous huckleberry species. A number of nonvascular plants such as lichens, liverworts, and mosses and fungi are also identified. A number of fungi are commonly associated with old growth forests and known to be commonly collected: goat's beard or *Herecium abietis*, cauliflower mushroom or *Sparassis cripus*, white chantrelle or *Cantharellus subalbidus*, blue chantrelle or *Polyozellus multiplex*, sulphur shelf fungus (*Laetiporus sulphureus)*, king bolete (*Boletus edulis)*, delicious milk cap (*Rosites caperata*), quinine conk (*Fomitopsis officinalis*), and matsutake (*Armillaria ponderosa).*

The recently published *Forest Ecosystem Management: An Ecological, Economic and Social Assessment* (FEMAT Report, 1993) specifically addresses the viability of many species that might be utilized as special forest products and identifies measures to maintain these resources. Fungi (527 species), lichens (157), bryophytes (106 liverworts and mosses), and vascular plant species (127) were identified as being closely associated or dependent on old growth ecosystems for survival, and a number of mitigation measures were described in that report to maintain viability.

Most of the plants collected are common species found throughout the forest. While it is unknown whether any rare or uncommon mosses or lichens are collected, those rare mushrooms and lichens listed in the FEMAT Report that are found on the Eugene District are incorporated into the list of species off limits for collection.

The lichen flora on the Eugene District may be as high as 400 species. These symbiotic species (an alga and a fungus) grow on substrates such as decaying wood, tree boles, soil, and rock or in riparian or aquatic habitats. Some lichens are collected for medicinal purposes and others for dying wool or floral arrangements.

Documentation of some of these products occurs when they are harvested under permit. Those that have been sold for harvesting under permit between FY 1987 and FY 1991 from the Eugene District are shown in Table 3-58.

Special Forest Products are legally removed from the forest through the use of permits; however, predetermined amounts of some specific SFP are removed without issuing permits (under sections from 43 CFR 5500 and/or 8365) (see Special Status Section).

Riparian Zones

Riparian zones occur throughout watersheds 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 quality and quantity, stream conditions, and width of flood plain. As the zone of interaction between the aquatic and upland areas, the riparian zone is impacted by a variety of activities. Hydrologic fluctuations, biotic interactions, geomorphic conditions and human-related activities result in an ecosystem characterized by a mosaic of plant communities with varying seral stages, including herbaceous, shrub, hardwood, and coniferous plant species (Kauffman, 1988). The plant diversity of the riparian zone is generally greater than that of drier topographic positions. The dynamic nature of the riparian zone creates a variety of substrates, side channels, flooding zones, etc., which in turn provide habitat conditions favorable for germination, seedling establishment, and plant growth of selected plants adapted to such systems.

Plants that initially colonize a riparian area modify the habitat in a variety of ways, including soil development and nutrient enrichment. These new site conditions make it easier for different plant species to colonize the riparian area. Because of the varying durations and frequency of natural and human-caused disturbances, the seral stage development of a riparian plant community can be quite variable and may exhibit multiple successional pathways. The plant communities that result after a

Table 3-57 - Partial Listing of Existing or Potential Special Forest Products and Their Possible Uses

Existing/Potential Special Forest Products[1]	CR	CO	FL	FO	GR	LP	PH	PO
bear grass (1-2)	x				x		x	
rhododendron (1-2)						x		
common sword fern (2-3)					x	x		
western bracken fern[2] (1-2)					x			
poison oak[2] (1-2)							x	
Himalaya blackberry (1-2)				x			x	
evergreen blackberry (1-2)				x				
trailing blackberry (1-2)				x				
wild cucumber (1)							x	
evergreen huckleberry (1-2-3)				x	x	x		
western red huckleberry (2)				x		x		x
ground or vine maple moss (2)					x		x	
foxglove[2] (1)							x	
yarrow (1)			x	x	x	x	x	x
salal (2)	x		x	x	x		x	
oceanspray (1-2)			x					
cascara sagrada (2)							x	
fuschia-flowered gooseberry (2)				x		x	x	x
redflowering currant (1-2)						x		
blackcaps (1-2)				x		x		
thimbleberry (1-2)				x			x	
salmonberry (1-2-3)				x				
blue elder (1)				x			x	
red elder (1)							x	
wood sorrel (2-3)				x		x		
goldenrod (1)				x		x	x	
vine maple (1-2-3)	x		x		x	x		
manzanita (1)					x	x		
large Oregon grape (1-2)	x			x		x	x	
dwarf Oregon grape (2)	x			x	x	x	x	
golden chinquapin (1-2)					x	x		
St. John's wort (1)							x	
incense cedar (1)			x		x	x		x
western red cedar (2-3)			x		x	x		x
Sitka spruce (2)	x	x	x			x	x	
ponderosa pine (1)	x	x	x			x	x	
western hemlock (2-3)		x	x			x	x	
red alder (1-2)	x	x	x	x	x	x		
Pacific dogwood (1-2)	x		x	x		x		
Oregon white oak (1)	x		x			x		
willows (1)	x			x		x	x	
Douglas-fir (1-2)		x	x		x	x	x	x
Pacific ninebark (1-2)			x					

[1] Information on possible uses is from a slide presentation by Anthony Walters, certified ethnobotanist
[2] May be poisonous to humans in some forms

Legend: CR = Crafts; CO = Cones; FL = Floral; FO = Food resource; GR = Greenery; LP = Live Plants; PH = Pharmaceutical; PO = potpourri —(1) shade intolerant; (2) intermediate shade tolerance; (3) shade tolerant

Table 3-58 - List of Special Forest Products Sold Under Permit During FY87-91

Product[1]	Unit of Measure	FY87-91 Issued Permits	FY87-91 $ Amounts
sawtimber	MBF	122	$ 75,529.90
pulpwood	MBF	8	3,434.00
marginal logs	MBF	1	677.00
bolts and shakes	MBF	32	4,282.70
corral poles	MBF	17	887.93
small poles	MBF	11	185.52
large poles	MBF	1	10.00
split rails	MBF	1	13.50
line posts	MBF	27	592.35
corner posts	MBF	1	9.00
fence stay	MBF	1	10.00
fuelwood	cords	2,301	30,852.17
Christmas trees	Number	859	3,645.00
wildings[2]	Number	66	1,367.00
cascara bark	pounds	19	872.00
moss	pounds	58	631.00
boughs	pounds	107	1,388.00
pitch	pounds	1	9.00
mushrooms	pounds	11	104.00
burls	pounds	1	150.00
huckleberry brush	bundles	1	5.00
ferns	bundles	18	410.36
beachgrass	bundles	2	20.00
greens[3]	bundles	50	536.50
Total		3,716	$125,622.00

[1] Since Pacific yew is currently being managed as a separate program, it is no longer considered a SFP.
[2] Wildings are considered plants that are sold as transplants.
[3] Greens include many SFP species that are used in crafts and floral designs.

natural or human-caused disturbance are also a function of the seed source that remains in other portions of the riparian system, water depths, available nutrients, and a variety of other biotic and abiotic conditions. When riparian zones are altered by human activities, some plant communities may be prevented from developing, and the biotic potential of the area may not occur.

Under common conditions, conifers (western red cedar, hemlock, and Douglas-fir) dominate riparian overstories in small V-shaped drainages. Deciduous trees (red alder, bigleaf maple, black cottonwood, and Oregon ash) gradually become more dominant as streams increase in size. Understory vegetation, vine maple, herbs, and shrubs are generally more abundant in riparian areas than in upland communities (see Figure 2-2). Prior to settlement by nonnatives in the mid-1800s streams and rivers were dominated by large woody debris and beaver dams. As a result, flatter valleys were covered by wetlands and broad riparian communities of conifers and deciduous trees. Removal of the large woody debris, channelization of streams, and flood control measures, all stabilize streams into a single, well defined channel, which facilitates settling of streams and river bottoms (Sedell and Luchessa, 1982). The broad riparian areas were nearly all converted to

urban and agricultural use. Road building and logging, particularly high-grading and splash damming, removed natural conifer riparian communities along larger streams and rivers that were replaced by deciduous trees, dominated by red alder and bigleaf maple.

Riparian ecosystems and the ecosystems of the associated transition zones are often referred to as riparian habitat. Hydrologically, riparian habitat functions to help regulate streamflow (lessen size of floods and increase low flows) control erosion, stabilize stream channels, increase groundwater recharge, regulate water temperature, dissipate water energy, change flow patterns, and trap sediments. These functions are discussed in Appendix M.

Riparian habitat is characterized by moister soils, greater abundance of water, and moderate microclimate. These conditions help create a community of plants and animals intermediate between the aquatic and upslope. Many animal species found upslope spend at least part of their life-cycle in riparian areas. Because of the more moderate conditions, the riparian habitat is especially important as a refuge area during adverse periods such as drought or severe cold. Riparian vegetation determines stream channel conditions. Larger trees and shrubs stabilize stream banks. Large trees falling into the stream provide structure for creating pools, rearing areas, cover, and stabilize substrates that create spawning habitat. Riparian vegetation provides food for fish directly from insects falling in the stream, and indirectly from litter that falls in the stream providing food and organic matter for many aquatic organisms. Structure is important in retaining litter in the stream for use by the aquatic community.

Riparian ecosystems, with the resulting mosaic of plant communities, are characterized by a diversity of plant species. On the Eugene District several special status plant species occur within the riparian area. Along riverine systems, BLM Bureau Sensitive species, *Cimicifuga elata* (tall bugbane), has been found. Wetlands, which can include ponds, wet meadows, seeps, etc., provide habitat for several of the District's sensitive plant species, including Federal Endangered species, *Lomatium bradshawii* (Bradshaw's lomatium). Lomatium occurs in seasonally wet meadows within the Willamette Valley, and this ecosystem is considered one of the most endangered plant communities in Oregon.

Of the approximately 200 forest-related wildlife species that inhabit the BLM operating area, 60 (30 percent) use forest streams and their associated riparian zones as their primary habitat for reproduction, feeding, or resting (Brown, Appendix 8). These include species such as ruffed grouse (*Bonasa umbellus*), screech owl (*Otus kennicottii*), black bear (*Ursus americanus*), and bobcat (*Lynx rufus*) that seem to find such habitat highly favorable while also making extensive use of upland habitats for the same life needs. Of the above 60 species, 21 may be considered obligates of the stream/riparian habitat since they must use this habitat for reproduction or forage. Large water bodies such as rivers, lakes and reservoirs are more suitable for some of these species, e.g., bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*) and great blue heron (*Ardea herodias*). As discussed in the Wildlife and T&E Species sections, cold, clear streams and cool, moist (shaded) riparian habitat are crucial for many species. For some species, maintenance of these conditions within small, headwater streams is crucial for their survival, e.g., Pacific giant salamander (*Dicamptodon ensatus*), Olympic salamander (*Rhyacotriton olympicus*), and tailed frog (*Ascaphus truei*). As described by Oakley et al., ". . . riparian zones are of paramount concern as wildlife habitat . . . since 1) they contain water, cover, and food - the three critical habitat components, 2) they have greater diversity of plant composition and structure than uplands, 3) their elongated shapes maximize edge effect with the surrounding forest, 4) their microclimates differ from the surrounding habitats, 5) they are natural migration routes and travel corridors, and 6) self-sustaining riparian forests stabilize streambanks and adjacent slopes and provide streams with large woody debris that ensures structure, high water quality, and substrate for invertebrates that form the bottom of the food chain."

On BLM administered lands in the planning area, riparian habitat is found along approximately 2,447 miles of 1st and 2nd order streams. Under the District's current land use plan, riparian habitat associated with 1st and 2nd order streams are included within the intensive timber management land base, except for those located within lands withdrawn for other purposes. In addition, riparian zones for 1st and 2nd order streams have been estimated at 14,062 acres (1983, Eugene District EIS).

The number of 3rd order and greater stream miles by watershed is shown in the Water Resources section (see Water, Table 3-40). There are 533 miles of 3rd order and greater streams with 12,922 acres of riparian zones associated with these streams. Zones along small, perennial 3rd order streams make up 46 percent of the total along 3rd order and greater streams. Riparian zones have also been identified

Table 3-15 - Existing Conditions of Riparian Zones on BLM Administered Lands

	Acres of Each Condition Class by Stream Order[1]				
Stream Order	1 (minimal)	2 (minimal)	3 (fair)	4 (good+)	Total
3	1,099	2,055	997	1,805	5,956
4	471	1,365	779	1,156	3,771
5	162	500	252	585	1,499
6+	68	570	166	824	1,628
Lakes and Ponds	19	39	01	09	68
Total	**1,819**	**4,529**	**2,195**	**4,379**	**12,922**

[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/optimal condition) = 21+ inch trees

Note: See Appendix Q for explanation of the rating system.

on 68 acres bordering ponds, lakes, and reservoirs and 4,568 acres of permanent wetlands. These riparian zones comprise 5.6 percent of the land base or 17,588 acres. In the current management plan, this acreage is not part of the intensive timber management land base, and has been calculated by using average widths on each side of stream and other waters: 3rd order streams (75 feet), 4th order streams (100 feet), 5th order streams (140 feet), 6th order and greater (160 feet), and other waters (100 feet).

According to Campbell and Franklin (1979) and Franklin et al. (1981), the greatest structural diversity in riparian areas is provided by old growth forest. A method of evaluating the condition of riparian zones was developed based on this conclusion and the knowledge of BLM biologists. The method uses average tree size, which can be derived from the Operations Inventory (OI) database, as the indicator of riparian habitat condition. In some riparian areas, OI data has not been collected. An estimate of average tree size for these areas was made using inventory data from adjacent forest stands.

In western Oregon, riparian habitat with mature trees averaging greater than 21 inches dbh provides the greatest plant and structural diversity, a high level of animal diversity, and a high level of woody debris (Brown, 1985). Mature riparian zones also contribute a high level of aquatic diversity and provide primary habitat for several wildlife species.

Standing riparian vegetation helps regulate water temperature through shading. It also provides nesting, roosting, cover habitat, and food sources for a variety of terrestrial and aquatic animals (Brown, 1985). Mature riparian vegetation maintains water quality, lessens peak flood flows, controls erosion, and increases ground water recharge. Downed riparian vegetation in a flood plain, supplied by mature trees in the riparian zone, provides terrestrial animal cover and food, dissipates water energy, traps sediment, increases water storage, changes flow patterns, and maintains and improves aquatic habitat conditions.

The existing conditions of riparian zones associated with 3rd order and larger streams are displayed in Table 3-15. Most of the acres (49 percent) are in minimal condition, with the average tree size less than 11 inches dbh. About 34 percent of the riparian zone acres are in good to optimal condition. Generally, riparian habitat in smaller streams has a higher percentage of acres in minimal condition, a result of more recent harvest along smaller streams. Larger streams have a higher percentage of acres in good to optimal condition with gradual recovery along larger streams, which were logged earlier in the current harvest cycles (see Appendix Q).

Wildlife Habitat

Introduction

Over 200 vertebrate wildlife species (excluding fishes) are known or believed to regularly inhabit the forest lands and intermingled nonforest lands within the Eugene BLM planning area, although no extensive wildlife inventory has been conducted. At least 28 reptiles and amphibians, 120 birds, and 64 mammals species are thought to occur on BLM lands. In addition, an unknown number of invertebrate species are known to occur on the District.

Over 100 species of vertebrate wildlife (excluding fishes) are considered high interest for management within the Planning Area. High interest wildlife species include all BLM Special Status Species (both vertebrate and invertebrate) and other species of management concern regarding potential impacts from one or more of the plan alternatives. These species consist of game animals (including furbearers), and species whose habitats are considered vulnerable to intensive timber management activities as practiced over the last 50 years. These species are listed in Table 3-54 along with information identifying their vulnerable habitats and species-related limiting factors.

Of the priority species within the Planning Area, 107 are known or suspected to occur regularly on BLM lands or intermingled lands of other ownerships within the BLM (Eugene District) operating area. These 107 species are, therefore, considered to be most closely related to the planning alternatives. Those species considered to be special status by BLM policy are considered in detail in the section on Special Status Species (Wildlife).

Suitable habitat for each priority species is associated with one or more of the forest seral stages that characterize the various forest plant communities, or one or more of the special habitats found within the BLM operating area. As explained in the Vegetation section, each major plant community has the potential to produce a variety of seral stages ranging from early seral to old growth. Wildlife diversity is generally correlated with vegetative diversity. For example, species richness within an area is a function of the diversity of plant species, richness of habitat components (e.g., snags, down logs), number of seral stages present, the size of habitat islands that make up the habitat mosaic, and the spatial distribution of these habitat islands.

Early, mid, and late seral stage conifer forests are the dominant habitats on BLM administered and private lands within the BLM operating area. Wildlife problems associated with these habitats (seral stages) that have been experienced are briefly described as follows:

Wildlife Habitat Management

The priorities for management of wildlife habitat on the Eugene District are established to integrate the needs for retention and recovery of habitat for all species within the guidelines of existing legal guidelines, endangered species recovery plans, BLM policy and requirements of the SEIS/ROD. These documents identify habitat management issues that affect many wildlife species on the District.

Although each wildlife species occupies a different niche, and has different life needs, many life needs can be summarized in general categories that provide a method to identify key resource issues and concerns. Each of the sections presented below summarizes management concerns or opportunities to conserve, protect, and promote wildlife resources on BLM lands, and identifies a variety of strategies to conserve and restore wildlife populations through effective habitat management. Table 3-54 provides a list of the primary habitat management concerns for wildlife species of high interest on the District.

Snag Retention and Recruitment

Standing dead trees (snags) provide primary habitat for many animal species (Neitro et al., 1985; Schreiber, 1987; Brown 1985: Appendix 18). Of the priority wildlife species and species groups within the area occupied by BLM administered lands, at least 36 (approximately percent) are dependent upon standing dead trees (or decadent green trees with cavities) for one or more life needs (see Table 3-54). The concern for this habitat is especially high because most cavity-using species of wildlife are insectivorous and, therefore, of ecological importance in the control of certain insects (Neitro et al., 1985).

The current BLM Management Framework Plan requires retention of one snag or green tree at least

Table 3-54 - Wildlife species in the planning area likely to be impacted under one or more of the planning alternatives.[1]

Common Name	Scientific Name	Vulnerable Habitats & Limiting Factors [2]
Inverterbrates:		
Fender's blue butterfly[SS]	*Icaricia icarioides fenderi*	SH
Ford Dick Limnephilus caddisfly[SS]	*Limnephilus atercus*	U
Oregon giant earthworm[SS]	*Driloleirus macelfreshi*	SH
Oregon silverspot butterfly[SS]	*Speyeria zerene hippolyta*	SH
Siuslaw sand tiger beetle[SS]	*Cicindela hirticollis siuslawensis*	U
Taylor's checkerspot butterfly[SS]	*Eukphydyas editha taylori*	SH
Tombstone pr'ie Farulan cad'fly[SS]	*Farula reaperi*	WQ, OF, DD
Tombstone pr'ie Olig. cad'fly[SS]	*Oligophlebodes mostbento*	WQ
mollusks		
Blue-grey tail-dropper	*Prophysaon coeruleum*	U (SA)
Burrington jumping-slug	*Hemphillia barringtoni*	U (SA)
Evening fieldslug	*Deroceras hesperium*	U (SA)
Oregon Megomphix snail	*Megomphix hemphilli*	U (SA)
Papillose tail-dropper	*Prophysaon dubium*	U (SA)
Puget Oregonian snail	*Cryptomastix devia*	U (SA)
Warty jumping-slug	*Hemphillia glandulosa*	U (SA)
Amphibians:		
Cascades frog[SS]	*Rana cascadae*	WQ, SH, JX
Cascade olympic salamander [3]	*Rhyacotriton cascadae*	SM,WQ,CM,SH,HW,OR
Clouded salamander[SS]	*Aneides ferreus*	SM,DD,CM,HD
Dunn's salamander	*Plethodon dunni*	SM,DD,CM,WQ,SH,OF
Foothill yellow-legged frog[SS]	*Rana boylii*	WQ, JX
Northern red-legged frog[SS]	*Rana aurora*	WQ,CM,SH,RA,OR
Oregon slender salamander[SS]	*Batrachoseps wrightorum*	SM,DD,CM,OF,CM
Pacific giant salamander	*Dicamptodon tenebrosus*	SM,DD,CM,HD,HW,OR
Spotted frog[SS]	*Rana pretiosa*	O, SH, SM
Tailed frog[SS]	*Ascaphus truei*	WQ,SM,OR, CM, JX, OF
Variegated salamander[3]	*Rhyacotriton variegatus*	SM,WQ,CM,SH,HW,OR
Western redbacked salamander	*Plethodon vehiculum*	CM, DD
Reptiles:		
Northwestern pond turtle[SS]	*Clemmys marmorata marmorata*	SM,SH,DD,SE, O
Painted turtle[SS]	*Chrysemys picta*	SM,SH,DD,SE,O
Sharp-tailed snake[SS]	*Contia tenuis*	SM,SH
Herons, Ducks, Other Waterbirds:		
Barrow's goldeneye[SS]	*Bucephala islandica*	SH,TC
Bufflehead[SS]	*Bucephala albeola*	SH,TC
Common merganser	*Mergus merganser*	TC,DT,OR,JX
Dusky Canada goose[SS]	*Branta canadensis occidentalis*	SH
Great blue heron[N]	*Ardea herodias*	LT,SE,OF,JX
Harlequin duck[SS]	*Histrionicus histrionicus*	TC,DT,WQ,OR,JX
Hooded merganser	*Lophodytes cucullatus*	TC,DT,JX
Marbled murrelet[SS]	*Brachyramphus marmoratus*	LT,OF
Wood duck	*Aix sponsa*	TC,DT,HD,OR,JX
Raptors:		
American kestrel[N]	*Falco sparverius*	TC,DT,JX
American peregrine falcon[SS,N]	*Falco peregrinus anatum*	SH,SE,JX
Bald eagle[SS]	*Haliaeetus leucocephalus*	LT,OF,JX,SE
Barred owl	*Strix varia*	TC,OF
Cooper's hawk[N]	*Accipiter cooperii*	DS
Golden eagle	*Aquila chrysaetos*	LT,OF,JX
Great gray owl[SS]	*Strix nebulosa*	OF,TC,SH,JX
Merlin[SS]	*Falco columbaris*	O
Northern goshawk[SS]	*Accipiter gentilis*	OF
Northern pygmy-owl	*Glaucidium gnoma*	TC,DT,OF
Northern saw-whet owl[SS]	*Aegolius acadicus*	TC,OF
Osprey[N]	*Pandion haliaetus*	DT,OR,JX
Red-tailed hawk[N]	*Buteo jamaicensis*	LT,OF,JX
Sharp-shinned hawk[N]	*Accipiter striatus*	DS
Northern spotted owl[SS]	*Strix occidentalis caurina*	TC,OF
Western screech owl	*Otus kennicottii*	TC,DT,HD,OR
Upland Game Birds:		
Band-tailed pigeon	*Columbia fasciata*	HD,SH,OF,JX
Blue grouse	*Dendragopus obscurus*	O
California quail	*Callipepla californica*	O
Mountain quail[SS]	*Oreortyx pictus*	HD
Mourning dove	*Zenaida macroura*	HD
Ruffed grouse	*Bonasa umbellus*	HD,RA,DD,OR
Wild turkey	*Meleagris gallopavo*	HD,OF
Woodpeckers:		
Acorn woodpecker	*Melanerpes formicivorus*	TC,DD,SH
Downy woodpecker	*Picoides pubescens*	TC,DD
Hairy woodpecker	*Picoides villosus*	DT,HD,OF
Lewis' woodpecker[SS]	*Melanerpes lewis*	DT,HD
Northern flicker	*Colaptes auratus*	DT,HD,OF
Pileated woodpecker[SS]	*Dryocopus pileatus*	DT,DD,OF
Red-breasted sapsucker	*Sphyrapicus ruber*	DT,HD,OR
Passerines and Swifts:		
Brown creeper	*Certhia americana*	TC,DT,OF
Chestnut-backed chickadee	*Parus rufescens*	TC,DT,OF
Common raven	*Corvus corax*	HD,OF
Evening grosbeak	*Coccothraustes vespertinus*	HD,OF

Table 3-54 - Wildlife species in the planning area likely to be impacted under one or more of the planning alternatives.[1]

Common Name	Scientific Name	Vulnerable Habitats & Limiting Factors [2]
Golden-crowned kinglet	*Regulus satrapa*	HD,RA,OF
Gray jay	*Perisoreus canadensis*	OF
Hammond's flycatcher	*Empidonax hammondii*	HD,OF
Hermit thrush[N]	*Catharus guttatus*	OF
Hermit warbler	*Dendroica occidentalis*	OF
Loggerhead shrike[SSN]	*Lanius ludovicianus*	O
Olive-sided flycatcher[N]	*Contopus borealis*	HD,OF
Pine siskin	*Carduelis pinus*	OF
Purple finch	*Carpodacus purpureus*	HD,OF
Purple martin[SSN]	*Progne subis*	TC,DT
Red-breasted nuthatch	*Sitta canadensis*	DD,TC
Pygmy nuthatch	*Sitta pygmaea*	TC
Ruby-crowned kinglet	*Regulus calendula*	OF
Solitary vireo[N]	*Vireo solitarius*	HD,OF
Steller's jay	*Cyanocitta stelleri*	OF
Swainson's thrush[N]	*Catharus ustulatus*	RA,OF
Townsend's warbler[N]	*Dendroica townsendi*	OF
Tree swallow[N]	*Tachycineta bicolor*	TC,DT
Varied thrush	*Ixoreus naevius*	OF
Vaux's swift[N]	*Chaetura vauxi*	TC,DT,OF
Violet green swallow[N]	*Tachycineta thalassina*	TC,DT
Western bluebird[SS]	*Sialia mexicana*	TC,DT
Western flycatcher[N]	*Empidonax difficilis*	RA,OF
Western tanager[N]	*Piranga ludoviciana*	HD,OF
Western wood-pewee[N]	*Contopus sordidulus*	HD,OF
White-breasted nuthatch	*Sitta carolinensis*	DD,TC
Winter wren	*Troglodytes troglodytes*	DD,OF,OR
Bats:		**(SA)**
Big brown bat	*Eptesicus fuscus*	TC,DT,DD,HD,SH,OF
California myotis	*Myotis californicus*	TC,DT,DD,HD,SH,OF
Fringed myotis[SS]	*Myotis thysanoides*	SH
Hoary bat	*Lasiurus cinereus*	HD,OF
Little brown myotis	*Myotis lucifugus*	TC,DT,SH,SH,OF
Long-eared myotis	*Myotis evotis*	TC,DT,HD,OF
Long-legged myotis	*Myotis volans*	TC,DT,DD,HD,SH,OF
Pacific pallid bat[SS]	*Antrozous pallidus*	SH,SE,TC
Pacific western big-eared bat[SS]	*Plecotus townsendii townsendii*	SH,SE
Silver-haired bat	*Lasionycteris noctivagans*	TC,DT,HD,SH,OF
Yuma myotis	*Myotis yumanensis*	TC,DT,DD,HD,SH,OF
Carnivores:		
American marten[SS]	*Martes americana*	TC,DD,OF
Black bear	*Ursus americanus*	DD,SH,SE,OF
Bobcat	*Lynx rufus*	DD,SH
Ermine	*Mustela erminea*	DD,O
Gray fox	*Urocyron cinereoargenteus*	DD,HD,RA
Long tailed weasel	*Mustela frenata*	DD,O
Mink	*Mustela vison*	O
Mountain lion	*Felis concolor*	SH,OF
Pacific fisher[SS]	*Martes pennanti pacifica*	TC,DD,SH,OF
Raccoon	*Procyon lotor*	TC,DD,HD,RA
River otter	*Lutra canadensis*	WQ,DD
Cervids:		
Black-tailed deer	*Odocoileus hemionus*	HD,JX
Columbian white-tailed deer[SS]	*Odocoileus virginianus leucurus*	O
Elk	*Cervus elaphus*	HD,OF,SE,JX
Insectivores:		
Dusky shrew	*Sorex montocolus*	SM,RA,OF
Pacific shrew	*Sorex pacificus*	SM,RA,OR
Pacific water shrew	*Sorex bendirii*	SM,HW,OR
Shrew-mole	*Neurotrichus gibbsii*	SM,RA,OF
Trowbridge's shrew	*Sorex trowbridgi*	SM,RA,OR
Rodents:		
Beaver	*Castor canadensis*	DD
Bushy-tailed woodrat	*Neotoma cinera*	TC,DD,RA,SH,OF
Deer mouse	*Peromyscus maniculatus*	SM,DD,HD,SH,OF
Douglas squirrel	*Tamiasciurus douglasi*	TC,DT
Dusky-footed woodrat	*Neotoma fuscipes*	OR,DD
Northern flying squirrel	*Glaucomys sabrinus*	TC,DT,OF
Red tree vole	*Phenacomys longicaudus*[5]	OF,SM (SA)
Townsend's chipmunk	*Tamias townsendii*	DD,SH,HD
Western gray squirrel	*Sciurus carolinensis*	TC,DT,HD
Western red-backed vole	*Clethrionomys californicus*	SM,DD,OF
White-footed vole[SS]	*Phenacomys albipes*[5]	SM

[1] Includes all Special Status Species known, or believed, to occur within, or adjacent to, the Planning Area - with the exception of extirpated species not planned for recovery within the planning area by USFWS. Also includes other species associated with habitats that are vulnerable to intensive timber management practices, game species and other high-interest species such as raptors and herons.

[2] Information derived from Brown, 1985, Appendices 8, 19, & 20, with limited modifications based on more recent literature and local observations. Symbols identify primary habitats vulnerable to intensive timber management and species-related limiting factors identified by District biologists:

Table 3-54 - Wildlife species in the planning area likely to be impacted under one or more of the planning alternatives.[1] (continued)

[3] These species are called torrent salamanders by some researchers. They are two of 4 species that were formerly considered one species: the Olympic salamander, *R. Olympicus.*
[4] This species was erroneously called *wrightii,* but has been corrected to *wrightorum* (Intl. code of Zool. Nomenclature, Article 32, 1985)
[5] Genus sometimes listed as *Arborimus*

LEGEND - Common Name

[SS] BLM Special Status Species, based on Oregon State Office policy issued Nov. 11, 1990. Species accounts and effects are presented in sections on Special Status Species (Wildlife).
[N] Neotropical Migrants (at least some individuals winter in the tropics - Love, 1990.)

LEGEND - Vulnerable Habitats & Limiting Factors:

CM = Cool, moist microclimate is an essential life requirement.
DD = Large dead and down (fallen) trees essential/primary habitat for one or more life needs.
DS = Densely stocked stands of mid and late seral conifers required for reproduction.
DT = Dead tree (snag) primary habitat for foraging, or reproduction.
HW = Headwater streams, (generally 3rd order and smaller) and their riparian zones, are primary habitat for one, or more, life needs.
HD = Hardwoods, or conifer-hardwood stands, primary habitat for one or more life needs.
JX = Juxtaposition of two, or more, habitats required as primary habitat for all life needs.
LT = Large (green) tree/limbs required for nest substrate.
OF = Mature or old growth forests are primary habitat for one, or more, life needs. Natural (unmanaged) stands of the late seral stage may be suitable for some species. Stands younger than late seral are generally unsuitable for one, or more, life needs.
OR = Same as OF except species use is strongly oriented toward riparian (or other wetland).
RA = Red alder forest (pole-size and older) primary habitat for one, or more, life needs.
SH = Special (unique) habitats essential for one, or more, life needs.
SM = Small creatures with small home ranges and low mobility.
SE = Secretive species - highly sensitive to human intrusion - at least during critical periods of life cycle, or in crucial portions of home range.
TC = Cavity in tree (live or dead) required for reproduction.
WQ = High water quality (cold and clear) essential life requirement.
O = Vulnerable habitats or limiting factors (if any) are other than above.
U = Vulnerable habitats & limiting factors currently undetermined.
(SA) = SEIS/ROD Special Attention Species or (SA) Groups of Species

20 inches dbh by 50 feet tall on about 20 percent of the BLM land base following timber harvest. Limited monitoring shows that mostly green trees are being left. This level of management was estimated to provide for approximately 17 percent of maximum woodpecker populations (on BLM lands) in 1983 (USDI, 1983). Throughout the period of active timber management, concerns about safety, wildfire, the economics of site preparation, and lost timber volume have essentially prevented effective retention of snags and residual green trees within timber harvest areas. District timber inventory data show that BLM timber harvest areas 0 to 15 years in age (i.e., early seral) have an average of 0.59 snags per acre greater than 11 inches dbh, and the 16 to 45 year age class (mid seral) have 1.08 snags per acre. In contrast, mature and old growth stands have 10.13 and 6.12 snags per acre, respectively. Snag retention practices on BLM administered lands are likely inadequate to maintain viable populations of cavity users over the long-term (USDI, 1983; ODFW, 1990).

Another relevant comparison is with conditions that occur following natural disturbance, especially fire, insect outbreak, or disease, where large numbers of standing green trees are converted to snags, providing for an abundance of this habitat component in early and mid seral stage forests under natural conditions. These conditions are virtually nonexistent in managed forests.

The recently revised Oregon Forest Practices Act requires a minimum of 2 snags or green trees at least 11 inches dbh and 30 feet tall be left on all State and private lands following timber harvest. However, 11 inch dbh snags are below recommended minimums for the majority of cavity-using species that occur within this area (Brown, 1985: Appendix 9). Therefore, potential populations for the BLM operating area (including private and State ownerships) is believed to be well below viability for cavity-using species.

The dearth of snags left in timber harvest areas may have established a trend where some species capable of using early and mid seral stages, given the presence of snags, are becoming obligates of the remaining mature and old growth stands (with sufficient numbers of usable snags) for one or more life needs (e.g. northern flicker, raccoon). However, some species such as purple martins and western bluebirds are not adapted to the interior of older forests (including small islands), and require snags within the early or mid seral stages.

Dead and Down Woody Debris Retention and Recruitment

As discussed in the Biological Diversity section, large volumes of dead and down woody material play several important ecological roles for wildlife in the forest ecosystem, and concerns have recently been expressed about the ecological effects of removing excessive amounts from the forest floor. Loss of wildlife habitat is one of these concerns since many species use dead and down woody material for one or more life needs (Maser and Trappe, 1984; Bartels et al., 1985; Brown et al., 1985: Appendices 8 & 20; Maser et al., 1988; Corn and Bury, 1991a & b). Habitat loss occurs when highly decayed material is destroyed by the physical effects of timber falling, yarding, and slash burning. Material that is less decayed has often been removed for the purpose of disturbing the forest floor as a method of assisting in reforestation and reduction of fire hazard. Also, timber sale purchasers often drag logs to the landing in order to determine their market value. BLM timber inventory data show that early seral stage habitats have approximately 10.4 tons of woody debris at least 30 inches in diameter, while old growth has 27.22 tons of the same size material. It is expected that through decay of post harvest slash, and lack of recruitment from replacement stands, future forests in mid or late seral stage will be devoid of large woody debris.

Wildlife associated with large woody debris includes several species of small mammals, such as western red-backed vole and bushy-tailed woodrat. Small woody debris may provide marginal value to these small animals, but the larger material is the most important for them as well as many species of invertebrates that form the bottom of the food chain (Maser and Trappe, 1984; Maser et al., 1988). Large, heavily decayed material that retains moisture through the annual dry period is important for animals such as the clouded salamander and Oregon slender salamander (see Special Status Species section). The progressive loss of large fallen trees (dead and down material) may be impacting habitat for large carnivores such as black bear (Noble et al., 1990) and mountain lion (Brown, 1985: Appendix 20) that use hollow logs and windfalls for den sites. Of the forest related species that occur on the planning area, dead and down woody debris is primary habitat for over 60 species (approximately 30 percent) (Brown, 1985: Appendix 20). Of the priority wildlife species, dead and down woody material is primary habitat for approximately 20 percent.

Nonconifer Tree/shrub Species

The presence of hardwood stands, and conifer stands with abundant hardwood trees, adds diversity to wildlife habitat (Huff and Raley, 1991). Species such as dogwood, madrone, chinquapin, cherry, oaks, alder, and bigleaf maple are a rich source of a variety of nuts, berries, seeds, and invertebrates. Because hardwoods frequently flourish in newly disturbed areas, such as timber harvest areas, and because of their lower economic value in comparison to conifers, they have been discriminated against in silvicultural practices (Huff and Raley, 1991; Spies, 1991). For example, herbicides were used extensively for controlling competing vegetation such as various species of brush and hardwoods prior to 1984 and alternative methods since that time (USDI, 1991b). Of the forest-related wildlife species that occur within the planning area, hardwood, conifer-hardwood, or red alder forests are primary habitat for over 140 species (approximately 65 percent). All three of these vegetative types are primary habitat for 51 species. Of the priority species in Table 3-54, hardwoods are considered the primary habitat for 34 species. Hardwoods are primary habitat for all of the District's upland game species.

Seral Stage Distribution on the Landscape

In the absence of major disturbance, seral stages are continually changing and progressing toward the climax stage (see Biodiversity section of Chapter 3). Plant communities in western Oregon normally progress toward a climax seral stage dominated by western hemlock forest. Under natural conditions, forests of the Pacific Northwest seldom reached the climax stage due to the extremely long time period normally occupied by the old growth stage. Therefore, given enough time, every acre of forest habitat may be expected to be returned to the early seral stage as a result of a stand replacement disturbance such as wildfire. Human-related disturbances, such as logging, and conversion of forest land to other uses have seriously reduced the amount of remaining older seral stage habitat and fragmented it into very small islands (see Biodiversity section).

Big game and some other wildlife species use both old and young seral stages to meet all life needs. For these species, the quality of habitat in a given area is strongly influenced by the degree to which these seral stages are interspersed. Large clear cuts, or small clear cuts harvested in close proximity over a few years, result in the subsequent early seral stage habitats being unfavorably interspersed within the remaining cover for optimum elk use. Over time, extreme situations (i.e., advanced stages of forest fragmentation) result in the loss of cover within or near large forage producing areas. These situations of unbalanced cover/forage ratios expose the animals to poaching and other forms of human disturbance associated with any roads in the area that are open to public travel (Witmer et al., 1985; Wisdom and Bright, 1986). These situations have occurred throughout the BLM operating area.

Additional discussion of seral stage distributions and Late-Successional forest fragmentation is presented in the Biodiversity section.

Human Disturbance and Increased Road Density

Timber harvest activities including road construction and yarding, and other activities such as quarry development, Off Highway Vehicle (OHV) use, power line rights-of-way, and communications site developments have removed cover and created disturbances in many habitats making them unsuitable for use by some species of wildlife, or by reducing their habitat values. Most of the major cliff sites in the District have been opened to human use due to the presence of roads.
Although elk habitat potential is believed to be declining (due to intensive road construction and the ongoing reduction of the mature and old growth forest), elk populations are believed to be increasing. This is thought to be the result of Oregon Department of Fish and Wildlife reintroductions and normal animal response to population vacuums caused by near extirpation of the species from western Oregon in the late 1800s to the early 1900s (Graf, 1943). Although early seral stage habitat created by timber harvest is (or was) potentially valuable as a forage-producing area for big game animals, thousands of acres created annually are actually below potential due to the high road density and increased distances to suitable cover.

In the Coast Range Resource Area, for example, roads open to public travel in the drainages within the Coast Range average between 3.02 and 4.45 miles per square mile of BLM land. This has opened large areas to human entry and exposed important big game use areas to human-caused disturbances. Reduction of elk habitat potential caused by high road densities has been well documented (Witmer et al., 1985; Wisdom and Bright, 1986).

BLM has closed very few roads due to general concerns about the need for road access to fight fires, carry out silvicultural treatments on previously logged lands, maintain the public's "right" to drive existing roads, and to meet the legal requirements of road right-of-way agreements. Compared to habitat conditions favorable for desirable elk harvest levels, elk habitat within the BLM operating area is believed to be well below potential (USDI, 1983).

High road densities also present problems for other species. Noble et al. (1990) recommended road closures for black bears. The District has documented several instances of great blue herons abandoning their nests when timber sales and associated roads were located close to the rookeries (Eugene District AMS). High densities of roads open to public travel also subject big game to poaching. For additional reference, see discussions of peregrine falcon and bald eagle in the Special Status Species section.

Truncation of Stocking Densities

Densely stocked stands of conifers between the ages of 25 and 80 years of age have been identified as being suitable nesting sites for sharp-shinned and Cooper's hawks given favorable topographic and other conditions (Reynolds et al., 1982; Reynolds, 1983). Until recently, precommercial thinnings were planned and conducted without concern about habitat protection for these species. The District is currently analyzing forest data for the purpose of identifying potential nesting habitat for these species. Other species, including Neotropical migrants, occur in dense unthinned stands that would be adversely impacted by thinning of all forest stands (Hagar and McComb, unpublished).

Lack of Large Trees and Forest Fragmentation

Currently, old growth represents less than 14 percent of the forest land base on BLM administered lands. Considering that the intermingled private forest lands are essentially devoid of old growth, dependent wildlife species are confined to less than 7 percent of the total acres within the BLM operating area. Unmanaged late seral stage habitat is in short supply on the BLM administered land base in the planning area and, at the rate of harvest established by the current land use plan, it will not be available to replace the mature and old growth scheduled for harvest (see Biodiversity section).

As a result of this conversion, wildlife species requiring older seral stage forests have been replaced by those species adapted to younger ones dominated by shrubs and saplings. For example, clear cutting mature and old growth coniferous forests has reduced the amount of optimum habitat for species such as the northern spotted owl, red tree vole, and northern flying squirrel while increasing the amount of optimum habitat for species such as the creeping vole and Beechey's ground squirrel.

Research and monitoring efforts to date indicate that the conversion of highly complex natural forests to less complex managed forests represents the most serious problem for wildlife in the planning area. Although studies are incomplete, several species appear to be potentially dependent on old growth, and many others require forests older than current rotations for one or more life needs (Jones and Stokes, 1980; Bruce et al., 1985; Brown, 1985: Appendix 8; Carey et al., 1991; Gilbert and Allwine, 199la & b; Corn and Bury, 1991 a & b; Lehmkuhl and Ruggiero, 1991). These include species that are full time inhabitants of larger tracts of older forest (i.e., interior forest species) and others that also use younger seral stages for some life needs. Many of the latter are "edge" species, since the edge between different seral stages provides all life needs within a relatively short distance (Logan et al., 1985; Brown, 1985: Appendix 8). The northern spotted owl, pine marten, red tree vole, and northern flying squirrel are examples of species that find all of their life needs within large tracts of Late-Successional stage forests; the red-tailed hawk, golden eagle, and Roosevelt elk are examples of species that may be considered as "edge" species since they use early as well as late successional stages to meet all life needs.

Water Quality, Riparian Habitat Quality and Microclimate Conditions

The presence of streams and small wetlands and their associated riparian zones greatly enhances the diversity of forest landscapes (Oakley et al., 1985). McComb and Hagar (undated) identified 20 species of vertebrates that "seem to be sensitive to timber harvest in or adjacent to riparian areas in Oregon"; 9 of these species are "associated with small headwater streams." These habitats are also heavily used by many species of wildlife that range throughout upland habitats but come to the aquatic/

riparian ecosystems for special needs such as drinking and temperature regulation (McComb and Hagar, undated). Analysis of the data presented by Brown et al. (1985: Appendix 8), indicates that the full range of riparian/wetland conditions are primary habitat for at least 150 of the species of wildlife that occur within the BLM operating area, and that about 60 of these same species use stream-side riparian as primary habitat. As shown in Table 3-54, older seral stage forests are primary habitat for at least 13 of these priority species.

Recent field investigations and habitat inventory have identified concerns about the suitability of forest habitats for several species of reptiles and amphibians. Several streams in the District appear to have very low populations of tailed frogs and red-legged frogs, and most others appear to have lost these populations entirely (Applegarth, 1994). These species (see Special Status Species section) and the southern torrent, Cascade torrent, and Pacific giant salamanders are closely linked to small, headwater streams with high water quality (cold and clear) and cool, moist riparian zones for one or all of their life needs (Applegarth, 1994; McComb, 1992). In contrast, streams with low or nonexisting populations of tailed or red-legged frogs are characterized by stream siltation and the absence of forest cover over the streams and their riparian zones (Applegarth, 1994). This situation is of concern since recent GIS analysis has indicated that less than 10 percent of all 1st and 2nd order drainages on BLM administered lands are in forest habitat 80 years old or older, and minimally disturbed by upstream activities such as timber harvest or road construction (Bosch, 1992). From a landscape perspective, an even smaller proportion of the entire BLM planning area is undisturbed due to the generally larger proportion of other ownerships. The District GIS analysis also shows that low elevation landscapes are in relatively worse condition, and the preponderance of the remaining minimally disturbed low elevation areas are in three tributaries of the McKenzie River (i.e., Bear, Martin, and Rough Creeks) (Bosch, 1992). Since most streams on BLM administered lands cross lands of other ownerships upstream from BLM habitats and are, therefore, out of BLM control relative to stream sedimentation and temperature, the high concentration of BLM lands within Bear, Martin, and Rough Creeks represent outstanding opportunities to manage for high quality stream and riparian habitat conditions. Over 7,000 acres of BLM lands within these three drainages have been proposed for management as Areas of Critical Environmental Concern (ACEC). (See also Special Areas section.)

Special Habitats

Unique or special habitats such as ponds (ephemeral as well as perennial), bogs, oak woodlands, cliffs, rock outcrops, grassy balds, and talus provide elements of diversity within the forest ecosystem (Scharpf and Dobler, 1985; Oakley et al., 1985). These habitats are widely scattered over the planning area, are of infrequent occurrence, and represent a small proportion of the total land base. They provide essential habitat for some species and add to the diversity of available habitats for others. These areas are important in maintaining biodiversity within the District and are refugia for several species of plant and wildlife species found inhabiting these specialized habitats. For example, the cliff swallow relies upon cliff habitat for reproduction, while deer and elk use grassy balds for forage and resting in the early spring along with other types of habitat. Of the over 200 forest-related species, at least 39 are closely associated with unique habitats (see Table 3-54). Several potential special status plant species also occur within these areas.

Special habitats are defined by BLM Manual 6602 as specific components of a habitat site requiring individual consideration, including geological anomalies, aquatic situations, or manmade structures. Wildlife (and plant) populations are frequently limited by these relatively small inconsistencies or diversities in the overall habitat. Although general forest types have been described for the Operations Inventory to meet timber management needs, plant associations for the Eugene District have not been described nor have Districtwide surveys been conducted for unique areas in terms of wildlife and plants. Vegetative types that provide variety in the landscape on the Eugene District such as pine stands, oak and oak woodlands, ash swale pockets and other diverse patches can also qualify as special habitats, based on the plant or animal species and communities that occur there (see Special Areas). The following have been identified on the District as special habitats, but not all locations have been mapped.

Sand Dunes (SD) - Areas found along the Oregon Coast that are dominated by open, unstabilized dune formations.

Ponds/Lakes/Vernal Pools/Slump Ponds - Habitats with standing water and its associated edge of water tolerant vegetation. These may be permanent or seasonal. Areas such as in the West Eugene Wetlands that have seasonally hydric pooling of water should be considered here.

- Ponds (PO) — Pools less than five acres.
- Lakes (LA) — Pools greater than or equal to five acres.
- Slump Ponds (SLP) — pools that form at the top of a rotational slump.
- Vernal Pools (VP) — seasonal pools which dry up in the summer.

Bogs (BO) - Permanently wet area dominated by sphagnum and other acid-tolerant plants (None currently identified on the District)

Coastal Deflation Plains (CDP) - Areas dominated with shore pine/slough sedge vernal pool on iron-cemented hardpan communities.

Swamps - A swamp is a permanently wet area, often shaded by the canopy. Several types of "swamps" occur on the Eugene District.

- Seeps/springs (SE) — an area where the water table is at the soil surface and associated vegetation.

- Skunk cabbage (SK) — usually small in area and covered by the canopy, these areas are dominated by a skunk cabbage.

- Swamp (SW) — these habitats are larger in area, open and often associated with western red cedar. Plants that inhabit the area may include a variety of species including vine maple, alder, skunk cabbage, devil's club, water hemlock, etc.

Mesic (wet) Meadows/Prairie (WM) - Meadow types that are dominated by such species as false hellebore, common parsnip, and coneflower. Water table is at or near the surface. Other mesic meadows can include facultative (seasonal) wetlands such as the West Eugene Wetlands.

Dry Meadows/Prairie (DM) - Several plant associations probably occur on the Eugene District for dry meadow types. Most habitats are south to southwest facing slopes where water is available only early in the season. Other areas such as Dorena Prairie are dry prairie remnants found on flat ground.

Moist Rock Gardens (MRG) - Rock outcrops that include some soil development. These outcrops/ gardens are generally moist through mid-summer and then become increasingly dry as the summer progresses.

Dry Rock Gardens (DRG) - Dry rock gardens are characterized by shallow soil development. Most are found on southerly facing slopes. These may be moist in the early spring, but dry out quickly.

Rock Outcrops (RO) - Rock outcrops are of two types: monolith/cliffs, which emerge from the surrounding canopy, and rock piles that do not (piles not accumulated/deposited as a result of "gravity"). Both are dry with little soil development.

Talus Habitats (TH) - Rock fragments of any size or shape derived from and lying at the base of a cliff or steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling or sliding; often with moss/lichen dominated communities.

Caves (CV) - Caves are true caverns with historic, current or potential wildlife habitat, and accompanying environmental characteristics. A cave is at least **twice** as deep as the diameter of the opening (see Rock Overhangs below).

Rock Overhangs (ROH) - Rock Overhangs provide shelter, but they are not deep enough to be classified as caves. An overhang is less than twice as deep as equal to the diameter of the opening.

Mines (MN) - Abandoned mine shafts qualify as special habitat when they provide potential habitat for cave-dwelling species.

Man-made Structures (STR) - Bridges, abandoned buildings, etc. may qualify as special habitat if they are being used as habitat.

Mineral Deposits/Wallows (MD/WA) - This habitat includes elk salt licks and pigeon springs.

Raptor Management

Many species of raptors that inhabit forested areas within the planning area are associated with older forest habitats. Only the goshawk and spotted owl require relatively large tracts of older forest. The others use a variety of vegetation types and forest seral stages, including old growth. That is, they require either large green trees with large limbs for support of large nests, or they are cavity nesters dependent upon decadent green trees, or snags, with cavities (Olendorf et al., 1989). As authorized by the Raptor Research Report No. 8 (BLM, 1989), 5 large areas, encompassing over 50,000 acres of BLM land within the Eugene District are currently under management as Key Raptor Areas (i.e., areas where management of raptor habitat is emphasized), (ibid).

Maps identifying the Coburg Hills, Fall Creek Reservoir, Dorena Reservoir, Cottage Grove Reservoir, and Triangle Lake Key Raptor Areas are in the District files.

Fisheries

Streams, rivers and other water bodies in the planning area provide habitat for over 30 native and introduced freshwater fish species (See Table 3-8). Some species live only in freshwater, while others live for part or most of their life cycle in the ocean, returning to freshwater to reproduce. Economically, the salmonids, including salmon, trout and steelhead, are the most important. The descriptions and analysis in the RMP are focused on these salmonids. In addition, many aquatic invertebrates utilize the waters in the planning area, but very little is known of their distribution or habitat use at this time.

Two species of fish, coho salmon and coastal steelhead trout, are currently in status review for possible listing as threatened and endangered species. A third species, the Oregon chub, has been listed as an endangered species. While the chub is found within the boundaries of the District, no populations are known in habitat managed by the District. These three species are discussed in the Special Status Species section of Chapter 3.

There are 533 miles of 3rd order and larger streams in the planning area. Resident trout are found in 275 miles, and 187 miles are used by anadromous salmonids (see Map 3-5 and Table 3-9). Potential anadromous salmonid habitat (67 miles) are blocked by barriers, primarily Dorena and Cottage Grove dams. Many of these streams have resident trout populations. For 66 miles of stream, no recent information is available on possible salmonid populations. Sculpins are found in streams with salmonid populations. Other native and nonnative fishes are found mainly in the larger streams and rivers.

Four stocks of anadromous salmonids in the District were included in the list of stocks of concern by the American Fisheries Society (Nehlsen et al., 1991) — Willamette spring chinook, Siuslaw coho, Siuslaw winter steelhead, and coastal sea-run cutthroat trout. In addition, the District has identified two other stocks of concern — summer run Siuslaw chinook and steelhead. The District has conducted spawning ground counts on all these runs, except sea-run cutthroat, and has identified major use areas on public lands. Management activities under the current guidelines have not impacted the habitat of these stocks, and has contributed to an upwards trend in the habitat. In addition, efforts have been made to identify resident populations needing special management. The District has cooperated fully with Oregon Department of Fish and Wildlife efforts to protect these and other stocks of wild fish.

An analysis of the productive potential of perennial streams in the District reveals that 19 percent are in poor condition, 51 percent in fair condition, and 30

Table 3-9 - Salmon and Trout Conditions and Potential Populations on Public Lands (in Miles)

Priority Species	Stream Miles	Condition of Habitat			Trend[3]	Current Wild Population	
		Poor	Fair	Good		Level[4]	Trend[5]
Coho	133.90	18.05	66.10	49.75	+	L	-
Chinook	59.20	8.22	28.40	22.50	+	M	0
Steelhead	187.44	26.47	96.17	64.80	+	L	-
Cutthroat	274.64	44.83	139.99	89.84	0	M	0
Rainbow	90.21	13.48	52.18	24.55	+	M	0
Unknown[1]	66.04	10.11	35.40	20.53			
Potential[2]	67.26	12.27	31.32	23.67			

[1] Streams whose gradient and size suggest fish may be present but for which no information on possible fish communities is available.
[2] Streams with potential for anadromous fish now blocked; these streams may have resident trout populations.
[3] Trend: + = Increasing, - = decreasing, 0 = stable
[4] Current Levels: H = High, M = Medium, L = Low. Ratings are for populations in relation to 10-year average population levels.
[5] Trend: + = Increasing, - = decreasing, 0 = stable

Table 3-8 - Fish Species in Eugene Planning Area Streams

Salmonids	
Coho salmon	*Oncorhynchus kisutch*
Kokanee (Sockeye salmon)	*Oncorhynchus nerka*
Chinook salmon	*Oncorhynchus tshawytscha*
Mountain whitefish	*Prosopium williamsoni*
Cutthroat trout	*Oncorhynchus clarki*
Steelhead trout	*Oncorhynchus mykiss*
Rainbow trout	*Oncorhynchus mykiss*
Bull trout	*Salvelinus confluentus*
Non-Salmonids	
River lamprey	*Lampetra ayresi*
Western brook lamprey	*Lampetra richardsoni*
Pacific lamprey	*Lampetra tridentata*
White sturgeon	*Acipenser transmontanus*
Chiselmouth	*Acrocheilus alutaceus*
Common carp	*Cyprinus carpio*
Peamouth	*Mylocheilus caurinus*
Oregon chub	*Oregonichthys crameri*
Squawfish	*Ptychocheilus oregonensis*
Longnose dace	*Rhinichthys cataractae*
Leopard dace	*Rhinichthys falcatus*
Speckled dace	*Rhinichthys osculus*
Redside shiner	*Richardsonius balteatus*
Tench	*Tinca tinca*
Largescale sucker	*Catostomus macrocheilus*
Mountain sucker	*Catostomus platyrhynchus*
Sand roller	*Percopsis transmontana*
Yellow bullhead	*Ictalurus natalis*
Brown bullhead	*Ictalurus nebulosus*
Black bullhead	*Ictalurus melas*
Channel catfish	*Ictalurus punctatus*
Mosquitofish	*Gambusia affinis*
Threespine stickleback	*Gasterosteus aculeatus*
Redear sunfish	*Lepomis microlophus*
Bluegill	*Lepomis macrochirus*
Pumpkinseed	*Lepomis gibbosus*
Warmouth	*Lepomis gulosus*
Largemouth bass	*Micropterus salmoides*
Smallmouth bass	*Micropterus dolomieui*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Yellow perch	*Perca flavescens*
Walleye	*Stizostedion vitreum*
Sculpins	*Cottus sp.*

percent in good condition (see Appendix Q). The majority of habitat for all salmonid species is in poor or fair condition. The condition of aquatic habitat for other native vertebrate and invertebrate species is not known, but is probably similar to that of salmonids. The overall trend in condition is upward, although recovery is initially expected to be very slow.

The productive potential for fish is determined by the condition of the riparian area and Basin hydrology. Alterations of aquatic habitats began with the arrival of nonnative settlers in the mid-1800s. Historic changes in riparian areas, including the removal of conifers in riparian and upslope areas, considerably reduced the amount of large woody material in the stream. This led to increased erosion, reduced water quality, loss of channel complexity and stability, and a reduction in habitat diversity, resulting in a decline in the potential productivity. Improved riparian and stream channel protection on BLM administered lands over the last 10 years has allowed recovery of riparian communities and stream channels to begin. Full recovery depends on the growth of large trees to provide instream structure, which is not expected for 200 years. As riparian and stream channels continue to improve, the productive potential of fish habitat will also improve. The District has implemented a program of instream habitat restoration (Table 2-2). These projects are expected to provide short-term habitat improvement until natural recovery occurs.

Special Status and SEIS Special Attention Species Habitat

Introduction

Species limited in abundance and distribution, which have identifiable threats to their existence, and for which specific Bureau policies for their conservation exist, are considered to be Special Status Species. The categories of Special Status Species are:

- Federal Threatened and Endangered
- Federal Proposed Threatened and Endangered
- Federal Candidate (Category 1 and 2)
- Oregon State Threatened and Endangered
- Bureau Sensitive
- Bureau Assessment

Several species are listed as threatened or endangered (or species proposed for listing) on both the State of Oregon list and the Federal list; these species require management under the more restrictive Federal listing. In addition, a species may be listed as threatened or endangered under the State of Oregon list and also occur as a Federal Candidate species; these species are managed under the more restrictive Federal Candidate status. Finally, some species may be listed as threatened or endangered under the State of Oregon and also be Bureau Sensitive; these species are managed under both criteria.

This section provides District-specific information about Federal Threatened, Endangered, and Proposed species associated with Late-Successional forests that is supplemental to that provided in the SEIS/ROD. In addition, this section provides a description of the affected environment for other Special Status Species, including Federal Candidate, Oregon State listed species, Bureau Sensitive, and Bureau Assessment species, as mandated in the SEIS, pages 3&4-205, and by BLM policy, plus those species not associated with Late-Successional forests for which District management actions could have a significant effect. The Federally listed and proposed species included in this discussion follow the list identified in the SEIS/ROD that occur on the Eugene District. In addition, some species that are not included in the SEIS/ROD, due to their nonoccurrence on forested habitats, are added to this discussion (e.g. Fender's blue butterfly).

Legal mandates for management and protection of these listed and proposed species are stated in the SEIS, pages 3&4-205.

Plants

Plant species that are limited in abundance and distribution, and that have identifiable threats to their existence, are managed by the Bureau as Special Status plants.

Special Status plant lists are amended as inventory and monitoring data provide new information. Over 45,000 acres of the Eugene District have been surveyed for Special Status plants since 1980. Currently, Special Status plant species have been documented at 63 locations, and approximately 1,044 acres are reserved for the protection and management of these species. In some cases multiple resource values are protected within the botanical reserve areas.

Special Status plant species occur in a variety of habitat types and plant associations within the Eugene District, including mid-elevation meadows, mid to low elevation coniferous forests, Willamette Valley native prairie grasslands, rock outcrops, riparian areas, seeps, ponds, coastal dunes, and wetlands. Although the general forest ecosystem is important for maintaining several Special Status plant species found within the Eugene District, the protection and management of Special Habitats is critical toward maintaining ecological diversity for Special Status plant species and other botanical resources.

Special Status plant surveys occur prior to ground-disturbing activities, including timber sales, land exchanges, silvicultural projects, wildlife projects, quarry projects, proposed mining operations, etc. Where Special Status plant species occur in project areas, Special Status plant sites are given protection either by dropping the proposed ground-disturbing action or by mitigating negative impacts such as in the establishment of a botanical reserve. Most existing Eugene District reciprocal right-of-way agreements with intermingled private landowners, however, do not contain provisions that allow BLM to prevent the construction of roads across public lands included in the agreements in order to protect Special Status plant species located within a proposed project area. In this situation, the private permittees are still subject to the provisions of the Endangered Species Act and must provide protection for those plant species that are listed as threatened or endangered as required by law. Where new agreements or plans are developed, language that addresses Special Status plant species would be incorporated into these contractual agreements. Currently, if Special Status plant species are found within a nondiscretionary right-of-way, Eugene District botanists propose mitigating measures for these species. Some private companies have cooperated fully in the modification of projects and the subsequent protection of the Special Status plant site. No Federal Threatened or Endangered plant species have been found in these project areas.

Inventory, research, and monitoring efforts have been implemented for Federal Endangered, Federal Candidate, and Bureau Sensitive plants. The Eugene District has worked closely with private, State, and Federal agencies in the protection and management of Special Status plant species. Coordination with the U.S. Fish and Wildlife Service has occurred on proposed action(s) involving Federal Endangered, Federal Candidate, and Bureau Sensitive plants.

Currently no oil, gas or mineral leases have impacted Special Status plant populations or habitat.

During the reevaluation of Special Status plant species, several non-BLM parcels were identified as having Special Status plant species that could be evaluated for possible acquisition or conservation easements, etc. Table 3-30 lists the Special Status plants that are known or suspected to occur in the planning area.

Following is a summary of those Special Status plant species known to occur within the Eugene District, including Federal Endangered, Federal Candidate, Bureau Sensitive, and Assessment plant species:

Bradshaw's lomatium (*Lomatium bradshawii* (Rose) Math. & Const.) Federal Endangered

Bradshaw's lomatium is presently listed by the U.S. Fish and Wildlife Service as an Endangered Species (1993 Federal Register Notice of Review). A recovery plan for this species was completed in August 1993 by the U.S. Fish & Wildlife Service. The State of Oregon has also listed this species as Endangered (1989, OAR 603-73-070(1)).

Lomatium is a perennial species and belongs to the *Apiaceae (Umbelliferae)* family. It is restricted to the central and southern Willamette Valley, Oregon. The species is found in seasonally wet native grassland communities or along shallow streams. Most of the extant populations for Lomatium are currently restricted to small populations within a 10-mile radius of Eugene, Oregon (1993 Recovery Plan). Habitat for the species has declined due to urban and rural development and conversion of habitat into agricultural land. Natural successional development of grasslands into shrub and tree-dominated sites may have also contributed to the loss of Lomatium habitat. Such grassland areas were historically kept in open condition by the regular burning of the Willamette Valley prairie by Native Americans for food and other purposes. Other threats to the species have also been identified such as alterations in hydrology, fungal parasites, inbreeding depression, and competition from native or introduced plant species.

The Eugene District manages two populations of Bradshaw's lomatium. The importance of one of these sites has been recognized by the District since

Table 3-30 - Special Status Plant Species - Known or Suspected[1]

Botanical Name	Common Name	Status
Lomatium bradshawii	Bradshaw's Lomatium	FE; SE
Sidalcea nelsoniana	Nelson's checkermallow	FT; ST
Howellia aquatilis	howellia	PT
Abronia umbellata spp. *breviflora*	pink sandverbena	FC; SE
Aster vialis	wayside aster	FC
Aster curtus	white-topped aster	FC
Castelleja levisecta	golden paintbrush	FC
Cimicifuga elata	tall bugbane	FC
Cypripedium fasciculatum	clustered lady's-slipper	FC
Delphinium pavonaceum	peacock larkspur	FC
Erigeron decumbens var. *decumbens*	Willamette daisy	FC; SE
Frasera umpquaensis	Umpqua swertia	FC
Horkelia congesta ssp. *congesta*	shaggy horkelia	FC
Lupinus sulphureus var. *kincaidii*	Kincaid's lupine	FC
Meconella oregana	white meconella	FC
Montia howellii	Howell's montia	FC
Chiloscyphus gemmiparus	liverwort	BS
Encalypta brevicolla var. *crumiana*	moss	BS
Delphinium oreganum	Willamette Valley larkspur	BS
Nephroma occultum	lichen	BS
Oxyporus nobilissimus	giant polypore fungus	BS
Romanzoffia "thompsonii"	Thompson's mistmaiden	BS
Sphaerocarpos hians	liverwort	BS
Tripterocladium leucocladulum	moss	BS
Andrea schofieldian	moss	AS
Astragalus umbraticus	woodland vetch	AS
Botrychium minganense	gray moonwort	AS
Botrychium montanum	mountain grape fern	AS
Bryoria bicolor	lichen	AS
Bryoria pseudocapillaris	lichen	AS
Bryoria subcana	lichen	AS
Cicendia quadrangularis	timwort	AS
Calypogeia sphagnicola	liverwort	AS
Campylopus schmidii	moss	AS
Carex livida	pale sedge	AS
Carex hystricina	porcupine sedge	AS
Erioderma sorediatum	lichen	AS
Eriophorum chamissonis	russet cotton-grass	AS
Hydrocotyle verticillata	pennywort	AS
Iwatsukiella leucotricha	moss	AS
Leiderma sorediatum	lichen	AS
Lophozia laxa	moss	AS
Lycopodiella inundata	bog club-moss	AS
Microseris bigelovii	coast microseris	AS
Mimulus tricolor	3-colored monkey flower	AS

Table 3-30 - Special Status Plant Species - Known or Suspected[1] (continued)

Botanical Name	Common Name	Status
Ophioglossum pusillum	adder's tongue fern	AS
Pellaea andromedaefolia	coffee fern	AS
Polystichum californicum	California sword-fern	AS
Porella vernicosa	liverwort	AS
Pseudocyphellaria mougeotiana	lichen	AS
Racomitrium pacificum	moss	AS
Splachnum ampullaceum	moss	AS
Sulcaria badia	lichen	AS
Tayloria serrata	moss	AS
Tetraplodon mnioides	moss	AS
Utricularia gibba	humped bladder-wort	AS
Utricularia minor	lesser bladderwort	AS
Usnea hesperina	lichen	AS
Wolffia punctata	dotted water-meal	AS
Wolffia columbiana	columbia water-meal	AS
Abronia latifolia	yellow sandverbena	TR
Aster brickellioides	smooth rayless aster or Brickellbush aster	TR
Carex buxbaumii	Buxbaum's sedge	TR
Carex comosa	bristly sedge	TR
Carex retrorsa	knot sheath sedge	TR
Corydalus caseana	Cusick's corydalis	TR
Cyperus acuminatus	short-pointed cyperus	TR
Cypripedium montanum	mountain lady's slipper	TR
Darlingtonia californica	California pitcher plant or cobra lily	TR
Epilobium luteum	yellow willow-herb	TR
Euonymus occidentale	western wahoo	TR
Heteranthera dubia	water star-grass	TR
Hieracium greenei	Greene's hawkweed	TR
Juncus kelloggii	Kellogg's dwarf rush	TR
Lathyrus holochlorus	thin-leaved peavine	TR
Lycopodium annotinum	stiff club moss	TR
Mimulus pulsiferae	candelabrum monkeyflower	TR
Minuartia cismontana	cismontane sandwort	TR
Montia diffusa	branching montia	TR
Navarretia leucocephala	white-flowered navarretia	TR
Phacelia verna	spring phacella	TR
Poa laxiflora	loose-flowered bluegrass	TR
Poa marcida	weak bluegrass	TR
Rotala ramosior	toothcup	TR
Scirpus subterminalis	water clubrush	TR
Sidalcea campestris	meadow sidalcea	TR
Sidalcea cusickii ssp. *cusickii*	Cusick's checkermallow	TR
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass	TR
Trillium parviflorum	small-flowered trillium	TR
Veratrum insolitum	Siskiyou-hellebore	TR
Buellia oidalea	lichen	TR
Hypogymnia duplicata	lichen	TR

Table 3-30 - Special Status Plant Species - Known or Suspected[1] (continued)

Botanical Name	Common Name	Status
Lecanora caesiorubella	lichen	TR
Lecanora pringlei	lichen	TR
Lecidia dolodes	lichen	TR
Niebla cephalota	lichen	TR
Peltula euploca	lichen	TR
Pilophorus nigricaulis	lichen	TR
Pseudocphellaria aurata	lichen	TR
Schismatomma californicum	lichen	TR
Teloschistes flavicans	lichen	TR
Usnea rubicunda	lichen	TR
Encalypta brevipes	moss	TR
Rhytidium rugosum	moss	TR
Triquetrella californica	moss	TR
Cephaloziella spinigera	liverwort	TR
Diplophyllum plicatum	liverwort	TR
Haplomitrium hookeri	liverwort	TR
Jamesoniella autumnalis	liverwort	TR
Marsupella emarginate	liverwort	TR
Marsupella sparsifolia	liverwort	TR
Metzgeria temperata	liverwort	TR
Preissia quadrata	liverwort	TR
Radula brunnea	liverwort	TR
Scapania gymnostomophila	liverwort	TR

FE = Federal Endangered species
PT = Proposed Threatened species
FC = Federal Candidate species
BS = BLM Bureau Sensitive species
AS = BLM Assessment species
SE = State Endangered species
ST = State Threatened species
TR = BLM Tracking species

[1] Plants species are listed in decending order according to the legal or policy status of the species.

its first inventory during the 1970s. A Special Area was established in January 1984 to protect this remnant piece of Willamette Valley prairie. This site has been the focus of extensive research, monitoring, and prescribed management treatments since 1988. Researchers have been studying the habitat and population dynamics of Lomatium at this site and others, including researching the use of prescribed fire for habitat enhancement and maintenance of Lomatium populations. Hydrological and soil characteristics within the native prairie, pollination studies, and modeling techniques (Transition Matrix Modeling) are being implemented to help predict the long-term viability of this population. Research and monitoring have been implemented through cooperative efforts with State and private organizations interested in the recovery of this species. The population within this Special Area presently appears to be stable; however, long-term monitoring will better assess the condition of the population.

The second site for Bradshaw's lomatium within the District was acquired in 1994 within the west Eugene wetlands. The status of this population will be assessed in the spring of 1994, and future monitoring and research will occur at this site and others under the direction of the *Lomatium bradshawii* Recovery Plan. This site will be given high priority under the Special Status plant program. Additional sites for *Lomatium bradshawii* may be acquired in the future within the west Eugene wetlands.

Howell's Montia (*Montia howellii* Wats.) Federal Candidate

Howell's montia is presently listed by the U.S. Fish & Wildlife Service as a Federal Candidate 2 species (1993 Federal Register Notice of Review). The State of Oregon has listed this species as a candidate for listing as State Threatened or Endangered (1991, OAR 603-73-080).

Montia howellii is an annual species and belongs to the *Portulacaceae* family. The historical range for the species extended from California to British Columbia. The species' presently occurs at approximately ten locations in Oregon. The species is also known from a few sites in British Columbia. The species' habitat was historically documented as occurring in moist lowland areas (Hitchcock et al., 1990) and vernal pools. The majority of sites recently inventoried in Oregon suggest a somewhat variable habitat that includes areas that are seasonally moist and superficially disturbed, resulting in a reduction of competing vegetation (ODA, 1992).

Much of this species' former habitat has probably been converted into urban and rural development as well as modified for agricultural purposes. Other threats to the species have been identified including, limited seed bank, competition from native or introduced plant species, and alterations in habitat conditions that limit safe sites for seedling establishment.

The Eugene District manages one population of *Montia howelii.* Inventory, monitoring, and research for this species started in 1989. A Special Area was established at this site in January 1989. Approximately 4,000 additional acres have been inventoried specifically for *Montia howellii* (ODA, 1992). Several new populations were located in Oregon during that effort. Because of the small size of this plant and its inconspicuous nature, additional inventory is needed to determine the species' appropriate status. Research on this species has included studies on soil seed-banking, disturbance ecology, and data collection on the population dynamics of Montia. In 1993 the Eugene District population appeared to be declining. Management actions in 1993 and 1994 have attempted to increase population levels for this species through site-specific prescriptions designed to reduce aggressive competition from exotic species. Population monitoring will continue at this site to assess the effectiveness of these treatments on the species. Inventory, monitoring, and research has been implemented in cooperation with State and private organizations interested in the long-term viability of the species. Additional sites for *Montia howellii* may be acquired in the future within the west Eugene wetlands.

Wayside Aster (*Aster vialis* (Bradshaw) Blake) Federal Candidate

The wayside aster is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has also listed this species as a candidate for listing as State Threatened or Endangered (1991, OAR 603-73-080) and is currently proposing this species as a Threatened species in Oregon.

Aster vialis is a perennial species and belongs to the *Asteraceae* family. The species' present range includes Lane, Douglas, and Linn Counties in

Oregon. This species is most often found at lower elevations in dry, open, coniferous forests. Historical fire suppression and the subsequent closure of forest stands have probably reduced the habitat for this species as well as urban and rural development and forest management activities. Other threats to this species have been identified, including browsing pressure from native ungulates, low rates of seed germination and recruitment, inbreeding depression, and insect predation.

The Eugene District manages several populations of *Aster vialis.* This species has been the focus of extensive inventory, monitoring, and research since 1989. Over 8,000 acres have been inventoried specifically for *Aster vialis.* Plant reserves have been established for Eugene District Aster sites. Some populations are currently not reproductive, and future management of these forest stands may be desirable for the long-term maintenance of this species and its habitat through adaptive management, including prescribed fire and density management treatments. Monitoring plots have been established at some populations. Research has included seed germination studies, pollination studies, and information on the population dynamics of *Aster vialis.* Inventory, monitoring, and research have been implemented in cooperation with various State and private organizations interested in the long-term viability of this species. Populations that are being monitored on the District appear stable in number. Several populations, however, are in need of active management for the long-term viability of the species. This species has been identified in the FSEIS/ROD as needing special management attention.

Umpqua swertia (*Frasera umpquaensis* Peck and Appleg.) Federal Candidate

Frasera umpquaensis is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has also listed this species as a candidate for listing as State Threatened or Endangered (1991, OAR 603-73-080). An Interagency Conservation Strategy for this species was completed in September 1993 by the BLM and the U.S. Forest Service that addresses the long-term management of Frasera throughout its range in Oregon.

Frasera is a perennial species and belongs to the *Gentianaceae* family. The species' range extends from northern California to the west side of the Oregon Cascade Range. The species is found at mid to high elevation sites in open forest, meadow, and forest/meadow ecotones. The primary concentration for the species occurs in southern Oregon with several other populations being disjunct from this population center (Frasera Report, 1993). Habitat has declined due to past forest management activities and from the natural successional changes of meadow and meadow/forest edges into closed forest conditions. Other threats to the populations have been identified such as low rates of seed germination, isolated populations suggesting the possibility of inbreeding depression, seed predation, and lack of seedling recruitment into some populations.

The Eugene District manages one population of *Frasera umpquaensis.* The importance of this site has been recognized by the District since the establishment of a Special Area in 1984. A new monitoring study will be implemented in 1994 at this site in compliance with the terms of the Interagency Conservation Strategy for this species. The monitoring is designed to aid in assessing the species' condition throughout its range in Oregon as well as to track the Frasera population at the Eugene District site. The Eugene District is actively cooperating with the U.S. Forest Service and other BLM Districts in the protection and management of Frasera.

Tall bugbane (*Cimicifuga elata* Nutt.) Federal Candidate

Cimicifuga elata is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has listed this species as a candidate for listing as State Threatened or Endangered (1991, OAR 603-73080).

Cimicifuga elata is a perennial species and belongs to the *Ranunculaceae* family. The species' historic range occurred from northern California to British Columbia. As of 1993, 103 populations had been documented from Oregon and 30 had been reported from Washington. Most of these populations, however, are fewer than 25 individuals (ODA, 1994). Cimicifuga is a forest species and on the Eugene District is often found on north-facing aspects where moisture is readily available. Cimicifuga in this portion of the species' range is often associated with an *Acer macrophyllum* (bigleaf maple)/*Polystichum munitum* (sword fern) /*Pseudotsuga menziesii* (Douglas-fir) community. The species has been the subject of extensive survey and monitoring efforts

since 1992. In 1993 approximately 4,000 acres were inventoried specifically for this species, 900 acres of which were inventoried on the Eugene District. Forest management activities have directly interfaced with this species and its associated habitat. Other threats to the species may include the successional closure of forest gaps resulting in the decline of individual populations. Small population numbers may also expose individual populations to high extinction risks due to natural catastrophes (ODA, 1994). Lack of flowering and recruitment indicates possible long-term viability problems for the species. Extensive browsing by native ungulates has been recorded at some populations.

The Eugene District manages several populations of *Cimicifuga elata*. Plant reserves have been established for these Cimicifuga populations. Monitoring has been established at several populations within the District. Some populations are currently not reproductive and will need active management to promote the long-term viability of the species. Prescribed management will include the maintenance of forest gaps through adaptive management. Several years will be needed to accurately assess the condition of these populations. Inventory, monitoring, and research for this species has been implemented in cooperation with various State and private organizations interested in the long-term viability of *Cimicifuga elata*.

Shaggy horkelia (*Horkelia congesta* Dougl. ssp. *congesta*) Federal Candidate

Horkelia congesta ssp. *congesta* is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has listed this species as a candidate for listing as State Threatened or Endangered (1991, OAR 603-73-080).

Horkelia congesta ssp. *congesta* is a perennial species and belongs to the *Rosaceae* family. The species' historic range was from the northern Willamette Valley to southern Oregon (Hitchcock et al., 1990). The subspecies appears to have been eliminated from the northern portion of species' range and from the east side of the Willamette Valley adjacent to Corvallis, Oregon (ODA, 1993). The habitat for the species appears to be native grasslands and forest edges (ODA, 1993). The primary threats to horkelia have probably been urban, rural, and agricultural development. Natural successional development of grasslands into shrub and tree-dominated sites may have also contributed to the loss of horkelia habitat. Such grassland areas were historically kept in open condition by the regular burning of the Willamette Valley prairie by Native Americans for food and other purposes. Browsing by native ungulates has also been identified as a potential problem for this species at the Eugene District population. There are 20 extant sites in Oregon (ODA, 1993). Clarification on the subspecific taxonomy of the species is being implemented in the southern portion of the plant's range (ODA, 1993).

The Eugene District manages 2 populations of *Horkelia congesta* ssp. *congesta*. One site was established as a Special Area in January 1984. Information on this plant's taxonomy, an assessment of the extant populations throughout the species' range, and the establishment of monitoring studies were implemented in 1993. Several years of monitoring data will be needed before an accurate assessment of this population's condition can be determined. The site has undergone several prescribed fires to enhance the prairie community. Inventory, monitoring, and research for this species has been implemented in cooperation with various State and private organizations interested in the long-term viability of *Horkelia congesta* ssp. *congesta*.

The second site was acquired in 1994 and an assessment of the status of the population in this area is scheduled for summer 1994. Establishment of biological monitoring for this species at this site will be given high priority within the Special Status plant program. Additional sites for *Horkelia congesta* may be acquired in the future within the west Eugene wetlands.

Pink sandverbena (*Abronia umbellata* Lam. ssp. *breviflora* (Standl.) Munz) Federal Candidate

Abronia umbellata ssp. *breviflora* is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has listed this species as Endangered (1989, OAR 603-73-070(1)).

Abronia umbellata ssp. *breviflora* is an annual species and belongs to *Nyctaginaceae* family. The species' historic range was along the coast from Oregon to northern California. The species grows in soft sand above high tide on coastal beaches and dunes. The primary threats to the species have probably been coastal development, Off Highway

Vehicle (OHV) use, and invasion by exotic plant species, including European beach grass. There are four naturally occurring extant (viable) sites in Oregon.

The Eugene District manages one population of *Abronia umbellata* ssp. *breviflora* within a proposed Special Area, which has been identified as needing special management through this planning effort. The population at this site is **not** a naturally occurring population. In 1993 the Eugene District BLM, in cooperation with State agencies and with support from the U.S. Fish and Wildlife Service, attempted to establish an experimental population of the pink sandverbena. Seedlings were transplanted into an enclosure that was built to protect plants from OHV damage. Seedlings were watered and shade-blocks were installed to promote plant establishment. Some individuals did mature to produce fruit. Monitoring information was collected to assess the success of this effort. Preliminary information on this project will not be available until summer, 1994.

Willamette daisy (*Erigeron decumbens* Nutt. var. *decumbens*) Federal Candidate

Erigeron decumbens var. *decumbens* is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 1 species (1993 Federal Notice of Review). The State of Oregon has listed this species as Endangered (1989, OAR 603-73-070(1)).

Erigeron decumbens var. *decumbens* is a perennial species and belongs to the *Asteraceae* family. The species' historic range was from Clackamas to Lane Counties within the Willamette Valley, Oregon. The species is found in grasslands and prairies within the mid-Willamette Valley. The species apparently prefers heavy soils (Eastman, 1990). There are 23 extant sites in Oregon. Habitat for the species has declined due to urban and rural development and conversion of habitat into agricultural land. Natural successional development of grasslands into shrub and tree-dominated sites has also probably contributed to the loss of Willamette daisy habitat. Such grassland areas were historically kept in open condition by the regular burning of the Willamette Valley prairie by Native Americans for food and other purposes.

The Eugene District manages two populations of *Erigeron decumbens* var. *decumbens*. These sites were acquired in 1994 and an assessment of the status of the populations is scheduled for summer 1994. Establishment of biological monitoring for this species in these areas will be given high priority within the Special Status plant program. Additional sites for *Erigeron decumbens* var. *decumbens* may be acquired in the future within the west Eugene wetlands.

White-topped aster (*Aster curtus* Cronq.) Federal Candidate

Aster curtus is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1993 Federal Notice of Review). The State of Oregon has also listed this species as a candidate Threatened or Endangered (1991, OAR 603-73-080) and is currently proposing *Aster curtus* as a Threatened species in Oregon.

Aster curtus is a perennial species and belongs to the *Asteraceae* family. The species' historic range was from the Willamette Valley to British Columbia. The species is found in grasslands and prairies within the Willamette Valley, Oregon. There are 23 extant sites in Oregon. The species is apparently more commonly found in the State of Washington (Eastman, 1990). Habitat for the species in Oregon has declined due to urban and rural development and conversion of habitat into agricultural land. Natural successional development of grasslands into shrub and tree-dominated sites has also probably contributed to the loss of white-topped aster habitat. Such grassland areas were historically kept in open condition by the regular burning of the Willamette Valley prairie by Native Americans for food and other purposes.

The Eugene District manages two populations of *Aster curtus*. These sites were acquired in 1994 and an assessment of the status of the populations is scheduled for summer 1994. Establishment of biological monitoring for this species at these sites will be given high priority within the Special Status plant program. Additional sites for *Aster curtus* may be acquired in the future within the west Eugene wetlands.

Bog clubmoss (*Lycopodiella inundata* L. Holub.) Assessment Species

Lycopodiella inundata is presently listed by the Oregon Natural Heritage Program as a List 2 species.

Lycopodiella is a perennial species and belongs to the *Lycopodiaciae* family. The species' historic range is known to be in the northern hemisphere. In Oregon it is reported mostly along the coast in sphagnum bogs, ponds, and along the dunes in areas with high moisture. The primary threats to the species include OHV use, disruption of hydrology, and invasion by European beach grass. There are 24 extant sites in Oregon.

The Eugene District manages one population of *Lycopodiella inundata.* The population is currently within a proposed Special Area, which has been identified as needing special management through this planning effort. Extensive monitoring has not been established for this species to accurately assess the condition of this population.

Timwort (*Cicendia quadrangularis* (Lam.) Griseb.) Assessment Species

Cicendia quadrangularis is presently listed by the Oregon Natural Heritage Program as a List 2 species.

Cicendia is an annual species and belongs to the *Gentianaceae* family. The species' historic range is known to be from the Willamette Valley, Oregon, to northeast California. It is also known from Peru, South America (Eastman, 1990). Habitat for the species in Oregon has declined due to urban and rural development and conversion of habitat into agricultural land. Changes in hydrology may threaten this species. Natural successional development of grasslands into shrub and tree-dominated sites has also probably contributed to the loss of timwort habitat within the Willamette Valley, Oregon. Such grassland areas were historically kept in open condition by the regular burning by Native Americans for food and other purposes. Fifteen extant sites occur in Oregon.

The Eugene District manages two populations of *Cicendia quadrangularis.* One site for the species has been designated as a Special Area and the other will receive protection/management as an important wetland habitat. Extensive monitoring has not been established for this species to accurately assess the condition of these populations.

Humped bladderwort (*Utricularia gibba* L.) Assessment Species

Utricularia gibba is presently listed by the Oregon Natural Heritage Program as a List 2 species.

Utricularia gibba is a perennial species and belongs to the *Lintibulariaceae* family. The species' historic range is known from the Willamette Valley, Oregon, California, Mexico, and Central America (Eastman, 1990). Because this species is an obligate wetland species, the primary threat to Utricularia would be an alteration in the hydrological condition of the species' habitat. There are two extant sites in Oregon.

The Eugene District manages one population of *Utricularia gibba.* The population occurs in a proposed Special Area, which has been identified as needing special management through this planning effort. Extensive monitoring has not been established for this species to accurately assess the condition of this population.

Moss (*Campylopus schmidii* (C. Muell.) Jaeg. *C. aureus*)

Campylopus schmidii is presently listed by the Oregon Natural Heritage Program as a List 2 species.

Campylopus schmidii is a perennial species and belongs to the *Dicranaceae* family. The species is trans-Pacific having a Southeast Asian, Indian Ocean and Australasian distribution. There are three extant sites in Oregon. The primary threats to this species include OHV use on coastal dunes and natural successional development of this species' dune/ forest ecotone habitat into a forest-dominated area. Populations in Oregon are exclusively male (sporophyte generation), leading to long-term problems in the adaptive capacity of this species.

The Eugene District manages one population of *Campylopus schmidii.* The population occurs in a proposed Special Area, which has been identified as needing special management through this planning effort. A fence has been established around portions of this population to prevent OHV damage. Extensive monitoring has not been established for this species to accurately assess the condition of this population.

SEIS Special Attention Species (Plants/Fungi)

SEIS Lichens, Bryophytes and Fungi

Lichens, bryophytes (mosses, liverworts and hornworts) and fungi occur within the Eugene District. The distribution and abundance of various species within the different groups of organisms has not been well-documented. Previous botanical surveys have identified some lichen and moss species that do occur; however, until 1994 no specific efforts had been implemented to describe these resources in detail.

In 1994 a systematic inventory was implemented to start documenting the lichen diversity within the District. Information is being collected on rare species, which may occur on the District, as well as the more common species. Information is also currently being developed that describes the rare bryophytes suspected on the Eugene District, what types of habitats they are likely to occupy, and how best to inventory for these organisms within the District. This information will be used in implementing future inventories for these organisms.

Efforts in 1994 also include research on the Eugene District incorporating lichen and bryophyte diversity studies into adaptive management treatments. The objectives of these studies will be to examine whether density management techniques will contribute towards the development of lichen and bryophyte diversity in managed stands similar to that found in old growth forest ecosystems. Such studies are long-term in nature and will take years for reliable information to become available.

No research or inventories have yet been implemented for forest fungi within the Eugene District. See Chapter 2, SEIS Special Attention Species Habitat, for proposed future management actions concerning lichens, bryophytes, and fungi.

Fungi, bryophytes, and lichens provide a wide array of important ecosystem functions. The Forest Ecosystem Management Report (1993) lists several of these, all of which are relevant for species within the Eugene District. Some of these are as follows:

Fungi provide food and cover for a wide variety of vertebrate and invertebrate species. Mycorrhizal or fungal connections with vascular plants, including conifers, are essential for the uptake of nutrients and water and the maintenance of many vascular plants. Fungi play vital roles in the decomposition and recycling of nutrients, providing organic matter for the formation of forest soils. Certain disease fungi, which result in tree mortality, provide for the formation of forest gaps that add structural complexity to the forest and are utilized by a wide variety of wildlife, plant, and fungal species. Specific fungi such as Chanterelles are important Special Forest Products within the Eugene District (See Special Forest Products section in Chapter 2,3)

Lichens contribute to nutrient cycling and biomass production. They are critical in providing food for vertebrates and invertebrates. Lichens capture fog and retain moisture in the canopy, helping to regulate forest climate. Some forest lichens, such as *Lobaria oregana*, fix atmospheric nitrogen, making it available for other plants to utilize. Lichen litterfall provides organic material to forest soils and increases the soil moisture holding capacity. Because lichens are sensitive to certain air pollutants, lichens are being used to monitor air quality on adjacent forest lands. Lichens are also being used in the floral and craft industry and are a source of natural dyes.

Bryophytes contribute large amounts of biomass to the understory of forest communities. They provide food and habitat for a variety of vertebrates and invertebrates. Bryophytes also play an important role in nutrient cycling. They add to soil nutrients, soil structure, soil stability, and interception and storage of water. Bryophytes can filter sediments and organic matter. Certain moss species are important Special Forest Products, which are used in the floral industry.

Because of the recent reductions in acres of mature and old growth forests, emphasis has been given to the management and inventory of those lichens, bryophytes, and fungi found in mature and late-successional forest ecosystems. Species that are considered in need of special management and/or inventory efforts are listed in Appendix O. For most of these organisms listed in Appendix O, it is not currently known whether these species occur within the Eugene District. Those species that have been identified, which are on the SEIS Special Attention Species list in Appendix O, are as follows: *Choiromyces venosus* (Rare Truffle), *Cantharellus cibarius* (Chanterelles), *Cantharellus subalbidus* (Chanterelles), *Gomphus floccosus* (Chanterelles - Gomphus), *Catathelasma ventricosa* (Uncommon gilled mushrooms), *Hydnum repandum* (Tooth fungi), *Hydnum umbilicatum* (Tooth fungi), *Clavariadelphus pistilaris* (Club coral fungi), *Clavariadelphus truncatus*

(Club coral fungi), *Phlogoitis helvelloides* (Jelly mushroom), *Sparassis crispa* (Cauliflower mushroom), Lobaria oregana (Nitrogen-fixing lichen), *Lobaria pulmonaria* (Nitrogen-fixing lichen), *Nephroma bellum* (Nitrogen-fixing lichen), *Nephroma helveticum* (Nitrogen-fixing lichen), *Nephroma laevigatum* (Nitrogen-fixing lichen), *Nephroma resupinatum* (Nitrogen-fixing lichen), *Pannaria leucostictoides* (Nitrogen-fixing lichen), *Pseudocyphellaria anomala* (Nitrogen-fixing lichen), *Pseudocyphellaria anthraspis* (Nitrogen-fixing lichen), *Pseudocyphellaria crocata* (Nitrogen-fixing lichen), *Usnea longissima* (Riparian lichen) and *Buxbaumia viridis* (Bryophyte). See Chapter 2, Special Status and SEIS Special Attention Species Habitat for proposed future management actions for these species.

Although complete species lists have not been fully developed for these organisms, it is clear that these nonvascular plants and fungi are important organisms within the District. Specific habitat features and ecological processes known to be important for supporting these organisms in late-successional forests were identified in The Forest Ecosystem Management Report (FEMAT 1993). These features and processes do occur within the Eugene District and some are summarized below:

Late successional forests are critical for the maintenance of various species of fungi, lichens, and bryophytes. Small fragments (5-40 acres) of old growth as well as larger contiguous late-successional forests are important for the maintenance of these organisms. Forest fungi and bryophytes rely on coarse woody debris as substrates and as a source of moisture, etc. Diversity for these organisms is highest in areas where a variety of tree species form diverse plant communities and complex forest structure. For example, old growth conifers with emergent crowns and large limbs support diverse lichen communities. Actions such as the retention of legacy trees may be important as a source of lichen inoculum for surrounding younger forests.

Various forest processes are also important for the maintenance of these organisms. Fine scale disturbances such as the formation of forest gaps produce diverse stand structure, which drives the development of microsites important for fungi, lichens, and bryophytes. In contrast, some lichen species rely on more stable forest ecosystems where large scale events such as wildfire have been absent for hundreds of years.

Special Habitats including riparian areas, rock outcrops, seeps, springs, hardwood forests, coastal dune areas, etc. are all important habitats for maintaining the diversity of lichens and bryophytes within the District.

Maintenance of various physical parameters is critical for these organisms, including such things as wetting and drying cycles, fluctuations in water flow and quality, temperature, humidity, light, and air quality, etc.

Species diversity appears to increase for lichens, fungi, and bryophytes as forest ecosystems mature toward Late-Successional conditions. Many species found in older forests do not survive or compete well in younger forests. Early successional forests are important, however, in supporting other fungi, etc. Changes in light, moisture, duff layers and a host of other environmental and physical factors will alter which organisms will be present. Forests of approximately 50 to 100 years old, for example, can provide habitat for the popular edible mushroom, the Chanterelle. Ecosystem processes, resulting in early seral conditions, are also significant factors shaping the species composition of a given area. For example, species that appear to respond favorably to fire, such as the edible morel mushroom, may not be as abundant on the Eugene District as in historical times, due to fire suppression and the reduction in broadcast burning as a site preparation technique. In general, however, the abundance of younger forests within the Eugene District and the species that rely on these conditions, including early to mid-seral fungi, lichens, and bryophytes, are thought to be abundant and well-distributed.

SEIS Vascular Plants

Those SEIS vascular plant species identified as needing special management attention are identified in Appendix O. Three species are known to occur on the Eugene District. Three other species are suspected to occur within the District, but currently have not been documented including *Botrychium minganense*, *Botrychium montanum*, and *Cypripedium fasciculatum*. These have all been considered under Eugene District's Special Status Plant Species Program. The District has been inventorying for these species for several years, and no sites have been identified. Detailed information about all of these species is outlined in Appendix J2 of the SEIS. See Chapter 2, SEIS Special Attention Species Habitat and Special Status Plant Species, for proposed future management actions for these species. Those species known to occur within the Eugene District are described below:

Sugar stick (*Allotropa virgata*) (Torrey & Gray)

Allotropa is a perennial species and belongs to the *Ericaceae* family. It occurs from the east slope of the Cascades to near the coast, from British Columbia to California (Hitchcock and Cronquist, 1973). The habitat for the species includes closed canopy pole, mature, and old growth seral stages in *Pseudotsuga menziesii* and other coniferous forest types. Threats to the species include fire suppression, fragmentation of habitat, and reduction in coarse woody debris, all leading to a decline in this species (SEIS Appendix J2 1994).

Because this species has not been identified as a BLM Special Status Plant Species, the District has not been tracking this plant. Recent review of all past District records from botanical clearance activities, however, have identified 8 historical sitings for this species. Inventories are scheduled in 1994 to revisit historical sites and determine the species status in these areas. Priority will be given to the status/ probable condition of these areas, i.e., timber harvest has occurred in two of these areas and it is doubtful that plant populations would still be extant within the harvest areas.

Mountain lady's slipper (*Cypripedium montanum*) (Douglas)

Cypripedium is a perennial species and belongs to the *Orchidaceae* family. It occurs from southern Alaska, British Columbia, Vancouver Island, and western Alberta, south to Montana, Idaho, Wyoming, and California (Hitchcock et al., 1969). In Oregon it occurs on both the east and west slopes of the Cascades. The habitat for the species is considered broad (SEIS Appendix J2 1994). On the Eugene District the species is found along Willamette Valley margins in mature, open, *Pseudotsuga menziesii* (Douglas-fir) forests. Threats to the species include fire suppression, logging, and the probable horticultural collection of plants, resulting in the decline of this species (SEIS Appendix J2 1994).

This species has been and is currently identified as a BLM Tracking Species and as such is currently being inventoried in conjunction with botanical clearance activities. One site has been documented for this species within the Eugene District. The population at this site was very small and the viability of this population is in question. A botanical reserve areas was established for this species in 1989. Detailed monitoring has not occurred at this site. The area will be reassessed in 1994 and the status of this population will be determined.

Wayside aster (*Aster vialis*)) (Bradshaw) Blake)

See BLM Special Status Plants (Chapter 3, Special Status Plant Species) for a description of this species and Chapter 2, Special Attention Species Habitat and SIES Special Attention Species Habitat, for proposed management direction.

Fisheries

Oregon Chub - The Oregon chub was listed as an endangered species by the U.S. Fish and Wildlife Service in 1993. It was once common throughout the Willamette River Basin, living mostly in the main stem and larger tributaries. Its preferred habitat is shallow, quiet, off-channel and backwater areas with emergent vegetation. Removal of large woody debris, channelization of fish channels, and other habitat changes altered much of the chub's habitat. It is unable to compete against many introduced species, such as the centrarchid fishes, mosquito fish, and bull frogs. The best known populations are found in a short reach along the Middle Fork of the Willamette River. At present none of the known populations are on lands administered by the BLM.

An interagency task force has developed a recovery plan for the chub, relying primarily on protecting existing populations and transplanting the chub into suitable habitat to establish additional populations. BLM has agreed to assist in inventory and monitoring efforts, and in efforts to locate suitable habitat for transplants. Current and proposed BLM management activities are not expected to impact the Oregon chub.

Anadromous Fish - Anadromous fish species are currently not included on the U.S. Fish and Wildlife Service's list identifying species being considered for addition to the list of Threatened and Endangered Wildlife (i.e., Categories 1, 2, and 3). Therefore, the BLM sensitive species policy cannot be applied to anadromous fish stocks prior to actual listing. This leads to a situation where severely depressed anadromous fish stocks can actively be considered for threatened or endangered status by the National Marine Fisheries Service (NMFS), but are not covered under the BLM sensitive species policy. To address this, the BLM in Oregon and Washington considers species that meet all of the following criteria to be equivalent to a Category 2 (FC2)

species on the USFWS list and provides these species with the same protection as Category 2 species (FC2).

1. A petition has been filed with the NMFS to add that species to the list of Threatened or Endangered species maintained by the USFWS, and

2. the NMFS has determined that the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted, and

3. the NMFS has commenced a status review of the species concerned.

Coho Salmon - Coho salmon are currently in status review by the National Marine Fisheries Service for possible listing as a threatened or endangered species. In the Eugene District, coho are found in the mainstem and tributaries of the Siuslaw River basin. The State of Oregon in the past attempted to establish coho in the upper Willamette River basin, but no coho have been found by BLM in that basin over the past 14 years. Coho use lower gradient streams, spawning in gravel riffles and deeper pools for maintaining rearing coho, particularly during periods of flooding or drought. Runs of coho have been declining in the Siuslaw River, part of a decline throughout their range due to a variety of factors such as past habitat changes, changes in genetic adaptability, fishing pressure, and changing estuary and ocean conditions. Current and proposed District management of coho habitat is designed to restore and maintain existing habitat. The District has restored over 13 miles of coho habitat. Monitoring by the District has shown that the restoration has slowed population declines compared to changes in other locations. In addition, the District created passage over Lake Creek Falls, opening an additional 100 miles of stream and lake habitat.

Steelhead Trout - Steelhead trout are currently in status review by the National Marine Fisheries Service possible listing as a threatened or endangered species. They are found in both the Siuslaw and Willamette Rivers in the Eugene District. Both summer and winter runs are found in both rivers. Summer run steelhead are present in fewer numbers. The summer run fish require deep, cold water pools for holding through the summer and autumn before the fish spawn in winter. Most of the deeper pools have been lost due to habitat changes. In the Siuslaw water temperatures in the main stem of the river are often too hot for the steelhead to survive. In addition, improved access to many areas has made illegal harvest of these fish more common. Steelhead use medium gradient streams, preferring habitat with larger rocks and boulders. They require suitable clean gravel for spawning, and clean water with good cover for rearing. While young fish show a preference for rocky rapids and cascades, older juveniles increasingly use pools with good cover, especially during the periods of high and low flows. Siuslaw River winter steelhead probably benefited from some of the human-induced changes that increased the amount of faster flowing water; however, overall habitat has declines in both the Siuslaw and Willamette. Runs have declined in recent years due to factors such as high seas, gill netting, other harvest pressures, changes in estuary and ocean conditions, changes in genetic adaptability, marine mammal predation, and loss of freshwater habitat. Current and proposed District management is designed to improve and maintain steelhead habitat. Habitat restoration efforts include habitat for steelhead trout.

Wildlife (animals)

Introduction

As shown in Table 3-31, several Special Status wildlife species are known to occur or have the potential to occur within the Eugene District planning area. Brief descriptions are also provided for species known or suspected to have been extirpated and species that could reestablish themselves naturally if suitable habitat conditions are restored. Special Status Species that occur within the planning area but are unrelated to the planning effort are not discussed. Such species include those associated with ecosystems not found within the BLM operating area. Similarly, species known to have been extirpated from the entire planning area, and whose essential habitats cannot be reestablished are also not discussed. Examples of Special Status Species that are believed unrelated to the planning alternatives on the Eugene District are as follows:

1. Species whose occurrence is limited to marine environments (including saltwater beaches) or the high Cascades (e.g., brown pelican, Steller (or northern) sea lion, southern sea otter, Aleutian Canada goose, western snowy plover, and Williamson's sapsucker).

2. Species that have been extirpated from the planning area and no critical habitat, or special management needs, have been designated for the planning area by the U.S. Fish and Wildlife Service (e.g., grizzly bear, gray wolf, and California condor).

Table 3-31 - Special Status Species (Wildlife and Fish) of Known, Suspected or Potential Occurrence Within the BLM Planning Area.

Common Name	Scientific Name	BLM Status[1]	State Status
Federal Listed and Proposed Species			
Invertebrates			
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	Threatened	-
Fish			
Oregon chub	*Oregonichthys cramari*	Endangered	-
coho salmon	*Oncorhynchus kisutch*	Managed as Candidate 2[3]	
steelhead trout	*Oncorhynchus mykiss*	Managed as Candidate 2[3]	
Amphibians (none)			
Reptiles (none)			
Birds			
American peregrine falcon	*Falco peregrinus anatum*	Endangered	Endangered
bald eagle	*Haliaeetus leucocephalus*	Threatened	Threatened
marbled murrelet	*Brachyramphus marmoratus*	Threatened	-
northern spotted owl	*Strix occidentalis caurina*	Threatened	Threatened
Mammals			
Columbian white-tailed deer (EX?)	*Odocoileus virginianus leucurus*	Endangered	Endangered
Federal Candidate and Bureau Sensitive Species			
Invertebrates			
Fender's blue butterfly	*Icaricia icarioides fenderi*	Candidate 2	-
Fort Dick limnephilus caddisfly	*Limnephilus atercus*	Candidate 2	-
Oregon giant earthworm	*Megascolides macelfreshi*	Candidate 2	-
Tombstone Prairie Farulan caddisfly	*Farula reaperi*	Candidate 2	-
Tombstone Prairie Oligophlebodes caddisfly	*Oligophlebodes mostbento*	Candidate 2	-
Fish			
bull trout	*Salmo confluentus*	Candidate 2[2]	-
Amphibians			
Cascades frog	*Rana cascadae*	Candidate 2	-
foothill yellow-legged frog	*Rana boylii*	Candidate 2	-
northern red-legged frog	*Rana aurora aurora*	Candidate 2	-
Oregon slender salamander	*Batrachoseps wrighti*	BLM Sensitive	-
spotted frog (EX?)	*Rana pretiosa*	Candidate 1	-
Reptiles			
northwestern pond turtle	*Clemmys marmorata marmorata*	Candidate 2	-
Birds			
harlequin duck	*Histrionicus histrionicus*	Candidate 2	-
Lewis' woodpecker	*Melanerpes lewis*	BLM Sensitive	-
merlin	*Falco columbaris*	BLM Sensitive	-
mountain quail	*Oreortyx pictus*	Candidate 2	-
northern goshawk	*Accipiter gentilis*	Candidate 2	-
pileated woodpecker	*Dryocopus pileatus*	BLM Sensitive	-
purple martin	*Progne subis*	BLM Sensitive	-

Table 3-31 - Special Status Species (Wildlife and Fish) of Known, Suspected or Potential Occurrence Within the BLM Planning Area. (continued)

Common Name	Scientific Name	BLM Status[1]	State Status
Mammals			
American marten	*Martes americana*	BLM Sensitive	-
California wolverine (EX?)	*Gulo gulo luteus*	Candidate 2	Threatened
fringed myotis	*Myotis thysanoides*	BLM Sensitive	-
Pacific fisher	*Martes pennanti pacifica*	Candidate 2	-
Pacific western (Townsend's) big-eared bat	*Plecotus townsendii townsendii*	Candidate 2	-
white-footed vole	*Arborimus albipes*	Candidate 2	-
Bureau Assessment Species			
Invertebrates			
Siuslaw sand tiger beetle	*Cicindela hirticollis siuslawensis*	BLM Assessment	-
Taylor's checkerspot butterfly	*Eukphydryas editha taylori*	BLM Assessment	-
Fish			
chum salmon	*Oncorhynchus lceta*	BLM Assessment	-
Amphibians			
clouded salamander	*Aneides ferreus*	BLM Assessment	-
tailed frog	*Ascaphus truei*	BLM Assessment	-
Reptiles			
painted turtle	*Chrysemys picta*	BLM Assessment	-
sharp-tailed snake	*Contia tenuis*	BLM Assessment	-
Birds			
Barrow's goldeneye	*Bucephala islandica*	BLM Assessment	-
black swift	*Cypseloides niger*	BLM Assessment	-
bufflehead	*Bucephala albeola*	BLM Assessment	-
dusky Canada goose	*Branta canadensis occidentalis*	BLM Assessment	-
great gray owl	*Strix nebulosa*	BLM Assessment	-
northern saw-whet owl	*Aegolius acadicus*	BLM Assessment	-
western bluebird	*Sialia mexicana*	BLM Assessment	-
Mammals			
Pacific pallid bat	*Antrozous pallidus pacificus*	BLM Assessment	-

[1] Candidate 2 =USFWS Candidate tor Federal Listing - additional information needed to support a proposal for listing.
Threatened =Listed by agency as Threatened - likely to become endangered within the forseeable future.
Endangered =Listed by agency as Endangered - in danger of becoming extinct within the forseeable future throughout all or a significant portion of the species' range.
BLM Sensitive =BLM category requiring managment as a Federal Candidate.
BLM Assessment =BLM-Oregon category requiring assessment of impacts to populations.
(EX?) =Species thought to be extirpated from the Planning Area.
[2] This species was warranted but not listed by USFWS, , 1994.
[3] These species are under status review. See Special Status Text for explanation ot management strategy.

Note: Species status designations are dated through March 14, 1994. Some status designations may change after this date.

SEIS Special Attention Species (Animals)

The following accounts of species groups are based on information presented in the SEIS/ROD and, where appropriate, include additional information about the species pertinent to the Eugene District planning effort.

Invertebrates

Invertebrate animals, which include tens of thousands of species and millions of individuals, comprise an important part of all natural ecosystems. Many species are endemic to small areas of the Pacific Northwest. Due to their diversity, habitat specificity, and low mobility, these species are vulnerable to adverse impacts from land management actions. Many species are not yet described and most are poorly understood. Their functions in these ecosystems, including their role in nutrient cycling, in the food chain, and as pollination agents is not well studied on either a local or regional scale (SEIS page 3&4-158). The Eugene District has conducted no rangewide or local surveys to assess the diversity or distribution of any invertebrate species, except for the introduced gypsy moth, conducted by the Oregon Department of Forestry. A few aquatic samples were identified as to genus,and crayfish are now noted during amphibian surveys.

Mollusks

Within the invertebrates, mollusks composed of land snails, slugs, aquatic snails and clams, are represented by an estimated 350 species in the Pacific Northwest. Many species are endemic. Most terrestrial species are limited to moist environments, associated with Late-Successional forests. Some species are aquatic. Due to their low mobility and susceptibility to habitat modification, these species have difficulty recolonizing areas following extirpation. No intensive or extensive surveys have been accomplished on the District for any species in this group.

Amphibians and Reptiles

"Herptiles" (amphibians and reptiles) comprise an important component of the vertebrate fauna of the District. Within the special status species there are species of amphibians and 3 species of reptiles known to occur on the District and are likely to experience population declines under one to several of the plan alternatives. All of the amphibians rely upon aquatic or other moist habitat situations. Most of the amphibians are associated with components of Late-Successional forests, including moist microclimate, clean water, large down logs, and forest litter. Several species of amphibians can reach high population densities in suitable habitats. Amphibians in particular are good indicators of ecosystem health due to their reliance on a variety of habitat components in their life cycle. Five species from the District are candidates for listing under the Endangered Species Act (foothill yellow-legged frog, northern red-legged frog, Cascades frog, spotted frog, northwestern pond turtle). Most herptiles have weak dispersal capabilities and have limited ability to recolonize areas after disturbance.

Birds

District lands provide habitat for many species of birds. Table 3-54 (see Wildlife Habitat section in Chapter 3) lists bird species for which management actions on the District are required by law or Bureau policy, or for which management opportunities have been identified to enhance populations. Several species are already listed under the Endangered Species Act, and are discussed in the Special Status Species sections of the document. A variety of habitat components, such as snags, multilayered canopy and forest fragmentation, are critical to the overall health of bird species communities.

Mammals Other Than Bats

Many species of mammals are important components of forest ecosystems on the District. The SEIS specifically analyzed 15 species/functional groups (including forest carnivores, elk, rodents, and insectivores) that occur in Late-Successional forests. These mammals contribute to the overall productivity and function of the biotic communities in which they occur through the distribution of nutrients and fungal spores integral to the overall health of the ecosystem, and through food chains involving other species of concern (e.g., spotted owls).

Bats

Bats play an important role in forests and other plant communities by distributing microfungi and in their role as consumers of insects, some detrimental to timber production. All species of bats that occur on the District are insectivorous. Most of these species

prefer Late-Successional forests due to the abundance of potential roost sites in large old trees and snags. The primary causes of population declines are loss of preferred habitat and disturbance of hibernacula and maternity roosts. Insecticides have also contributed to their decline. Species that are known to occur on the District are identified in Table 3-54.

Early-Successional Species

Many special status species of wildlife that occur on the District are associated with or dependent upon early successional stages of forest communities for one or more of their life needs. In the recent past (50 years), timber harvest and other human actions have resulted in a substantial increase of early and mid seral stage forests on the District, on both Federal and nonfederal lands, and caused increases in many of the species associated with these habitat conditions. In general, the species associated with Early-Successional forests are good dispersers, tolerate drier habitat conditions, are widely distributed in the region, and have wider ecological tolerances. Many of these species are migratory (in contrast to Late-Successional species that are primarily permanent residents).

Despite the abundance of early seral conditions over a large portion of the planning area, some habitat components usually associated with early seral stages, including abundant down logs and large snags, herbaceous vegetation and residual green trees, are often lacking in managed forests and result in habitat conditions unfavorable to species normally common in natural stands. These conditions are addressed in more detail in the following sections.

Special Status Species Accounts

Federal Listed Threatened or Endangered Species (and Proposed Species)

American Peregrine Falcon, *Falco peregrinus anatum* (Federal Endangered, State Endangered)

Peregrine falcons require secluded cliffs as nest sites (eyries) located close to areas supporting high populations of prey species such as ducks, shorebirds, pigeons, jays and other similar size birds (USDI, 1982). Reasons for previous declines, and the need to list as endangered, are mining, timber harvest, pesticide contamination, and poaching (Ratcliff, 1962; Sherrod et al., 1981).

Although there are two formerly occupied eyries within the planning area on nonfederal lands, none are known to exist on BLM administered lands. Several cliffs have been identified for study and evaluation. Most of these sites have been impacted by road construction over the years so that peregrine habitat management requires evaluation for access management actions. The District has completed no management plans or evaluated the effects of management actions.

The Federal Recovery Plan for Peregrine Falcon (Pacific Population) (USDI, 1982) identifies several recovery actions that are Bureau responsibilities. These include Action 312 (survey potential nesting sites and evaluate present suitability and potential for enhancement) and Action 325 (prepare management plans for suitable potential sites). The District made an initial but incomplete attempt at Action 312 in 1991.

Bald Eagle, *Haliaeetus leucocephalus* (Federal Threatened, State Threatened)

Bald eagles inhabit the forests of western Oregon during both the wintering and nesting seasons. Bald eagles require large, dominant nest trees that are close to lakes, reservoirs, and rivers that contain abundant fish populations. Nest sites usually command a view of the forage area and must be relatively secure from human disturbances (Anthony and Isaacs, 1987; Stalmaster et al., 1985). Anthony and Isaacs (1988) found that trees used for nesting by bald eagles for nesting were larger and older than those produced under an 80-100 year harvest rotation system.

Although bald eagles still occupy most of their historic range in the northwest, their populations declined steadily for many years. This decline has recently slowed and may have stopped. Although widespread use of pesticides has been the primary cause of past population declines, habitat alteration (e.g., loss of nest sites along shorelines) has also been a contributing factor, and poisoning of bald eagles and their prey have also been significant factors in population declines (Stalmaster et al., 1985; DellaSalla et al., 1989).

Results of the 1991 bald eagle nest survey for Oregon identified 184 occupied breeding territories, the highest number recorded to date. These territories produced 1.05 young per occupied site, which was higher than the 5-year average of 0.90 (Isaacs and Anthony, 1991). Similarly, the 1991 Midwinter Bald Eagle Count produced an all time high of 803 sightings of eagles (Isaacs, 1991).

There are four known bald eagle nest sites within the Eugene District's operating area. Three of these nests are on BLM administered lands; the fourth is on Weyerhauser land immediately adjacent to BLM administered lands. Although each nest is less than 1/4 mile from a road, the roads are dead-end (or spur) roads that begin on private land. Public access to all of these sites is restricted in varying degrees. These nest sites are associated with the McKenzie River, Dorena Reservoir, Cottage Grove Reservoir, and Fern Ridge Reservoir. Three of the four nest sites produced a total of 5 juvenile bald eagles in 1993. Although two nests failed in 1992, both produced 1 young each in 1991 and are still active sites. Two additional nests are known more than 1 mile from BLM lands on the McKenzie Resource Area, associated with Lookout Point Reservoir and the McKenzie River. Bald eagles have been observed near Triangle Lake during the nesting season, but no nest has been found.

Bald eagles often roost in large groups, especially in winter (Stalmaster et al., 1985). There are two known communal winter roost complexes on BLM administered lands in the Coburg Hills. The roost sites are in mature and old growth forest islands on topographic situations that are relatively sheltered from strong southerly storms. These sites are occupied by eagles during the period mid November through early April, with the population peaking in late December and early January.

Eagles that use these roosts forage on private lands on the nearby Willamette Valley floor. Due to the extensive habitat alteration that has occurred on the Valley floor since European settlement, food supplies are almost exclusively sheep carrion (DellaSalla et al., 1989). Wintering bald eagles have also been observed at Fern Ridge Reservoir, along the McKenzie and Siuslaw Rivers, Fall Creek Reservoir, Dorena Reservoir, Cottage Grove Reservoir, Triangle Lake, and Hult Pond (Gawronski, 1991). Sixty-four bald eagles were counted at these foraging areas during the 1991 Midwinter Bald Eagle Count; 52 of these birds were associated with the Coburg Hills (Isaacs, 1991; Gawronski, 1991). Winter roost sites for eagles outside the Coburg Hills have not been identified.

The Pacific Bald Eagle Recovery Plan (USDI, 1986) and the Working Implementation Plan (Bald Eagle Working Team, 1990) list 10 target nesting territories and the Coburg Hills winter roost area for protection and enhancement. The District has inventoried its lands within two miles of known foraging areas and stands at greater distances where there is a direct line of sight to a foraging area. Inventories were conducted by the Oregon Cooperative Wildlife Research Unit (Anthony and Isaacs, 1987) and by District biologists in coordination with the Unit and the Bald Eagle Working Team over a period of several years. These surveys identified approximately 2,700 acres of occupied or suitable-but-unoccupied habitat.

In addition, the Pacific Bald Eagle Recovery Plan recommended the development of site-specific management plans to effectively manage the species, its habitat, and reduce potential threats.

Bald Eagle Habitat Area (BEHA) and Relict Forest Island (RFI) Management

Approximately 6,660 acres of District lands were nominated as Area of Critical Environmental Concern (ACEC) for the management of bald eagles as part of the Recovery Plan for the Pacific Population of the Bald Eagle, under the designation of Bald Eagle Habitat Area (BEHA). An additional 4,622 acres of District lands were nominated for ACEC designation as Relict Forest Island (RFI), for the management of raptors and other Late-Successional forest species and processes in portions of the District managed as Key Raptor Areas. Most of these forest stands are characterized as being remnant patches of Late-Successional forests in large areas dominated by younger forests. Following interdisciplinary review (summarized in Special Areas section), most of these nominated forest stands were determined to have the relevant and important values necessary to be considered for ACEC designation, and managed in a manner whereby those relevant and important values would be conserved.

A final review of forest habitat characteristics (including elimination of those stands considered too young to have relevant and important values), and proposed changes of some RFI stands to BEHA stands to better meet the needs for recovery of eagle populations were completed in April 1994. Following this final review, 5,829 acres of Bald Eagle Habitat Area were identified as habitat essential for bald eagle recovery and will be managed through administrative means for eagle protection and recovery; 1,656 acres were identified as Relict Forest

Islands for the management of raptor species in the Key Raptor Areas through ACEC designation and are to be managed to protect those relevant and important values. These changes to the acres of ACEC nominated stands, and changes in designation of some stands from RFI to BEHA, were discussed with and approved by the nominee.

Columbian White-tailed Deer, *Odocoileus virginianus leucurus)* (Federal Endangered, State Endangered

Historic population declines and regional extirpation throughout the Willamette Valley resulted from human intrusions, habitat modifications, and excessive hunting (U.S. Fish Wildl. Service, 1983). Preferred habitat types include riparian lowlands, grass-shrub meadows (within 75 feet of cover), oak-savannah, open oak, closed oak and riparian woodlands, and lowland hardwood-conifer forests. Recent population and range expansions have occurred via riparian zones (ibid.: 22-27). The principal threats to Columbian white-tailed deer habitat are livestock grazing, subdivision of occupied habitat areas for residential development, and brush clearing (ibid.:29).

Although native to District lands in and adjacent to the Willamette Valley, the species has been extirpated here. Suitable recovery habitat (described in U.S. Fish Wildl. Service, 1983:22-27) exists in the West Eugene Wetlands area, and possibly other District locations. Recovery sub-objective 3 for the Columbia River population is to reintroduce Columbian whitetails to areas within their historical range with suitable habitat (ibid.:32). The District has taken no previous conservation or recovery actions, although some potential for future reintroduction exists.

Marbled Murrelet, *Brachyramphus marmoratus* (Federal Threatened)

The marbled murrelet, a pigeon-sized seabird that nests in the coastal forests of the Pacific Northwest, was listed as a Federal Threatened species in California, Oregon, and Washington on September 23, 1992. The marbled murrelet inhabits the west coast of North America from central California north to the Aleutian Islands.

In Oregon the marbled murrelet occurs along the entire coast but is most common between Coos Bay and Yaquina Bay and the adjoining inland areas (Marshall, 1992). Marbled murrelets forage on small fish and invertebrates in the open ocean, near shore, in estuaries, sounds, and other inland saltwater. Marbled murrelets use inland freshwater lakes in some areas.

From California to British Columbia, the marbled murrelet nests in old growth forests or mature forests with old growth characteristics, including large trees (greater than 34" dbh) with broken tops and large deformed branches, up to 52 miles inland from the marine environment. Nests are found on large (often deformed), moss or debris covered, sheltered branches that provide protection against rain, wind, and detection by predators. The murrelet nests in aggregations and uses forests every month of the year (Nelson et al., 1987; Marshall, 1987; Marshall, 1988; Varoujean et al., 1988). The reasons for winter use are unknown. The size of nesting aggregations is related to stand size, the larger stands having more birds (Marshall, 1992). There are more than 20 known nests sites in Oregon (Biological Opinion). Nest success is generally low; the most significant mortality factor appears to be nest predation by great horned owls, Steller's jays, and ravens.

Inventories were first conducted for the species on the Eugene District in 1990. The 1991 effort was primarily timber sale clearances for lands where potential habitat was present nearby. Two nests, with one chick in each, were found on BLM administered lands in 1991; one of these two chicks died prior to fledging age. Both of these nests were approximately 24 miles inland from the ocean. No nests have been found during other survey seasons. To date, there are 12 occupied sites in the District and 14 additional locations where presence has been detected. Protocol for conducting surveys was developed prior to the 1991 field season, and has been updated and improved annually.

To quantify the amount of potential marbled murrelet habitat within the District, habitat was estimated using forest stand descriptions in the forestry database (MICRO*STORMS) for stand age and stocking levels. Generally, potential murrelet habitat was described as stands older than 150 years of age, or stands with an overstory of at least 120 years of age with a well-stocked understory at least 80 years old. These stands would most likely have trees with the characteristics described above for known nesting sites in the Pacific Northwest.

Because habitat closer to the ocean has been described as more important for the murrelet, this habitat was analyzed by distribution in 4 zones described in miles from the ocean: 0-12, 13-25, 26-35 and 36-50.

Analysis indicates that the Eugene District currently has a total of approximately 28,737 acres of marbled murrelet habitat that is about 9 percent of the total forest acres on the District. Table 3-53 lists the acres of marbled murrelet habitat by zone along with total BLM acres for the Eugene District compared with acres of murrelet habitat by all BLM Districts, by zone.

The Eugene District has about 80 acres of marbled murrelet habitat in the 0-12 mile zone, which are potentially the most important for murrelets considering its proximity to the coast. The District manages less than 1 percent of the marbled murrelet habitat on public land in this zone within Western Oregon. Approximately 29 percent of the suitable murrelet habitat on the District lies in the 13-25 mile band, about 40 percent in the 26-35 mile band, and 30 percent in the 36-50 mile zone.

Northern Spotted Owl, *Strix occidentalis caurina* (Federal Threatened, State Threatened)

The USFWS (USDI, 1991a) has determined the physical and biological habitat features that support nesting, foraging, roosting, and dispersal are essential to the conservation of the northern spotted owl. This biological habitat feature is referred to as primary constituent elements. According to the Service, these attributes include a moderate to high canopy closure (60 to 90 percent); a multi-layered, multi-species canopy with large (greater than 30 inches dbh) overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly.

The Service has also determined that "to achieve recovery", habitat must be available for owls to move throughout their range to provide genetic and demographic exchange between subpopulations, to recolonize formerly occupied portions of the subspecies range (linkage), and for juvenile owls to disperse from their natal areas (dispersal). Both functions are types of connectivity. Dispersal habitat must be able to provide protection to owls from avian predators, provide marginal foraging opportunities, and allow juvenile and adult owls to move successfully within and between blocks of nesting habitat.

In the Eugene District, spotted owl nesting habitat is provided almost exclusively by tree cavities that are usually 50 feet or higher in large trees within or beneath the forest canopy. Platform nests on large limbs of old growth trees have also been found. Over 90 percent of all nest sites/activity centers found within the Eugene District are in mature or old growth habitats. During rainy weather, owls roost on limbs on the lee side of large, leaning trees. Summer roosts are more variable and include small understory trees close to the ground on sites that are cool and heavily shaded. Foraging occurs within the canopy of mature and old growth forests, and beneath the canopy of dense, younger stands. Within the Eugene District, the youngest stands believed capable of providing marginal foraging opportunities are those with adequate space beneath the canopy, e.g., 30 feet or more. This condition is usually developed by the time forests are 50 years old. Large tracts of mature and old growth forest are

Table 3-53. Marbled murrelet habitat within the Eugene District

Miles from Coast	Eugene District Forest Acres	Marbled Murrelet Habitat Acres	Western Oregon BLM Habitat Acres
0-12	222	80	12,038
13-25	27,972	8,412	73,938
26-35	80,740	11,491	115,386
36-50	41,866	8,754	156,479
50 +	149,724	0[1]	0[1]
Total	**300,524**	**28,737**	**357,841**

[1] As of June 1994, no murrelets have been located in Oregon more than 50 miles from the coast.

considered optimum to superior habitat for all requirements of the owl; younger forests, and highly fragmented older forests, provide habitat of lesser quality and, therefore, lower productive capabilities; early and mid seral stages provide essentially no usable habitat (Thomas et al., 1991; USDI, 1991a).

Although there are over 50,000 acres of mature and old growth forests present on BLM lands within the planning area (based on the 1988 forest inventory), not all of it is within foraging range of known owl nest sites and activity centers. Assuming a foraging range of 1.2 miles in the Cascades and 1.5 miles in the Coast Range, approximately 46,000 acres of mature and old growth are occupied suitable spotted owl habitat (based on occupancy by pairs in 1991, and pairs or singles for any two years during the period 1987 through 1991). This area (46,000 acres) is approximately 63 percent of the District's total acreage of mature/old growth forest, 15 percent of all BLM administered lands, and less than 7 percent of all forest lands within the BLM operating area.

Younger forests (e.g., 40 to 70 years) serve as marginal habitat for foraging (if adequate prey populations are available) and for nesting if large residual nest trees remain from a prior stand, or such stands are within the home range of birds nesting in adjacent older forests. Based on the 1988 forest inventory, there are approximately 30,000 acres of this habitat within 1.2 and 1.5 miles of occupied owl nest sites/activity centers within the BLM operating area. This is approximately 10 percent of the BLM forest land base and less than 5 percent of all forest lands within the BLM operating area.

Due to the very low capability of existing young forest stands (lacking structural diversity) for sustaining nesting pairs, their value to spotted owls is, for all practical purposes, limited to providing cover for dispersing birds. Although spotted owls are thought to be capable of dispersing through young forests with at least 40 percent crown closure, such conditions are considered marginal for this use. Furthermore, given the amounts of recently denuded lands and other stands less than 40 years of age, which provide no significant habitat value for spotted owls, the BLM operating area is highly fragmented with regard to dispersal habitat.

Owl inventories began in the Eugene District in 1972. These low intensity inventories continued through 1985. After 1985, survey intensity increased considerably and generated more information and a significantly better understanding of spotted owl behavior and habitat use. A radio telemetry study of spotted owl habitat use was conducted in the Siuslaw River/Wolf Creek area (Coast Range) during the spring/summer of 1980 (Forsman, 1981), and another in the same area between 1985 and 1990 (Thrailkill and Meslow, 1990). Banding began in 1986 and has been continued annually. Ongoing research/monitoring efforts include density/demography studies in the Coast Range and McKenzie Resource Areas.

Since 1972 over 120 spotted owl nest sites and activity centers have been identified on BLM lands within the BLM operating area (see Map 3-6). Numbers of pairs and single adult, or subadult birds found at each site have varied from year to year depending upon survey intensity and both natural and human caused environmental factors. Over 300 spotted owls have been banded in the Eugene District.

Oregon Silverspot Butterfly, *Speyeria zerene hippolyta* (Federal Threatened)

Hammond (pers. comm.) identified this as an endemic coastal species with Florence as the southern extent of its range. The species utilizes meadows and low shrub fields close to ocean beaches. No suitable habitat is known to occur on Eugene District lands.

Federal Candidate, State Listed and Bureau Sensitive Species

American Marten, *Martes americana* (Bureau Sensitive)

The principal factors responsible for the declining numbers of martens are losses of old-growth and mature forest stands and habitat fragmentation due to timber harvest (Marshall et al. 1992). Home ranges are large (from 700 to 5,400 acres per animal). Research from areas outside western Oregon indicates that one square mile of mature and old growth forest (with a canopy closure greater than 50 percent, and normal snag/fallen tree components) provides suitable winter cover and forage habitat for a pair of martens; a tree canopy closure of less than 25 percent provides no value as winter cover (Allen 1982). Martens are apparently dependent upon an abundance of snags, logs, and windthrown trees for denning and habitat base for prey (Jones and Stokes 1980, Marshall et al. 1992).

Although a large proportion of the BLM operating area is within the historic range of the marten (Maser et al., 1981), few observations have been made in recent years. The paucity of recent records of this species and current ranges of the marten in Oregon as shown by Marshall et al. (1992) indicate that the species may no longer occur within the BLM operating area. A 1980 survey in the South Valley Resource Area failed to locate any individuals. However, given restoration of suitable habitat, the species may become reestablished on District lands.

California Wolverine, *Gulo gulo* (Federal Candidate 2, State Threatened)

This species probably occurs in the higher elevations of the Cascades. No surveys have been accomplished on District lands, and the species is not expected to occur here due to reduction and fragmentation of its preferred habitat, older forests, and lack of open alpine meadows and shrub fields. Range expansion onto BLM lands is unpredictable, although possible.

Cascades Frog, *Rana cascadae* (Federal Candidate 2)

This aquatic species occurs in the Cascade Range above 2,600 feet; it is associated with wet meadows and edges of ponds in meadow situations and along marshy edges of lakes and ponds (Marshall et al., 1992). Ongoing inventories for occurrence of amphibians in planned timber sales have not located any animals of this species on District lands, but some potential exists on higher elevation sites.

Fender's Blue Butterfly, *Icaricia icarioides fenderi* (Federal Candidate 2)

This species occurs in the Willamette Valley in low elevation meadows that represent prairie remnants, and in at least one middle elevation forest prairie in the Coburg Hills (Hammond pers. comm.). Threats to the butterfly include agricultural and urban development, grazing, and the lack of prairie-maintaining fire. The species requires various *Lupinus* species, especially Kincaid's lupine, for reproductive needs. No populations are known to exist on BLM ownership, but at least 2 populations are known to occur near BLM lands in Lane County. Potential to manage this species exists through land acquisition or exchange.

Foothill Yellow-legged Frog, *Rana boylii* (Federal Candidate 2)

This species was formerly common in the southwestern portion of the State but also inhabits the Willamette Valley (Marshall et al., 1992). The primary habitat is low to moderate gradient streams, normally 4th order or larger with a gravelly or rocky substrate, and some open sunlit areas; the species does not venture far from water (Applegarth, 1994). This species appears to have severely declined throughout the District, based on literature reports and limited field survey information. The local decline of these frogs may be the result of stream destabilization by timber harvest, grazing, and mining. Other reasons include the spread of exotic predators (bass, bluegill, and the bullfrog), and silt pollution. It occurs in the Smith River drainage south of the Eugene District and has been documented from foothill areas of the Cascades in the Eugene District (Applegarth, 1994). It may occur on other streams within the BLM operating area but inventory data are lacking.

Fort Dick Limnephilus Caddisfly, *Limnephilus atercus* (Federal Candidate 2)

This species inhabits permanent and temporary streams, lakes, ponds, marshes, and bogs (Invert. Characterization Abstract, Ore. Nat. Heritage data base).

Fringed Myotis Bat, *Myotis thysanodes* (Bureau Sensitive)

This species occurs primarily along the coastal strip and in the Willamette Valley (Marshall et al., 1992). The primary habitat concern for this species is roost and nursery sites provided by mines, caves, and similar sites; it is also highly intolerant of human caused disturbances (Marshall et al., 1992). Where caves and other structures have been protected, local populations have remained stable or increased (Marshall et al., 1992). This species forages through many forest and open habitat types. No surveys have been conducted on the District by BLM personnel, nor has the District identified or protected roosts, nurseries, or hibernacula in a systematic manner; however, data on some sites has been reported by Perkins (1984).

Harlequin Duck, *Histrionicus histrionicus* (Federal Candidate 2)

The harlequin duck is a rare breeding species in Oregon. Its breeding habitat is described as whitewater mountain streams where it nests under the shelter of vegetation, rocks, or stream debris on the ground, or in stream debris along rocky shores of streams adjacent to rapids or other turbulent water (Marshall et al., 1992), where riparian vegetation has not been adversely modified or where it has recovered following disturbance. Harlequins feed mainly on aquatic invertebrates (Bellrose, 1980:182-184). Within the District, white water reaches and tributaries of the McKenzie and Willamette Rivers in the Cascades provide potential breeding and feeding habitat (Marshall et al. 1992, Ore. Nat. Heritage Database). In 1993 the District delineated reaches of Mosby, Sharps, Martin, Fall, and Bear creeks, and Big River and McKenzie River that offer potential breeding or feeding habitat, and initiated cooperative surveys with ODFW and USFS. One sighting of this species in the east portion of the South Valley Resource area was reported by a BLM biologist.

Lewis' Woodpecker, *Melanerpes lewis* (Bureau Sensitive)

This species was originally widely distributed throughout the State, but is now limited "mainly to the oak-ponderosa pine belt east of Mt. Hood . . .", and also "breeds sparingly in the foothill areas of the Rogue and Umpqua river valleys . . ." (Marshall et al., 1992). It is believed to have been extirpated from the Willamette Valley as a breeding species where it formerly occupied open Douglas-fir and oak-grass savanna areas. The loss of large cottonwood trees in riparian areas, and open oak and oak-conifer woodlands, causes severe declines in the breeding population. Lewis' woodpeckers prefer trees that are "hundreds of years old" in recently burned woodlands for nesting and foraging, avoiding areas with young overstory trees, unburned forests, or clear cuts (Marshall et al., 1992). Timber management practices of the last 40+ years have not produced the type of habitats required by this species. Little potential habitat currently occurs on the District.

Merlin, *Falco columbaris* (Bureau Sensitive)

These small falcons range throughout the District but are an uncommon nester. Their habitat includes open stands of Douglas-fir, oak woodlands, and riparian zones. They nest in cavities, tree nests built by other birds, and sometimes on the ground or on cliffs. They feed mainly on birds, but also take insects and small mammals.

Mountain Quail, *Oreortyx picta* (Federal Candidate 2)

Despite the Federal Candidate 2 status of this species, populations west of the Cascade Range appear to be stable, wide spread, and locally common. This species occurs in a variety of habitats Districtwide, usually associated with early seral and open forest and woodland vegetation. The rapid regrowth of stands following harvest reduces potential nesting habitat on the District due to the rapid closing of the canopy and ensuing suppression of herbaceous and shrubby vegetation. Although believed to forage primarily in the early seral stage, this species also uses conifer stands for cover, including the edges of mature and old growth stands. Although incidental observations of this species have been made throughout the BLM operating area, the District has conducted no inventories for it.

Northern Goshawk, *Accipiter gentilis* (Federal Candidate 2)

In western Oregon goshawk nesting is believed to occur above the 1,900 foot elevation in the Cascade Range. Research from several study areas in the western United States indicates the birds require dense overstories of mature or old growth trees and sparse ground cover for successful foraging and nesting. These conditions generally apply to the nest site, nest stand, and forage area. Nests are typically situated on a large limb against the bole of a large mature or old growth tree and beneath or just above the lower branches of the upper tree canopy. Nest sites are usually on north exposures of gentle to moderate slope, while sites in steep topography are usually situated on benches or at the bottom of steep slopes. Nest sites are also often closely associated with quiet streams or springs (Reynolds et al., 1982; Reynolds, 1983; Hall, 1984; Crocker-Bedford, 1990).

Goshawk nesting densities are approximately 4 pairs per township in suitable habitat (Reynolds, 1983). Goshawk nest territories can be 6,000 or more acres in size (Marshall et al., 1992). Nest stands approximate 400 acres and are associated with large tracts (nearly 5,000 acres) of mature and old growth forest for foraging (Crocker-Bedford, 1990). Since goshawks appear to require large tracts of older forest for successful nesting, Crocker-Bedford (1990) recommended extended rotations on a watershed

basis so as to maintain 2,500 to 5,000 acres of older forest around nest sites. Based on literature review, it appears goshawk declines are due to the reduction and fragmentation of preferred nesting and foraging habitat, leaving nesting habitat isolated and in need of regrowth of the matrix forest. They also have suffered from pesticide contamination and human disturbances at nest sites.

About 10,700 acres of older forest habitat currently exists on the District in highly fragmented stands, and another 37,200 acres of foraging habitat occurs. Because of the checkerboard land pattern of the District, the current age class of BLM forest habitat, and the large percentage of intermingled private lands managed for younger seral conditions, there are few contiguous older forest habitat patches greater than 400 acres occurring within the planning area to support nesting. Goshawk sightings are scarce in the Eugene District. Individual birds have been observed only occasionally. One nest was located in 1979 but was subsequently destroyed during timber harvesting. No systematic, project level surveys for goshawks have been performed.

Northern Red-legged Frog, *Rana aurora aurora* (Federal Candidate 2)

The red-legged frog roams far into humid, well-vegetated forests and forest meadows, sometimes many hundreds of feet from the nearest pond or stream (Applegarth, 1994; Nussbaum et al., 1983). It is a diurnal predator on the forest floor and probably eats mostly arthropods, but may also consume small vertebrates (Hays, 1955). The species has recently become scarce in the Willamette Valley (St. John, 1987) and now seems to be absent from many streams and ponds in western Oregon (Applegarth, 1994).

Potential habitat for the red-legged frog exists throughout the District. Multiple factors, including introduced predators (e.g., bullfrogs, bass), loss of breeding ponds, and riparian habitat degradation, have caused declines and local extirpation of the species. Based on assessments of most timber sales and other proposed projects since 1991, and limited, nonsystematic surveys to document red-legged frog populations on District lands, the species shows a fragmented distribution within the District, occurring on the flood plains and in tributaries of the Long Tom, McKenzie, Mohawk, and Siuslaw rivers. It is scarce or absent, and is generally replaced by the bullfrog along the lower parts of all forks of the Willamette River.

Northwestern Pond Turtle, *Clemmys marmorata marmorata* (Federal Candidate 2)

On August 4, 1993, the U.S. Fish and Wildlife Service declined to list this species as threatened stating that it is still distributed over 90 percent of its native range, but would continue to review the biological status of the species. However, the species has suffered severe declines within the Willamette Valley and surrounding drainages, with little evidence of reproduction (Holland pers. comm.).

The western pond turtle requires quiet waters in small lakes, ponds, and streams, with logs and rocks exposed for basking areas. Rangewide surveys and research indicate population decline and local extirpation resulting from exotic predators, habitat degradation, overharvest, and reproductive failure. Turtle habitat has been degraded by reservoir construction, removal of rocks and logs from rivers, stream channelization, wetland "reclamation," chemical pollution, and the loss of nesting habitat. The Oregon Department of Transportation surveyed parts of the West Eugene Wetlands area in 1993; preliminary results indicate the presence of a small but declining population.

Oregon Giant Earthworm, *Megascolides macelfreshi* (Federal Candidate 2)

This subspecies inhabits well drained soils with subsurface moisture, in conifer or bigleaf maple bottoms, in valley situations, with clay loam soils (Invert. Characterization Abstract). No surveys have been accomplished on the District.

Oregon Slender Salamander, *Batrachoseps wrighti* (Bureau Sensitive)

This is the only amphibian that is endemic to Oregon. It occurs on the west slope of the Cascade Range from Waldo Lake to the Columbia Gorge, plus an isolated population east of Mount Hood. This salamander is associated with coarse woody debris and/or fractured rock rubble usually under mature Douglas-fir forest within an elevational range of 15 to 1,340 meters (50 to 4,400 feet), but "They are largely absent from recently clear-cut areas (Nussbaum et al., 1983)." The extent of decline in numbers and distribution that resulted from logging activities is unknown. Preliminary surveys in 1992 and 1993

failed to locate any examples of this species on BLM land in the Eugene District. Potential habitat is present at higher elevations in the eastern part of the McKenzie Resource Area (Applegarth, March 1994).

Pacific Fisher, *Martes pennanti pacifica* (Federal Candidate 2)

The historic range of the fisher (Maser et al., 1981) includes that portion of the Eugene District located within the Cascade Range. The range map (Marshall et al., 1992) also indicates a considerable portion of the District's ownership in the Coast Range was at least formerly occupied. Research from outside Oregon indicates that fishers prefer dense mature and old growth conifer-dominated forest, with hardwoods and riparian vegetation of 40 to 70 percent canopy cover, and rely heavily upon down woody debris and tree cavities for denning, including the rearing of young (Jones and Stokes, 1980; Marshall et al., 1992). "Dense mature and old growth forest stands are believed to constitute optimum habitat, although study results vary by region" (Marshall et al., 1992). The District's 1980 inventory for marten and fisher failed to detect any animals or their sign. Thought never to have been abundant in this area, fishers are now considered to be "depleted" with an unknown number inhabiting the area today. Although the original population decline in Oregon resulted from trapping and the placement of strychnine baits for predator control, the failure of the fisher population to recover is the result of habitat loss, fragmentation, and degradation (Marshall et al., 1992).

Pacific Western (Townsend's) Big-eared Bat, *Plecotus townsendii townsendii* Federal Candidate 2)

This bat species feeds on flying insects in a variety of habitats, including wet meadows, riparian and forest openings. The primary habitat concern is suitable undisturbed roost, nursery, and hibernaculum sites (Marshall et al. 1992). In the BLM operating area abandoned mines, cliffs, caves and rock outcrops provide suitable sites. The species is highly intolerant of human caused disturbances, including recreational activities such as rock climbing and spelunking. The species is declining severely in Oregon and other states primarily due to human disturbance and habitat destruction. Where caves and other structures have been protected, local populations have remained stable or increased (Marshall et al., 1992). No surveys have been conducted on the District by BLM personnel, nor has the District identified or protected roosts, nurseries or hibernacula in a systematic manner; however, data on some sites has been reported by Perkins (1984, 1987). None of these known sites are on District lands.

Pileated Woodpecker, *Dryocopus pileatus* (Bureau Sensitive)

Research indicates that pileated woodpeckers require large snags for nesting (e.g., a mean diameter of 28 inches dbh and 83 feet tall). These snags must be located within or beneath a relatively dense (over 60 percent indicated by most studies) forest canopy (Mellen, 1987). Excavation in live trees is considered rare or uncommon. Pileated woodpeckers in western Oregon nest extensively in Douglas-fir, and most nest trees (green or snags) have broken tops (Mellen, 1987). Mellen (1987) found the average home range size for pileated woodpeckers in the Oregon Coast Range was 1,170 acres (range 600 to 2,600 acres). Within these home ranges, forests older than 70 years averaged 44 percent of total land area. The birds selected for mature forest and deciduous hardwood and selectively avoided coniferous stands less than 40 years of age. The species does utilize younger aged forests containing mature or old growth remnants. All studies show that pileated woodpeckers nest at sites with high basal area and high densities of large snags, although a wide range of conditions were used (Mellen, 1987). Recommendations for timber harvests include leaving 45 dead trees of appropriate sizes per nesting territory (Marshall et al., 1992), and maintaining 6 large snags per 100 acres over the life of a stand (Neitro et al., 1985). Bull and Meslow (1977) found that pileated woodpeckers selected nest snags from clusters of snags (in dense forests) and recommended management for groups of snags in 5-acre patches.

Elimination of old growth and mature forests with two or more canopy layers, and loss of abundant large snags and down wood has caused significant declines in population and distribution in western Oregon, although the pileated woodpecker may be common locally. The species appears to be widespread but uncommon on the District wherever suitable habitat exists. Habitat suitable for this species is believed to be declining throughout the BLM operating area due to the depletion of mature and old growth forests and the very low rate of retention of snags and large, decadent green trees (essential for snag production in subsequent second growth forests) in timber harvest areas.

Although numerous observations of pileated woodpeckers have been recorded throughout the BLM operating area, no systematic, project level inventories of the birds have been done.

Purple Martin, *Progne subis* (Bureau Sensitive)

Purple martins are avian pioneers of burned forests. Under natural conditions, post wildfire habitats in older forests afford an abundance of nest cavities within airspace free of obstructions where high-flying insects can be captured (Jackman and Scott, 1975; Scott et al., 1977; USDI, 1985; Marshall et al., 1992). The U.S. Fish and Wildlife service has identified the problem confronting the species as "a serious lack of nesting sites (snags)." USFWS also states that "Forest management practices, such as the suppression of fires and clear cutting without snag retention, have significantly reduced natural nesting cavities and nesting opportunities" (USDI, 1985).

The USFWS assessment of regional problems appears to be an accurate description of the situation within the BLM planning area where populations are believed to be far below potential due to past management actions that removed snags and dead trees after wildfires, and the small numbers of large snags being retained in openings created by timber harvest. Minimum snag sizes suitable for purple martins are at least 15 inches dbh and 10 feet tall (Brown, 1985: Appendix 19).

Competition with introduced species (starlings and house sparrows) for available nest cavities also impacts reproduction (Marshall et al., 1992). The species readily adapts to artificial nest boxes at appropriate habitat, when properly maintained. No extensive surveys have been accomplished for this species on the District, although a few breeding sites have been documented through incidental observations.

Spotted Frog, *Rana pretiosa* (Federal Candidate 1)

Throughout its range, the spotted frog seems to favor lakes and slow-flowing streams. Generally these frogs are associated with permanent water where the bottom is soft—muddy or boggy—which may be needed for hibernation (Applegarth, 1994). The spotted frog appears to have been extirpated from most of its range in western Oregon. This is thought to be the result of introduced aquatic predators, especially the bullfrog (Nussbaum et al., 1983), as well as habitat modification including stream channelization and wetland "reclamation".

The spotted frog formerly inhabited the Willamette Valley, and it is known from at least 15 locations including Amazon Creek at Highway 36. The spotted frog probably is extirpated from the Willamette Valley due to the introduction of aquatic predators and habitat loss, including elimination and degradation of valley wetlands. The species still occurs in limited distribution in high Cascades lakes on National Forest lands. Reintroduction of the species into the West Eugene Wetlands area is considered a possibility.

Tombstone Prairie Farulan Caddisfly, *Farula reaperi* (Federal Candidate 2)

This species is likely to occur throughout the Oregon Cascades at elevations above 4,000 feet. Crawling larvae inhabit small (0.25-1.0 m wide) spring-fed streams shaded by old growth forest. Intact coniferous canopy over small streams may be important. Inhabited streams have cold water, abundant moss, large amounts of cobble and woody debris, in moderate to fast current (Invert. Characterization Abstract).

Tombstone Prairie Oligophlebodes Caddisfly, *Oligophlebodes mostbento* (Federal Candidate 2)

The genus occurs in cold mountain streams (large and small) from sea level to alpine communities throughout western North America. Streams are perennial, cool or cold, free of fine sediment and filamentous algae, with moderate to strong current and are well-oxygenated" (Invert. Characterization Abstract). Species of this genus have larvae that associate with rocks that support diatoms.

White-footed Vole, *Arborimus albipes* (Federal Candidate 2)

This species, possibly the rarest of North American microtine rodents, apparently uses a wide range of successional stages in moist riparian zones when dense vegetation and down woody debris is present (Marshall et al., 1992). According to Marshall et al. (1992), habitats where the species has been found include "along small streams in alder associations" and "logged, burned and mature coniferous forests. However, as indicated by Marshall et al. (1992), data

from recent ongoing trapping suggests association with mature riparian stands.

Most of the Eugene District is within the range of the species as mapped by Marshall et al. (1992). A white-footed vole was captured in a pitfall trap in the Siuslaw River area during 1984-1985 field work for a U.S. Fish and Wildlife Service study in the Oregon Coast Range. Also, the remains of a white-footed vole were found in a spotted owl pellet collected from BLM lands east of Cottage Grove. The Eugene District has conducted no inventories for this species.

Bureau Assessment Species

Barrow's Goldeneye, *Bucephala islandica* (Bureau Assessment)

Goldeneyes nest in tree cavities excavated by woodpeckers, and in artificial nest boxes (Bellrose, 1980:423 & 425; Marshall et al., 1992). Availability of nesting cavities around wooded lakes and ponds limits breeding by Barrow's goldeneyes. They likely would expand their breeding range onto the District if suitable cavities were available within 100 feet of shallow lakes and ponds that have extensive beds of submerged aquatic and marsh vegetation (Bellrose, 1980:425). No surveys for this species have been conducted on the District, but habitat potential is assumed to be low.

Black Swift, *Cypseloides niger* (Bureau Assessment)

Although there are no confirmed nests of this species in Oregon, there is a possibility that it nests within the BLM operating area. It feeds wherever it finds flying insects; its nesting habitat is extremely specific: high, inaccessible cliff sites with falling water, day-long shade and unobstructed flyways (Marshall et al., 1992). Although no surveys have been accomplished on the District, habitat potential is assumed to be low.

Bufflehead, *Bucephala albeola* (Bureau Assessment)

Buffleheads nest in cavities in trees close to the margin of a lake, river or pond. A Canadian study found that deciduous trees were preferred for nesting over Douglas-fir trees (Bellrose, 1980: 414 & 418). Nesting habitat on the District (high mountain lakes in the Cascade Range) is limited, or nonexistent. The primary limiting factors are loss of nest trees around these lakes, and disturbance. No survey work has been accomplished on the District, and population potential is assumed to be low.

Clouded Salamander, *Aneides ferrus* (Bureau Assessment)

The clouded salamander "is associated with two basic types of habitat throughout its range - talus and fallen trees," especially large fallen Douglas-fir, which are the product of old growth forests (Whitaker et al., 1986). "Females lay their eggs in late spring in rotting Douglas-fir logs" (Green and Campbell, 1984). Clouded salamanders often climb as high as 20 feet up in trees and can be found under the bark of dead trees, both fallen and standing (Nussbaum et al., 1983). The clouded salamander inhabits forests (including edges) and can be abundant in forest clearings created by fire where there is an abundance of large woody debris in advanced stages of decay (Applegarth, 1994; Marshall et al., 1992). Clouded salamanders estivate inside large rotten logs, deep in rock crevices, near clay layers, in root channels, or wherever they can find persistent dampness (Applegarth, 1994).

The clouded salamander seems to be fairly widespread in the BLM operating area. In some areas it seems to be absent, in a few locations it is abundant, and in general it is moderately scarce (Applegarth, 1994). The elevational distribution of this species in western Oregon is from sea level to over 4,000 feet. It probably occurs in all three Resource Areas.

Dusky Canada Goose, *Branta canadensis occidentalis* (Bureau Assessment)

This species occurs as an overwintering species within wetlands of the Willamette Valley. Oregon supports about 40 percent of the wintering dusky goose population; 28 percent of these winter in Lane County (Bellrose, 1980: 153; U.S. Fish Wildl. Service, 1986:7; Marshall et al., 1992). The Oregon Department of Fish and Wildlife has established an objective to increase the Oregon wintering population to 20,000 birds. District actions do not appear to be contributing to the current population decline (ibid.). Potential exists to manage this species on the West Eugene Wetlands through reestablishment of wetland/aquatic ecosystems.

Great Gray Owl, *Strix nebulosa* (Bureau Assessment)

This circumpolar species has been extirpated from the Willamette Valley, and is uncommon in central Oregon and declining due to habitat losses. Its primary habitat has been described as "open forest, or forest with adjoining deep-soiled meadows" (Marshall et al., 1992). The species appears to be expanding its range into the west slope of the Cascades where it is believed to be using timber harvest areas for foraging while nesting in adjacent older forest stands. On the Willamette National Forest, the species nests in mature and old growth conifer stands with more than two canopy layers near open meadows or partially logged stands (Marshall et al., 1992). The species has not been documented in the recent past in District lands, and no analysis is available regarding its potential reestablishment in the Willamette Valley.

Northern Saw-whet Owl, *Aegolius acadicus* (Bureau Assessment)

According to Jones and Stokes (1980), the saw-whet owl is a secondary cavity nester that requires natural cavities or cavities excavated by woodpeckers in snags for nesting; cavities are also used for roosting and for shelter during the overwintering period. Habitats of high capability for maintaining or increasing saw-whet owl populations are young growth, mature and old growth successional stages of coniferous forest type, if snags with suitable nesting cavities are present. Grass-forb and shrub-seedling stages, as well as "large areas of uniform stands," are not suitable habitat for this species. Because of its dependence on existing cavities for nesting, the saw-whet is adversely affected by forest management practices that remove snags or diseased trees, or convert mixed-aged stands to young stands (Johnsgard, 1988).

No inventories have been conducted exclusively for this species but encounters during spotted owl inventory and monitoring surveys have been recorded. Suitable habitat for this species is rapidly declining within the District planning area, and a similar trend in populations is assumed.

Pacific Pallid Bat, *Antrozous pallidus pacificus* (Bureau Assessment)

Although this species occurs primarily in arid regions of the State, it has been documented in Lane County (Marshall et al., 1992). Bridges, rock crevices, cliff overhangs, and large trees are potential roost sites. It is extremely susceptible to human disturbance at roosts and nursery sites. No surveys have been conducted on the District by BLM personnel, nor has the District systematically identified or protected roosts, nurseries, or hibernacula. A few known locations of the species were reported by Perkins (1984).

Painted Turtle, *Chrysemys picta* (Bureau Assessment)

The painted turtle is an inhabitant of wetland habitats in the Willamette Valley, and probably reaches its southern limit near Eugene. The species is adapted to wetlands having large amounts of aquatic vegetation and open areas nearby for nesting. The population status on the District is unknown, although few specimens have been reported here, and is likely to be declining due to habitat degradation and introduced predators, especially bullfrogs. It may occur in the Long Tom River drainage, and possibly could benefit from wetland acquisition and restoration in the West Eugene Wetlands.

Sharptail Snake, *Contia tenuis* (Bureau Assessment)

Occurrence of this species in Oregon is limited to scattered localities in the Willamette, Umpqua, and Rogue River valleys and other interior valleys west of the Cascades. Habitat for this species includes open conifer forests and oak-grassland edges, often near streams or in damp situations associated with stable talus slopes (Marshall et al., 1992). This species occurs in grass-oak woodlands on the fringes of the Willamette Valley, and is adversely affected by the invasion of grass-oak woodlands by conifer species and the ensuing closure of the canopy due to the absence of historic fire patterns. The District manages relatively few acres of this habitat and, hence, another adverse impact to the species is the loss of habitat to agricultural and urban development under existing private ownership. Ongoing inventories of planned actions have located one animal and several locations supporting what appears to be favorable habitat for this species (Applegarth, 1994).

Tailed Frog, *Ascaphus truei* (Bureau Assessment)

The tailed frog lives where other anurans (toads, tree frogs, and ranid frogs) cannot — where it is not in

direct competition — in cold, high gradient mountain streams associated within late seral, mature, and old growth coniferous forests. Tailed frogs seem to require streams that are cold (generally well shaded) and clean, i.e., little mud and silt (Applegarth, 1994; Marshall et al., 1992; Nussbaum et al., 1983: 150). They may also be absent from streams in otherwise favorable habitats where they are downstream from sources of siltation (e.g., clear cuts or roads) (Applegarth, 1994). Persistence of the species in degraded habitats can occur due to its long generation time (up to 15 years) and site tenacity. Adult tailed frogs are less tolerant of desiccation than many other anurans; the coolness and dampness of air near streams may also be critical to these animals (Claussen, 1973; Hawkins et al., 1988: 259).

Many mountain streams in the District no longer seem to be inhabited by the tailed frog. Tailed frog populations have been found in Bear Creek and Marten Creek in the McKenzie Resource Area, and in the Greenleaf Creek drainage in the Coast Range Resource Area. Other sites on the District (January Creek, Wildcat Creek, Pheasant Creek) have what appears to be remnants of declining populations. The tailed frog now seems to be limited to minimally disturbed watersheds on BLM and National Forest lands.

Western Bluebird, *Sialia mexicana* (Bureau Assessment)

Bluebirds nest in natural cavities in decadent older trees, holes excavated by woodpeckers, and artificial nest boxes in areas of diversified agriculture and early seral stages. In the coniferous forest zone, western bluebirds are avian pioneers of post wildfire conditions. Western bluebirds favor nest sites dominated by herbaceous vegetation that occupy burned areas for a relatively brief period of time (Pinkowski, 1979). Western bluebirds are also cavity nesters that exploit natural cavities and old woodpecker holes in standing dead trees (Jackman and Scott, 1975; Scott et al., 1977; USDI, 1985; Morrison and Meslow, 1983). Snags or decadent green trees, at least 15 inches dbh and 10 feet tall (Brown, 1985: Appendix 19), are capable of providing suitable bluebird nest sites if they have cavities and are located in early seral stage (i.e., herb dominated) habitat (Pinkowski, 1979). Similarly, the USFWS (USDI, 1985) and Power (1989) state that suppression of wildfire has ended the periodic renewal of bluebird habitat, as has the conversion from primitive logging methods of the past to modern practices that leave no snags as a source of nest cavities. USFWS concluded that this has led to the apparent serious decline of the species throughout western Oregon, western Washington and southwestern British Columbia (USDI, 1985).

The availability of nest cavities is a principal limiting factor; studies have found significant nesting populations in clear cuts with residual snags or nest boxes. Recommended conservation measures include snag retention procedures during logging, nest box placement and maintenance, and restricted use of pesticides (Marshall et al., 1992). The District currently manages bluebirds at the Tyrrell Seed Orchard through the maintenance of bird boxes.

Special Areas

Special Areas are currently identified for management on the Eugene District through land use plan allocation and designations. Special Areas consist of Areas of Critical Environmental Concern (ACEC), Research Natural Areas (RNA), Outstanding Natural Areas (ONA), and Environmental Education Areas (EEA).

ACEC have been designated under the authority of the Federal Land Policy and Management Act of 1976 to protect important historic, cultural, scenic values, natural resources, and natural systems or processes. Natural hazard areas can also be identified under an ACEC designation. An RNA is an ACEC that contains natural resource values of scientific interest and is managed primarily for research and educational purposes. An ONA is an ACEC that contains unusual natural characteristics and is managed primarily for educational and recreational purposes. An EEA is identified for educational purposes. Identification of EEA has been under management discretion where significant interest in specific areas has been identified for environmental education.

Some inventory, monitoring and research has occurred within previously designated areas. Monitoring has focused primarily on defensibility monitoring, preventing such activities as camping, Off Highway Vehicle (OHV) use and illegal harvest of Special Forest Products, etc. Research and Inventory has been implemented within Special Areas both from external sources such as Universities as well implemented by BLM botanists and biologists.

Most existing Eugene District reciprocal right-of-way agreements with intermingled private landowners do not contain provisions that allow BLM to prevent the construction of roads across public lands included

within a proposed project area. Special Areas, included within these areas, would be subject to the provisions of these agreements. To date, no such conflicts have occurred.

Currently no oil, gas or mineral leases have impacted Special Area values. Some Special Areas are currently withdrawn and closed to mineral entry. For ACEC that are not withdrawn, claimants would have to file a Plan of Operation. Salable mineral development could occur but would have to be consistent with surface management objectives.

During the initial stages of the 1990s RMP process, the public, BLM employees, and other government agencies identified new areas within the District with resource values that appeared to meet ACEC criteria. (See Identification & Screening of Candidate ACEC, Appendix U, Table 3-27). All existing and potential Special Areas were then reviewed by an interdisciplinary team to determine whether the areas met the ACEC criteria of relevance and importance (see glossary). During this review, recommendations were made to alter boundaries of some of the potential or previously designated Special Areas to better protect or identify the primary values of the area(s). The decision to designate any or all of the potential ACEC will be part of the District's RMP decision, which will be made following completion of the RMP/EIS.

The Eugene District manages 10 Special Areas, totalling 1,572 acres. Included in these Special Areas are 4 ACEC/RNA, totalling 939 acres; 3 ACEC, totalling 201 acres; and 3 EEA totalling 432 acres. All existing Special Areas were reviewed and found to still meet relevance and importance criteria, except for Vik Road EEA and Row River EEA.

Existing and potential Special Areas are briefly described in Table 3-25 and displayed on Map 3-7. EEA were reviewed separately to determine the current and past use as well as the future potential for environmental educational purposes. The present condition of each existing and potential Special Area is described in Appendix V, Table 3-28.

Prior to issuing the Draft RMP, 21 new areas had been nominated for possible designation as ACEC, ACEC/RNA or ACEC/ONA. Potential adjustments to 4 existing ACEC or ACEC/RNA were also identified. An interdisciplinary team determined each of the areas eligibility for Special Area status. The team determined that 3 of the 21 proposed Special Areas did not meet the ACEC criteria of relevance and importance.

Low-elevation Headwaters of the McKenzie River Proposed ACEC, Lorane Ponderosa Pine Proposed ACEC, Dorena Prairie Proposed ACEC, and Cottage Grove Old Growth Proposed EEA were received during the internal review of the draft RMP/EIS. These nominations have gone through an internal review and qualify as potential ACEC or EEA. Because these areas have not been through the required public review process, the BLM has decided to carry these areas forward into the Final RMP/EIS as potential ACEC or EEA until a plan amendment is implemented or until a new planning process is initiated. Potential ACEC will be managed to prevent any degradation to the relevant and important values for which the areas were nominated as per BLM Policy 1613.21, Areas of Critical Environmental Concern, until they are fully evaluated through a future resource management planning process.

Deberry Road Ponderosa Pine Proposed ACEC was received on April 1, 1992. At the time the proposal was received, the area of concern was within a timber sale that had already been sold and awarded. The area was not screened for relevance and importance because the area could no longer be considered for ACEC status. Some mitigation of the primary values for which the site was nominated did occur by leaving and replacing ponderosa pine trees within the harvest area.

A thorough analysis of the potential RFI (Relict Forest Islands) and BEHA (Bald Eagle Habitat Areas) ACEC was accomplished during the internal review of the draft RMP/EIS. All areas contain forest stands that meet the relevance and importance criteria. Specific stands were identified within the larger nomination for BEHA or RFI that actually contained the relevant and important values for which the areas were nominated. Some areas within the original nomination were early seral stage forests that did not qualify under either nomination, and these areas were dropped from consideration. Several of the areas identified as RFI also qualified as essential habitat for bald eagles under the potential BEHA ACEC. RFI that qualified for bald eagles were shifted from the original RFI nomination over to potential BEHA ACEC (See Appendix U, Table 3-27 for adjustments in final acres recommended). Although BEHA qualified as potential ACEC, recommendations were to protect and manage the relevant and important values under Pacific Bald Eagle Recovery Plan and not as an ACEC. RFI were recommended to be carried forward in the final RMP/EIS as ACEC. See Special Status Species/Wildlife for a description of areas that were identified for bald eagles and other raptors.

Potential Special Areas are briefly described in Table 3-26 and displayed on Map 3-7.

Table 3-25 - Existing Special Areas

Special Area	Size (Acres)	Primary Resource Value/Description	Designation Current	Potential Proposed	Modification
Camas Swale ACEC/RNA	280*	Plant Community: Mature, dry-site, Douglas-fir forest in the Willamette Valley foothills	ACEC/RNA	ACEC/RNA	Adjust boundary to 314 acres to follow the road and to extend the north boundary to make area more easily managed.
Fox Hollow ACEC/RNA	160*	Plant Community: Mature, dry-site, Douglas-fir and ponderosa pine forest in the Willamette Valley foothills	ACEC/RNA	ACEC/RNA	None
Horse Rock Ridge ACEC	191*	Plant Community: Cascade foothills grass bald complex	ACEC	ACEC/RNA	Expand to 378 acres to include RNA values.
Lake Creek Falls ACEC	3	Hazard Area/ Fisheries/Recreation: Water play area; hazardous swimming area; anadromous fish passage	ACEC	ACEC/ONA	Expand to 58 acres. Area is used extensively by the public and can be better managed by addressing recreational interests.
Long Tom ACEC	7	Plant Community: Relict, pre-settlement presettlement Willamette Valley wetland community	ACEC	ACEC	None
McGowan Creek EEA	229	Educational: Mature forest, reforested harvest units and riparian zone along McGowan Cr.	EEA	EEA	Adjust boundary to 79 acres to include old growth forest only.
Mohawk ACEC/RNA	292*	Plant Community: Old growth Douglas-fir and western hemlock forest in the Willamette foothills	ACEC/RNA	ACEC/RNA	None

Table 3-25 - Existing Special Areas (continued)

Special Area	Size (Acres)	Primary Resource Value/Description	Designation Current	Potential Proposed	Modification
Row River EEA	25	Education/Recreation The area was nominated for Douglas-fir forest and adjacent riparian forest along Row River; Area is used for fishing access.	EEA	DROP	N/A
Upper Elk Meadows ACEC/RNA	207*	Plant Community: Mosaic of Douglas-fir and grand fir-Pacific silver fir old growth forests, open wet meadows and shrub covered wetlands	ACEC/RNA	ACEC/RNA	Adjust boundary and expand to 242 acres to include a buffer zone.
Vik Road EEA	178	Educational: Young Douglas-fir forest with Vik Creek and associated riparian community, including active beaver ponds	EEA	DROP	N/A

* Title Plat Acres

Table 3-26 - Potential Special Areas

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	Special Area[1] Eligibility
Bunker Hill	ACEC	36	Plant Community: The area was nominated for a remnant stand of old growth Douglas-fir.	No
Camas Swale Addition	ACEC/RNA	34	Plant Community: Additional acres were nominated to make the ACEC/RNA a more manageable unit by following roads and property lines.	Yes

Table 3-26 - Potential Special Areas (continued)

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	Special Area[1] Eligibility
Cannery Dunes	ACEC/ONA	40[2]	Scenic Values & Plant Community: The area was nominated for its Oregon Coastal scenic qualities and recreational opportunities.	Yes
Coburg Hills BEHA	ACEC	1,502	Wildlife: The area was nominated for its bald eagle habitat; Coburg Hill Key Raptor Area.	Yes
Coburg Hills RFI	ACEC	804	Plant Community/ Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area; old growth forest.	Yes
Coburg Hill Scenic Area	ACEC	40	Plant Community/ Visual: The area was nominated for a Douglas-fir forest along the crest of Coburg Hills visible from Interstate 5.	No
Cottage Grove[3] Old Growth	EEA	80	Plant Community/Wildlife/ Education: The area was nominated for the low elevation old growth forest in close proximity to Cottage Grove school system.	Yes
Cottage Grove Reservoir RFI	ACEC	54	Plant Community/ Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area; Willamette Valley fringe forest ecosystem.	Yes
Cottage Grove Reservoir BEHA	ACEC	177	Wildlife: The area was nominated for its bald eagle habitat: Cottage Grove Key Raptor Area.	Yes

Table 3-26 - Potential Special Areas (continued)

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	Special Area[1] Eligibility
Cougar Mountain Yew Grove	ACEC	40[1]	Plant Community: The area was nominated for the stand of large Pacific yew trees.	Yes
Dorena Prairie[3]	ACEC	8	Plant Community: The area was nominated for its remnant red fescue prairie grassland.	Yes
Dorena Reservoir BEHA	ACEC	803	Wildlife: The area was nominated for its bald eagle habitat and nest site. Dorena Lake Key Raptor Area.	Yes
Dorena Reservoir RFI	ACEC	18	Plant Community/ Wildlife: The area was nominated for important raptor habitat within identified Key Raptor Area; Willamette Valley fringe forest ecosystem.	Yes
Fall Creek Reservoir BEHA	ACEC	881	Wildlife: The area was nominated for its potential bald eagle habitat; Fall Creek Key Raptor Area.	Yes
Fawn Creek	ACEC	100	Plant Community/ Historic: The area was nominated for Douglas-fir forest adjacent to old homestead and school site that occurs off of BLM land.	No
Fern Ridge BEHA	ACEC	192	Wildlife: The area was nominated for its bald eagle habitat.	Yes
Grassy Mountain	ACEC	74[2]	Plant Community: The area was nominated as one of the last and finest examples of native grassy bald plant community.	Yes

Table 3-26 - Potential Special Areas (continued)

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	Special Area[1] Eligibility
Heceta Sand Dunes	ACEC/ONA	218[2]	Scenic/Geological/ Recreational: The area was nominated for its diversity in wildlife, plant communities and ecological systems.	Yes
Horse Rock Ridge Addition	ACEC/RNA	187	Plant Community: Additional acreage was nominated for RNA status to extend the undisturbed grassy bald. Includes important wildlife values.	Yes
Hult Marsh	ACEC	167	Plant Community/ Wildlife/Fisheries/ Recreational: The area was nominated for its diversity in plant and wildlife values.	Yes
Lake Creek Addition	ACEC/ONA	55	Recreation: Additional acres were nominated to include an area that has high recreation values.	Yes
Lorane Ponderosa[3] Pine	ACEC	106	Plant Community: The area was nominated for its Willamette Valley Ponderosa Pine plant community.	Yes
Low-Elevation[3] Headwaters of the McKenzie River	ACEC	7,650	Plant Community/Fish & Wildlife/Scenic: The area was nominated for the large block of intact low-elevation forest with Special Status fish and wildlife species.	Yes

Table 3-26 - Potential Special Areas (continued)

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	Special Area[1] Eligibility
McKenzie River BEHA	ACEC	2,752	Wildlife: The area was nominated for its potential bald eagle habitat; McKenzie River Key Raptor Area.	Yes
McKenzie River RFI	ACEC	0[4]	Plant Community/ Wildlife: The area was nominated for important raptor habitat within identified Key Raptor Area; old growth forest	Yes
Siuslaw River BEHA	ACEC	586	Wildlife: The area was nominated for its potential bald eagle habitat; Siuslaw River Key Raptor Area.	Yes
Triangle Lake BEHA	ACEC	1,100	Plant Community/ Wildlife: The area was nominated for its potential bald eagle habitat; Triangle Lake Key Raptor Area.	Yes
Triangle Lake RFI	ACEC	0[4]	Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area; old growth forest.	Yes
Upper Elk Meadows Addition	ACEC/RNA	16	Plant community: The additional acres were nominated to include a 16-acre parcel that will provide a buffer zone for the ACEC/RNA.	Yes

BEHA = Bald Eagle Habitat Area
RFI = Relict Forest Island

[1] Special Area Eligibility = Meets the ACEC criteria of Relevance and Importance
[2] Title Plat Acres
[3] These ACEC nominations were received between the Draft and Final RMP. They have gone through the ACEC screening process and have been determined to qualify as potential ACEC. Because they have not yet gone through the required public review period, they will be carried forward as potential ACEC/EEA until a RMP amendment is implemented or until a new planning process occurs.
[4] Some acres of RFI were converted to acres of BEHA, based on interdiciplinary review and review by the nominee, in order to better meet the needs of species associated with the ACEC nomination.

Cultural Resources

The planning area encompasses lands that fall into two different cultural areas. The Coast Range portion of the District is within the Northwest Coast cultural area. The interior valley and the Cascade Range are within the Plateau cultural area. Human occupation of the planning area may date back continuously for 11,000 years. A variety of sites represent a wide range of human activities over this time span. These sites range from seasonally occupied winter village sites to ephemeral residence and extractive/activity specific sites. A number of 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 in the Cascades and Coast Range. No site of aboriginal religious significance has been identified in the planning area.

On BLM administered land 89 prehistoric sites and 171 prehistoric isolated finds have been documented on BLM administered land. Two sites have been formally determined eligible for listing on the National Register of Historic Places.

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.

There are 7 inventoried historic sites located in the Eugene District. None are eligible for listing on the National Register of Historic Places.

Visual Resources

The Eugene District land ownership is in a checkerboard pattern with private ownerships. The majority of private ownerships utilize the land for intensive timber management, which has limited the Bureau's ability to effectively manage its visual qualities.

Visual resources are the topography, water, vegetation, structures, and other natural features or cultural modifications that make up the scenery of BLM administered lands. Visual resource or scenic values must be considered when planning management activities. BLM administered lands have been classified according to those values described in BLM Manual H-8410-1 (Visual Resource Inventory). On the Eugene District, four Visual Resource Management (VRM) classes have been established from this manual. Objectives for each class are used to identify management prescriptions that would maintain, enhance, or preserve scenic values. These objectives, general class standards, and management prescriptions are described in Chapter 2 under the Management Direction Common to All Alternatives section.

The last extensive Districtwide VRM inventory was completed in the late 1970s and early 1980s in conjunction with the planning process that led to the 1983 Management Framework Plan (MFP). Acreages of each VRM class, as inventoried, are listed in Table 2-1 (Chapter 2), under Issue 6, Alternative D, and displayed on Map 3-8. The result of this inventory indicates less than 1 percent of BLM administered land is Class I, 12 percent is Class II, 24 percent is Class III, and 64 percent is Class IV.

Representative Class I areas are ACEC such as Horse Rock Ridge and Upper Elk Meadows. Examples of Class II areas include but are not limited to recreation sites such as Clay Creek and Whittaker Creek. Most areas visible from County roads in rural residential areas are Class III and most logging areas visible from access roads and other seldom seen areas are Class IV.

Recreation

Recreation activities occurring on BLM administered land in the planning area include but are not limited to camping, picnicking, bicycling, hiking, horseback riding, hang gliding, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing, recreational mineral collection, boating, and driving recreation vehicles on and off highways. Some of this activity is concentrated in developed recreation sites, but most is dispersed recreation, that is, unstructured activities that do not take place on developed sites.

Based on resource management planning guidance established in November 1986, all BLM administered land falls into two recreation management categories - Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs). These recreation management area categories were not used in the 1983 MFP. However,

SRMAs and ERMAs are an integral part of the inventory for the 1990s Resource Management Plan. Typically, SRMAs are sites or areas requiring substantial recreation investment and/or management. The SRMA identification is applied to various types of areas such as high-use recreation sites, wilderness areas, wild and scenic rivers, and large areas where the provision of recreation opportunities is a principal management objective.

Most BLM administered lands not included within SRMA boundaries are classified as ERMAs. Lands designated for special purposes, such as Areas of Critical Environmental Concern (ACEC) or Resource Natural Area (RNA), are excluded from ERMAs. In the Eugene District each Resource Area has been identified as a separate ERMA. The Coast Range ERMA has approximately 115,000 acres, the South Valley ERMA about 108,000 acres, and the McKenzie ERMA has approximately 93,000 acres. Within these ERMAs the majority of the 1990 recreation visits within the District occurred as dispersed recreation.

Within the planning area, the Eugene District has four developed and managed recreation sites; four boat ramps; approximately eight miles of developed hiking trails; 400 miles of stream supporting fishable populations of trout and salmon, and 300 miles of fishable streams; four Recreation and Public Purposes (R&PP) leases; three Environmental Education Areas (EEA); approximately 127,000 acres legally accessible to the public; and 1,852 miles of BLM controlled roads open to motorized travel. Areas currently closed to Off Highway Vehicles (OHV) are ACECs. Areas currently limited to OHV are existing recreation sites. For further discussion see Appendix for OHV in Chapter 2. The Eugene District lands fall within three Recreational Opportunity Spectrum (ROS) classifications: Roaded Natural, Rural, and Urban.

Two recently initiated programs in BLM are the Back Country Byways and Watchable Wildlife. The purpose of these programs is to identify and publicize sightseeing opportunities on lesser travelled roads and wildlife viewing areas within the BLM administered lands. Potential Back Country Byways in the McKenzie Resource Area are Coburg Hills, Shotgun Creek, and Lost Creek; in the Coast Range Resource Area are the Siuslaw River, Whittaker Creek, Alsea, and Oxbow; and in the South Valley Resource Area are Calapooya Divide and Blue Mountain. Two Watchable Wildlife sites are located along the McKenzie River (osprey) and Lake Creek (anadromous fish). Potential Watchable Wildlife sites are along but not limited to, Fish Creek (anadromous fish) and Whittaker Creek (anadromous fish).

Existing and potential recreation sites are described in Tables 3-16 and 3-17. Existing and potential trails are described in Tables 3-18 and 3-19. Existing and potential SRMAs are described in Table 3-20. All trails and recreational sites, including ERMAs and SRMAs, are displayed on Map 3-10 and trails on Map 3-11. All potential sites, trails, and SRMAs are not limited to those listed in the tables. Unanticipated events may lead to the development of additional sites, trails, or SRMAs, in which case they would be consistent with the other provisions of this PRMP.

Recreation use of BLM lands, including all activities occurring within existing SRMAs and ERMAs, totaled slightly more than 1,263,260 recreation visits in 1990. This use estimate is based on data presented in the 1988 Statewide Comprehensive Outdoor Recreation Plan (SCORP) for the Oregon Parks and Recreation Department (OPRD, 1988), which is the most recent database available for estimating existing Districtwide recreational use. The SCORP estimates were prorated to lands under BLM jurisdiction based on percent of forest land administered by BLM in the region.

Table 3-21 shows total 1990 recreation visits to BLM administered land for 11 separate use categories. These are BLM specific figures and are based on the SCORP database (OPRD, 1988), which was revised in 1991. Motorized travel visits (sightseeing and exploring), other land-based visits (nature study, wildlife observation, outdoor photography, visiting interpretive displays and picnicking), and nonmotorized travel visits (visiting the beach/ beachcombing, day hiking, backpacking on trails, bicycling off the road, and horseback riding), accounted for 79 percent of total visitation and were, by far, the most popular recreation activities occurring on BLM administered land in 1990. Camping visits (all modes of overnight camping), and fishing (fishing from a boat or bank, fresh water) accounted for another 12 percent. No other use category accounted for more than 5 percent of total visitation.

Occasional conflicts between recreation uses do occur. However, there are thousands of acres of BLM administered land in the ERMAs and potential SRMAs and, in most cases, recreation use at any given time and location is relatively light. It is anticipated that the capacity of existing recreation sites to handle foreseeable recreation use could be exceeded this decade. Currently, at the District's Shotgun Recreation Site, a high investment development, use is at design capacity. Visitation at

Table 3-16 - Existing Recreation Sites

Site	BLM Acres	1990 Visits [2]	Amenities
Clay Creek Campground (Coast Range RA)	14	2,200	22 camping units, handicap accessible, along the Siuslaw River; 7 picnic units, 2 day use shelters with ball field, horseshoe pits, swimming area
Greenway Tract (South Valley RA)	3	-	BLM land along the Willamette River leased to the State (R&PP) for Greenway Management
Haight Creek Campground (South Valley RA)		3	- This is an existing site, but is currently closed*. See Table 3-17 for its potential
Lake Creek Campground Range RA)	22	-	This is an existing site, but is currently closed*. See (Coast Table 3-17 for its potential
McKercher Park County Park) (McKenzie RA)	2 [1]	-	This is a County Park within the McKenzie RA. Two (Linn acres of BLM land are in a R&PP lease to complete the park's boundary
Sharps Creek Campground (South Valley RA)		10	1,500 10 camping units, 2 picnic units, natural swimming area on Sharps Creek
Whittaker Creek Campgrd (Coast Range RA)		16	2,500 31 camping units, handicap accessible, along Whittaker Creek at the confluence of the Siuslaw River; 9 picnic units, one boat ramp, seasonal swimming area, and one potential hiking trail in the area
Turner Creek (Coast Range RA)	4	-	Existing day use site, but is currently closed*
Marten Rapids (Lane County Park) (McKenzie RA)	3	-	Existing site (R&PP lease), see Table 3-17 for its potential
Whitewater Park (Lane County Park) (McKenzie RA)	17	-	Existing site (R&PP lease), see Table 3-17 for its potential
Whittaker Landing (Coast Range RA)	<1	-	A boat ramp on the Siuslaw River, next to Whittaker Creek Recreation Site
Rennie Landing (McKenzie RA)	<1	-	A boat landing along the McKenzie River, North Bank (T17-R3E-04)
Silver Creek Landing (McKenzie RA)	<1	-	A boat landing along the McKenzie River, North Bank (T17-R3E-03)
Taylor Landing (McKenzie RA)	<1	-	A boat landing along the McKenzie River, South Bank (T17-R1E-19)

Source: WODDB and District recreation inventory records including the 1990 Recreation Management Information System (RMIS).

[1] Title Plat acres
[2] The most current recreation visitation estimates tor BLM administered recreation sites are tor 1990. Visitation estimates are derived from user fee envelopes collected at developed recreation sites, and observations by District employees.
* These recreation sites were closed in the early 80's due to inadequate funding, low visitor use, excessive vandalism and being isolated. These sites have not been maintained since. The acres have been retained tor recreation purposes and not returned to the land base.

Table 3-17 - Potential Recreation Sites

Site	BLM Acres	Resource Area Location	Amenities
Blachly-Lane Flume Lower Trailhead		<1 16-7W-19	Coast Range Potential trailhead within the potential Lake Creek SRMA. Amenities would include sanitation, parking and information for the potential Blachly-Lane Flume trail.
Cannery Dunes	40 [1]	Coast Range 18-12W-15	Located north of Florence, the area provides scenic sand dunes near the ocean. This site is an ACEC/ONA nomination. Opportunities for hiking, photography, and nature viewing among others are available.
Esmond Lake	65	Coast Range 19-8W-35	Potential camping site next to Esmond Lake, and trail head for Haskins trail to Clay Creek Recreation Site. Included in the potential Siuslaw River SRMA.
Heceta Sand Dunes	218 [1]	Coast Range 18-12W-3	Located north of Florence, the site provides an area in rare dune formation, forest, and coastal plant life. Potential environmental education site and/or opportunities for hiking, Watchable Wildlife, and photography. Is currently an ACEC/ONA nomination.
Hult Pond Recreation Site	3	Coast Range 15-7W-23	Potential campsite, nestled in the Coast Range hills. Opportunities for fishing, canoeing, and hiking. Is within the 181-acre potential ACEC (Hult Marsh) and potential Upper Lake Creek SRMA.
Lake Creek* (existing, but is currently closed)	22	Coast Range 16-7W-19	This area could be reestablished for day use and/or camping. Area could include a trail to the falls with interpretation displays. This site is currently closed and is within the potential boundary of the Lake Creek ACEC/ONA and potential Lower Lake Creek SRMA.
Overland Trailhead	<1	Coast Range 16-7W-29	Potential trailhead with parking, sanitation and information for the potential Overland trail. This facility would be within the potential Lower Lake Creek SRMA.
Oxbow	61	Coast Range 20-7W-3	Potential walk-in campsite along the Siuslaw River. Included in the potential Siuslaw River SRMA.
Saleratus	37	Coast Range 18-7W-31	Potential day use site along Wolf Creek.
Siuslaw Bend	144	Coast Range 19-7W-21	Potential for large campground area along the Siuslaw River; able to accommodate 500-1,000 people. Has 6,000 feet of river frontage, combination of clear cut, old grow western red cedar. Included in the potential Siuslaw River SRMA.

Table 3-17 - Potential Recreation Sites (continued)

Site	BLM Acres	Resource Area Location	Amenities
Wolf Cr. Falls	36	Coast Range 18-7W-33	Potential day use area at Wolf Creek Falls.
Fall Creek	16	McKenzie 18-1E-25	Potential day use area along Fall Creek; Corps of Engineers use the site to unload anadromous fish.
Fall Cr. Res.	34	McKenzie 18-1E-31	Provide scenic area within potential Bald Eagle Habitat ACEC. Corps of Engineers have zoned this area for preservation and visual values.
Homestead	56	McKenzie 15-2W-24	Potential camping area in Coburg Hills not far from Shotgun day use site.
Marten Rapids	3	McKenzie 17-2E-1	Site leased to Lane County, but day use (Lane County Park) improvements have been removed. Site provides photographic opportunities of rafters on the McKenzie River as well as a good area to picnic and fish. Included in the potential McKenzie River SRMA. Potential for BLM or the County to reestablish improvement for day use.
Mohawk Wayside	5	McKenzie 15-1W-27	Potential roadside rest area along Mohawk River.
N. Fk. Gate Creek	38	McKenzie 16-2E-23	Potential day use/camping area along Gate Creek.
Whitewater Park	17	McKenzie 17-2E-34	Site leased to Lane County, but day use (Lane County Park) improvements have been removed. Included in the potential McKenzie River SRMA. Potential for BLM or the County to reestablish improvements for day use.
Mosby Creek Trailhead	3	S. Valley 21-3W-01, 02	Potential trailhead within the potential Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot
Culp Creek Trailhead	2	S. Valley 21-1W-31, 32	Potential trailhead within the potential Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot.
Disston Trailhead	3	S. Valley 21-1W-35	Potential trailhead within the potential Row River SRMA. Facilities would include but not be limited to sanitation and a large parking lot.
Red Bridge	10	S. Valley 21-1W-05	Potential developed campground with potable water, sanitation and other amenities near Culp Creek within the potential Row River SRMA.

Table 3-17 - Potential Recreation Sites (continued)

Site	BLM Acres	Resource Area Location	Amenities
Doe Creek	30	S. Valley 20-6W-11	Potential day use area within a majestic old growth stand along the Siuslaw River. Included in the potential Siuslaw River SRMA.
Edwards Creek	20	S. Valley 23-2W-7	Potential camping and day use area between Edwards Creek and Big River.
Frying Pan	188	S. Valley 20-6W-5	Potential site for camping along the Siuslaw River. Included in the potential Siuslaw River SRMA.
Haight Creek* (existing but is currently closed)	15	S. Valley 19-7W-35	This site could be reopened for camping/day use near Siuslaw River on Haight Creek. This site is included in the potential Siuslaw River SRMA.
Row River	14	S. Valley 20-2W-31	Potential day use area with interpretation trail overlooking the Dorena Reservoir.
Sharps Creek	20	S. Valley	Expand current Sharps Creek Recreation Site to accommodate this popular area. Expansion 22-1W-15
Sidog	140	S. Valley 19-6W-29	Provide camping/day use area along the Siuslaw River. Included in the potential Siuslaw River SRMA.
Other Rec Sites	—	on-going in all Resource Areas	Potential to develop other recreation sites which would be consistent with the other provisions of the PRMP.

Source: WODDB and District recreation inventory records.

[1] Title Plat Acres

* These recreation sites were closed in the early 80's due to inadequate funding, low visitor use, excessive vandalism and being isolated. These sites have not been maintained since. The acres have been retained for recreation purposes and not returned to the land base.

Table 3-18 - Existing Recreation Trails

Trail	Miles	Resource Area Location	Other Descriptive Information
Eagles Rest Trail	.7	McKenzie 20-1W-12	Provides access to the top of Eagles Rest Mt. (elevation 3,022); also connects to FS trail #3461.
FS Trail #3462	.2	McKenzie 20-1E-20	This Forest Service trail crosses BLM lands in the McKenzie Resource Area. The two agencies have a right-of-way agreement for this access.
Shotgun Recreation Area Trails	5.7	McKenzie 15-1W-29, 30,31,32	Provides a variety of trails located in the Shotgun Recreation Site (SRMA). Trails included are: Shotgun Creek, Drury Ridge, Meadow Loop, Lower, and Loop Trails A, B, C.
Whittaker Creek Old Growth Ridge Trail	1.0	Coast Range 18-8W-21	A forested trail within diverse habitats on a ridge above Whittaker Creek Recreation Site. The area is included in the potential Siuslaw River SRMA.
Row River Trail	14.0	South Valley 20-2W-31-34 20-3W-36 21-1W-19,30-32 21-2W-2,3,11,13,14,24 21-3W-1	A multi-model non-motorized trail along Row River and Dorena Lake, between Cottage Grove and Culp Creek within the potential Row River SRMA.
Tyrrell Forest Succession Interpretive Trail	1.0	South Valley 20-5W-15,21	An interpretive trail within the Tyrrell Seed Orchard near Lorane, Oregon.

Table 3-19 - Potential Recreation Trails

Trail	Miles	Resource Area Location	Other Descriptive Information
Blachly-Lane Flume Trail	1.0	Coast Range 16-7W-19	Potential trail within the potential Lower Lake Creek SRMA which would follow the old flume trail and overlook Lake Creek Falls.
Big Canyon Trail	1.0	Coast Range 18-8W-27	Potential trail for interpretation of old growth forests, logging practices, and spotted owl habitat information. This trail is within the potential Siuslaw River SRMA.
Clay Creek Trail	1.0	Coast Range 19-7W-19	Potential trail along the Siuslaw River at the Clay Creek Recreation Site. This trail is within the potential Siuslaw River SRMA.
Fish Creek Trail	3.0	Coast Range 16-7W-27,29,33	A potential hiking and mountain bike trail along the banks of Fish Creek. Accesses Watchable Wildlife and riparian areas along the creek. This trail is within the potential Lower Lake Creek SRMA.
Greenleaf Creek	3.0	Coast Range 16-8W-22,15	Potential trail along the banks of Greenleaf Trail Creek.
Hult Equestrian Loop Trail	2.0+	Coast Range 15-7W-13,14	Potential horse trail north of Hult Pond, and is within in the potential Upper Lake Creek SRMA.
Haskins Creek Trail	4.0	Coast Range Esmond Lake to Clay Creek.	Potential trail connecting Esmond Lake and Clay Recreation sites in the Haskins Creek area. This trail is within the potential Siuslaw River SRMA.
Lake Creek Trail	1.0	Coast Range 16-7W-19	Potential trail within the BLM fish ladder area along Lake Creek and is within the potential Lower Lake Creek SRMA.
Overland Trail	2.0	Coast Range 16-7W-19,29,30	Potential mountain bike trail that would connect Fish and Lake Creek areas. The area is included in the potentail Lower Lake Creek SRMA.
Siuslaw River Trail	2.0	Coast Range 19-7W-19,20,21	Potential trail connecting Clay Creek and Siuslaw Bend Recreation Sites along the Siuslaw River with an overlook of the river area. This trial is within the potential Siuslaw River SRMA.
Whittaker Creek Falls Trail	3.0	Coast Range 18-8W-31 19-9W-12	Potential scenic trail along Whittaker Creek to to several waterfalls 30-40' high.

Table 3-19 - Potential Recreation Trails (continued)

Trail	Miles	Resource Area Location	Other Descriptive Information
Deadwood-Windy Peak Trail	6.0	Coast Range 16-9W-36 to 16-8W-27	Potential forested trail from the Deadwood Community to Windy Peak Mt. (elevation 2,502).
Coburg Crest Trail	23.0	McKenzie	Potential trail along the Coburg Hills.
Coburg Connector Trail	6.0	McKenzie	Potential trail to connect Shotgun to the Coburg Crest Trail.
FS Trail		0.5 20-1E-17	McKenzie A potential FS trail near Hardesty Mountain, which would cross BLM lands.
Marten Creek Trail	4.0	McKenzie 17-2E-1,12 17-3E-7,18	Potential forested trail up Marten Creek, partially within the potential McKenzie River (SRMA) and potential Low Elevation Headwaters of the McKenzie River.
McKenzie River Trail	6.0	McKenzie on the South Bank of the River	Potential trail within the potential McKenzie River SRMA would meander along the South Bank and potential Low Elevation Headwaters of the McKenzie River.
Shotgun Additions	1.4	McKenzie within Shotgun SRMA	Two additional trails to loop existing paths within the Shotgun System.
Row River Trail Expansion	5.0	S. Valley 21-1W,32-36	Potential expansion of the Row River trail system within the potential Row River SRMA, along an old railroad bed. Facilities could include but not be limited to vehicle control barriers, bridge decking for 4 bridges and 3 trailheads: Mosby Creek, Culp Creek, and Disston.
Sharps Creek Trail	1.0	S. Valley 20-1W-15	A Potential trail on the east bank of Sharps Creek starting near the campsite area.
Other Trails	-	on-going in all Resource Areas	Potential to develop other trail routes which would be consistent with the other provisions of the PRMP.

Source: WODDB and District recreation inventory records

Table 3-20 - Existing and Potential Special Recreation Management Areas (SRMAs)

SRMA	BLM Acres	Resource Area Location	Other Descriptive Information
Existing SRMA			
Shotgun Creek	277	McKenzie 15-1W-29,30 31, 32	Over 88,000 visits in 1990[2]. Day use only; 2 large group shelters, 2 modernized rest rooms, 4 parking areas, 1 public phone, 23 picnic sites, playground, ball field, volleyball court, 5.7 miles of trails, horseshoe pits, and handicap accessible.
Potential SRMAs			
Gilkey Creek	375[1]	McKenzie 17-2W-13,14 15,23,24	The area contains diversified habitats and three sensitive plant species; is a good potential site for horse trails, mountain biking, and watchable wildlife. The area would include 1,572[1] acres if all identified lands are acquired.
McKenzie River	1,474[1]	McKenzie 16-3E-31 to Eagle Rock	Potential for various recreation facilities such as campgrounds, trails and day-use facilities along 5 miles of the McKenzie River. This river is popular for its fishing and recreational activities, and is very accessible from the Eugene-Springfield area. The area would include 2,178[1] acres if all identified lands are acquired.
Row River	10,000	S. Valley 20-2W, 3W 21-1W, 2W 22-1W	Potential SRMA includes the former potential Sharps Creek SRMA in the the Draft RMP. The Row River SRMA boundary includes 39,090 acres of BLM and private lands. Potential for recreational activities such as bicycling, hiking, horseback riding, recreational mining. Facilities would include but not be limited to additional campsites, trailheads, and trails. Four bridges would need bridge decking and vehicle control barriers would be used. Sharps Creek Campground is also within this SRMA.
Lower Lake Creek	2,090	Coast Range 16-7W-19,20,27 29,30,33	The area includes Lake Creek Falls ACEC/ONA, the currently closed Lake Creek Recreation Site and Fish Creek riparian area. Possible alterations to the landscape could occur to improve the safety and enjoyment of the area. Facilities, trails, and interpretation would be part of the potential recreation project plan for this SRMA. The area would include 2,530 acres, if all identified lands are acquired.

Table 3-20 - Existing and Potential Special Recreation Management Areas (SRMAs) (Continued)

SRMA	BLM Acres	Resource Area Location	Other Descriptive Information
Siuslaw River	9,529[1]	Coast Range Siuslaw River between junctions of Smith River and Wildcat Creek	Potential recreation area along 55 miles of the Siuslaw River (confluence with Smith River and Wildcat Creek). This coincides with the potential WSR river segments of B and C. Within the area, there are potential trails, (Big Canyon, Clay Creek, Haskins Creek, Siuslaw River and existing Whittaker Creek Ridge trails), campsites (Siuslaw Bend, Oxbow, Esmond Lake, Sidog, Haight Creek and Frying Pan), day use areas, and boat landings. The area currently includes Whittaker and Clay Creek recreational sites. The area would include 23,231[1] acres if all identified lands are acquired.
Upper Lake Creek	10,515	Coast Range 15-7W-most sections	Potential for various mountain bike and horse trails, campsites and byways. Area includes Hult Pond, Lake Creek and Congdon Creek headwaters. The area would include 15,072[1] acres, if all identified lands are acquired.
Other SRMAs	—	on-going in all Resource Areas	Potential to develop other SRMAs provided that they would be consistent with the other provisions of the PRMP.

Source: WODDB and District recreation inventory

[1] Title Plat acres
[2] The most current visitation estimates are for 1990. Visitations figures were derived from vehicle traffic counts, shelter reservations, and observations by District employees.

Table 3-21 - Total 1990 Recreation Visits to BLM Administered Land

Recreation Use Category (with PNORCPS definitions)	Recreation Visits	% of Total Visitation
Off Highway use (motor cycling off road, ATV 3 & 4 wheel, 4-wheel drive, dune buggy)	41,700	3
Motorized travel (sightseeing & exploring)	305,980	24
Nonmotorized travel (hiking, backpacking, visiting the beach, beachcombing, trail bicycling, horseback riding)	378,030	30
Camping (all modes)	81,540	7
Hunting (big game, bow hunting, birds, and small game)	29,670	2
Other land-based activities (nature study, wildlife observation photography, picnicking, visiting interpretive displays)[1]	318,170[1]	25
Fishing (fishing from boat or bank, fresh water)	61,280	5
Boating (river, nonmotorized such as rowboat, canoe, raft, etc)	19,550	2
Other water-based activities (swimming or wading at beach/lake/river)	17,790	1
Winter sports (X-country, snowshoe, snowboarding, sledding, general snowplay)	9,550	1
Snowmobiling	0	0
Total	**1,263,260**	**100**

[1] includes Shotgun SRMA figures

the other recreation sites during the July-August period varies from 30 percent (weekdays) to 100 percent (weekends) of design capacity. At the end of the planning period (2002), use of existing recreation sites is expected to reach design capacity through the July-August period on both week-end and mid-week days. With the development of the potential sites and SRMAs this exceeded design capacity could be reduced.

Wild and Scenic Rivers

BLM uses a three-step wild and scenic rivers study process. The first step is to determine eligibility, the second is to determine potential classification (both were completed in 1990), and the third step is to determine suitability, which is accomplished through this planning process. Final decisions concerning designation of Wild and Scenic Rivers is reserved by Congress.

Files used to document eligibility and potential classification are maintained in the Eugene District Office.

The Eugene District currently does not have any Federally designated Wild, Scenic or Recreational rivers. Within the planning area, the State of Oregon manages the Willamette River Greenway. This program, developed prior to the State Scenic Waterways Act, exists to ". . . protect, and enhance the historical, agricultural, natural, recreational, scenic, and economic resources of the Willamette River Corridor." Within the Eugene District there are three acres of land along the Willamette Greenway. These acres are leased to the State of Oregon for management under this program. Outside of the Willamette River Greenway, there are no State Scenic Waterways within the District planning area.

The Nationwide Rivers Inventory along with the 1991 American Rivers List, the 1987 Pacific Northwest Rivers Study, the 1988-1993 State Comprehensive Recreation Plan (SCORP) River Inventory, and the Eugene District have identified 58 river segments that cross or are within a quarter mile of BLM administered lands in the planning area. These rivers have potential for national Wild, Scenic, or Recreational river designation. The Eugene District has applied eligibility and classification criteria established in U.S. Department of the Interior-Department of Agriculture guidelines to each of these river segments. See the Federal Register, Vol. 47, No. 174, September 7, 1982 for a description of these guidelines and BLM Instruction Memorandum OR-89-632 for criteria for the Outstandingly Remarkable Values (ORV). A corridor extending one quarter mile on each side of the river segment measured from the ordinary high water mark was included in the evaluation. The status of eligibility determinations for these rivers is shown in Table 3-55 (those found eligible) and Table 3-56 (those found ineligible).

Sixteen river segments within the planning area meet the eligibility criteria for designation and thus are eligible for suitability study based on their free flowing character and Outstandingly Remarkable Values (see Map 3-9). Nine of these river segments were selected for river assessments on the basis of percentage of adjacent BLM administered lands and other resource management considerations. Until a final determination is made, the remaining seven eligible river segments not assessed will be afforded a level of interim management necessary for protection of their identified Outstandingly Remarkable Values. The South Fork Alsea River also qualified for an assessment study; however, this study is being done by the BLM Salem District.

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 (TPCC) system. The TPCC criteria and categories were revised between 1977 and 1987. District lands were reinventoried in 1987 using the current TPCC system. Differences in criteria, categories, and District acreage between the 1977 and 1987 information prevent direct comparisons of the inventories. Table 3-32 displays the results of the TPCC as of October 1, 1988. Appendix EE provides additional information on forest inventories used in the RMP.

The TPCC classifications are described below.

Nonforest Land - Sites within the forest zone that are not capable of maintaining at least 10 percent stocking of forest trees and those sites that have been converted to nonforest uses. These sites are excluded from the timber production base by definition.

Table 3-55 - Potential Wild and Scenic Rivers - Found Eligible

River Name	Class	ORV[1]	Total River Seg. Miles	BLM River Miles	% BLM Corridor
South Fork Alsea River	Recreational	Geology	The BLM Salem District will lead management of this river.		
Bear Creek	Wild and Recreational	Fish	3.4	3.2	94
Fish Creek	Recreational	Fish	5.1	3.9	76
Greenleaf Creek	Recreational	Fish	7.4	4.3	58
Marten Creek	Recreational	Fish	5.0	4.4	88
Fall Creek	Recreational	Recreation	6.0	0.5	8
North Fork Gate Creek	Recreational	Fish	7.9	0.6	8
South Fork Gate Creek	Recreational	Fish	8.9	0.5	6
Lake Creek (Seg B)	Recreational	Recreation Fish	18.25	0.5	3
McKenzie River (Seg A)	Recreational	Fish Recreation Scenic	11.0	3.5	32
McKenzie River (Seg B)	Recreational	Fish Recreation Scenic Wildlife	40.0	0.5	1
Nelson Creek	Recreational	Fish	7.0	1.0	14
Sharps Creek	Recreational	Recreation	11.1	4.4	40
Siuslaw River (Seg B)	Recreational	Fish Wildlife	46.3	15.6	34
Siuslaw River (Seg C)	Recreational	Recreation Wildlife	13.4	3.5	26
Whittaker Creek	Recreational	Fish	6.5	2.4	37
Willamette River	—	State Greenway	30.0	0.001	<1

[1] ORV = Outstandingly Remarkable Value
Note: River segments are identified on the Wild and Scenic/Recreational Rivers Map in this FEIS.

Table 3-56 - Potential Wild and Scenic Rivers - Found Ineligible

River Name	Total River Seg. Miles	BLM River Miles	% BLM Corridor
Alder Creek	2.0	0.5	25
Anthony Creek	5.3	1.6	30
Big River	16.0	1.6	10
Brush Creek	6.5	1.0	15
Calapooia	80.0	0.13	<1
Camp Creek	9.9	1.5	15
Cartwright Creek	6.5	1.0	15
Cogswell Creek	3.0	1.1	37
Deer Creek	2.5	0.5	20
Deer Creek (South Fork)	2.0	0.8	40
Esmond Creek	10.5	3.75	36
Fall Creek	6.0	0.5	8
Little Fall Creek	39.6	1.0	3
Finn Creek	2.5	1.0	40
Gale Creek	2.0	1.0	50
Guiley Creek	4.5	1.5	33
Hatchery Creek	1.5	0.3	20
Hills Creek	11.6	3.2	28
Indian Creek	2.2	0.9	41
Johnson Creek	3.4	2.0	59
Lake Creek (Seg A)	13.0	3.75	29
Long Tom River	25.0	1.5	6
Lost Creek	13.8	3.0	22
McGowan Creek	4.8	0.8	17
Mohawk River	24.0	0.4	2
Mosby Creek	19.5	0.5	3
Row River (Seg A)	12.0	0.5	4
Row River (Seg B)	7.5	0.3	4
Shotgun Creek	6.3	4.0	64
Siuslaw River (Seg A)	10.0	0.5	5
Toms Creek	3.0	1.0	33
Wildcat Creek	18.5	2.75	15
Wolf Creek	23.0	7.2	31

Note: River segments identified in this table are available for review at the Eugene District Office.

Table 3-32 - TPCC Summary as of October 1, 1988

	Acres		
	O&C	PD[1]	Total
Nonforest Land			
Rockland	332	9	341
Brush	27	6	33
Grass	13	0	13
Water	63	0	63
Highway	10,407	163	10,570
Utility	344	3	347
Agriculture	2	0	2
Nonforest Unclassified	514	252	766
Subtotal	11,702	433	12,135
Nonsuitable Woodland			
Fragile nonsuitable	13,574	621	14,195
Suitable Woodland			
Low Site	83	0	83
Noncommercial Species	29	0	29
Nonsuitable CFL - (Reforestation Problem)	2,055	15	2,070
Subtotal	15,741	636	16,377
Suitable Commercial Forest Land			
Nonproblem	4,947	187	5,135
Fragile Suitable	6,733	92	6,825
Cat. I CFL	212,746	3,803	216,549
Cat. II CFL	0	0	0
Combination Reforestation and Fragile Problem	54,153	3,541	57,694
Subtotal	278,579	7,623	286,203
Total	**306,022**	**8,692**	**314,715**

[1] Acquired Lands are Included with Public Domain.

Woodland - Woodland is forest land that is not included in the Commercial Forest Land (CFL) 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 ground water 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.

Noncommercial Forest Land (Low Site) - Sites that produce less than 20 cubic feet per acre per year of commercial species.

Noncommercial Forest Land (Noncommercial Species) - Sites producing forest tree species (hardwoods) that are typically utilized as nonsawtimber products.

Nonsuitable CFL (Reforestation Problem) - Sites that cannot be reforested to meet or exceed minimum stocking levels of commercial species within 5 years of harvest using artificial regeneration and operational reforestation practices, or 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 that is determined to be capable of sustaining long-term timber production.

Commercial Forest Land (CFL) - All forest land that is capable of yielding at least 20 cubic feet of wood per acre per year of commercial tree species.

Nonproblem - 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 ground water tables.

Category I CFL - Sites that can be reforested within 5 years of harvest using artificial regeneration and operational reforestation practices or natural regeneration.

Category II CFL - 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.

District forest lands were inventoried in 1978 and 1992 to estimate the volume and age class distribution. Table 3-33 displays a comparison of the volume growing and age class distribution. Appendix EE provides additional information on inventories used.

The difference in inventoried acres displayed in Table 3-33 is a result of several factors including 1978 acreage estimates derived from the master title plats; 1992 estimates derived by GIS; exchanges and acquisitions of land since 1978; construction of roads during the previous decade, etc.

As shown in Table 3-33, there is more volume in the 1992 inventory than the 1978 inventory. Reasons for the difference are: inclusion of volume less than 30 years old in the 1992 data but not in the 1978 data; inclusion of hardwood volumes in the 1992 data but not in the 1978 data; differences in data analysis techniques between 1992 and 1978; higher than expected growth; and several years with a reduced timber sale program.

The weighted average board foot/cubic foot ratio decreased during the 14 years as a result of harvesting timber in the larger size classes while ingrowth is primarily in the smaller diameter, younger age classes.

Table 3-33 - Comparison of District Inventory Data 1978 and 1992

Age Class	Acres 1978	Acres 1992	Cubic Volume 1978	Cubic Volume 1992	Board Foot Volume 1978	Board Foot Volume 1992
0	33,211	24,712	0	0	0	0
10	27,540	27,104	0	813,120	0	0
20	36,344	31,805	0	8,648,552	0	36,396,935
30	35,306	36,279	86,082,000	54,515,428	506,672,793	272,050,286
40	31,514	30,402	94,000,000	131,237,850	561,354,460	708,607,661
50	14,195	41,377	50,321,000	281,435,373	304,028,389	1,588,106,738
60	5,491	18,821	21,957,000	148,031,621	133,833,376	863,205,909
70	7,116	7,740	32,831,000	69,137,065	201,045,484	411,282,709
80	7,359	4,477	37,597,000	33,622,387	231,245,998	203,052,937
90	8,007	5,538	43,907,000	58,697,480	271,750,211	359,657,221
100	4,840	6,750	29,484,000	92,217,863	182,209,122	571,396,053
110	8,243	5,912	52,718,000	79,498,073	327,845,563	497,058,154
120	9,099	1,484	61,872,000	17,799,815	385,663,104	112,075,835
130	3,519	1,208	24,966,000	17,827,905	156,415,484	112,999,997
140	4,207	1,726	31,273,000	22,702,386	196,468,115	144,521,242
150	1,527	533	12,102,000	6,732,746	75,730,233	43,037,377
160	1,527	330	12,578,000	4,215,209	78,838,034	27,080,465
170	2,270	3,167	18,581,000	40,828,617	118,318,768	262,139,958
180	2,083	56	18,127,000	727,556	114,407,984	4,700,256
190	0	258	0	3,373,983	0	21,867,941
200+	42,851	34,526	405,401,000	404,018,988	2,568,198,473	2,626,070,574
Total	**286,249**	**284,205**	**1,033,797,000**	**1,476,082,018**	**6,414,025,591**	**8,865,308,249**

Note: 1978 acres are URA-4 acres, 1992 acres are suitable commercial forest land acres.
1978 volumes are net merchantable volume for commercial conifer species.
1992 volumes are net merchantable volume for commercial hardwood and conifer species.
1978 Avg. BF/CF ratio = 6.17
1992 Avg. BF/CF ratio = 6.01
Note: Age class defines a 10-year period of time, with the mid-point accepted as the age class break. For example, stands in age class 20 have an actual age between 16 and 25 years.

Table 3-34 displays the volume by ownership and timbershed as reported in *Timber for Oregon's Tomorrow the 1989 Update*. Timbersheds are defined as local economic areas. The data presented in this table cannot be compared directly with Table 3-33 as the timbersheds are comprised of parts of more than one BLM District. The Eugene Timbershed is comprised of Lane County; the Roseburg Timbershed is comprised of Douglas County; and the Willamette Timbershed is comprised of Multnomah, Clackamas, Hood River, Marion, and Linn Counties. Approximately 88 percent of the District lands are included in the Eugene Timbershed, 7 percent in the Roseburg Timbershed, and 5 percent in the Willamette Timbershed. Table 3-34 displays that within the Eugene Timbershed, Bureau lands contain approximately 13 percent of the total available growing stock; within the Roseburg Timbershed, Bureau lands contain approximately 30 percent of the total; and within the Willamette Timbershed, Bureau lands contain approximately 8 percent of the total.

Table 3-35 displays the volume of timber harvested by County and ownership. As in Table 3-34, the data presented encompasses harvest from more than one District. However, it shows the following approximate percentages of harvest originating from Bureau land by County between 1977 and 1988: Douglas 20 percent, Lane 13 percent, and Linn 7 percent.

Table 3-34 - Forest Area and Growing Stock, by Owner and Timbershed (1989)

Owner	Forest Land		Available Growing Stock[2]
	Available	Not Available	(million cubic feet)
	(thousand acres)		
Eugene Timbershed[1]			
Public			
National Forest	721	544	3,682
Bureau of Land Management	249	29	906
State and Other	15	2	77
Private			
Forest Industry	568	0	1,600
Nonindustrial	220	0	580
Total	**1,773**	**575**	**6,845**
Roseburg Timbershed[1]			
Public			
National Forest	611	285	2,602
Bureau of Land Management	522	77	2,206
State and Other	39	9	219
Private			
Forest Industry	750	0	1,586
Nonindustrial	287	0	663
Total	**2,209**	**371**	**7,276**
Willamette Timbershed[1]			
Public			
National Forest	713	547	3,743
Bureau of Land Management	126	34	564
State and Other	86	10	393
Private			
Forest Industry	571	0	1,340
Nonindustrial	365	0	1,212
Total	**1,861**	**591**	**7,252**

Source: Sessions 1990.

[1] Eugene Timbershed = Lane County; Roseburg Timbershed = Douglas County; Willamette Timbershed = Multnomah, Clackamas, Hood River, Marion and Linn counties. Approximately 88 percent of the Eugene District is in the Eugene Timbershed, 7 percent in the Roseburg Timbershed, and 5 percent in the Willamette Timbershed.

[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 a 7-inch dbh and 4-inch top for all stands. Private data are based on a 5-inch dbh to a 4-inch top for all stands.

Table 3-36 displays timber management and forest development accomplishments projected for the 10 years in the current plan for the District, and the actual accomplishments from 1984 to 1988.

Table 3-37 displays the number of acres by age class that have been subjected to intensive management practices through October 1, 1988.

Douglas-fir is the most important commercial species on the District, comprising approximately 87 percent of the standing volume. Western hemlock, western red cedar, true fir, incense cedar, sugar pine, ponderosa pine, and Pacific yew are the other commercial coniferous species. Red alder, bigleaf maple, chinquapin, and madrone are merchantable hardwood species.

Table 3-35 - Volume Harvested by County and Ownership - Thousand Board Feet (Scribner Log Scale)[1]

Year	County	Forest[2] Industry	Other[2] Private	State[2]	BLM[3]	National[4] Forest	Indian[5]	Other[2] Public	Total
1977	Douglas	797,822	28,544	22,530	299,476	298,334	0	0	1,446,706
	Lane	328,004	43,093	13,636	163,699	602,270	0	0	1,150,702
	Linn	384,204	27,072	11,563	45,582	159,513	0	0	627,934
1978	Douglas	665,617	48,169	27,044	92,070	412,748	0	25	1,245,673
	Lane	324,304	33,406	7,464	204,587	588,891	0	3,955	1,158,652
	Linn	369,915	13,950	8,952	47,262	267,586	0	0	707,665
1979	Douglas	676,384	20,993	17,341	277,803	376,435	0	415	1,369,371
	Lane	369,380	29,672	1,965	139,571	705,079	0	0	1,245,667
	Linn	375,620	9,922	5,908	37,179	197,826	0	0	626,455
1980	Douglas	729,556	23,501	13,944	186,545	181,722	0	488	1,135,751
	Lane	309,605	15,623	17,031	144,031	493,188	0	0	979,478
	Linn	406,659	3,926	9,564	33,202	135,951	0	12	589,314
1981	Douglas	598,577	19,478	6,779	199,894	170,716	0	0	995,444
	Lane	315,894	13,256	2,901	118,448	328,373	0	130	779,002
	Linn	327,823	4,643	14,087	32,047	136,199	0	0	514,799
1982	Douglas	694,122	39,970	18,203	68,431	137,826	0	85	958,637
	Lane	488,718	21,449	6,632	82,282	347,781	0	14	946,876
	Linn	402,688	5,533	12,517	22,116	113,174	0	0	556,028
1983	Douglas	677,539	36,411	2,297	217,103	318,592	0	0	1,251,942
	Lane	444,651	38,141	11,621	120,113	477,354	0	160	1,092,040
	Linn	366,185	7,855	5,562	26,997	165,089	0	0	571,688
1984	Douglas	646,848	32,880	11,015	261,391	324,498	0	1,833	1,278,465
	Lane	414,599	33,320	6,550	139,646	594,070	0	12	1,188,197
	Linn	430,326	7,175	6,420	53,812	161,566	0	0	659,299
1985	Douglas	636,113	35,692	23,779	290,188	327,008	0	286	1,313,066
	Lane	433,606	46,404	12,762	165,750	626,040	0	20	1,284,582
	Linn	341,335	7,782	2,875	37,870	231,270	0	0	621,132
1986	Douglas	591,435	38,227	31,608	349,410	492,455	0	50	1,503,185
	Lane	454,691	34,477	6,407	194,221	646,725	0	537	1,337,058
	Linn	388,260	5,672	2,360	52,108	205,954	0	0	654,354
1987	Douglas	471,437	30,854	21,645	378,054	406,283	0	3,274	1,311,547
	Lane	464,156	46,394	288	183,463	633,954	0	0	1,328,255
	Linn	264,361	13,522	10,044	43,784	236,879	0	0	568,590
1988	Douglas	325,008	45,532	28,221	545,351	377,143	0	2,124	1,323,379
	Lane	467,889	64,229	168	226,222	673,896	0	22	1,432,426
	Linn	212,741	13,541	5,186	55,203	215,138	0	0	501,809

[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 United States Forest Service, Region 6.
[5] Compiled by U.S. Bureau of Indian Affairs.

Source: Oregon Timber Harvest Reports, Oregon State Department of Forestry

Table 3-36 - Timber Management and Forest Development Accomplishments (Oct. 1, 1988)

Practice	Average Annual Planned for 10 years	Average Annual Accomplished in 5 Years
Allowable Harvest Sold		
Million Cubic Feet	35	33.8
Million Cubic Feet Buyback[1]	0	6.9
Million Board Feet	223	215
Million Board Feet Buyback[1]	0	43
Harvest Acres Sold		
Clear cut Acres	3,995	3,321
Clear cut Acres Buyback[1]	0	782
Mortality Salvage	105	0
Commercial Thinning	1,308	689
Site Preparation Acres		
Broadcast Burning	2,550	1,856
Herbicide	785	0
Manual	300	401
Mechanical	330	140
Planting Acreage		
Initial Plant	3,851	3,009
Replant or Interplant	963	609
Plantation Protection Acreage	1,283	3,140
Plantation Maintenance and Release Acreage	3,855	887
Precommercial Thinning Acreage	1,401	913
Fertilization Acreage	6,769	669

[1] Volume and acres sold as a result of "Buyback" legislation in 1984. Timber bought back by BLM was resold as part of regular sale commitment.
Footnote: FY1988 is the last year in the base period for historical information in the RMP. In fiscal years 1989-1992, additional funding was available for precommercial thinning and fertilization. During that period, 13,757 acres were precommercially thinned and 26,553 acres were fertilized.

Table 3-37 - Acres of Stand Treatment Accomplishments by Age Class (as of October 1, 1992)

Age Class	Total Acres*	Imp. Stock	PCT	Imp. Stock and PCT	PCT & Fert.	Imp. Stock and PCT & Fert.	PCT and Fert. and CT	PCT and CT	CT
0	24,712	6,879	6	0	0	0	0	0	0
10	27,104	171	5230	0	1,388	0	0	0	0
20	31,805	83	14,389	55	5,702	0	0	0	0
30	36,278	0	18,324	0	6,388	0	0	0	0
40	30,402	0	12,661	0	4,597	0	0	0	65
50	41,378	0	7,669	0	1,453	0	0	512	2,738
60	18,822	0	262	0	105	0	0	15	2,263
70	7,740	0	16	0	0	0	0	0	1,633
80+	65,965	0	12	0	0	0	0	0	1,104
Total	**284,206**	**7133**	**58,569**	**55**	**19,633**	**0**	**0**	**527**	**7,803**

Key: PCT = Precommercial Thinning Fert = Fertilization CT = Commercial Thinning Imp. Stock = Planted with genetically selected stock

* Total acres are all suitable commercial forest land acres; all other acres are treatment acres.

Energy and Mineral Resources

The mineral potential classification system as described in BLM Manual 3031, Illustration 3, was used to evaluate the mineral potential in the District. Potential refers to the occurrence of mineral resources rather than whether a deposit could be economically extracted. The mineral potential areas were developed from known geologic settings, inferred geologic processes (mineralization models), current and past mining activity, and the extrapolation of known mineralization into areas of inferred similar geologic settings. No Areas of Critical Mineral Potential (ACMP) were nominated in the District. It is BLM policy to encourage exploration and development of minerals using environmentally sound practices within the limits of applicable laws. Table 3-14 summarizes the potential for leasable, locatable, and salable minerals, and Map 3-12 displays those areas of potential.

Leasable Minerals

The geologic setting in the Coast Range and portions of the McKenzie and South Valley Resource Areas are considered to have moderate potential for the accumulation of oil and gas. This area is underlain by a thick sequence of marine sediments, which may contain organic material well below the surface. In the Eugene District 216,494 acres of BLM land are rated as having moderate potential for oil and gas based on the indirect evidence of geologic inference. Most of the lands within the Western Cascade physiographic province are rated as having a low potential for oil and gas due to the volcanic derivation of the rocks in the area. Lands considered to have low potential for oil and gas encompass 99,551 acres.

During the leasing boom period from 1976 through 1985, 215 oil and gas leases were issued that covered 281,815 acres of public lands and reserved mineral estate administered by the Eugene District. Geophysical (seismic) work was conducted on some of the public land and drilling one exploratory well commenced on private land within the District in 1979. This well was drilled by Mobil Oil Corporation on privately owned land located in T. 15 S., R. 3 W., Sec. 28 near Interstate Highway 5. It is estimated that one or two acres of land were disturbed during the drilling of this well. The depth of the hole was 10,412 feet and mostly volcanic rocks were encountered below 1,100 feet. It is unknown whether or not fluid leasable minerals were encountered. There are no known deposits of coal, tar sands, oil shale, or other solid leasable minerals in the planning area. Leasing of any minerals other than oil and gas and geothermal resources would require an RMP amendment. As of January 24, 1992, there were no mineral leases on BLM administered land in the planning area.

Extraction of minerals from acquired mineral estate is authorized by leases, but there has been no such activity on any of the District's acquired mineral estate.

Table 3-14 - Mineral Potential (Acres)

Mineral Type	Low/Unknown	Moderate	High	Total
Locatable	299,634	13,496	2,927	316,057
Salable	299,870	12,668	3,519	316,057
Leasable (Oil and Gas)	99,551	216,494	0	316,045
Leasable (Geothermal)	316,045	0	0	316,045

GIS ACRES

A total of 316,045 acres of BLM managed land in the planning area are subject to geothermal resource management, and the entire acreage is classified as having low potential for such resources based on the indirect evidence of geologic inference.

Locatable Minerals

Since 1980, mineral activity on BLM administered lands in the planning area has consisted primarily of gold exploration and aggregate production. Most of the locatable mineral activity on these lands has been small scale placer mining utilizing portable suction dredges, sluice boxes, and gold pans in the Sharps Creek drainage. As of January 24, 1992, there were 104 mining claims, 7 notices filed pursuant to 43 CFR 3809 regulations, and no plans of operation.

Approximately 2,927 acres of land are considered to have high potential, and approximately 13,496 acres are considered to have moderate potential for uncommon variety minerals such as placer gold, disseminated mercury, copper, iron, zinc, silver, lead, and uncommon varieties of other minerals having unique and special values.

Salable Minerals

It is estimated that approximately 12,668 acres of BLM administered land in the planning area have moderate potential for the occurrence of mineral materials in the form of basaltic and andesitic flows and intrusions. This rating is based on the indirect evidence of geologic inference. This acreage is located throughout the District and illustrated on Map 3-12. Approximately 3,519 acres are rated as having a high potential for the occurrence of mineral materials based on the direct evidence of rock outcrops as observed in the field.

As mentioned above, the principle salable commodity in the District is volcanic rock used for the production of construction materials intended for road surfacing, riprap and, in one recent case, jetty stone. The demand for mineral materials is based primarily on the need for construction materials by the timber industry. During 1979 at the height of logging activity in this area, nearly 80,000 cubic yards of rock were removed from BLM quarries for surfacing Federal timber haul roads. In areas where there are no nearby rock sources, crushed and pit run rock was (and is) purchased from private landowners and commercial quarry operators. Most sales of rock to the public have been through contracts with timber companies who desire to minimize haul costs by using the nearest source. These mineral material sales are based on the appraised market value as described in BLM Manual 3630.

The District manages 75 rock quarries of which 12 have been designated community pits. Community pits are designated at sites near populated areas or are located where there is a demand for quarry rock by the logging industry, private individuals, and other government agencies. The average annual production of rock during 1981-1989 was 77,329 cubic yards.

Socioeconomic Conditions

The Eugene District is located in the southern Willamette Valley and includes lands in Lane, Douglas, Benton, and Linn counties. The District contains the cities of Eugene and Springfield, which combined make up Oregon's second largest metropolitan area. For purposes of socioeconomic description, the Eugene District has been equated to Lane County. Information regarding population, employment, and personal income has been examined to determine the basic structure and scope of the economy in the general planning area. A 1984-1988 baseline was selected for the purpose of this analysis. All data in this section refers to this period, unless otherwise stated. This baseline encompasses a period of national growth that followed the recession of the early 1980s. Additional information regarding recent trends has been included, when available, to provide a context for current decisions.

Population

During the baseline period, the population in Lane County averaged 268,210. Throughout the baseline period and continuing to the present, the population in Lane County has displayed a consistent upward trend. In the 1990 Census the population in Lane County was reported by Portland State University's Center for Population Research and Census as 282,912, with 34.8 percent of those persons living in unincorporated areas. In 1992 the most recent year for which information is available, Lane County population totaled 293,700, with 34.6 percent living in unincorporated areas. Prior to the baseline period, the population fell sharply during 1982 and 1983 as

households relocated to areas where employment opportunities were, or were perceived to be, greater. Even with the population increases in recent years, the net migration out of Lane County (1980-1992) remains at 9,191. Demographic information for 1992 suggests that 13.4 percent of Lane County's population is over 65 years of age. This approximates the Statewide average of 14 percent.

Employment

The Willamette Valley in Oregon has traditionally been economically dependent upon natural resources. Timber, agriculture, fisheries, and recently tourism provide significant employment in the region. The trade (25,820), services (22,180), and government sectors (21,800) all generated significant employment in the region during the baseline period. Employment in these sectors increased during the baseline period. Employment in these sectors during 1992 was as follows: trade (30,000), services (29,100), and government (24,500). The wood products sector (including paper) employed 11,020 persons during the baseline period. Employment in this economic sector is particularly sensitive to raw material supply and overall economic health. Following the baseline period, Lumber and Wood Products employment fell dramatically; 1990 employment was 10,000, a drop of 1,200 jobs from the previous year. In 1991 employment was 8,700 and in 1992 it was 8,200. This decrease represents a 28 percent decrease in Lumber and Wood Products employment between 1989 and 1992 in Lane County. Because lumber and wood products historically (1984-1988) represented half of all manufacturing in Lane County, total manufacturing decreased by 15 percent in the same period. More recently employment growth in all sectors has slowed. 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.

The unemployment rate in Lane County has generally decreased since 1982 when it peaked at 12.5 percent. The rate steadily declined until 1988, reaching a low of 5.6 percent. The unemployment rate in Lane County was unchanged in 1989 and increased in 1990, 1991, and 1992. Unemployment in 1992 was 7.5 percent, the same as the State unemployment rate. For supporting and additional information on employment see Tables 3-59 and 3-60.

Personal Income

Personal income statistics include both wage and nonwage income sources. Nonwage income sources include transfer payments, interest, dividends, and rent. Per capita income in Lane County averaged $12,434 during the 1984-1988 baseline period. Statewide, average per capita income was greater than in Lane County, averaging $13,308. In recent years personal income in Lane County has increased at rates similar to that of the State. In 1991 Lane County per capita personal income was $16,145 relative to the State per capita income of $17,495. For additional information on personal income see Tables 3-61 and 3-62.

Rural Communities

The Bureau of Land Management's Eugene District encompasses both rural and metropolitan areas. BLM resource management is most directly tied to rural areas of the District. However, the Eugene/ Springfield area, with its concentration of population and employment, is vital to the rural economies within the District. Secondary services needed by rural economies of the District are purchased in the urban areas of the District and from outside the District. Examples of services not usually available in rural areas include transportation, business, financial, and export. In addition the markets for many rural products (lumber, wood products, and recreational opportunities) are concentrated in urban areas.

The lumber and wood products sector is affected by fluctuations in the price and supply of raw materials. BLM timber resource management directly affects this sector of the economy. The State of Oregon, using a Desktop Analysis technique, has identified rural timber dependent communities (Oregon Joint Legislative Committee for Forest Products, 1990). Existing dependence, location in relation to final markets, and viability were ranked. Of the three identified subregions within the District, the Mapleton and Oakridge areas were identified as highly timber dependent. The Eugene/Springfield area was determined overall to be moderately dependent upon the lumber and wood products industry. Several outlying areas were included in the Eugene/ Springfield subregion. Of these communities only Pleasant Hill was identified as highly timber dependent. Other communities in the subregion have lumber and wood products firms and are timber dependent to some extent.

Table 3-59 - Oregon Employment by Sector

	1970	1980	1984-88 (Average)	1989	1990	1991	1992
Civilian Labor Force	864,500	1,295,000	1,362,400	1,475,000	1,491,000	1,508,000	1,537,000
Unemployment	61,700	107,000	104,800	84,000	82,000	90,000	115,000
Total Wage and Salary Emp.	709,200	1,044,600	1,068,680	1,209,400	1,251,900	1,250,800	1,270,900
Total Manufacturing	172,300	215,100	203,240	218,400	220,300	211,700	207,400
Lumber, Wood Products, & Paper	76,200	79,900	75,060	76,400	73,200	65,800	63,300
Other Manufacturing	96,100	135,200	128,180	142,000	147,100	145,900	144,100
Total Nonmanufacturing	536,900	829,500	865,440	991,000	1,031,600	1,039,000	1,063,500
Const. & Mining	30,800	48,800	35,800	47,600	54,000	53,000	51,100
Trans., Comm. & Utilities	48,700	60,500	58,040	63,100	64,500	65,200	65,500
Trade	162,000	255,600	269,680	305,900	313,100	314,300	320,200
Finance, Ins. & Real Est.	36,000	70,000	69,360	75,900	80,300	83,200	86,000
Services & Misc.	112,700	191,400	231,180	282,900	296,200	296,900	309,900
Government	146,700	203,200	201,360	215,600	223,500	226,400	230,900

Source: Oregon Employment Division

Table 3-60 - Lane County - Employment by Sector

	1970	1980	1984-88	1989	(Average) 1990	1991	1992
Civilian Labor Force	87,250	135,400	134,420	147,520	148,200	147,500	148,700
Unemployment	6,850	13,300	10,220	8,170	8,700	9,600	11,200
Total Wage and Salary Emp.	69,650	102,900	101,240	115,200	117,900	115,700	116,800
Total Manufacturing	18,400	19,800	19,300	21,400	20,700	19,000	18,000
Lumber & Wood Products	15,400	12,900	11,020	11,400	10,200	8,700	8,200
Other Manufacturing	3,000	6,900	8,280	10,000	10,500	10,300	9,800
Total Nonmanufacturing	51,250	83,100	81,960	93,800	97,200	96,700	98,900
Const. & Mining	2,950	4,600	3,300	4,000	4,200	4,200	4,500
Trans., Comm. & Utilities	4,150	5,100	4,180	4,400	4,500	4,400	4,500
Trade	14,650	25,700	25,820	29,300	30,600	30,000	30,000
Finance, Ins. & Real Est.	2,950	5,500	4,740	5,600	5,800	6,100	6,200
Services & Misc.	10,050	19,700	22,180	27,300	28,000	27,800	29,100
Government	16,500	22,500	21,800	23,300	24,200	24,200	24,500

Source: Oregon Employment Division

Table 3-61 - Local Area Personal Income, Lane County

	1970	1980	1984-88	1989	1990	1991
Total personal income	757,504	2,511,965	3,370,650	4,192,973	4,486,507	4,651,178
Population (thousands)	216.4	275.2	268.7	278.0	284.7	288.1
Per capita personal income (dollars)	3,500	9,127	12,536	15,083	15,760	16,145
Farm	7,816	5,375	17,050	41,046	50,044	41,009
Nonfarm	583,738	1,813,034	2,309,452	2,874,225	3,027,084	3,111,277
Ag. serv., for., fish., and other	3,199	11,283	24,788	34,797	37,471	36,390
Mining	3,031	9,928	5,458	5,933	5,740	6,080
Construction	42,111	129,336	118,795	157,127	167,369	168,943
Manufacturing	175,000	460,454	542,607	659,031	640,597	633,022
Nondurable goods	26,815	70,028	110,143	129,477	142,075	157,453
Paper and allied products	(D)	(D)	(D)	(D)	(D)	(D)
Durable goods	148,185	390,426	432,465	529,554	498,522	475,569
Lumber and wood products	130,051	320,080	333,536	379,639	341,656	322,467
Transportation and public utilities	47,547	133,632	146,358	170,901	173,340	171,042
Wholesale trade	31,771	127,896	135,717	171,191	187,300	186,510
Retail trade	80,943	231,498	315,075	375,315	404,940	423,796
Finance, insurance, and real estate	17,372	71,811	72,583	88,809	98,967	103,753
Services	80,044	334,970	524,752	698,644	757,472	789,247
Government and government enterprises	102,720	302,226	423,318	512,477	553,888	592,494
Federal, civilian	15,002	45,076	62,011	73,535	82,504	83,412
Military	2,181	4,405	8,541	10,061	10,607	10,570
State and local	85,537	252,745	352,766	428,881	460,777	498,512

Source: Bureau of Economic Analysis, Regional Economic Information System. 1993.

Table 3-62 - Local Area Personal Income, Oregon

	1970	1980	Average 1984-88	1989	1990	1991
Total personal income	8,163,400	26,053,992	36,647,682	45,188,249	48,744,661	51,111,885
Population (thousands)	2,100	2,642	2,693	2,791	2,861	2,922
Per capita personal income (dollars)	3,887	9,863	13,598	16,193	17,038	17,495
Farm	235,598	474,419	558,796	887,987	902,618	875,029
Nonfarm	6,191,140	18,903,314	25,431,683	31,599,836	34,259,527	35,858,962
Ag. serv., for., fish., and other	45,970	153,099	279,316	354,802	406,179	413,179
Mining	15,256	101,468	48,332	44,598	54,463	62,441
Construction	409,967	1,373,943	1,297,393	1,783,668	2,063,099	2,114,244
Manufacturing	1,579,414	4,749,512	5,809,247	6,969,524	7,204,428	7,340,506
Nondurable goods	406,845	1,073,769	1,401,383	1,650,289	1,769,440	1,869,165
Paper and allied products	98,990	287,975	368,584	414,698	418,696	431,657
Durable goods	1,172,569	3,675,743	4,407,864	5,319,235	5,434,988	5,471,341
Lumber and wood products	641,124	1,684,758	1,962,060	2,182,055	2,087,623	1,962,324
Transportation and public utilities	546,832	1,538,631	2,048,669	2,394,109	2,535,167	2,698,171
Wholesale trade	440,505	1,436,555	1,823,268	2,333,046	2,527,784	2,626,699
Retail trade	795,358	2,235,839	3,044,078	3,668,902	3,950,646	4,190,681
Finance, insurance, and real estate	304,149	1,000,050	1,269,971	1,545,520	1,710,894	1,753,013
Services	944,887	3,328,738	5,519,321	7,324,212	8,175,474	8,612,905
Government and government enterprises	1,108,802	2,985,479	4,292,088	5,181,455	5,631,393	6,047,123
Federal, civilian	262,232	609,044	849,918	1,025,116	1,127,937	1,171,540
Military	35,662	67,919	116,768	128,780	136,391	140,620
State and local	810,908	2,308,516	3,325,402	4,027,559	4,367,065	4,734,963

Source: Bureau of Economic Analysis, Regional Economic Information Analysis. 1993.

Several communities in the Eugene District, including Oakridge and Mapleton, have been working with the Oregon Economic Development Department (OEDD) through the Community Initiatives Program to identify specific actions to enhance economic activity and diversity in their areas. The BLM Eugene District has not identified specific management actions relating to these development strategies.

Local Resources

Within the local region there are community and regional efforts to diversify and attract new industry. Since 1982, 4,000 nontimber manufacturing jobs have been added to the Eugene/Springfield regional economy. These jobs have helped offset the loss of about 3,000 manufacturing jobs in the timber sector since 1988, which remains Lane County's dominant manufacturing industry.

The Lane Council of Governments (LCOG) reports that important areas of growth over the past decade include transportation equipment; electronic and electrical equipment; rubber and plastic products; printing and publishing; and warehousing and distribution (nondurable goods) (Eugene/Springfield Metropolitan Partnership, Inc., *FasTrack*, Vol. 6, No. 4, Fall 1991).

Regional economic strategies to attract new industry have been developed by several local agencies. Recently, Lane County and the Oregon Economic Development Department (OEDD) reached agreement on regional strategy guidelines that will direct State economic development grants allocated to the County for the coming biennium. Contracts for the administration of 1.5 million in Regional Strategies money for Lane County from the OEDD have been signed, making the Eugene/Springfield Metropolitan Partnership, Inc. the local administrative agency for these funds. The money is targeted at developing an industrialized housing industry in Lane County, and may be used to help companies develop business and marketing plans, tap research resources, and acquire the necessary facilities and equipment (Eugene/Springfield Metropolitan Partnership, Inc., *Quarterly Report*, April-June 1991 and July-September 1991).

To facilitate community development in rural areas of Lane County, the Lane County Rural Resources Development Committee (RRDC) was formed in August, 1990. In September 1991 the RRDC produced a recommendations report, *Conservation and Development of Rural Resources in Lane County, Oregon*. The report was submitted by the RRDC to the Oregon State Rural Development Council in support of the Presidential Initiative on Rural Development. The Report addresses the needs of Lane County's incorporated and unincorporated rural communities.

The coordinated efforts of local agencies such as LCOG, OEDD, the Lane County RRDC, and the Eugene/Springfield Metro Partnership have influenced and supported many new successful local business developments. For example, Springfield Forest Products, which manufactures plywood, veneer, and specialty products, began operations in 1989 after the purchase and renovation of the former Georgia-Pacific plant in Springfield. During 1990, employment increased from 180 to 225 for an annual payroll of approximately $7 million. Another example, Blue Water Boats located in Springfield, is one of the largest manufacturers of recreational boats in the region. About 100 employees build 1,200 to 1,400 boats each year. An upcoming project is Weyerhaeuser Company's recently announced plan to invest $70 million in a new Springfield facility for recycling cardboard. The facility is expected to be completed by the summer of 1992. Continued coordinated efforts will enhance local economic diversity and strengthen the local economy in the future.

Educational and Retraining Opportunities

The University of Oregon (U of O) and Lane Community College (LCC) are located in the Eugene/Springfield area. Both institutions offer a diversity of educational opportunities. The U of O offers accredited bachelor to doctoral degree programs and LCC offers associate degree programs and numerous on and off-campus programs Countywide. One of LCC's retraining programs, the dislocated worker program, has received special attention in recent years. Since its beginning in 1989, over 1,600 dislocated workers have enrolled in the program. The majority of these enrollees were previously employed by the wood products industry. Current statistics for the program are 77 percent of former enrollees (since 1989) are currently employed and 63 percent have entered employment in the field in which they received training. Five percent of enrollees returned to jobs in the wood products industry (Ellen Palmer, Program Director). LCC in partnership with the Private Industry Council receives funding for the program from the U.S. Department of Labor, through the Job Training Partnership Act (JTPA), and from Oregon's Department of Economic Development.

BLM Economic Contribution

BLM administered lands in western Oregon contribute 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 (BLMPACT) was developed to facilitate estimation of economic impacts of local BLM management on local and regional economies. Models were developed to represent each BLM District and Western Oregon as a whole.

Timber

BLM currently manages about 277,000 acres of forest land allocated for timber production in the Eugene District. The average annual harvest during 1984-1988 totaled 230 million board feet (mmbf) (USDI, BLM - Timber Sale Information System, TSIS), or approximately 14 percent of all harvest from all ownerships in Lane County. USFS harvests totaled 48 percent of all harvests, and private industrial harvests totalled 34 percent. The remaining 4 percent was harvested from State, other public, and nonindustrial private lands (State of Oregon, Oregon Dept. of Forestry). The average annual harvest from BLM administered lands is estimated to contribute 1,330 jobs in the timber industry and $35.7 million in local personal income. Respending effects added 1,210 jobs in other sectors and $17.1 million in local personal income. With Federal harvest restrictions imposed since the baseline period, BLM contribution is significantly less.

Recreation and 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 pleasure, horseback riding, OHV use, camping, hiking, water sports, swimming, and mountain biking. Community economic impacts occur when visitors from out of the region make local purchases. These "new" dollars create jobs and enhance personal income. The total level of local spending is assumed not to be directly influenced by the provision of recreation opportunities on BLM administered lands. BLM estimates that a total of 259,800 annual visits were made to BLM administered lands in the Eugene District by nonresidents. Among these visitors, 4,800 were hunters and 15,900 were fishermen. Nonconsumptive visitation by nonresidents was estimated to be 239,100. Input-output analysis suggests that spending by these visitors generated 157 direct jobs and $1.68 million in local personal income. Respending effects added 87 jobs and $1.32 million in local personal income.

Fisheries

The BLM manages 533 miles of streams suitable for the spawning and rearing of anadromous and resident fish species in the Eugene District. Most of the fish spawned and reared in BLM managed streams are caught offshore or on waters accessed through other ownerships. The importance of fisheries provided by the 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 fish, particularly anadromous species, the economic benefits of fish spawned and reared in a specific location may accrue to regions outside the spawning region. An estimated 23,500 pounds of chinook and coho salmon (round weight), or less than 1 percent of Oregon's total commercial landings of these anadromous species, can be attributed to BLM managed streams in the Eugene District. An estimated 13,800 sport fishing visits can be attributed to BLM administered streams in the Eugene District. This estimate is independent of recreational fishing estimates discussed previously. Input-output analysis estimates Statewide employment of 7 direct jobs and $74,000 of direct personal income is dependent upon the fisheries resource in the District. Statewide respending effects added 4 jobs and $75,000 of personal income.

Special Forest Products

BLM provides for public use of special forest products consistent with other land uses and resource allocations. Free use collection of mushrooms, huckleberries, elderberries, and other products provides a unique and rewarding recreational opportunity for many individuals. Traditional, ceremonial, and subsistence uses are also met through free use collection.

In addition, negotiated and advertised sales provide significant receipts and contribute to local

employment. In 1989 floral greenery sales within the Pacific Northwest were estimated to generate $128 million within the regional economy and employ 10,000 people (Schlosser et al., 1992).

Tables 3-57 and 3-58 (see Vegetation in this chapter) identify types of forest resources collected in the Eugene District and quantity collected for those items documented through permit or sale. In western Oregon the total BLM collections associated with the sale of special forest products totalled $2,355,000 between FY 1987 and FY 1991.

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 and other resource management activities, and as compensation for taxes foregone due to public ownership of lands. Changes in these payments affect local government employment and the services they provide.
Fifty percent of the total gross revenue generated by timber sales and other resource activities on O&C lands is distributed to western Oregon counties under terms of the O&C Act. Average payment to Lane County during the baseline period (1984-1988) was $9.6 million. (USDI, BLMFacts). O&C payments to Lane County have increased since the baseline period, averaging $19 million between 1989 and 1992. Payments for those years (million dollars) were as follows: 1989, $16.7; 1990, $31**; 1991, $10.5; 1992, $18; and 1993, $12. (**Includes FY 1990 payments for 10 months of land and material sales and 11 months of grazing fees paid at the end of FY 1990 rather than at the beginning of the next FY as in the past.) The level of O&C payment is currently protected from large decreases by temporary legislation that guarantees 85 percent of the average annual payment made to those counties during the 5-year baseline period of fiscal years 1986-1990, provided total payment does not exceed the total amount of receipts collected from the Oregon and California grant lands during FY 1993. Although similar annual legislation was enacted for FY 1991 and 1992, this legislation is temporary and may not be continued in the future. Unlike payments to counties from timber sales in the National Forests, which are required to fund schools and roads, the O & C payments enter directly into the County general fund and can be spent without restriction. In Lane County this is a substantial portion of the general fund.

Although payments are not made on a per capita basis to counties in the District, 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, average payments per capita in Lane County were $36.00. 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 and C Counties* (Lee et al., 1991). Lane County was examined in the report. In the FY 1990-1991 budget, BLM payments were approximately 7 percent of the total County budget. The County general fund received 42 percent of its budget from BLM payments to the County. Federal (BLM and USFS) timber revenues were approximately 21 percent of the total County budget.

The counties also receive Payments in Lieu of Taxes (PILT) from the BLM for a variety of Federally managed lands (not O & C or CBWR). 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 installations. These annual payments of 75 cents per acre, subject to a per capita ceiling, are reduced to a minimum of 10 cents per acre when other revenue sharing activities make equivalent payments. In western Oregon, each County receives the minimum payment because of the value of timber receipts (USDI, BLMFacts). Since the baseline period, PILT to Lane County were as follows: 1989, $137,244; 1990, $137,274; 1991, $138,270; 1992, $138,400; and 1993, $138,404. For Lane County, PILT payments averaged $133,816 during the baseline period.

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. Several programs are funded by this tax. Forest research, the activities of the Forest Practices Act, and emergency fire control are funded. Table 3-29 displays the tax rate during the baseline period and to the present. The purchasers of BLM timber pay this tax.

The impacts of Ballot Measure 5 property tax limitation are independent of Federal taxation, spending, revenue sharing, or land management. However, it is an important economic condition that is influencing County funding in western Oregon. In general, urbanized counties in western Oregon have reduced tax rates to comply with the law. Most rural counties are at or approaching the maximum

Table 3-29 - Forest Products Harvest Tax (FPHT) Rates Applicable to BLM Timber Purchasers ($/MBF Scribner Long Log)

Total FPHT Period Rate	Forest Practices Act	Forest Research Lab	Emergency Fire Fund	Forest Resources Inst.	Industrial Fire Prevention
7/1/83-6/30/85 $0.50	$0.12	$0.23	$0.15	$0.00	$0.00
7/1/85-6/30/86 $0.31	$0.10	$0.21	$0.00	$0.00	$0.00
7/1/86-6/30/89 $0.46	$0.10	$0.21	$0.15	$0.00	$0.00
7/1/89-6/30/91 $0.67	$0.16	$0.21	$0.30	$0.00	$0.00
7/1/91-6/30/92 $1.64	$0.39	$0.30	$0.50	$0.31	$0.14
7/1/92-6/30/93 $1.80	$0.40	$0.30	$0.66	$0.31	$0.13

Source: Oregon Department of Revenue. Personal Commmunication, Rick Schaek. July 1991. Gwen Gilchrist. June 1993.

permitted tax rates. For this reason it is generally accepted that western Oregon counties will be unable to generate additional or substitute revenue through property tax rate increases if revenue from Federal or other sources declines.

Community Stability

The years after the baseline period of 1984 to 1988 included a National recession that was felt locally. In addition, constraints on Federal land management have limited Federal timber sales. 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.

Lands in the Willamette, Siuslaw, and Umpqua National Forests are encompassed within the planning area. Weyerhaeuser, Willamette Industries, Giustina, and International Paper are the major industrial forest owners in the area. Timber sales from National Forests and BLM administered lands in the resource area have been substantially lower than the historic levels of the baseline period. Harvest levels have also declined since the baseline period. Timber dependence in the region, as measured by lumber and wood products employment as a percentage of the total employment, has been decreasing. As a portion of personal income, lumber and wood products dependence has also been decreasing.

Impacts of reduced harvest levels are occurring amidst ongoing structural changes in the lumber and wood products industry. Examples of structural changes 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, and increased production and use of laminates and engineered wood products.

Timber dependence in the region, as measured by lumber and wood products employment as a percent of total employment in the region, has decreased since 1984. As a portion of personal income, lumber and wood products dependence has decreased since 1984. Total personal income and employment have increased throughout the baseline period and to the present. Demographic data shows population is becoming more concentrated in the incorporated areas of Eugene, Creswell, Florence, and Junction City. 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 much slower rate than incorporated areas of Lane County. Given this, it is likely that personal income and employment are not increasing in the rural areas of the District and may 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 Cottage Grove, Elmira, Oakridge, and Mapleton.

Although the Eugene District as represented by Lane County is not considered highly timber dependent, certain areas/communities do rely heavily upon timber harvest and processing as a source of economic activity. In those areas, changes in the structure 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. The following communities have been identified by the Oregon Economic Development Department as "severely affected" by changing timber harvest patterns. As identified communities, they are eligible for State assistance from the Oregon Timber Response Program.

Cheshire	Fall Creek	Noti
Coburg	Florence	Oakridge
Cottage Grove	Harrisburg	Saginaw
Creswell	Junction City	Springfield
Culp Creek	Lorane	Swisshome
Deadwood	Lowell	Thurston
Dexter	Mapleton	Walton
Elmira	Marcola	

Source: Oregon Economic Development Department, February 2, 1993

An Oregon State University Extension Service Publication examined these and other communities within Oregon. Using Census data for 1980 and 1990, the report found that these timber dependent communities lagged behind nontimber dependent communities. On average, these communities experienced no population growth, declining median household income, higher unemployment and poverty rates, and lower educational attainment (Seidel, K., 1993).

Rural Interface Areas

County governments have zoned some private forest and nonforest lands that are intermingled with BLM administered forest lands to allow rural residential development. In some places in the District, residential uses are or, in the future, may be incompatible with intensive forest management activities. Any resulting concerns are problems for both BLM and our residential neighbors; therefore, the issue is being addressed in the BLM land use planning process. Areas of rural residential development and the adjoining BLM administered lands are referred to as Rural Interface Areas (RIA). It should be noted that rural residents living in the areas identified in Table 3-22 are not the only residents with potential concerns, nor are they all necessarily affected by or concerned about BLM's

Table 3-22 - BLM Acres in Rural Interface Areas

	Within 1/4 Mile of:		Within 1/2 mile of:	
County	0 to 5 Acre Lots	6 to 20 Acre Lots	0 to 5 Acre Lots	6 to 20 Acre Lots
Lane	4,485	2,156	14,652	4,557
Linn	38	89	181	260
Totals	**4,523**	**2,245**	**14,833**	**4,817**

management activities. The RIA described below have been defined for analytical purposes, not as management areas.

The lands managed by the Eugene District are located in 4 counties. There are no RIA in the Eugene District portions of Benton or Douglas counties. Table 3-22 shows the amount of BLM administered land within one-quarter and one-half mile of private lots up to 20 acres in size in Lane and Linn Counties. These areas have also been mapped (see Map 3-13). The total amount of BLM administered land within RIA in the Eugene District is 6,768 acres within the quarter-mile zones of influence and 19,650 acres within the half-mile zones of influence.

Rural residential zones in Lane County have minimum lot sizes of 1, 2, 5 and 10 acres. In Linn County, the minimum lot sizes are 1, 2.5, and 5 acres. Single-family dwellings and certain other uses are allowed outright in these areas.

In areas zoned for forest or farm/forest uses, lot sizes may or may not be regulated. Single-family dwellings may be allowed under certain conditions in those areas. Depending upon the quality of forest resources and the levels of existing development, local land use plans and ordinances may restrict nonresource uses (for example, no homes unless necessary for management of forest resources); they may allow nonresource uses with conditions (e.g., a home placed so it does not interfere with adjacent resource uses); or they may allow a mixture of resource and nonresource uses. These provisions are intended to reduce the possibility of conflicts between residential uses and forest resource management activities.

Rural Interface Areas are found throughout the lower elevations of the District. Most are located near population centers, along State or County highways, and in stream valleys extending into the Coast and Cascade Ranges. Many of the private lands in RIA are highly desirable for residential use. This use is a concern to BLM for several reasons:

1. Homes and small lot sizes may impede economic and efficient management of BLM administered forest lands.

2. Some RIA residents, and others who live nearby, may object to forest management activities on adjacent or nearby public lands and take actions to stop or change the activity.

3. Private homes on forest lands may be vulnerable to wild forest fires and may cause problems for protecting resource lands as well as the private structures from wildfires.

BLM rural neighbors generally accept adjacent or nearby forest management activities with few complaints. However, the District has experienced a number of problems including:

1. Homes too close to property lines to allow safe and efficient timber harvest and reforestation operations.

2. Residents taking domestic water from a stream that would be temporarily affected by road building or other forest management operations.

3. Residents objecting to clear cuts on slopes within immediate view of the home.

4. Concerns about possible health and safety problems resulting from proposed intensive management practices such as slash burning, forest fertilization, and herbicide application.

5. Denial of access across private property.

These concerns and similar ones are expected to increase with time because significant amounts of private land, which are intermingled with or adjoin BLM administered lands, are planned and zoned to allow rural residential development.

Fire/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 events 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. 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 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 events 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 westside 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 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 the Cascade Range of the District were moderate due to the incidence of lightning, which was supplemented by the use of fire by Native Americans (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.

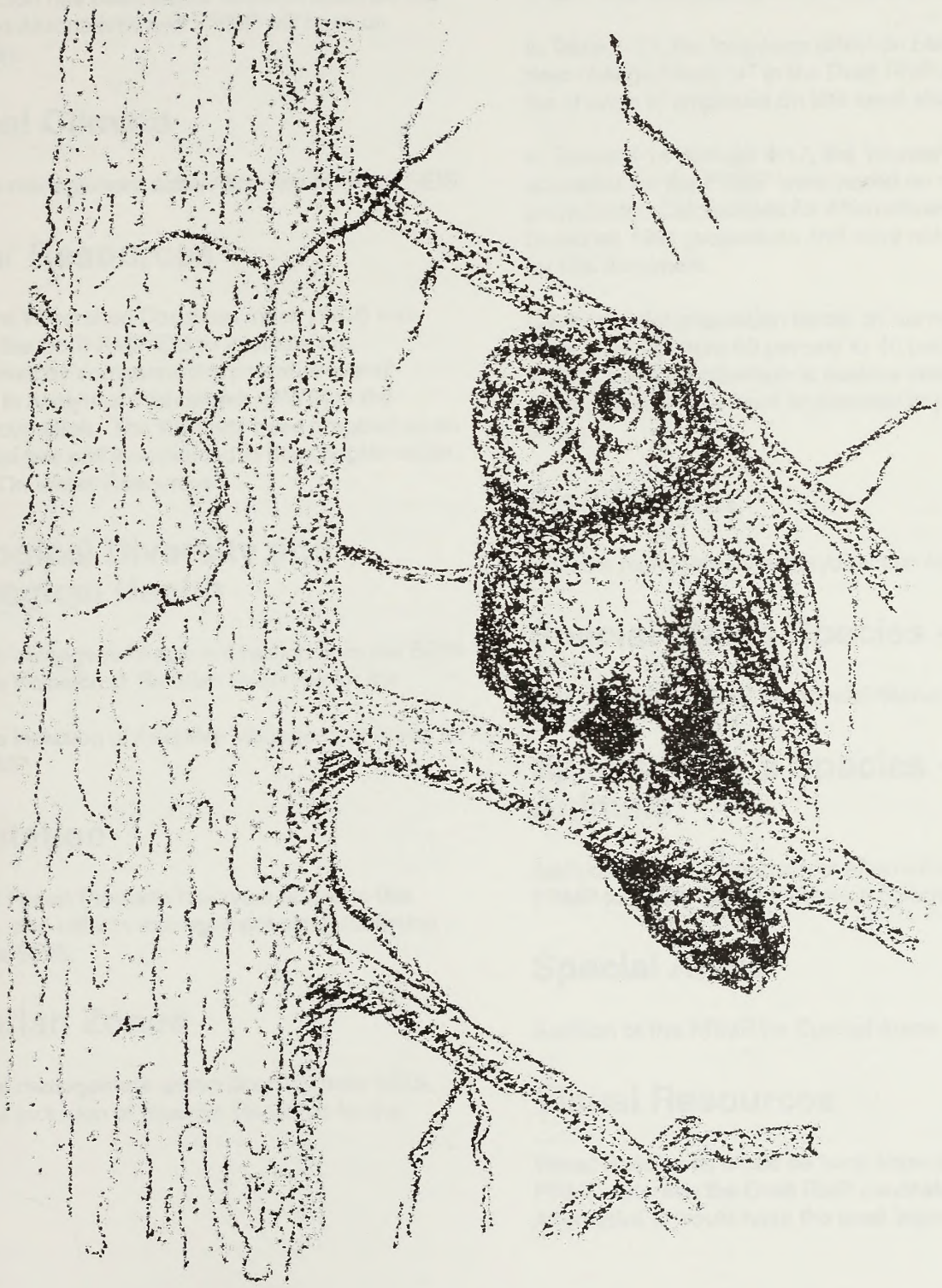
The recent historic fire history of the planning area is as follows:

Distribution of Fires by Size Class, 1984 to 1993

Size Class (acres)	Number of Acres	Number of Fires
0.00 to 0.25	39	5
0.26 to 9.99	27	75
10.0 to 99.99	2	40
100.0 to 299.99	0	0
300.0 to 999.99	0	0
greater than 1000.0		

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.

Chapter 4
Environmental Consequences



Chapter 4
Summary of Major Changes

Effects on Wildfire

This section has been added to better describe the effect the Alternatives and PRMP will have on wildfire(s).

Global Climate

Reflects management action/direction from the SEIS.

Water Resources

A relative Watershed Condition Index (WCI) was used in the Draft RMP/EIS to evaluate the alternatives by comparing the potential overall change in Analytical Watersheds (AWS) to the current condition. The WCI has been dropped as an analytical tool and is explained in this chapter under Effects On Water Resources.

Biological Diversity and Ecological Health

Reflects management action/direction from the SEIS.
Reflects inclusion of Riparian Reserves for the PRMP.
Reflects inclusion of Adaptive Management Areas for the PRMP.

Vegetation

Special Forest Products has been added to this section, and reflects management action/direction from the SEIS.

Riparian Zones

Reflects management action/direction from SEIS.
Reflects inclusion of Riparian Reserves for the PRMP.

Wildlife

Affects on wildlife resources were summarized from the more detailed analysis of the Draft RMP.

Acres of treatment were determined either by adding predicted matrix treatment acres and estimated acres of Late-Successional Reserves, or by using 1992 habitat numbers if the level of impact under the PRMP was less than under the Draft RMP.

In Table 4-13, the long-term effect on black-tailed deer changed from "+" in the Draft RMP to "-" due to the change in emphasis on late seral stage forest.

In Tables 4-14 through 4-17, the 10-year age class scenarios for the PRMP were based on new 1994 projections. Calculations for Alternatives NA - E were based on 1991 projections and were not recalculated for this document.

Cavity dweller population levels on harvested stands were changed from 60 percent to 40 percent in the PRMP, but snag retention in reserve areas will be managed at 100 percent of potential population levels.

Fish Habitat

Reflects management action/direction from SEIS.

Special Status Species - Plants

Addition of the PRMP for Special Status Plants.

Special Status Species - Animals

Addition of the Comparison of Alternatives and PRMP for SEIS Special Attention Species.

Special Areas

Addition of the PRMP for Special Areas.

Visual Resources

Visual Resources would be least impacted in the PRMP, whereas the Draft RMP concluded that Alternative C would have the least impact.

Timber Resources

- Reflects management actions/direction from the SEIS.
- Reflects changes in Sensitivity Analysis
- The discussion on green tree retention requirements has been expanded.
- A discussion on Adaptive Management Areas has been added.
- A discussion on adjustments of Riparian Reserves has been added.
- A discussion on Protection Buffers, Survey and Manage Requirements, and Protection of Bat Roost Sites has been added.
- The discussion on forest health has been included in the Biological Diversity section.
- All references to Allowable Sale Quantity (ASQ) have been changed to Probable Sale Quantity (PSQ).

Energy and Minerals

- The analysis of the effects of PRMP land-use allocations on mineral resources was added in this chapter.

- Since publication of the Draft RMP, 2 parcels located north of Florence, Oregon, considered to have high potential for silica sand, have been withdrawn from locatable mineral entry to protect surface resources.

- Tables 4-4- through 4-43 have been changed to indicate that acres with unknown mineral potential are added in with those considered to have low mineral potential. On these tables, discretionary closures indicate closures under BLM control.

Socioeconomic Conditions

Reflects management actions/direction from the SEIS.

Rural Interface Areas

VRM Class II guidelines have been changed to VRM Class III guidelines.

Special Status Species/Special Attention Species Habitat

- The analyses for the northern spotted owl and marbled murrelet were changed to conform with the analyses done in the SEIS.

- Tables 4-23, 4-24, and 4-25 were deleted.

- Information on current marbled murrelet habitat and short-term projections was added to Table 4-26.

- All northern spotted owl and marbled murrelet tables were updated to reflect 1994 10-year age class scenario projections for all alternatives.

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 RMP/EIS Summary (Table 2-1).

Preliminary analysis, including scoping, indicates that the alternatives would not significantly impact the following: geology, topography, grazing, agriculture, prime and unique farmlands, paleontological values, or renewable energy (i.e., wind, hydro, biomass) use. Therefore, these topics are not discussed in this document. Potential energy and mineral development projects were assessed and likely major impacts are discussed under the appropriate resource section in this chapter. In addition, no analysis of impacts on wilderness values is presented since those values have been addressed in the separate Oregon Wilderness EIS completed in 1990.

Direct, indirect and cumulative effects are all considered, to the extent identifiable, in each analysis. Direct effects result from activities planned or authorized by the BLM under each alternative. 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 the combined activities on BLM administered lands and on other lands, both other public and private.

There are 3 topics that the National Environmental Policy Act requires the EIS to address in relationship to the proposed action, which an EIS often treats as separate topics:

- Relationship between short-term uses and long-term productivity
- Irreversible or irretrievable commitments of resources
- Adverse environmental effects that 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. This is the period for which the existing plan was in effect at the start of Environmental Impact Statement 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 10 years. Short-term impacts include those resulting from harvest of timber sold during the 10-year period, even though such a harvest may occur 2 or 3 years after sale. Long-term is the period beyond 10 years. Whenever meaningful analysis depended on specificity provided by the 10-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, validation of most of these models would take decades. Nonetheless, they provide the most useful available methods, other than analyst intuition, for comparing probably 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.

The application of the models to Alternative C and the Proposed Resource Management Plan 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 (AMA) 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.

In addition to analyses of the consequences of the 7 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 decision. It can assist selection of a Resource Management Plan 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 Resource Management Plan and summarized in Appendix 4-A 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 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 (PSQ) and annual average silvicultural practices for the alternatives would be approximately as shown in Table 4-1.

- The alternatives would be continued for many decades.

- 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 4-A for further discussion) and related conditions for plant growth will continue.

- During the 10-year life of the plan, new roads would be constructed across BLM administered lands by private parties under the terms of existing reciprocal Right-of-Way (ROW) agreements.

- For analysis of cumulative effects, most private forest lands would be intensively managed with final harvest on commercial economic rotations averaging 40-60 years.

The PSQ 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 PSQ rather than Allowable Sale Quantity (ASQ) 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 PSQ 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 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 PSQ. 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 ASQ to be declared when a plan decision is made. The separable component of the PSQ 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 PSQ will be offered for sale. The PRMP represents a new forest management strategy. Time will be required to develop new timber sales that conform to the PRMP.

Average annual timber sale volumes from thinnings in young stands in Late-Successional Reserves are also estimated. It is also unlikely that these volumes will be offered for sale in the first few years of plan implementation.

A 10-year representative timber management scenario was developed based on the land-use allocations for each alternative except the No Action alternative, 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 of the other alternatives except the PRMP.

For Alternatives A through E, random spatial selection of timber harvest units was linked to the TRIM-PLUS ASQ calculation to determine the 10-year scenario that meets management selection criteria to provide the calculated PSQ 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 that 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 10-year representative harvest units could be developed to fit the PRMP, except that many of the intermittent streams are not currently mapped in the Geographic Information System. 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 age class and timber type scheduled for harvest in the first decade was randomly depleted in average harvest unit quantities from across the available land-use allocations and 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 10-year scenarios. The scenarios provide an analytical tool, however, to help provide more specificity to analysis

Table 4-1 - Estimated Annual First-Decade Levels of Timber Management Activity by Alternative

Activity (acres[1] except as noted)	Alternative						
	NA	A	B	C	D	E	PRMP[2]
Regeneration Harvest	3,750	4,410	3,890	1,120	1,570	1,690	570
Commercial Thinning/Density Management	4,840	1,410	1,480	2,640	800	790	730
Road Construction (miles)	27	29	26	23	15	18	8
Road Construction	150	160	140	120	80	100	40
Ground-based Yarding	170	120	110	80	50	50	30
Cable Yarding, No Suspension	1,260	1,030	950	670	420	440	230
Cable Yarding, Partial Suspension	5,820	3,940	3,640	2,550	1,610	1,680	880
Cable Yarding, Full Suspension	1,070	720	670	470	300	310	160
Broadcast Burn	730	780	690	90	150	180	80
Mechanical Pile and Burn	1,260	1,350	1,210	270	610	640	190
Hand Pile and Burn	960	1,030	900	550	410	440	160
Conversion	0	100	90	80	60	20	10
Planting, Regular Stock	2,130	2,960	2,310	0	0	0	0
Planting, Genetic Stock	2,580	2,580	2,580	1,530	1,960	2,120	680
Vegetation Control	2,780	3,280	2,860	50	1,080	1,180	350
Protection	3,050	3,590	3,180	880	1,320	1,420	600
Precommercial Thinning	3,640	2,530	2,310	2,170	1,580	960	590
Fertilization	13,010	9,040	7,880	4,160	3,030	2,650	1,670

[1] All acreage values rounded to the nearest 10 acres.
[2]Acreages for the PRMP are only for our Matrix lands, they do not include other land use allocations.

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 Environmental Impact Statement (EIS) might differ significantly from those predicted based on the 10-year scenarios.

Ten-year scenarios of expected mineral exploration and development activity have also been developed. They are set forth in Appendix DD.

Analysis of the alternatives is also based on their different levels of planned activities as shown in **Table 2-1**.

This PRMP 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 the subject of an inexact science.

There is a substantial amount of credible information about the topics of this Environmental Impact Statement (EIS); 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 (CEQ) Regulations (40 CFR 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 have been incorporated and evaluated. For the actions analyzed in this PRMP/EIS, mitigating measures are addressed

primarily through land allocations, and management practices and standards as described in Chapter 2.

Some examples of such mitigating measures built into the design of alternatives and identified in Chapter 2, follow:

- 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.

Effects on Global Climate

Scientific opinion anticipates noticeable global warming during the 21st century. However, there is substantial scientific uncertainty about the rate of such warming. A report of the Intergovernmental Panel on Climate Change stated that temperature increases could be as low as 1°C or as high as 5°C by the year 2100 (Schneider, 1991).

The primary factors leading to the expectation of warming are substantial increases in atmospheric carbon dioxide, nitrous oxide, methane, chlorofluorocarbons, and other trace gases attributed to human activity. BLM's land management activities in the planning area would primarily affect the amount of carbon dioxide. Forecasts of global carbon dioxide increases suggest that it may double from the level of 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.

The amount of carbon stored within the trees of the forest is a key factor in assessing the impact of timber harvest and forest regrowth on the amount of carbon in the atmosphere. 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. Commentors 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 United States.

The calculations of Harmon et al. indicate that each million acres of old growth forest harvested in the northwestern United States would add less than .01 percent to the total carbon currently in the atmosphere. The largest acreage of old growth (age class 200+) anticipated for harvest over a 10-year period in any alternative is 32,738 acres in Alternative A, while the Proposed Resource Management Plan (PRMP) would harvest 488 acres of old growth. Although young, fast growing trees store less carbon in total, they absorb more carbon from the atmosphere than older trees. Fertilization, vegetation management, and planting genetically selected stock all enhance this effect. In mature and old growth stands, release and absorption of carbon dioxide tend to be in balance. However, logging, especially clear cutting, increases the rate of decomposition of debris on the forest floor, releasing more carbon dioxide. Not until a young stand reaches the stage of canopy closure does its carbon uptake offset that release (Alaback, 1989). One forest practice directly releasing carbon dioxide to the atmosphere is prescribed burning after timber harvest. In the absence of burning, however, the decay of the same wood over many years would contribute a similar amount of carbon dioxide. The largest amount of prescribed burning anticipated over 10 years in any alternative (Alternative A) is 680,000 tons (see Effects on Air Quality, Chapter 4), while under the PRMP, approximately 258,600 tons would be burned. These levels of burning would contribute a maximum of 1,020,000 tons and 387,900 tons of carbon dioxide to the atmosphere, respectively. (Burning a ton of slash can create up to 1½tons of carbon dioxide as the released carbon combines with oxygen.)

In the long-term, a managed forest will be in balance with its release and absorption of carbon dioxide, just as an unmanaged forest is. However, since one-half of newly injected carbon dioxide would remain in the atmosphere (Schneider, 1989), a decade of harvest of some of the older forest and prescribed burning under the PRMP could add .0001 percent to the

carbon in the world's atmosphere, an unavoidable adverse impact.

Harmon et al. calculated that the past harvest of 5 million hectares (12-1/2 million acres) of old growth in the Pacific Northwest accounted for 2 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.
At the level of RMP/EIS analysis, each 10,000 acres of old growth that would be harvested (assumes clear cutting) 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 preferred alternatives would (preliminary liberal estimate) harvest the equivalent of as much as 30,000 acres of old growth in the first decade; 190,000 acres of such harvesting on Federal lands (a high estimate) would add .0076 percent 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 10-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 forest lands in western Oregon and Washington for the expected 10-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).

Effects on Air Quality

Major sources of air pollutants associated with BLM resource management activities are smoke from prescribed burning, application of pesticides used to control unwanted vegetation, dust from use of unsurfaced roads, and road construction and 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 (see Appendix JJ).

Dust from 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. Localized effects from road dust would be felt by residents within the Rural Interface Area (RIA) for all alternatives. The major adverse effect would be local 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 (OSMP) and the Visibility Protection Plan. The focus of the effects by

alternatives is on PM10 (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, wood stoves, 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 4-2). 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) 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, D, E, and PRMP represent 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, D, E, and the PRMP use a combination of under-canopy and broadcast burning to meet the fuel treatment objectives.

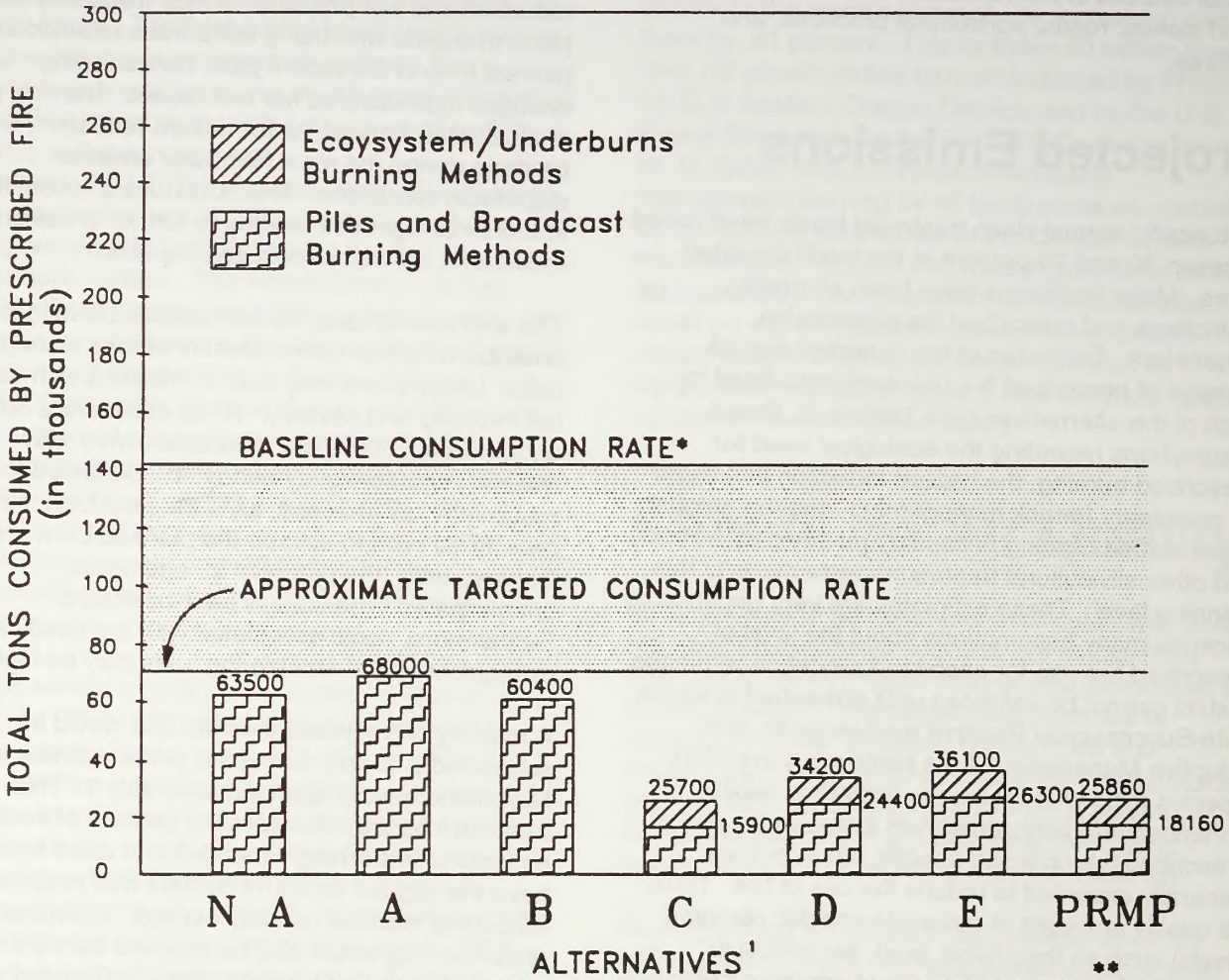
In Alternatives C, D, E, and PRMP, prescribed burning emphasizes ecosystem processes restoration, habitat restoration and maintenance, and hazard reduction. In these alternatives, much of the proposed burning would be underburning, in both natural and managed stands. Burning for hazard reduction and 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 may increase, 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.

A majority of the prescribed fire use would be scheduled primarily during the period starting in March and ending approximately July 1. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content that 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. Pile burning may be conducted in the winter months. Control of prescribed fire becomes more difficult after July.

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 (DA), as well as nonattainment areas, while prescribed fires are

TABLE 4-2 PREDICTED ANNUAL CONSUMPTION BY ALTERNATIVE



	N A	A	B	C	D	E	PRMP**
Hand Piles	960/12	1030/12	900/12	550/12	410/12	440/12	320/12
Machine Piles	1260/25	1350/25	1210/25	270/25	610/25	640/25	360/25
Broadcast	730/28	780/28	690/28	90/28	150/28	180/28	190/28
Underburns	N/A	N/A	N/A	700/14	700/14	700/14	550/14

[1] Acres/Tons per Acre

*Baseline Consumption Rate (1976-1979)

**PRMP Treatment Acres consist of silvicultural, hazard reduction, and habitat maintenance and restoration activities.

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 toward the 50 percent reduction goal for total suspended solids (TSP) emissions from forestry burning for all of western Oregon by the year 2000 (see Chapter 3, Air Quality for further discussion).

Alternatives NA, A, and B would have the greatest potential impact on air quality, with each proposing to emit roughly 700 tons of PM10. Alternatives C, D, E, and PRMP have the least impact on air quality, with projected PM10 emissions of approximately 280 to 420 tons of PM10 from prescribed burning. The PRMP would emit approximately 370 tons of PM10. For reference, baseline (1976-1979) emissions for PM10 were approximately 2,400 tons. For a description of the techniques used to estimate emissions in the PRMP, see the Air Quality Analysis in the Final SEIS.

Oregon has an established emission reduction goal for Total Suspended Particulate (TSP) 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 to the Oregon TSP baseline. For each alternative, 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 would 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 the Class I wilderness areas during the visibility protection period (July 1 to September 15), because prescribed burning would not be conducted in the planning area during this period, unless conducted under the special provisions of the OSMP.

Prescribed burning emissions, under all alternatives, is not expected to affect annual PM10 attainment within the Eugene/Springfield nonattainment areas (see Table 3-1 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, D, E, and PRMP. Alternatives A, B, 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). 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 C when compared with the base period. The amount of underburning would increase for Alternatives 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 RIAs 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 that would have the potential to affect wildfire emissions, as well as to damage property and resources.

Firewood

Firewood smoke has become a major pollutant in populated areas. Limited availability of firewood and local government wood stove curtailment programs would reduce this source of pollution. Availability of

residual wood from timber harvest activities on BLM administered lands would be substantially less under Alternatives C, D, E, and PRMP compared to Alternatives NA, A, and B. Firewood availability would decline under all alternatives due to increased utilization of wood waste by contractors and from leaving some wood debris on the sites for biological and soil protection reasons. Local city and County wood stove curtailment programs will also make demand for firewood decline.

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, D, E, 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 A, B, and the NA are projected to result in the highest total PM10 smoke emissions, as well as greater chance for intrusions from prescribed burning. Alternative C would produce the lowest level of emissions and least risk of smoke intrusions. Alternatives C, D, E, and the PRMP would increase the amount of underburning compared to the base period. While emissions would be less, the risk of these lighter intrusions would increase under these alternatives.

Air quality under all alternatives would not deteriorate to a point that ambient air quality would be adversely impacted due to prescribed fire. Particulate emissions from prescribed burning have not been shown to be a major contributor to any nonattainment area problem. Under all alternatives, air quality impacts associated with BLM administered activities are normally of very short duration and would have no short or long-term impacts on regional air quality.

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 have 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.

Since wildfire records have been kept, humans have 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 (RIA), and timber management activities on both private and public land (refer to Chapter 3 for additional information on wildfire occurrence). 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 buildup of fuels through fire suppression activities, and the natural successional changes in ecosystems. Unless fuels are actively managed, this increased risk would 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 methods to reintroduce fire into these ecosystems. Each of these ecosystems had some natural fire regime prior to fire suppression and would 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, 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 to reduce 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 through the cutting of hardwoods, and thinning of the forest understory would 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 ahead of time 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, E, and PRMP would produce moderate amounts of untreated logging slash.

Underburning proposed in the alternatives would also reduce the risk of wildfire. Alternatives C, D, E, and the PRMP have the highest likelihood 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 RIA 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.

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 has the overall responsibility for wildfire suppression in the planning area. Oregon Department of Forestry, under contract, provides the suppression, prevention, and detection under each of the alternatives. While the costs of the contract and actual fire suppression costs would vary under the range of alternatives, the costs cannot be determined at this time because 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. In the planning over the next 50 to 100 years, a total fire protection strategy is likely to be unsuccessful in providing protection against catastrophic disturbance, while fire severity would 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.

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 of the site variables

involved, and the limited number of investigations that have occurred. 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, Water and Soils - Management Actions/Direction, and Management Direction Common To All Alternatives sections) and Best Management Practices (BMP) in Appendix G should prevent unacceptable degradation of the soil resource. Monitoring and incorporating the latest information will determine whether the prescriptions and BMPs are effective and being correctly applied.

Both soil and non-soil factors influence soil productivity. Non-soil factors, such as climate and geology, are not influenced by forest management activities. Soil factors that can be modified by management activities are soil moisture, soil aeration, organic matter content, 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 soil related adverse impacts. This determination would be accomplished during the interdisciplinary team review of specific projects.

Timber Productivity Capability Classification (TPCC): Soil Capability

The Timber Productivity Capability Classification (TPCC) identified fragile sites (fragile, nonsuitable woodland classification) that were judged to be incapable of supporting a sustained yield of forest products. No planned timber harvest would take place on these lands under any of the alternatives. They would be managed primarily for their nontimber values. Forest management activity on some fragile nonsuitable woodland areas would be unavoidable. For instance, nonsuitable woodland sites may be located within timber harvest unit boundaries or in the alignments of roads to be constructed. When these situations are encountered, mitigation measures would be used to reduce adverse impacts. Despite the use of mitigation measures, unavoidable impacts could occur. The acres of disturbed nonsuitable woodland sites and the level of unavoidable impacts would be minimal, but higher under Alternatives NA, A, and B and lower under Alternatives C, D, E, and the PRMP.

Also identified by the TPCC are sites (fragile suitable, restricted classification) that are subject to unacceptable soil productivity loss as a result of management activities, unless special restrictive or mitigation measures (see Appendix G) are used to protect them. These sites would be managed using BMPs (see Appendix G) and other mitigating measures to minimize impacts from management activities. Unavoidable impacts may occur from unforeseen circumstances during implementation of management prescriptions. Most of these impacts would be nondetrimental or within acceptable limits. The harvested acreage of fragile restricted sites would be highest under Alternatives NA, A, and B. Alternative E harvests the least acreage in the fragile classification partly because no fragile gradient areas would be subject to planned harvest under this alternative. Table 4-3 lists acres of fragile suitable, restricted classifications harvested by alternative.

Table 4-3 - Approximate Acres[1] of TPC Fragile Suitable, Restricted Classifications Harvested by Alternative

	Alternatives						
Classification	**NA**	**A**	**B**	**C**	**D**	**E**	**PRMP**
Soil Moisture	689	407	376	260	166	174	91
Nutrient	10	6	5	4	2	2	2
Slope Gradient	1,082	640	591	408	261	0	143
Mass Movement	256	151	140	96	62	64	34
Groundwater	89	52	48	33	21	22	12
Total	**2,126**	**1,256**	**1,160**	**801**	**512**	**262**	**282**

[1]Acres of fragile suitable lands scheduled for harvesting (regeneration and density management) were derived by multiplying the percentage of fragile lands in the District's timber producing base by the proposed acreage to be harvested by alternative.

Forest management practices (including road construction), recreation, mining, and Off-Highway Vehicle (OHV) 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. Contributing to the degree of disturbance and resultant effects, are soil type and condition, equipment used, topography, degree and extent of implementation of planned practices and mitigation measures, and skills of individual equipment operators. Detrimental effects can be avoided, minimized, or ameliorated, and long-term productivity can be maintained at acceptable levels, if adequate soil management practices are planned and implemented.

Adverse effects on long-term soil productivity should be within acceptable levels for all alternatives with successful implementation of BMPs, mitigation measures (Appendix G), and practices in Water and Soils - Management Actions/Direction, and Management Direction Common To All Alternatives (Chapter 2). Some researchers suggest that productivity, even on lands available for forest management, may not be sustainable over the long-term under highly intensive management prescriptions with short rotations. Management prescriptions and mitigation and amelioration measures have been designed to keep the extent and duration of adverse effects on soils within acceptable levels. Past monitoring has shown that actual results of applying a given BMP or mitigation measure vary due to factors such as an operator's skill and understanding of desired results, weather conditions, and amount of contract administration. The most common types of disturbances affecting soils and associated long-term productivity are displacement/compaction, erosion (surface erosion and mass wasting), and alteration of nutrient status and soil biology. A summary of effects of the alternatives on these disturbance types and on long-term soil productivity are discussed in this section. Appendix I contains more detail and discussion on each of these disturbance types.

Compaction/ Displacement

Research literature reports data for growth effects created by detrimental soil compaction and displacement as a combined effect which cannot be separated. Detrimental soil compaction is assumed to occur at depths greater than 2 inches, and is evidenced by an increase in soil density of 15 or more percent (USFS standard in Forest Service Manual Supplement 45, Section 2520.4) over the undisturbed level. Soil compaction effects are long-term and can occur on all soils within the District. The majority of increase in density occurs after the first machine pass when soils are wet, and after the first 3 to 5 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 on immediately adjacent (3 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 high lead and skyline cable yarding; however, tree growth impacts from cable yarding are inconclusive.

Yarding and site preparation methods would be determined on a unit by unit basis. On slopes exceeding 35 percent, adverse compaction/ displacement 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 1 percent) growth loss effect (see Water and Soil - Management Actions/Direction, and Management Direction Common To All Alternatives sections of Chapter 2). 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 1 percent.

Timber harvest and site preparation methods together with soil conditions during operation influence the degree of soil compaction and displacement. The effects of soil compaction from cable yarding have not been well documented in the literature. The PRMP schedules the fewest acres targeted for ground based yarding or cable yarding with no suspension; Alternatives D and E have the next fewest. Mechanical site preparation is scheduled for a high of 1,350 acres for Alternative B to a low of 190 acres for the PRMP(see Table 4-1).

Because all management practices will be planned and implemented to avoid detrimental compaction/ displacement for all alternatives, there should be insignificant (less than 1 percent reduction in productivity) adverse growth impacts for any of the alternatives. However, Alternatives NA, A, and B, with the most acres of ground based yarding and

mechanical site preparation (see Table 4-1), have the greatest risk to create adverse impacts from compaction/displacement. This is because of the greater risk for unforeseen circumstances of not implementing actions required to achieve insignificant growth loss. The PRMP has the least acres of tractor yarding and mechanical site preparation.

Soil Surface Erosion and Mass Wasting (Landsliding)

Soils in the District are subject to 2 types of erosion that can remove or relocate soil. They are surface erosion and mass wasting (landsliding). Natural surface erosion rates in undisturbed forested areas of western Oregon are very low. Overland flow of water and associated erosion tend to be rare due to the usually thick protective cover of vegetation, duff and litter, and the high infiltration rate of the soils. Erosion is more prevalent on roads and other compacted surfaces.

Most sites that are prone to landsliding or surface erosion have been identified by the TPCC fragile site inventory. Surface soil erosion and landslide occurrence should be similar for all alternatives due to protection from harvest of unstable sites and successful implementation of BMPs, mitigation measures, (Appendix G), and management actions/ direction listed in Chapter 2.

Forest management activities with the greatest potential for accelerating surface erosion include road and landing construction, log yarding, machine slash piling, scarification, and broadcast burning. Forest management activities can accelerate surface erosion 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. However, soil may be carried off-site and into streams if the erosive force is great enough. Soil loss would have a negative effect on long-term soil productivity because soil nutrients, water supplying capacity, rooting depth, and lateral rooting would be reduced. Due to lack of data relating surface erosion to forest soil productivity, no conclusive productivity analysis is possible. Indications are that topsoil removal would reduce productivity. The PRMP should have the least risk for accelerated soil erosion due to the fewest acres of planned harvest and the least amount of road construction (Table 4-1). Alternatives D and E should have an intermediate level of risk, and Alternatives NA, A, and B should have the highest risk of accelerated soil erosion.

Landslides can have significant on and off-site impacts on water quality, fish habitat, and long-term productivity. Alternatives NA, A, and B, which propose to harvest more acres classified in TPCC as fragile, slope gradient and fragile, mass movement potential (see Table 4-3), have the most potential for increasing the rate of mass failures compared to natural conditions. Alternative E and the PRMP have the least potential for increasing the rate of mass failures. The watershed restoration emphasis of the PRMP should help decrease the potential for road related mass movements.

Nutrient Status and Soil Biology

Due to 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 that 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.

Forest management prescriptions have a highly variable impact on long-term productivity. 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 (e.g., 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, as they would be under the intensively managed forest acres of Alternative E. Alternatives NA, A, B, and the intensively managed forest acres under Alternative D would have the second most intense and frequent harvesting and site preparation activities (Table 4-1). The PRMP would have the least intense and frequent regeneration harvest and site preparation activities, while Alternative C would

have the second least (Table 4-1). For all alternatives, management prescriptions are designed to avoid or minimize soil damage (see Chapter 2, Water and Soil - Management Actions/Direction, and Management Direction Common To All Alternatives sections and BMPs, Appendix G). In most instances, broadcast burning would be avoided on highly sensitive (category 1) soils. On other soils, burn prescriptions would be designed to protect beneficial soil properties and result in low intensity burns (see Chapter 2). If this protection does not occur, long-term soil productivity may be decreased. However, if proper soil management practices are used as planned, soil organic matter and related long-term soil productivity should not be significantly affected in all alternatives.

Differences in management practices between alternatives are the most direct indicator of relative risk to soil productivity decreases due to reduction of organic matter. The management prescriptions that have longer rotations and leave more organic material on the site will generally maintain or improve long-term productivity and site quality. The alternatives using more of these prescriptions are Alternative C and the PRMP.

Differences between alternatives in the amount of land fertilized depend on the amount of land allocated for timber production. Generally, fertilization would be planned for all well-stocked stands in areas managed for intensive forest production (Alternatives A, B, D, and E) and in the General Forest Management Area (GFMA) under the PRMP. Fertilization may be used under Alternative C and the PRMP to hasten development of old growth stand structure. Fertilization may also be used to enhance growth on well-managed sites and to help restore growth on sites where practices have reduced productivity by significantly reducing nutrient status. However, fertilization is not a substitute for excessive organic material removal from a site and would not be a planned mitigation.

Several plant species (e.g., red alder and ceanothus) host nitrogen fixing bacteria on their root systems and may enhance soil/site productivity. Alternatives NA, A, and B would be the most discriminant against these nitrogen fixing plants. Alternative C and the PRMP would plan to maintain red alder as a component of stands (based on site specific occurrence) and, therefore, would generally provide more nitrogen from symbiotic plant fixation.

Forest management practices can have a dramatic effect on nitrogen status and associated productivity trends. The FORCYTE-11 Model (Kimmins and Scoullar, 1990), a combination historical bioassay and process-based simulation forest yield predictor computer model, is used to estimate long-term soil productivity trends for various management practices that would be used under all alternatives. The FORCYTE-11 Model simulates yields of various management practices and is used to estimate relative comparisons of long-term productivity trends. This model is used to evaluate trends and not to predict definitive yields because it has not been substantiated with actual field measurements and data. A general description of the FORCYTE-11 Model, procedures for management prescription analyses, and results of trend analyses are in Appendix I and Table 4-4. In general, the FORCYTE-11 Model illustrates several basic principles of nutrient cycling effects in a managed forest:

- The more frequent and/or intense the burn, the more likely timber productivity and soil site quality would decrease over time.

- Fertilization makes up for nutrient losses from harvesting activities, especially on shorter rotations where more fertilization applications occur over time. However, this does not maintain organic matter in the soil. Soil organic matter influences many beneficial soil properties, such as bulk density, soil water holding capacity, cation exchange capacity, and soil biological activity.

- For multiple short rotations (less than 50 years), productivity would not be maintained when burning is used as a site preparation tool, even with prescriptions using frequent fertilizer application. However, productivity would be maintained when only 1 short rotation (less than 50 years) with a broadcast burn occurs in a series of longer rotations (Alternative D and future decades of Alternatives A, B, D, and E).

Forest management activities may affect soil organisms. Intense burning, soil compaction, or topsoil removal could result in detrimental impacts to soil organisms and soil productivity. Long-term impacts to soil organisms would be minimized for all alternatives by using management practices that reduce soil disturbance severity, maintain organic material, and emphasize revegetation by indigenous host species and associated soil organisms. Soil organisms could be affected most under Alternatives NA, A, and B (Table 4-1). The fewest impacts would occur under the PRMP, due to the low acreage intensively managed for timber production, the amount of organic material that would be retained on sites, and less intensive site preparation treatments; Alternative C would have the second fewest impacts.

Table 4-4 - Long-Term Soil Productivity Trend

Management Prescription	Rotation Length (Years)	Number of Rotations	Evaluation Time Frame (Years)	Productivity Trend For No Burn: Mean Annual Production/ Baseline	Productivity Trend For No Burn: Last Rotation/ Mean Annual Production	Productivity Trend For Light Burn: Mean Annual Production/ Baseline	Productivity Trend For Light Burn: Last Rotation/ Mean Annual Production	Productivity Trend For Moderate Burn: Mean Annual Production/ Baseline	Productivity Trend For Moderate Burn: Last Rotation/ Mean Annual Production
1. No Treatment/High Stocking	65	8	520	+	0	-	0	-	—
2. No Treatment/Low Stocking	65	8	520	-	-	—	—	—	—
3. PCT Only/CMAI	70	8	560	+	0	-	0	—	—
4. PCT Only/150 Yr Rotation	150	4	600	0	0	0	0	0	0
5. PCT/Fert/CMAI	70	8	560	+	0	0	-	0	-
6. PCT/Fert/150 Yr Rotation	150	4	600	0	0	0	0	0	0
7. PCT/1 CT/CMAI	70	8	560	+	0	-	—	—	—
8. PCT/1 CT/150 Yr Rotation	150	4	600	0	0	0	0	0	-
9. PCT/1 CT/2 Fert/CMAI	70	8	560	+	0	0	0	0	-
10. PCT/1 CT/ 2 Fert/150 Yr Rota.	150	4	600	+	0	0	0	0	0
11. PCT/1 CT/3 Fert/CMAI	70	8	560	++	0	+	0	0	0
12. PCT/1 CT/3 Fert/150 Yr Rota.	150	4	600	+	0	+	0	0	0
13. Max Tbr/12" dbh (40 Yr Rota.)	40	14	560	0	0	-	-	—	—
14. Max Tbr/16" dbh (60 Yr Rota.)	60	10	600	+	0	+	0	0	-
15. Max Tbr/20" dbh (115 Yr Rota.)	115	4	460	++	0	+	0	+	0
16. Max Tbr/24" dbh (170 Yr Rota.)	170	3	520		0		0	0	0
17. PCT/1 CT/2 Fert/Organic Retention/CMAI	70	8	560	+	0	0	0	0	-
18. PCT/1 CT/3 Fert/Organic Retention/CMAI	70	8	560	++	0	+	0	0	0

Increasing = + (Change is + 11-20%)
Decreasing = - (Change is - 11-20%)
Maintaining = 0 (Change is + or - _ 10%)
Strongly Increasing = ++ (Change is + > 20%)
Strongly Decreasing = — (Change is - > 20%)
PCT: Precommercial Thinning
CMAI: Culmination of Mean Annual Increment
Fert: Fertilization
CT: Commercial Thinning

High Stocking: 1,630 trees/hectare
Low Stocking: 308 trees/hectare
Max Tbr/12", 16", 20", or 24" dbh: Maximum Timber Prescription (PCT/2 CT/3 Fert) with rotation length necessary to produce desired dbh.
Organic Retention: Simulation for leaving on site 400 feet of large woody debris (Alternatives D and E).

Alternatives D and E would have intermediate levels of effects due to their intermediate acreages of regeneration harvest and site preparation (Table 4-1).

Cumulative Effects

Under all alternatives, construction of most rocked and/or excavated roads, most quarries, and water impoundments are irreversible or irretrievable commitments of the soil resource. The watershed restoration emphasis of the PRMP may provide for reclamation of some roads. Impacts to the soil resource should be negligible for all alternatives if BMPs (Appendix G), and Management Practices Common to All Alternatives and Water and Soils - Management Action/Direction (Chapter 2) are implemented.

Effects on Water Resources

Introduction

The analysis of impacts of the Proposed Resource Management Plan (PRMP) 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 to 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 of each alternative are the Riparian Reserve scenarios or Riparian Management Areas (RMA), 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 that, in turn, has been incorporated into the PRMP.

The Final SEIS concluded that Alternative 9, along with other Final SEIS alternatives with the same Riparian Reserve (RR) scenario, would have the fewest adverse effects to 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. Cumulative effects would be further addressed in subsequent analyses during watershed analysis and project level Environmental Assessment.

Impacts and Evaluation

All forest management activities can cause impacts on water resources. Appendix M (Basic Principles) and the Aquatic Conservation Strategy discuss the interactions between land management activities and water quality, as well as basic hydrologic principles. The following analysis focuses on the analytical watersheds described in Chapter 3. (These analytical watersheds are not necessarily the watersheds that would be used for watershed analysis under the proposed plan). Each watershed was analyzed to determine the impacts expected from the forest management activities attributable to management alternatives that have been outlined in Chapter 2. Physical water resources, stream channel, upland portion of the watershed, water quality parameters, and overall condition of the watershed are analyzed for impacts that would adversely affect beneficial usage, especially domestic water use, salmonids, and other aquatic species. The BLM is required by the National Environmental Policy Act (NEPA, 1977) to analyze all impacts upon water resources that include direct, indirect, and cumulative effects in the short-term (10 years) and long-term (200 years).

BLM administered land is intermingled with other ownership in a fragmented pattern (see District map). 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 NEPA.

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 directly 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 of this.

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 because 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 actions in the past, present, and reasonably foreseeable future. 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 BLM lands (Table 4-1). 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 (WCI) was used in the Draft RMP/EIS to evaluate the alternatives by comparing the potential overall change in Analytical Watersheds (AWS) to the current condition. The WCI has been dropped as an analysis tool because (1) the WCI was not developed to analyze ecosystem management; (2) the information upon which the Draft RMP/EIS WCI analysis was calculated is out-of-date, due to significant logging activities on private and industrial lands; (3) it would be difficult to update and forecast land disturbing activities on BLM administered lands, due to soft projections of potential sale quantities in the 10-year timber management scenario for the Proposed Resource Management Plan; and (4) 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 decision-making.

Impacts to Water Resources

There is no evidence that any of the alternatives, except the PRMP, would impact the existing water resources listed in Chapter 3. Under the PRMP alternative, expected land acquisition would increase the miles of stream and the acres of riparian habitat.

Additional water rights are expected to be filed throughout the District. In addition to the increases in water use by the population growth, instream water allocations have been authorized by the State of Oregon. The only possible significant increase in water use on BLM administered lands would be for geophysical/geochemical exploration, described in Appendix II. The result of increased surface water use would be more over appropriated stream segments.

Ground water quality would not 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 aquifers in both the Coast Range and Cascades. Activities that significantly decrease soil infiltration, such as road construction and soil compaction, would decrease the amount of water in the aquifers. These decreases in ground water quantity would be far too small to measure under all alternatives. Soil compaction is discussed below in "Impacts To The Upland Condition."

Sixteen river segments on the Eugene District have been identified as eligible for consideration for Wild and Scenic Rivers Status (see Chapter 3, Wild and Scenic Rivers). Legislation designating a river segment under the Wild and Scenic Rivers Act normally reserves to the United States any previously unappropriated water in the river. The only amount of water reserved is that which is reasonably necessary for the preservation and protection of those outstanding and remarkable values for which a particular river segment is designated. Valid existing water rights protected under State law would not be effected by designation. In addition, further appropriations of water could be made by nonfederal parties, as long as those appropriations would not adversely affect the values for which the river was designated.

Impacts to Stream Channel Condition

The condition of stream channels, described in Chapter 3, would be affected more by the proper

application of Best Management Practices (BMP) (Appendix G) than by any differences between Alternatives A through E. The watershed restoration portion of the PRMP is expected to impact stream channels in a manner that would greatly improve channel conditions for most beneficial uses, especially aquatic habitat.

The BMPs (Appendix G) are designed to minimize or eliminate direct negative impacts on BLM lands from management activities, such as roads and yarding methods, that disturb stream banks. Under the proposed alternative, watershed restoration projects would be designed to decrease degradation (down cutting) of stream channels and to agrade (build up) the stream so that it would reach its flood plain. As a result, many streams would start to cut their banks and meander across the flood plain, creating a condition similar to pre-European times. The streams listed in Table 3-44 (Scoured Streams) would probably have the greatest improvement. Direct negative impacts to stream channels from activities on private lands are expected to decrease under the new Oregon Forest Practices Act.

The most important factors that affect stream channels are decreases in woody debris, changes in riparian vegetation, and increases in peak flows. These factors can be used as indirect measures of impacts to stream channel condition.

The lack of large woody debris causes streams to down cut and straighten their course, creating an unstable condition. Under all alternatives, successful implementation of the BMPs would prevent any significant short-term decreases in the amount of large woody debris in streams on BLM administrated lands. Under the proposed alternative, short-term increases of large woody debris would occur from watershed restoration projects. Long-term impacts would be expected to occur due to increases or decreases of coniferous tree species that provide future large woody debris. Alternatives NA, A, B, and C would have the long-term effect of decreasing large woody debris in intermittent streams by removing trees, which are the future source of the large woody debris. Under Alternative D these impacts would occur on 1st order intermittent streams only. Alternative E would provide future large woody debris in all streams. The PRMP would decrease large woody debris on some intermittent and ephemeral streams without a well defined channel. All alternatives may have the long-term effect of increasing large woody debris in perennial streams, on BLM administered lands, that presently have a deficiency. This material would come from coniferous trees that are preserved or intentionally grown in Riparian Reserves. A study of streams in the Cascades and Coast Range found that 90 percent of the large wood in channels originated within 92 feet of the stream (McDade et al., 1989). If current OFPA rules are followed, long-term large woody debris recruitment would increase on non-BLM lands along fish bearing streams, which are presently deficient, and decrease or remain the same on lands that presently have an abundant supply. The effect to all land ownerships would probably be a net increase in large woody debris because of the current deficit is debris in streams within the operating area (Chapter 3).

The condition of riparian vegetation affects all aspects of the functioning of the channel (see Appendix M). The Riparian section of this chapter rates the riparian condition on BLM lands for each stream order by alternative, based on the size of the coniferous tree species. The impacts to the hydrologic functioning of riparian areas was rated by the size and amount of all vegetation on all ownerships within each watershed. The greatest impacts would happen on lands where natural riparian areas are converted to pasture, agriculture, or urban uses. The forestry practice that can cause the highest impacts to riparian areas is the use of ground based equipment for silvicultural practices. Differences between alternatives are small compared to the differences between watersheds. This is primarily due to increased activities in nonforest areas. A net decrease in adequate riparian vegetation is expected after the first decade in several of the watersheds, assuming present trends in the management of non-BLM lands continue.

The amount of scoured stream channels would decrease under all alternatives as the knowledge of landslide processes and control methods continue to improve.

Designating Sharps Creek as a recreational mining area could increase the amount of placer mining along Sharps Creek under Alternatives C, D, E, and the PRMP. This designation would also provide for the implementation of BMPs described in Chapter 2, which would offset part or all of the additional impacts to Sharps Creek and Row River (see Appendix II).

Instream suction dredging may cause short-term loss of all aquatic habitat in a projected 7.5 acres of streams throughout the District. An additional 7.5 acres of streams and stream banks are projected to be impacted from Bench Placer Mining. This could cause cumulative impacts to water quality and channel condition would occur (see Appendix II).

Increases in the magnitude and duration of peak flows is a cumulative effect that causes channel erosion, down-cutting, and landslides. The risk of negative impacts to the channel condition from changes in peak flow would vary between the alternatives. Although the relationship between peak flows and impacts on channel condition is not direct, it is proportional. Changes in peak flows are a function of the upland factors, which are discussed below.

Impacts to the Upland Condition

The major impacts from proposed actions on the nonstreamside portion of the watershed are erosion and increases in the intensity and duration of peak flows (floods).

Erosion creates increased sediment and turbidity in the water. The impacts from timber management and erosion processes are discussed in the soils section and in Appendix M. Erosion caused by Off-Highway Vehicles (OHV) would decrease under all alternatives, with the implementation of the OHV restrictions described in Appendix G (BMPs).

Increases in the frequency, magnitude, or duration of peak flows (floods) can increase sediment and degrade stream channels, as well as cause damage to structures. These increases are caused by soil compaction, the interception of groundwater by roads and the removal of vegetation (Appendix M).

The acres in each watershed that would be compacted, and the miles of roads that can intercept groundwater, would increase under all alternatives because recovery from compaction is a very long term process. Mitigation is planned under Alternative C and the PRMP. The mitigation consists of ripping road surfaces and/or putting the roads to bed. These mitigative measures are expected to decrease the impacts from roads on federal lands. The net impact on peak flows would be dependent on the amount of road building on other ownerships.

Removal of vegetation effects peak flows in 2 ways. First, less vegetation means less transpiration, which allows more of the precipitation to become stream flow. The second, and more important reason, is that openings in the forest collect more snow and, in the transient snow zone, this snow is melted rapidly when warm rains fall (Appendix M). Except for the Calapooia, Coast Fork, Upper Siuslaw And Willamette watersheds, there would be a decrease in the acres harvested and a larger decrease in the acres clear cut (openings). The vegetation effect on peak flow would decrease from present condition during the next 10 years, and then should remain the same in the long-term.

No significant water yield changes are expected in the watersheds of rivers identified as eligible for consideration for Wild and Scenic River Status under any alternative.

Land management activities have a more significant impact on water yields in smaller watersheds. If large portions of these smaller watersheds are logged or roaded, significant impacts would occur. Because these impacts are affected by individual management actions, a cumulative effects analysis would be done on each small watershed for each annual timber sale plan, under Alternatives A, B, C, D, and E. Impacts would either be mitigated or timber sale units and roads would be deferred until the small watershed has recovered. Under the PRMP watershed analysis would be done in each watershed prior to the determination of proposed actions. Predicted cumulative effects would be addressed at that time.

Impacts to Water Quality

The various water quality parameters are discussed in Appendix M. Chapter 3 gives the information that is known about the present condition of these parameters. Because no streams on the Eugene District have been classified as "water quality limited" by the Oregon Department of Environmental Quality (Appendix N, Table 3-53), the effects on total maximum daily loads would not be analyzed. Methods for quantifying the effects of the various alternatives on these parameters are not available. Therefore, the following discussions are qualitative and based on general hydrologic principles. These discussions are for short-term (within the 10-year planning period), indirect effects, except where noted.

All Alternatives

- Sediment and turbidity in Big River, Row River, Middle Willamette River, and Wolf Creek watersheds would decrease, as vegetation reestablishes itself and increased mass soil movement returns to natural levels.

- Sediment and turbidities may increase in watersheds where heavy compaction is expected from land development: Upper Siuslaw River, Calapooia River, Mohawk River, McKenzie River, and Willamette River watersheds.

- Dissolved oxygen may decrease in the lower portions of Panther Creek in the Wolf Creek Analytical Watershed (AWS), Doe Creek in the Middle Siuslaw AWS, Kelly Creek in the Upper Siuslaw AWS, and other low gradient streams where there is low stream velocity and an expected increases in temperature from non-BLM lands.

- No significant impacts are expected to the water quality of any Wild and Scenic River candidates under any alternative.

- The Willamette River watershed would have water quality impacts due to urbanization of the Eugene-Springfield area. These impacts may be mitigated by new water quality laws.

- Several watersheds have large areas in a single forest age class. This could result in long-term impacts. Mosby Creek in the Row River watershed, Big River and the upper portion of the Calapooia River have been extensively logged on private lands in the past 10 years. Water quality is expected to improve until timber on these lands matures. It is expected that water quality would decline when logging of a substantial portion of the watershed occurs in a relatively short period of time. These impacts would be less than have occurred in the past, because the roads are already constructed.

- The Wildcat Creek watershed has approximately 45 percent of the land in pole size timber due to fire. Both logging and road construction would be relatively heavy in the next decade under all alternatives.

More detailed analysis of the indirect cumulative and long-term impacts to water quality would be done during watershed analysis. The direct impacts to water quality would be analyzed in the Environmental Assessment process for each management action. The direct impacts from the alternatives cannot be analyzed because detailed plans are not available. The relative differences between alternatives are the functions of the acres harvested, miles of road built, acres of silvicultural practices (especially mechanical pile and burn), and the acres of riparian vegetation harvested. This information can be found in Chapter 4, Table 4-1 and in Chapter 2, Table 2-1.

Impacts to the General Watershed Condition

The overall condition of the Lake Creek, Middle Siuslaw River, Wildcat Creek, and Wolf Creek watersheds would remain unchanged. Few new roads are expected to be built in these watersheds and little development of the land is expected. Although logging activities are expected to increase in the Wildcat Creek watershed on non-BLM ownership, they would decrease on BLM administered land. These Watersheds are 39 percent BLM administered lands. They contain 18 percent of the area in all the watersheds and 32 percent of BLM lands in the District.

The watershed conditions of the Willamette River, Coast Fork Willamette River, Upper Siuslaw River, and Mohawk River are expected to decline under all alternatives. These watersheds are expected to have continued use of ground based equipment for forestry and increases in development. Lands subject to land development would lead to a decline in riparian protection and an increase in soil disturbance and compaction. These Watersheds are 17 percent BLM administered lands. They contain 36 percent of the area of all the watersheds and 33 percent of BLM lands in the District.

The Calapooia River watershed condition would probably significantly decline, primarily due to loss of riparian vegetation in the eastern portion and soil disturbance in the western portion of the watershed. This analysis was completed with little information about the eastern portion of this watershed. This watershed is 10 percent BLM administered lands. It contains 4 percent of the area of all the watersheds and 3 percent of BLM lands in the District.

The McKenzie River and Middle Fork of the Willamette would have significant nonforestry impacts in the western portions. Logging activities are projected to decline or remain the same in both watersheds. These Watersheds are 10 percent BLM administered lands. They contain 22 percent of the area of all the watersheds and 12 percent of BLM lands in the District.

Much of the Row River and Big River watersheds are in young age classes, logging activities are expected to be less during the next decade than in the past, and negative impacts are expected to decrease as these watersheds recover. These Watersheds are 18 percent BLM administered lands. They contain 20 percent of the area of all the watersheds and 19 percent of BLM lands in the District.

Biological Diversity and Ecological Health

Effects on Biological Diversity And Ecological Health

This section addresses how well the alternatives would provide for biological diversity and ecological health, maintaining viable populations of native species in functional habitats. Primary activities affecting biological diversity on BLM administered lands would be timber harvest, silvicultural practices, and reservation of land from these activities. Analysis of impacts on these elements is filled with uncertainty, as management for biological diversity has not been intensively researched.

Although the baseline for assessment of impacts is the existing situation, biological diversity is best defined in the context of the model provided by nature. Insofar as possible, this analysis of the effects on biological diversity is based on the extent to which management actions or resource protection would retain or depart from the natural, evolved state that existed before active forest management and protection activities began. Human activities have been affecting the ecosystems of western Oregon for thousands of years, but those effects have escalated substantially in the last 150 years, as described in Chapter 3.

Prior to settlement by nonnative people, 60 to 70 percent (the amount was not static but fluctuated) of western Oregon and Washington forests were old growth (Franklin and Spies, 1984). In 1850, about the time settlement was beginning in earnest, only 40 percent of the Coast Range was known to be old growth (Teensma et al., 1991).

Current estimates indicate that 85 percent of all forests in the Northwest have been harvested in the past century. The remaining 15 percent, in which no harvesting has been done, is of mixed age, predominantly at higher elevations. Most of the remaining old growth is in Federal ownership, mainly the U.S. Forest Service.

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 336,000 acres of old growth stands after 10 years and 718,000 acres after 100 years. These figures make allowance for anticipated losses due to catastrophic events.

BLM manages lands at middle and lower elevations. The Eugene District has few remaining large blocks of timber that have not been entered. The older age classes are mostly in small islands of variable size and distribution. These forest lands are in both the Coast Range and the Cascades, but are separated throughout most of the District by the Willamette Valley, which lacks forest cover. A forested area begins near Cottage Grove and extends from the Coast Range to the Cascades, providing an important biological corridor, but it has been greatly altered by timber harvesting and land use conversions.

These lands are mostly intermingled with private lands having ownership patterns limiting the potential for blocks larger than one square mile. A variety of land management activities are applied on these intermingled private lands, although timber management by private companies is most common. These private timberlands are mostly managed on short rotation, and are primarily in early-successional stages with limited structural and vegetative species diversity. Some private timberlands are now in their third rotation. In the planning area, many of these private timberlands have been harvested recently, and are in the early-successional stages.

Biological diversity is created by a constantly changing mix of plant and animal communities across the landscape. This mixture is influenced by both long-term factors, e.g., geological activity and climate pattern fluctuation, and short-term factors, such as fires and landslides. The community in any one location is dependent on the availability of suitable habitat components. As these components change over time, the biological community also changes. Species are adapted to the natural periodic disturbance with mechanisms for colonization, migration, and utilization of the legacies from such disturbances.

The biological system has a natural resiliency that aids in responding to change, so species and communities are able to maintain themselves across the landscape even as change occurs in a limited area. Many of these species and their habitat needs are discussed in the FEMAT. Because of human-induced changes throughout the planning area, some habitat types and habitat components have been reduced or lost. Natural processes have been modified, such as the reduction in acres burned and an increase in erosion rates. The flexibility of the natural systems may have been reduced, making them more susceptible to long and short-term threats, such as disease. Changes in rainfall and temperature patterns in the planning area, suggested by larger scale climate change models, may create additional stress on the natural systems.

Changes in the natural processes and availability of habitat components may be so extensive that these areas are no longer able to provide for historic habitat types in either the short or long-term. Wide scale harvesting of timber has led to extensive fragmented areas with isolated small patches of older forests. These small, isolated patches may not be large enough to maintain the full range of old growth related species. Because of the limited mobility of many old growth related species, it may not be possible to recover the full old growth community even if stands of larger trees are established.

Specialized habitats are usually associated with conditions, such as a greater abundance of water or very shallow soils, where larger trees do not become established. Many of these smaller, specialized habitats are relatively short-lived, the result of catastrophic events. Species that utilize these areas are often found in relatively small numbers, and may have life cycles or adaptations specific to the specialized habitats making it unlikely they will be found in other habitat types. Although limited in time and size, these specialized habitats may be quite productive.

While more specialized habitats, such as wetlands, rocky outcroppings, and talus slopes, are present, most of the available habitat in the planning unit is associated with conifer forests. A variety of habitats are created as the forests grow and mature. Standing and down dead trees and other legacies remaining from past communities provide much of the habitat variability. Diversity across the landscape depends on the patterns of the seral stages or level of maturity of the forest trees. The size of the patches of trees of a similar age and their distribution across the landscape influence their suitability as habitat for different species, the ability of populations of species to interchange to avoid genetic isolation, and the ability to respond to changing habitat conditions through migration and colonization.

A number of indicators (Seral Stages, Fragmentation, Special Areas, Special Habitats, Riparian Areas, Species Mix and Hardwoods, Snags, Dead and Down Material, Special Status Animals, Special Status Plants) have been selected for analysis of biological diversity. The following sections explain how the indicators are affected by the alternatives. Analysis of each indicator considers some or all of the focal components of biological diversity: genetic diversity, species diversity, ecosystem diversity, and landscape diversity. Alternatives that promote these four focal components are considered beneficial to biodiversity (improving), and alternatives that reduce these components are considered detrimental to biodiversity (declining). The effects are summarized in Table 4-8 and 4-9.

Table 4-8 - Comparison of Alternatives, Changes in Indicators of Biological Diversity, Short-Term (10 years)

Indicators	NA	A	B	C	D	E	PRMP
Seral Stages	-	-	-	0	0	0	0
Fragmentation	-	-	-	0	0	0	0
Special Habitats	-	-	-	-	0	0	0
Special Areas	-	-	-	-	0	0	0
Riparian Zones	0	-	0	0	0	0	0
Species Mix and Hardwoods	-	-	-	0	0	0	0
Snags	-	-	-	0	0	0	0
Dead and Down Material	-	-	-	0	0	0	0
Special Status Animals	-	-	-	0	0	0	0
Special Status Plants	-	-	-	-	0	0	0

+ improving/increasing; 0 maintaining; - declining

Table 4-9 - Comparison of Alternatives, Changes in Indicators of Biological Diversity, Long-Term (100 years)

Indicators	NA	A	B	C	D	E	PRMP
Seral Stages	-	-	-	+	+	0	+
Fragmentation	-	-	-	+	+	+	+
Special Habitats	-	-	-	0	0	0	
Special Areas	-	-	-	-	0	0	0
Riparian Zones	0	-	0	0	+	+	+
Species Mix and Hardwoods	-	-	-	+	+	+	+
Snags	-	-	0	+	+	+	+
Dead and Down Material	-	-	-	0	0	0	+
Special Status Animals	-	-	-	+	+	0	+
Special Status Plants	-	-	-	-	0	0	0

+ improving/increasing; 0 maintaining; - declining

Seral Stages

All seral stages and the array of plant communities existing within each of these stages provide habitat for a diversity of plants, animals, and fungi. The various seral stage structure, composition, and functions contribute to biodiversity by providing various life-history requirements and maintaining ecological health. Some species have broad habitat requirements and are generalists while other species are tied to narrow or specific habitat conditions. Diversity, however, cannot be determined simply by defining what seral stage a given plant community is currently exhibiting. Factors such as patch size, distribution, and the flows and processes between seral stages are extremely important in being able to characterize or predict plant, animal, and fungal diversity. Development of the various seral stages would exhibit various pathways over time, with some terrestrial and aquatic systems being more dynamic and variable than others. Some of these successional pathways are easily predictable while others are seemingly random in nature. This is important when trying to predict how species of plants and animals might respond to natural and human disturbances on managed landscapes.

Limited research has been done on the plant, animal, and fungal communities associated with the various forest seral stages. The interrelationships are not well known, so it is difficult to predict the actual impacts to biological communities given specific management actions. Information on impacts to the few species for which more complete information is available, such as the northern spotted owl and salmonid fish, can provide some indication of the impact of management actions. For many species, it may be necessary to use potential habitat as an index for estimating the status of a species' abundance and distribution across a landscape. Current information indicates that not only are structure and composition of seral stages important, but equally important are the processes involved in helping to maintain and shape the quality and quantity of habitat. Because of the spatial and temporal nature of plant and animal communities, it is difficult to predict the impacts on long-term survival, ecological interactions and processes, genetic variability of these organisms, and overall ecological health.

The acreage within each seral stage can be used as an index to express the 4 focal components. These acreage for the short and long-term are in Figures 4-1 and 4-2. For the purpose of this analysis, seral stage ages are defined as Early = 0 - 15; Mid = 15 - 45; Late = 45 - 95; Mature (closed canopy) = 95 - 145; Mature (open canopy) = 145 - 195; Old Growth = 195+.

Genetic Diversity

Intensive forest management activities are modeled after agricultural approaches. Practices that simplify ecosystems and focus on wood fiber production, create ecological impacts at various levels (Franklin et al., 1981). One of the impacts can be the reduction or elimination of genetic variability in plants and animals. Habitat fragmentation and the resulting isolation leads to a reduction in genetic fitness for

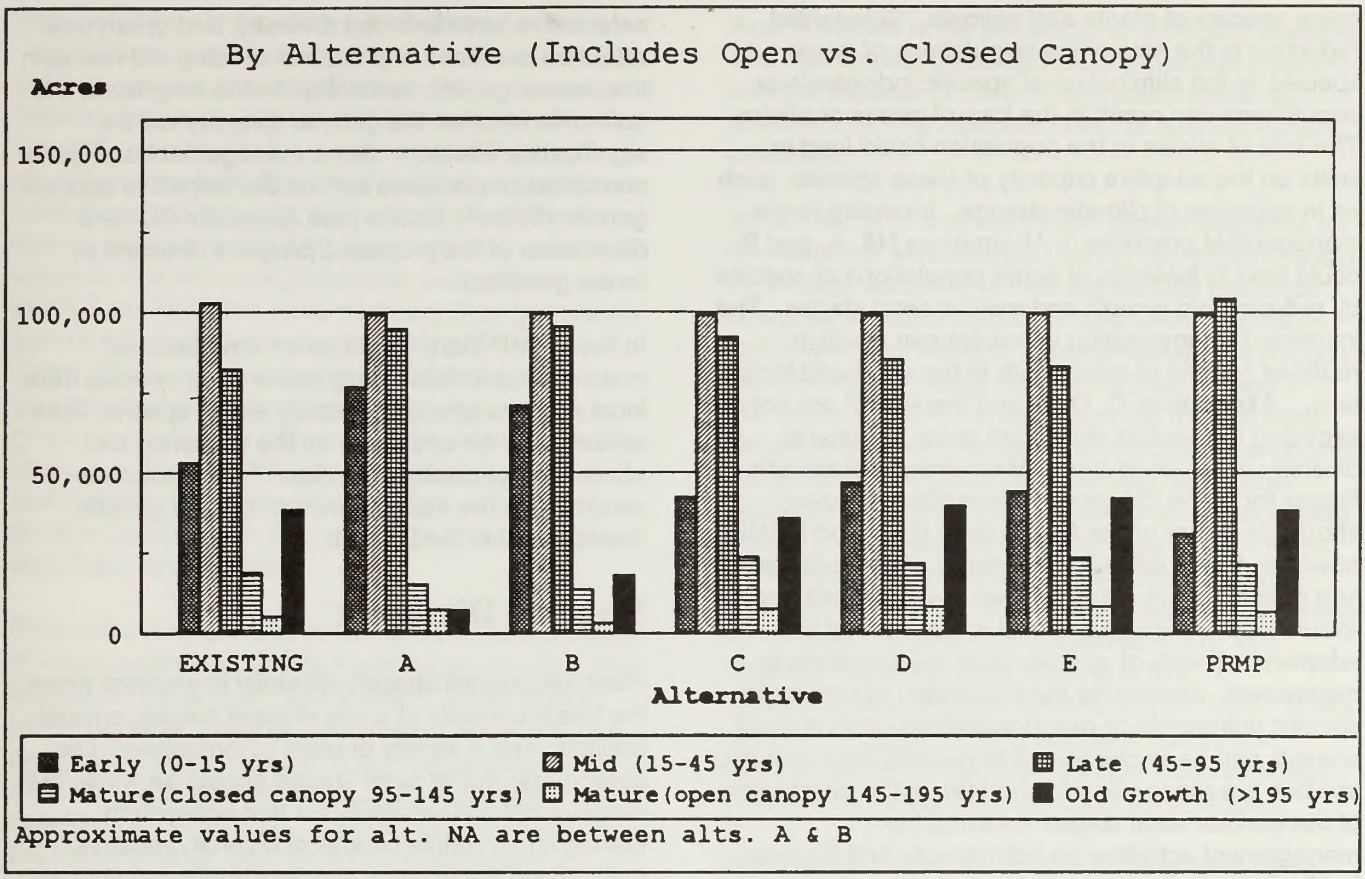


Figure 4-1. *Seral Stages Short-Term (10 years)*

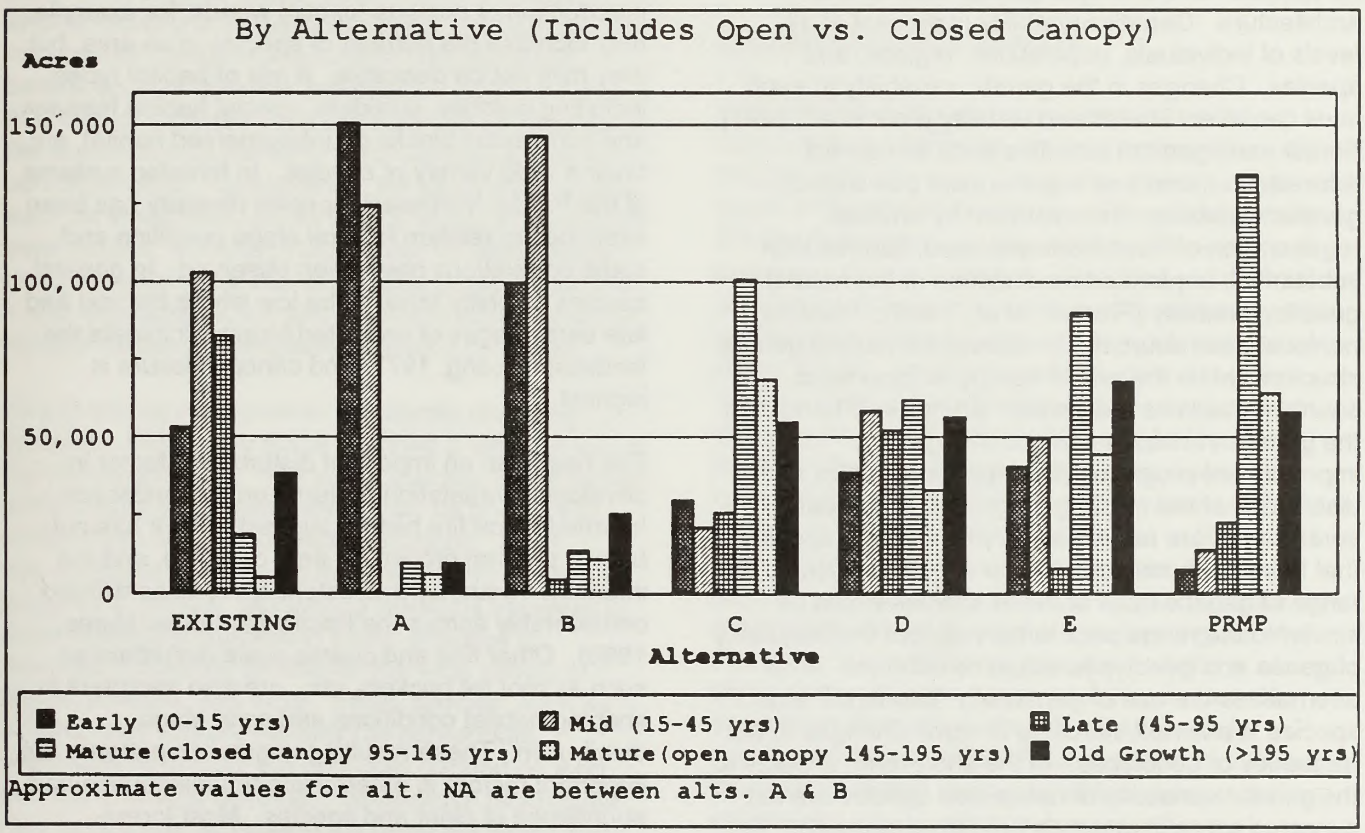


Figure 4-2. *Seral Stages Long-Term (100 years)*

many species of plants and animals. Substantial reduction in the size of the populations of some species or the elimination of specific individuals or populations can result in the loss of genes or alleles. The loss of alleles in the population could lead to limits on the adaptive capacity of these species, such as in episodes of climatic change. Intensive forest management practices in Alternatives NA, A, and B could lead to isolation of some populations of species by reducing old growth and mature seral stages. The increased fragmentation of habitat can result in reduced genetic diversity both in the short and long-term. Alternatives C, D, E, and the PRMP are not expected to result in significant gains in genetic diversity in the short-term. Maintenance of genetic fitness for many old growth- dependent species should be better under Alternatives D, E, and PRMP; however, this is difficult to measure. The condition and distribution of many species can be monitored to assure viable populations and to assure that the adaptive capacity of species over the long-term is maintained. Monitoring the population dynamics for specific vulnerable or rare populations of plants and animals can be implemented to quantify how selected species are responding to changes in the distribution of the various seral stages resulting from management activities on both private and Federal lands.

All species have a unique genetic structure or architecture. Genetic variability is present at all levels of individuals, populations, regions, and species. Changes in the genetic variability at each level can affect fitness and viability (Falk et al., 1991). Forest management activities such as harvest, reforestation, and tree improvement can impact genetic variability. Reforestation by artificial regeneration of trees from wild seed, can result in substantial, unplanned modification of the natural genetic variability (Franklin et al., 1980). Planting nonlocal seed sources can disrupt the natural genetic structure, while the use of nearby or local seed sources maintains the genetic structure. Changes in the genetic variability can occur in genetic improvement programs (see Appendix CC for a discussion of the existing program). When early seral stages are reforested by planting tree species that have been manipulated for specific attributes, the range of genetic traits of these species would be similar to the range prior to harvest, but the frequency of genes and genotypes would be different. In all alternatives the use of genetically "improved" tree species is planned, resulting in some changes to the frequency of genotypes. In the short-term, impacts to the genetic variability of native tree species are not expected as natural stands are reforested with genetically improved seedlings. Improved trees are selected to include broad diversity, and green tree retention practices and natural seeding will maintain the natural genetic variability. In the long-term, it is unknown whether the genetic diversity will be significantly affected. Gene management and gene conservation practices can be developed to address genetic diversity issues (see Appendix CC for a discussion of the proposed program direction in forest genetics).

In the PRMP there would be an emphasis on restoration activities using native plant species from local sources where previously exotic species were utilized, and an emphasis on the reduction and elimination of noxious species. These activities would aid in the maintenance of natural genetic diversity within the District.

Species Diversity

Plant and animal species diversity is greatest when the forest consists of a mix of seral stages, special habitats, and a variety of plant communities. The appropriate mix of seral stages should be within the range of natural variability for that ecosystem. Managing for native biological diversity requires maintaining the array of successional seral stages typically occurring in a landscape (Landres, 1992). Diversity in itself should not be the goal. The introduction of noxious (exotic) weeds, for example, may increase the number of species in an area, but they may not be desirable. A mix of habitat types, including patches, corridors, special habitat features, and contiguous blocks of unfragmented habitat, etc., favor a wide variety of species. In forested systems of the Pacific Northwest, species diversity has been examined in relation to seral stage condition and some correlations have been observed. In general, species diversity tends to be low where the mid and late seral stages of regulated forests dominate the landscape (Long, 1977) and canopy closure is highest.

Fire has been an important disturbance factor in developing vegetation patterns on the landscape. Information on fire history suggests that it has not been a uniform process in time or space, and the intensity, frequency and extent of fires has differed considerably across the Pacific Northwest (Agee, 1990). Other fine and coarse scale disturbances such as root rot pockets, etc., are also important in shaping habitat conditions and seral stage distribution. These resulting vegetation patterns are important factors in determining the distribution and abundance of plant and species. Most forest-dwelling animal species 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 stable habitat, tend to be specialists that often have relatively slow population growth rates and poor dispersal capabilities (Crow, 1990; Perry, 1992). In even-aged stands, the younger and older forest age classes provide the greatest species diversity, while the intermediate age classes (mid, late, and part of the mature seral stage that typically have closed canopies) are far less diverse (Long, 1977; Shoemaker and McKee, 1988; and Bruce et al., 1985).

One index of species diversity would be the acreage of each seral stage that is expected in the short and long- term under each alternative. Other factors, including such things as the quality and quantity of snags and down wood, are also key to species diversity within a seral stage, and must be given consideration. Because fiber production would continue to be an emphasis on private lands surrounding BLM managed lands, it is expected that nonfederal lands would generally be maintained in early seral stages. Older seral stages would be largely missing in these landscapes. Alternatives that maintain or increase older forest habitats would benefit species diversity more than those that maintain or increase the early seral stage because of the dominance of the early seral stages on adjoining non-BLM lands. Management for structural features, such as snags and coarse woody debris in BLM early seral stages, would provide habitat for some cavity using species within the early seral stage. Figures 4-1 and 4-2 project short and long-term acres by seral stage and canopy condition for each alternative.

Forest stands are dynamic, constantly changing systems. Each seral stage provides a different mix of habitat components. For some species, these habitat components are known, and it may be possible to create them using silvicultural practices. Such management is still being developed and would be adaptive in nature. Monitoring would be essential in determining the success of these activities in developing suitable habitat for the wide variety of plants, animals, and fungi. Some species, such as lichens, may require not only the appropriate substrates to live on, but may also depend on long periods of time to develop. Silvicultural techniques may not be able to replace the temporal needs that certain biotic communities may need to fully develop. Also unknown is the possibility of artificially creating and maintaining these habitat components over time and the impacts of periodic entry and roads on species that might benefit from the new silvicultural practices.

In Alternative C and the PRMP, partial mitigation for decreases in seral stages (mainly old growth) would be through adoption of new silvicultural practices designed to retain habitat components needed by some species. Many of these practices are not given full quantitative recognition in Figures 4-1 and 4-2. For example, over the long-term the mature seral stages would have some structural characteristics of old growth. The success of utilizing silvicultural practices along with the availability of funding would have a large influence on the effects of the PRMP. Silvicultural practices, like density management, would also be occurring as nonscheduled harvesting within Late-Successional Reserves (LSR) and Riparian Reserves (RR), adding to the unpredictability of these actions in the PRMP. There are also benefits to cavity dwellers due to the management for structural features such as snags and coarse woody debris in early seral stages.

Under Alternatives NA, A, and B there would be a shift to a dominance of species adapted to earlier seral stages in the short term.

Ecosystem Diversity

Associations of species are called biological communities, and these can be recognized as distinct stands, patches, special habitats, riparian areas, or a patch of old growth forest, etc. These communities are the biotic parts of ecosystems. The variety of species in an ecosystem is a function of the structural and functional characteristics and the diversity of its ecological processes and the physical environment (Noss, 1992). Seral stage distribution within the Eugene District is an important part of ecosystem diversity and maintenance of ecological health. Special habitats, also important components of ecosystem diversity, are covered under a separate section in the Biodiversity section, as is Riparian. The different alternatives would cause different impacts on ecosystem diversity by altering the acres associated with each seral stage (see Figures 4-1 and 4-2). It is not known, however, what mix of seral stage and vegetation types would best meet all ecosystem diversity goals. Recent research suggests that to maintain biological communities and those species that are a part of those communities, vegetation patterns should remain within the range of natural variability for that ecosystem. The seral stage

distribution should fluctuate spatially and temporally within ecological limits for the biological communities that rely on them. Under all alternatives the distribution and abundance of the various seral stages, driven by the selection of certain land-use allocations, were not selected using historical disturbance patterns as a reference point. The long-term implications of this are uncertain at this time. Watershed analysis, however, would identify historic disturbance patterns on the District and would attempt to define the range of natural variability for selected watersheds. This information would be used in activity level planning to the extent possible within each land-use allocation. Such information would be valuable in identifying conditions under which species evolved and were maintained. The ability of the District to provide for a specific seral stage pattern varies by alternative and would be influenced under all alternatives by management on intermingled non-BLM administered land. Because a plant community classification system for describing the variety of plant communities on the District has not been fully implemented, it is difficult at this time to assess how many acres of a certain seral stage would be within a given plant community.

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. The relatively short harvest rotation on many private forest lands means that a substantial portion of them would be in the early and mid seral stages. These two seral stages would dominate throughout the future. Little mature and old growth forest will remain on these lands, so forests on BLM administered lands and National Forest lands would provide essentially all that remains in the planning area.

In the PRMP the allocation of a network of Riparian Reserve, Late-Successional Reserve areas, 200-acre owl reserve areas, remaining tracts of old growth in 5th field watersheds, etc. would provide for old growth species and ecosystem diversity. New silvicultural practices would be implemented to develop old growth conditions, contributing to ecosystem function and composition. For example, density management activities would focus on developing larger trees with some characteristics of old growth as quickly as possible, providing structural and functional attributes such as large woody debris.

Old growth is defined as at least 10 percent stocked with trees 200 years or older. This stocking level may be a good measure for determining whether the acreage amounts generally fit the old growth definition (as defined by the Old Growth Definition Task Force). This measure does not necessarily represent all characteristics and functions of an old growth ecosystem. This is important to understand when implementing silvicultural treatments designed to develop some old growth characteristics. For example, density management treatments in Alternative C and the PRMP may develop large tree diameters but may not develop all biotic communities normally associated with naturally occurring old growth forests. Preliminary studies and observations suggest that epiphytic succession continues beyond 200 years and into 400/500 year old forests. Biomass estimates of specific lichen species appear to continue to increase as stands mature. Not only is biomass changing during this period but epiphyte communities are also thought to be changing. Studies indicate that, like vascular plants, lichens may also exhibit early and late seral species. Studies in the H.J. Andrews Experimental Forest showed the lichen, *Lobaria oregana*, did not occur until the stand was 200 years of age and showed increasing biomass production up to and possibly beyond 400 year old stands. *Lobaria oregana* is a cyanolichen that is able to fix nitrogen. Some estimates suggest that this species contributes 10 percent of the forest nitrogen. Density management practices may not provide the time frames necessary to fully provide for these types of communities. Some of these species, including *Lobaria oregana*, are considered SEIS Special Attention species and would be managed under those guidelines (see Chapter 2, Special Status and SEIS Special Attention Species).

A particularly scarce component of ecosystem diversity is low elevation (below 1,000 feet) old growth forest. Currently, there are several hundred acres of low elevation old growth forest stands delineated in the planning area. In the short-term this would decline under all alternatives except E. It is expected to increase in the long-term in Alternatives C, D, E, and the PRMP while it would continue to decrease in Alternatives NA, A, and B. In the PRMP, some existing stands of low elevation old growth may be deferred from harvest because they represent the remaining stands within 5th field watersheds. Some other stands would be protected under Special Area designation as ACEC.

See Figures 4-1 and 4-2 for a comparison of acres allocated to each seral stage under all alternatives. Alternatives NA, A, and B would have disproportionate amounts of early and mid seral stages throughout most of the District, and there would be a decrease in mature and old growth seral stages in both the short and long- term. Alternatives

D, E, and the PRMP would not provide a range of seral stages in the northeast portion of the planning area. However, only in the PRMP this northeast portion would have the Adaptive Management Areas (AMA) that would also focus on maintaining ecosystem functions and protecting ecological health as well as resource extraction. Alternatives C, D, E, and the PRMP would have no significant changes in the short-term, but would have a significant increase in mature and old growth in the long-term. However, the near elimination of late seral stage in Alternative E may outweigh the other increases.

Prescribed fire would be utilized in all alternatives. Historically it has been used most frequently in the early seral stages for site preparation prior to planting conifers. Although many plant communities are adapted to the occurrence of fire in the natural system, prescribed 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, inhibit the growth of most residual vegetation, and promote the growth of nonnative invader species. Gradual 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 most often would be limited to the short-term.

The use of prescribed fire can also be a beneficial tool when managers are aware of the historical and ecological influences of fire in the ecosystem (Kauffman, 1990). In the PRMP, fire would be used to maintain or develop certain seral stages or plant communities. Loss of fire from these ecosystems would threaten species diversity, leading to the eventual loss of some species.

Landscape Diversity

At large geographic scales, from watersheds to the larger geographic regions, biological diversity includes a variety in the kinds of ecosystems, their patterns and linkages across regional landscapes. Landscape or regional diversity includes the variety of ecosystems, patterns, connections, linkages, and finally the resilience and integrity of the region (Noss, 1992). The ROD and the adoption of this plan under the PRMP provides for landscape diversity by considering the entire Pacific Northwest within the range of the northern spotted owl. The PRMP is part of a plan to establish a network of well-distributed reserves to protect large blocks of old growth forests and the diversity of species that are dependent on these forests (SEIS/ROD, 1994). In addition, a network of riparian corridors, providing important habitat and linkages for a variety of species would be implemented. The Riparian Reserve system would conserve aquatic resources, as well as provide dispersal habitat for a variety of species. Seral stage distribution of mature and old growth forests both in the short and long-term are critical components of this regional planning effort.

The East/West Corridor within the District would also provide mature and old growth habitat essential for the dispersal of key organisms across the landscape. Such large scale landscape linkages provide essential seral stage patterns to support organisms and functional habitats throughout several physiographic provinces, in which the Eugene District is only a part. Other alternatives did not address landscape planning that covered multiple agencies and multiple provinces to such a degree as the PRMP.

Fragmentation

Fragmentation of habitat is of critical importance to many species of plants and animals, which require specific conditions to survive and reproduce within a unit of habitat and to disperse between habitat units. Of concern are both the size of habitat patches and their isolation or spatial arrangement. For example, the Old Growth Definition Task Group (1986) indicated that stands smaller than about 80 acres are so influenced by edge effects that they lack interior forest conditions. This impact may be modified by having an attached network of riparian and other reserves that are included in the PRMP.

Fragmentation affects all habitats and species. The impact depends on the amount of contiguous habitat and corridors, and on the dispersal capability of the plant or animal species. Species associated with early-successional stages are generally more adaptable for rapid dispersal than species associated with Late- Successional Reserves and old growth forests.

It is difficult to state exactly how many and what size units of suitable habitat in blocks are needed to provide adequate habitat for any particular species of animal or plant to live, reproduce, and disperse. Two general assumptions have been made when assessing the impacts of fragmentation. First, the ability of species to exist in a fragmented habitat varies from species that need only small patches of suitable habitat (e.g., invertebrates), to species that need large areas (e.g., spotted owl, goshawk, fisher).

Second, the ability of various species to disperse between patches of suitable habitat varies among species, from species that disperse over only relatively short distances (e.g., amphibians) to species that are capable of more large-scale movements (e.g., birds, large mammals). Habitat units that are closer together provide better dispersal conditions for a larger number of species than habitat patches that are farther apart. Considering these two assumptions, general statements can be made about the alternatives and their influence on fragmentation of old growth forests.

Models of vertebrate species' response to habitat fragmentation show that species diversity would begin to decline when 50 to 75 percent of the landscape is cut over 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 moderately high and high risk categories.

Edge Effect, which is more important in forest communities dependent on large trees such as old growth and riparian areas, can extend to well over 400 feet into a stand, changing light, temperature, and moisture patterns. It would promote growth of brush species, and cause considerable stress to shade tolerant, and moisture requiring species. As discussed in Chapter 3, effective interior old growth forests conditions do not occur until at least 400 feet into the unit from an edge with an adjacent stand younger than 40 years. For analysis, all nonfederal and all Federal lands allocated to intensive timber production were assumed to create such an edge; other Federal lands were not. As a result of changes in temperature and moisture, interior old growth forest conditions may also change, altering plant and animal communities. Many animal species use riparian and mature forests as refuge areas during periods of inclement weather, such as summer heat or deep cold periods; the Edge Effect can reduce or eliminate the conditions in riparian or mature forests that allow them to be used as refuge habitat.

At the present time, about 87 percent of District lands are not in old growth condition, and 79 percent of District forest lands are not in mature or old growth stands. Surrounding private forest lands are essentially all in early- successional stages. About 32,000 acres of old growth forests exist on the Eugene District, in blocks of at least 80 acres in size. In the short-term, Alternative E would have no reduction in acres of old growth greater than 80 acres. Alternatives NA, A, B, C, D, and the PRMP would reduce old growth by about 23,500, 27,900, 19,000, 7,900, 700, and 200 acres, respectively. These acreage reductions would result in a drop of 73 percent, 87 percent, 59 percent, 25 percent, 2 percent, and less than 1 percent of old growth acreage, respectively, in the decade. Thus, many species of plants and animals dependent on old growth forests would be vulnerable at a moderately high to high risk.

In the short-term, this condition would likely not show substantial improvement for most species under any alternative. In the long-term, however, substantial improvements are expected under Alternatives C, D, E, and the PRMP. In the long-term, substantial increases in fragmentation are expected under Alternatives NA, A, and B, due to further fragmentation of existing older forests. In addition, the distance between old growth stands would increase. This distance, if large, could lead to isolation of some species of plants and animals that rely on these habitats. The distance between blocks of old growth, greater than 200 years of age, can be used as an indicator of spatial fragmentation.

In all alternatives, many of the blocks identified would be dissected by roads not planned for closure due to the need for their continued use for access to other lands including lands in private ownership. Under any alternative, because of terms of existing reciprocal right-of-way agreements, additional roads may be constructed through blocks that have been excluded from timber harvest. Roads may be constructed by BLM through blocks excluded from harvest, to provide access to other lands for timber management, if alternative access routes are considered more ecologically damaging. The impact of these various existing and possible future roads has not been considered in identification of interior habitat, but they would clearly diminish the quality of the habitat in these blocks.

For those species that depend on true interior old growth conditions, the total number of acres meeting this criteria are limited to 5,200 acres at the present time. Under Alternatives D, E, and the PRMP, none of these acres would be cut in the short-term. Under Alternatives NA, A, B, and C, approximately 4,500 acres, 5,100 acres, 3,900 acres, and 400 acres of interior old growth habitat, respectively, would be cut in the decade. This would result in reductions of 87 percent, 98 percent, 75 percent, and 8 percent of interior old growth habitat in the decade.

The total amount of old growth remaining after 10 years varies between planning alternatives, as does the distance between the units. The total amount of

old growth in each distance band an index of this closeness of habitats showing where there is suitable habitat and how easy it is for organisms to disperse to other suitable habitat. Alternative A would provide extremely limited habitat in all distance bands, and would be unlikely to meet suitable habitat or dispersal needs for a large number of plant and animal species that require old growth for some of their life needs. Alternatives NA, B, and C provide more habitat near other old growth stands, although there would be substantial declines from the present condition. Alternatives D, E, and the PRMP would nearly maintain the existing condition of fragmentation. In the short-term, there is little potential to improve the condition of fragmentation, due to the need for long-term ingrowth of habitat to old growth condition. In the long-term, substantial gains could be made under Alternatives C, D, E, and the PRMP due to this ingrowth of habitat into mature and old growth conditions after 100 years.

The average distance between old growth blocks is an index of the ability of plants and animals to disperse between patches. The spatial distribution of patches provides a measure of the average distance between patches. Alternatives A and B would have much wider distances between patches as a percent of the total old growth available at the end of the decade, when compared to Alternatives C, D, E, and the PRMP. This suggests that Alternatives A and B would provide substantially poorer conditions for dispersal than the remaining alternatives.

The calculations for the preceding figures consider only those blocks that would be retained or restored by BLM. They do not consider blocks administered for retention by the U.S. Forest Service or any other party, as those blocks are not in the BLM Western Oregon Digital Database. The calculations also make no allowance for loss due to major natural catastrophic events.

Genetic Diversity

Fragmentation of plant and animal species into noninterbreeding populations can cause inbreeding within the population or extinction of individual populations. If fragmentation of populations is extensive, it can result in the reduced ability of a species to survive. The ability of species to survive in old growth and mature patches, and disperse between patches, would be low in Alternatives NA, A, and B and, as a result, they are likely to suffer significant adverse impacts. Alternative C would likely have some significant adverse impacts in the short-term. Alternatives D, E, and the PRMP would have low impacts in the short-term, but would likely have significant acreage gains in the long-term. Because gains to genetic diversity involve a slower process than reductions, there would be no gains within the 100-year period. Therefore, Alternatives NA, A, and B would be negative in the short and long-term, and Alternatives C, D, E, and the PRMP would be neutral.

Species Diversity

Fragmentation reduces species diversity by isolating populations, increasing the possibility of local extinctions, or by causing habitat to be too disconnected for individual pairs to fulfill all life requirements. The impact is greater on those species that are less mobile or require more extensive habitat, particularly in mature and old growth forests. The extreme degree of fragmentation under Alternatives NA, A, and B would likely not provide habitat conditions for a wide variety of species that use old growth forests; this would have the effect of reducing overall species diversity through the elimination of some species from large areas. Alternatives C, D, E, and the PRMP would at least support existing level of most species.

The larger blocks that would exist under Alternatives NA, A, and B would probably not be large enough to provide habitat for wide ranging animals such as goshawks and marten, which rely substantially on undisturbed habitat. Other species, capable of living on smaller blocks of such habitat, would persist in some areas. Block sizes likely to be retained under Alternatives C, D, E, and the PRMP should support larger populations of some less mobile species, and at least low population levels of more mobile species in some portions of the landscape.

Ecosystem Diversity

For any ecosystem that is represented by a limited amount of habitat or few blocks, any reductions in the amount of habitat in these units is an adverse impact. Impacts of management activities on the number and condition of ecosystems varies by size and type of ecosystem, and may be greatest on the ecosystems associated with old growth dependent species. Alternatives NA, A, and B would cause a decline because there would be significant reduction of interior acres of old growth in blocks greater than 80 acres. In addition, the total amount of habitat in old growth and mature seral stages, as well as the average distance between these blocks, limits the ability to provide connectivity between the variety of special habitats found throughout the District.

Meanwhile, Alternatives C, D, E, and the PRMP would retain nearly the existing number of old growth acres in blocks greater than 80 acres, and would provide stands of an age where dispersal between blocks is facilitated, so that many forest-related ecosystems are likely to be represented in the network of older forest stands.

Landscape Diversity

Most of the old growth and mature blocks expected to remain at the end of 10 years under all alternatives would be concentrated in the western and southern portion of the planning area. The blocks would provide some useful connectivity between the major reserves in the Willamette and Siuslaw National Forests, except in Alternatives NA, A, and B. The strongest connectivity would be provided by the blocks in the PRMP, which would retain substantial old growth characteristics on BLM administered lands. Intermediate connectivity would be provided by Alternatives C, D, and E. In the long-term (100 years) the blocks would be better distributed under these alternatives, though few would exist in the northeast portion of the District. Effects on ecosystems other than those that are forest-related would show similar patterns.

Special Areas

The Special Areas Program consists of identifying and designating Areas of Critical Environmental Concern (ACEC). Special areas that are designated through an interdisciplinary review process represent areas where special management attention is required because of hazardous conditions, or to protect and prevent irreparable damage to important historic, cultural or scenic values, fish, wildlife and plant resources, safety, or natural systems or processes. These areas contain qualities that make them fragile, sensitive, rare, unique, or endangered and thus are critical components for preserving biodiversity. Within the ACEC program, special areas termed Research Natural Areas (RNA) can also be designated. The RNA program is a cooperative, interagency program implemented to preserve natural diversity by establishing and protecting representative examples of natural ecosystems. This system of preserves represents regional concerns and interests in identifying and protecting areas of significant natural ecosystems for various biological reasons, including use in comparisons with systems already influenced by humans, providing educational and research areas for ecological and environmental studies, and for preserving gene pools for typical as well as rare and endangered plants and animals (see Special Areas in Chapter 4).

Genetic Diversity

Genetic diversity, as it relates to the Special Areas Program, focuses on maintaining adequate genetic diversity between and within special areas. The number and types of special areas that are designated are critical in maintaining genetic diversity, including genetic diversity of individual plant and animal species found within special areas. Special area design and the resulting protection of the genetic variability of plant and animal species within the special area and the capacity of those species to adapt to changing environmental events through time, is critical in assessing genetic diversity in the short and long-term. Genetic deterioration of plants and animals is generally due to changes in genetic diversity through inbreeding and genetic drift. Whether genetic diversity is maintained in a given special area would depend on a variety of attributes, including maintaining large enough populations of plants or animals within the special area that are not prone to genetic drift, and maintaining the biological and physical community that may be critical to the survival of the target species. These elements, in turn, depend on the size of the special area, the degree of edge effect, landscape distribution between preserves, the land-use allocations adjacent and between preserves, and the ability of plant and animal species to move in and out of special area preserves and between preserves (Jensen, 1987). Because genetic variability can differ for a given species across a landscape, maintaining several preserves for the same species or types of plant communities may be important in protecting the long-term genetic diversity and variability of plants and animals within special areas.

At present, little information is available on the effectiveness of maintaining genetic diversity for plant and animal species within existing or potential special areas in the Eugene District. Replication has not been implemented for varying types of special areas that could provide genetic variation for specific plants and animals across a landscape. In most cases, finding large unaltered communities similar to those already identified ACEC/RNAs would no longer be possible due to habitat fragmentation and the lack of areas that are not disturbed. The number of acres allocated in each alternative for special area status can be used as an index for genetic diversity, recognizing that genetic diversity results from a variety of factors.

In the short-term Alternatives NA, A, B, and C would protect the least number of acres of special area habitat. Alternatives D and E would protect the most acres of special area habitat. The PRMP, while not protecting as many acres in special area status as D and E, would still protect areas not designated as ACECs within bald eagle habitat areas. Alternatives D, E, and the PRMP would maintain the greatest levels of genetic diversity for special areas.

In the long-term, Alternatives D, E, and the PRMP would protect the most acres of special area habitat. Alternatives A, B, and C, where fewer acres would be allocated for special area status, could result in the depletion of genetic diversity if areas were impacted by resource development.

Species Diversity

Species diversity of special areas refers to the number of various species within each special area or within each community within a special area. It also can be an assessment of diversity between special areas. Factors that can affect species diversity include time, landscape heterogeneity, competition, predation, climatic stability, productivity, and combinations of these factors (Menge, 1976). To assess species diversity, it is necessary to consider all of these factors. Like genetic diversity, few of these attributes have been measured for species within special areas, making predictions about short-term or long-term species diversity difficult. Because many of these elements are difficult and costly to measure, habitat, including structural complexity, habitat diversity, and the variety of habitat niches and resources is often used to measure maintenance of species diversity. Because habitat is one measure of diversity, the assumption used in this analysis is that the larger the special area and the more acres allocated into special area status, the greater the numbers and types of plant and animal species would be, using these areas in functioning communities. It is recognized, however, that preserve design would be vital to the long-term maintenance of biotic diversity within these areas.

In the short-term, Alternatives NA, A, B, and C would allocate fewer acres to special area status than would Alternatives D and E. The PRMP would allocate fewer acres then D and E but more acres then NA, A, B, and C into special area status. Some special areas that would not be designated would not be protected under other authorities such as the Bald Eagle Recovery Plan.

Ecosystem Diversity

Ecosystem diversity is the variety of different habitats or communities existing within special areas. As additional special areas are designated, protection and management of these unique communities would be implemented and ecosystem diversity would be maintained, if their preserve design was adequate. Management action(s) designed to maintain or enhance the primary values for which the areas were nominated may be implemented through such actions as prescribed burning.

In the short-term, in Alternatives NA, A, B, and C, fewer acres would be managed as special areas and, while some of these acres may be protected under other existing authorities, some acres that would be available for resource development activities and ecosystem diversity could decline in the short and long-term. Under Alternatives D, E, and the PRMP, most special areas would be protected due to special area designation or protection under existing authorities (see Special Areas in Chapter 4).

Landscape Diversity

Landscape diversity for special areas refers to the landscape distribution of special areas. Special areas have been proposed for designation in all 3 Resource Areas within the Eugene District, except in Alternative A. As more areas are designated as special areas or protected under other authorities or other land-use allocations, landscape diversity would be maintained. In the short-term, Alternatives NA, A, B, and C would allocate fewer acres and could lead to the loss of special areas that would reduce landscape diversity. Alternatives D, E, and the PRMP would provide greater protection and the reduced likelihood of decreasing landscape diversity of special areas (all areas nominated are protected in Alternatives D and E). Although some acres are not designated as special areas in the PRMP, these acres would be maintained for bald eagles and would provide greater landscape diversity than Alternatives NA, A, B, and C. In the long-term, areas not designated for special area status in Alternatives NA, A, B, C, and the PRMP would be lost and landscape diversity of special areas would decline.

Special Habitats

Special habitats within the Eugene District represent significantly fewer acres than the general forested areas but probably contain a greater plant species diversity than adjacent forested areas. Studies done

by Hickman (1968), which were conducted on the west side of the Cascade Range and east of the Eugene District, indicate that 85 percent of the plant species diversity occurred on 5 percent of the land base in nonforested areas. Special habitats exhibit a wide range of ecological conditions and communities. In some cases, special habitats contain disjunct plant communities found more commonly in other geographic provinces. Because of their limited size and disjunct distribution, the plant and animal species associated with these often have special adaptation for survival and dispersal. Special habitats include the following: ponds; bogs; swamps; marshes; sedge meadows; other wet meadow types; dry meadows; grassy balds; rocky habitats including cliffs, caves, talus slopes, rock outcrops with or without soil development (wet or dry); and mineral deposits, including salt licks and mineral springs. A wide variety of wildlife species uses special habitats for food, water, and cover for breeding, hiding, and roosting. Special habitats vary in size from less than an acre to several acres. All sizes of special habitats can be important to plants and animals, both for those species that use these areas as primary habitat and for those animal species that periodically use these areas for food, cover, or water (see Wildlife, Chapter 3).

Maintaining special habitats requires protecting these habitats through management practices and protective buffers. Some special habitats may need active management to maintain the primary values, such as the use of prescribed fire to maintain meadow-like conditions. In some cases, ecological restoration of disturbed or altered ecosystems may be necessary, such as the conversion and maintenance of oak woodlands that are now dominated by conifers. A long-term decrease in the number and quality of special habitats and their associated flora and fauna may result from lack of protection and active management.

Genetic Diversity

Genetic diversity would follow the same principles as those for special areas (see previous section Biodiversity - Special Areas, Chapter 4). The more acres allocated for special habitat protection, the greater the probability that genetic diversity may be maintained. Buffering of special habitats is critical in reducing Edge Effects and in reducing the changes in environmental conditions such as light, soil hydrology, temperature, and humidity that, in turn, can alter the structure, function, and composition of these areas. These factors are critical to the species that are adapted to them and, if altered, may reduce the size of a population or its reproductive vigor, thus decreasing the gene pool and changing the genetic diversity. Because some of these areas exhibit disjunct populations of organisms, loss of habitat can contribute to a loss of unique genotypes. In the short-term, Alternatives A and B would provide no buffers for special habitats, and changes in special habitats would be expected with the resulting loss in genetic diversity. The NA alternative proposes a 100-foot buffer that may protect some of the primary values of an area, but recent evidence suggests that much larger buffers may be required to protect interior core areas (Harris, 1986). Data are still lacking on what constitutes minimum buffer widths for the protection of various communities. In Alternative C, a 100-200 foot buffer would be allocated to protect special habitats. Alternatives D, E, and the PRMP provide the best short and long-term protection for special habitats, by allocating 100-300 foot buffers for D and E, with more specified requirements for the PRMP (see Table 2-5) that include more protection for some habitat types and less for others. Genetic diversity would be affected the least where biological communities are well-buffered.

Species Diversity

Plant and animal species associated with special habitats have adapted to the specialized habitat conditions and components (see Biodiversity - Special Areas, Chapter 4). The size and conditions of special habitats are critical for maintaining species diversity within such areas. Alternatives that provide the greatest protection, including the widest buffer widths, would help to maintain biological communities within special habitats. In the short and long-term, Alternatives D, E, and the PRMP would provide the greatest protection for species diversity in special habitats. Alternatives A and B would provide no protective buffers, and Alternatives NA and C would provide some protection.

Ecosystem Diversity

Like special areas, special habitats represent a wide range of different plant and animal communities. Those alternatives with the greatest protection of special habitats, including the widest buffers, would best maintain special habitats and their associated biological communities, and would better maintain ecosystem diversity. Alternatives D, E, and the PRMP would provide the best short and long-term protection for special habitats and for the maintenance of ecosystem diversity. Alternatives NA and C would provide some protective buffers for special habitats. Alternatives A and B would provide for no buffer allocations, which would result in loss or

adverse changes to the ecosystem diversity of special habitats.

Landscape Diversity

Special habitats occur throughout the District. Maintenance of landscape diversity could be critical to the plants and animals that use these areas. The landscape diversity that exists today for these special habitats would best be maintained if special habitats are adequately protected in the short and long-term. Alternatives D, E, and the PRMP would provide the greatest protection. Alternatives NA and C would allocate some buffer protection for special habitats but may not be adequate in maintaining ecosystem integrity, and biological communities could be lost, resulting in a decline in landscape diversity. Alternatives A and B would provide no protection for special habitats. Special habitats would be altered as would the current landscape or landscape diversity currently found across the Eugene District.

In some cases, buffers alone may not provide adequate protection for certain habitat features. Certain special habitats may need some type(s) of active management attention to maintain the primary values of an area, such as in the use of prescribed fire to maintain a certain seral stage of a meadow. In other instances, ecological restoration of disturbed or changed ecosystems may be necessary, such as in the conversion and maintenance of oak woodlands now dominated by conifers. Failure to undertake sufficient active management opportunities in any alternative, may create or add to long-term decreases in some of these areas and their associated flora and fauna.

Riparian Areas

As the interface between the aquatic and upslope areas, riparian areas have transitional physical conditions and associated community of plants and animals. The riparian area is characterized by the presence of water, wetter soil types, and moister and cooler microclimates. Except for some species of plants and animals dependent on water, most species found in the riparian area are not restricted to the riparian area. A greater variety of plant and animal species utilize riparian areas at some stage in their life cycle. As a result, riparian communities are the most diverse and complex in the planning area. In an undisturbed condition, the riparian area formed a continuum from the mouth of a valley to the headwaters. Changes in land form and elevation, and the influence of natural processes, such as fire and floods, created a wide variety of communities along the riparian continuum. (see Vegetation, Wildlife sections on riparian).

Riparian communities contribute to the diversity in streams through contributions of woody debris and energy in the form of leaf fall, insect fall, and other organic matter. Riparian vegetation and woody debris influence hydrologic processes, and thus stream and riparian communities (see Hydrology and Fisheries section on Riparian). Upslope vegetation helps maintain the moister and cooler microclimates in the riparian area, and may be a source of down trees for the riparian and stream, especially in headwater areas.

Most riparian areas in the planning area have been changed by past activities. Low elevation and wide valley communities, in particular, have been substantially reduced. Most of the remaining unaltered riparian areas are found along smaller, headwater streams. Conversion of riparian communities to other uses such as agriculture, development of travel corridors, and removal of timber contributed to the fragmentation and alteration of riparian areas. While riparian areas were originally dominated by conifers, many have now been converted to hardwoods such as red alder and bigleaf maple. The most diverse communities occur where there is a more balanced, unfragmented mixture of communities, containing conifer and hardwood overstory trees, down logs and snags, and a diversity of understory vegetation. Restoration and maintenance of physical conditions and biological features needed to create habitat for riparian-related species often depends on restoration of the riparian vegetation to one that is predominantly conifer. Retention of riparian vegetation in Riparian Reserves, decreased fragmentation, and retention of upslope vegetation in reserves or areas of partial harvest contribute to the restoration and maintenance of riparian habitat. Evaluation of alternatives include the long-term restoration of conifers in the riparian area and the maintenance of upslope vegetation.

Genetic Diversity

Restoration and protection of riparian under Alternative E and the PRMP would increase the genetic diversity over both the short and long-term through maintenance of existing riparian communities and restoration of previously altered communities. Under Alternative D, genetic diversity in natural riparian areas of headwaters would continue to decline along 1st order streams, but recovery would occur along perennial and 2nd order streams. Alternatives D, E, and the PRMP would benefit because of wider Riparian Management Area (RMA)

or RR widths, which would help screen internal areas from Edge Effect and help maintain existing genetic diversity. For Alternatives NA, B, and C genetic diversity along ephemeral streams, which constitutes the largest acreage of natural riparian communities, would continue to decline. The riparian community along perennial streams would not be harvested, but Edge Effects would occur, with some loss of existing genetic diversity. Under these alternatives, genetic diversity would increase in the long-term as the riparian areas recover. Under Alternative A, there would be a decline of genetic diversity along the ephemeral and perennial streams, although some recovery would be expected in the long-term.

Species Diversity

Species diversity would increase under all alternatives except A in the long-term. Improvement would be greatest under Alternatives D, E, and the PRMP, which would retain the widest RMA or RR widths, and maintain the most vegetation in the headwater 1st and 2nd order streams. Diversity would increase in the long-term along perennial streams in Alternatives NA, B, and C, as a result of protection of existing riparian area and maturation of previously altered riparian areas. Species diversity would decline along ephemeral headwater areas, as a result of continued timber harvesting, but would be retained in the unharvested areas in the short- term. Retention of reserves and trees upslope from the riparian area under Alternative C and the PRMP could help maintain the riparian microclimate and contribute to increased species diversity. In the short-term, species diversity would show little overall change under all alternatives except A, where it would continue to decline, and Alternative E and the PRMP, which would both show some improvement. A decline in diversity may occur in some locations, as a result of management activities, but these declines may be balanced by improvements in other locations.

Ecosystem Diversity

As a result of wider RMA or RR widths and protection of headwater streams, Alternative E and the PRMP would protect existing riparian ecosystems more than the other alternatives, and would show the greatest improvement in previously altered areas. Alternative D would provide somewhat less protection and recovery, due to narrower RMA widths and continued timber harvesting along 1st order streams. Alternative C would maintain diversity along perennial streams, but would continue to have timber harvesting in headwaters, while Alternatives NA, A, and B would have a reduction in ecosystem diversity because of reduced upslope vegetation along perennial streams and continued harvesting along headwater streams.

Landscape Diversity

Communities would change, as a result of management activities and maturation of the riparian communities, but the overall riparian acreage would remain similar to the present. While road closures would decrease fragmentation, the construction of other roads, harvest corridors, and conversion to other uses would increase the fragmentation of riparian areas along larger streams and reduce the total acreage of riparian vegetation.

Under all alternatives except A, the riparian community along perennial streams would be protected, although widths of the RMA would vary. Reconversion to a more balanced distribution of riparian vegetation with a greater percentage of conifer-dominated communities is expected to occur in all previously disturbed riparian areas. Timber harvesting would continue along intermittent streams under all alternatives except E and the PRMP, and along 1st order streams in Alternative D, which would reduce the overall diversity in the harvested areas. Vegetative recovery would occur along intermittent streams. Full recovery of riparian communities along all streams would not occur within 100 years, because mature and old growth conifer trees 150 years or older are needed to fully restore diversity elements in the stream and adjoining riparian area.

Species Mix and Hardwoods

All native tree species are important components of habitat for many species of plants and animals, contributing to biological diversity. However, due to the limited data on uncommon tree species (e.g., madrone, tan oak, dogwood, ponderosa pine) this evaluation includes only the relationship between common tree species and the living community of animals and plants.

The mix of species in the planning area has been influenced for over 10,000 years by human activity. In recent years, the number of plant and animal species in the planning area has been increased by the introduction of exotic species. Land converted to nontimber management and early forest seral stages create conditions more favorable to these exotic species. These exotic species may increase the number and diversity of species in a locality, but may also displace native species, reducing the number and diversity of species in other localities. Timber

management utilizes tree planting as the primary method of restocking harvested units, with units often planted with a single species. Seedlings used for planting are grown from selected seed sources. Management of seed sources selects for superior growth potential, but also for a range of genetic diversity and adaptability to a variety of sites. Management of planting stock is common to all alternatives. The alternatives differ in the acreage retained in forest reserves, the length of rotations, degree of fragmentation, and harvesting practices, such as tree retention, all of which can influence the mix of tree species and tree genetic variability.

Genetic Diversity

The genetic population considered is that of the general population of plants not just rare plants or those adapted to special areas or habitats. Alternative C and the PRMP include proposals for new silvicultural activities, such as planting native species to provide for populations of trees other than the most common. Refer to the previous discussion under the genetic diversity focal component of seral stages for further general information (Biodiversity Seral Stages, Chapter 4).

Species Diversity

The management of most lands allocated to timber production in Alternatives NA, A, B, D, and E would emphasize growth of commercial conifers, more than in Alternative C and the PRMP. Analysis of BLM's forest inventory data indicates that timber management actions would not substantially diminish the level of diversity of tree species in the harvested stands, but in Alternatives NA, A, B, D, and PRMP would reduce older age classes in those stands. Compared to natural processes, the management activities in these alternatives would shorten the length of time in the early seral stages, which have the highest level of plant and animal species diversity, including exotic species. The high percentage of lands under timber production in Alternatives NA, A, and B would cause negative impacts in both the short and long-term. Alternatives C, D, E, and the PRMP would maintain diversity in the short-term and improve it in the long-term.

Ecosystem Diversity

The 5,000 acres of hardwood stands on BLM administered lands provide another important element of ecosystem diversity. Most of this acreage would remain intact, but some would be converted (those considered to be conifer sites) to conifer production under all alternatives. Some of these conversions would return conifers to lands previously converted to hardwoods, as a result of timber management. The approximate reductions in hardwood acres, not including acres in Reserves (RMA, RR, or LSR), by alternatives are as follows: Alternative NA = 934 acres; Alternative A = 959 acres; Alternative B = 906 acres; Alternative C = 760 acres; Alternative D = 450 acres; Alternative E = 119 acres; and the PRMP = 7 acres. The hardwood component of conifer dominated stands would be temporarily diminished by intensive timber management practices on a portion of the lands in all alternatives. Alternatives NA, A, B, D, and E would reduce the hardwood component of the conifer stands to a lower level and for a longer period of time than Alternative C or the PRMP. In the long-term, hardwood composition would increase on lands excluded from timber management, which would balance the loss of hardwoods on lands subject to intensive management practices in Alternatives D and E. In Alternative C and the PRMP, the hardwood component of conifer stands would increase in the long-term.

Landscape Diversity

Alternatives NA, A, and B have an overall negative impact in the short and long-term on the distribution of species mix across the landscape because forest lands would primarily be managed for Douglas-fir and fewer acres would be excluded from harvest. Alternatives D and E would have an overall neutral impact in the short and long-term, because of the amount of land excluded from timber harvest activities. Alternative C and the PRMP would have an overall neutral impact in the short-term and a positive impact in the long-term, because of active management to provide for natural levels of different tree species and because of the amount of land excluded or deferred from timber harvest.

Snags

Snags (including retention trees) are important components of habitat for many species of wildlife (including invertebrates), and contribute to biodiversity by providing necessary life requirements (FEMAT 1993). The importance of snags to specific vertebrate species has been discussed in detail in Chapter 4 in sections describing impacts to wildlife and special status species. Snags are sparse in areas of recent harvest activity. The potential for snag creation varies by the amount of land in reserves, the retention of trees, and active management to create snags, and it varies by

alternatives. Under all alternatives, the potential for new snags is limited in the short- term, increasing in the long-term under alternatives providing for greater reserves and active management to create snags.

Genetic Diversity

Genetic diversity is evaluated for snags and retention trees through the ability of an alternative to maintain adequate animal and plant populations that encompass entire gene pools of species, and promote gene exchange between populations, so that inbreeding and genetic deterioration do not occur. Alternatives NA and A would be likely to have adverse impacts to species dependent on snags through both lack of sufficient retention trees to produce viable populations, and isolation of populations due to large areas without snags. Alternative B better maintains biodiversity by producing at least viable populations throughout most of the District over time. Alternatives C, D, E, and the PRMP would promote higher population levels (larger gene pools) and wider distribution of snag-dependent species (better gene exchange between populations) through requirements to maintain a minimum of 40 percent of primary cavity excavator populations through retention of snags on harvest units. As snags fall and become dead and down woody debris, animals that use this habitat would benefit in a similar way.

Species Diversity

Alternatives that cause overall declines in the abundance and distribution of snags, would result in the decline in abundance and distribution of those species that use them; whereas increases in snags would promote increases in those species. Although no species is likely to face extinction under any alternative, populations would be likely to decline significantly for several species under Alternatives A and NA. Alternative B would maintain viable populations of cavity excavators, but other animal groups may have some adverse impacts in the long-term. Alternatives C, D, E, and the PRMP are designed to retain 40 percent of optimum population levels of woodpeckers on harvested units in the long-term, a significant improvement over the present condition, and would be likely to distribute this component over a wide range of seral stages, contributing to species diversity.

Ecosystem Diversity

Alternatives that distribute snags within all ecosystems in the District are likely to provide this habitat component through the full array of habitats. These ecosystems include special habitats, such as wet meadows and wetlands, as well as forest seral stages, which provide special niches for animals. Alternatives which limit the number of snags or the distribution of these features to restricted areas would be likely to have some adverse impacts to biodiversity. Alternatives A and NA severely restrict the number and distribution of snags, and would be expected to have adverse impacts to ecosystems and species dependent upon those ecosystems. Alternative B would provide some snags in a variety of habitats, but might restrict the distribution of snags to only early and mid seral stages, with minor amounts of mature and old growth available with snags. Alternatives C, D, E, and the PRMP would distribute snags in or near all of the plant communities and seral stages on the District and provide this important habitat component to species in a wide variety of habitats.

Landscape Diversity

Alternatives that distribute snags in large numbers throughout the landscape are preferable to alternatives that retain few trees, or distribute them over small portions of the landscape. Widely distributed, abundant snags allow species dependent on them to become integral components of the fauna and flora over the widest geographic distribution. Alternatives that restrict snag distribution and abundance restrict the distribution of snag dependent species so that some habitats lack these species, and are less than optimal functionality. Alternatives NA and A would restrict the distribution of snags to riparian and other set aside areas of low acreage (Alternative A), or to these set asides and the corridor area along the south and west edges of the District (NA), less than 15 percent of the District acreage. Alternative B would provide better distribution of snags by allowing the retention of merchantable snags, providing for 40 percent of cavity excavators throughout the District in the long-term. Alternatives C, D, E, and the PRMP would provide wide distribution of relatively larger numbers of snags throughout the District through both snag creation, and deferral of mature and old growth blocks which naturally have high numbers of snags.

Alternatives NA and A would cause significant losses in biodiversity in both the short and long-term due to the logging of older seral stage forests where snag numbers are high, and the lack of production of snags due to short rotation lengths and intensive density management of young trees. Alternative B

would reduce biodiversity, as evaluated by snag density and distribution, in the short-term, through cutting of old growth forests. In the long-term, Alternative B may increase snag benefits to biodiversity in early and mid seral stage forests through retention or creation of snags after timber harvest operations over most of the District. Alternatives C, D, E, and the PRMP are likely to increase the biodiversity benefits of snags in both the short and long-term due to the retention of significant numbers of snags within all seral stages, and within all plant communities.

Dead and Down Material

Dead and down material provides a number of functions, including habitat for many species, moisture retention, and nutrient retention and cycling. Assessment of impacts on the amount of dead and down woody material involved the determination of an index factor for the quantity of this habitat material (see Appendix Z for an explanation of the methodology and the calculations of the quantities by alternative). The benchmark used in this analysis was the average of 45 tons per acre of large woody debris found in old growth stands. The material found in other stand conditions was then estimated at a value less than this maximum level. Alternatives vary in their potential for creating dead and down material, being greatest with the highest level of reserves. Values calculated for the existing condition and for each alternative are shown in Figure 4-3. The methodology for calculating this material only takes into account practices for retention or creation of larger material. Increased total values in this graph will correlate with increased percentages of larger material. Practices for increasing dead and down material would not create appreciable amounts in the short-term. Refer to Tables 4-10 and 4-11 for Analysis of Dead and Down Wood Material by Alternative.

Genetic Diversity

Genetic diversity is evaluated for dead and down woody material through the ability of an alternative to maintain adequate animal and plant populations that encompass entire gene pools of species, and promote gene exchange between populations so that inbreeding and genetic deterioration do not occur. Alternatives NA, A, and B would likely have adverse impacts to species dependent on down woody debris through both lack of sufficient material to produce viable populations, and isolation of populations, due to large areas without adequate amounts of woody material. Alternatives C, D, E, and the PRMP would promote higher population levels (larger gene pools)

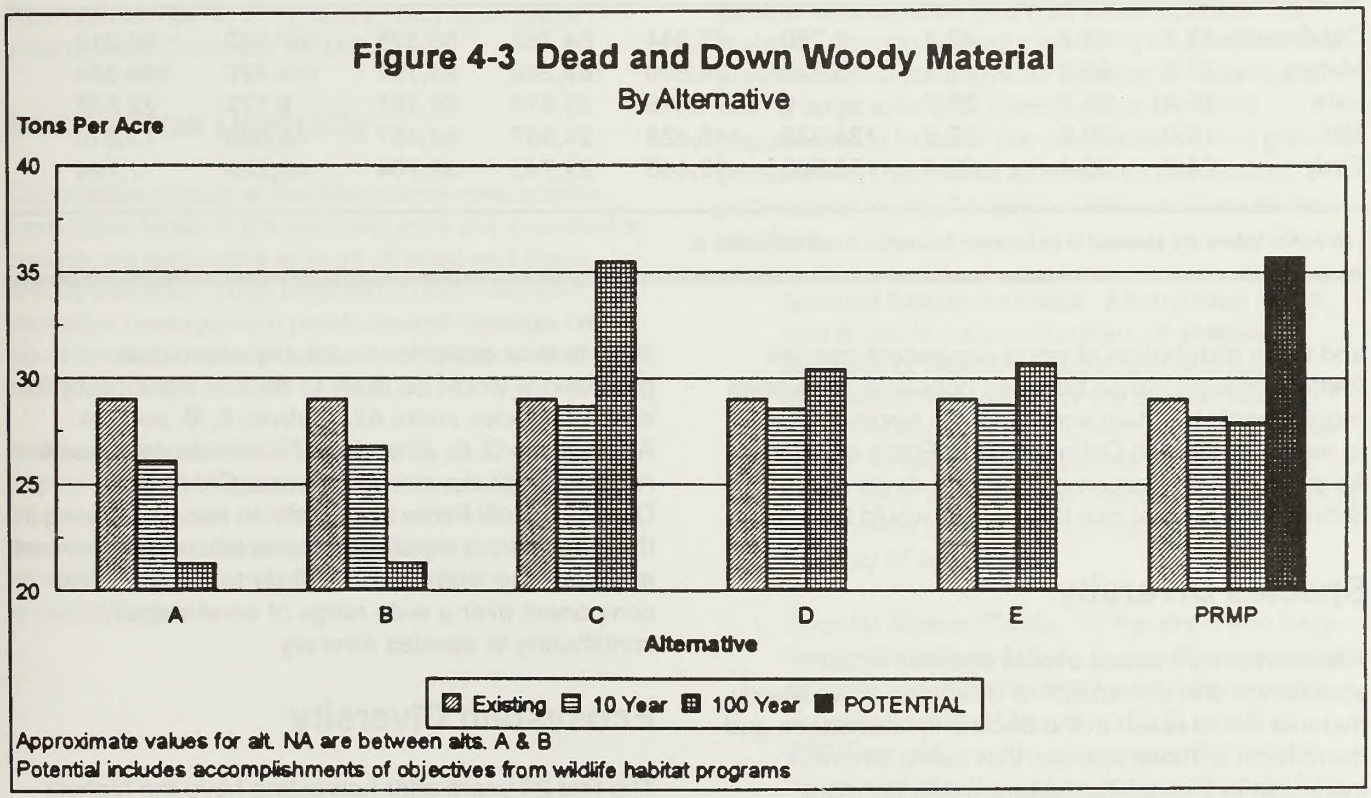


Figure 4-3. *Dead and Down Woody Material*

Table 4-10 - Analysis of Dead and Down Wood Material[1]

Column 1 Stand Category	Column 2 (Index Factor)	Existing and Short-Term (10 years) Column 3 (acres) Existing	A	B	C	D	E	PRMP
Old Growth	43.4[2]	38,266	7,195	17,854	35,685	39,385	42,018	38,038
Mature	23.2[2]	23,759	22,573	16,685	31,280	29,933	31,824	28,106
Late	25.7[2]	82,426	94,746	95,519	92,321	85,461	83,074	104,212
Mid	29.9[2]	102,858	99,303	99,634	99,126	99,105	99,620	99,287
Early	24.8[2]	53,215	76,707	70,832	42,112	46,640	43,988	30,881
Commercially Thinned/Density Managed	7.0				37,600	23,700	24,800	7,273

[1] No Action Values are assumed to be between Alternative A and Alternative B.
[2] Values from Table 3-6

Table 4-11 - Analysis of Dead and Down Wood Material[1]

Column 1 Stand Category	Column 2 (Index Factor) A&B	C & Potential	D, E& PRMP	Long-Term (100 years) Column 3 (Acres) A	B	C	D	E	PRMP
Old Growth	43.4	43.4	43.4	9,780	25,344	54,782	56,375	67,843	58,014
Mature	23.2	35.0	23.2	15,825	24,690	169,202	94,797	134,429	198,334
Late	15.0	25.7	25.7	0	4,616	25,810	52,191	8,177	22,572
Mid	15.0	29.9	29.9	124,333	146,428	20,987	58,457	49,686	13,810
Early	24.8	36.4	36.4	150,586	99,446	29,743	38,704	40,389	7,794

[1] No Action Values are assumed to be between Alternative A and Alternative B.

and wider distribution of wood-dependent species (better gene exchange between populations) through requirements to retain enough down woody material to meet Old Growth Definition Task Force standards. As snags fall and become dead and down woody debris, animals that use this habitat would benefit.

Species Diversity

Alternatives that cause overall declines in the abundance and distribution of dead and down woody material would result in the decline in abundance and distribution of those species that use it, whereas increases in this habitat feature would promote increases in those species. Although no species is likely to face extinction under any alternative, populations would be likely to decline significantly for several species under Alternatives A, B, and NA. Alternatives C, D, E, and the PRMP are designed to retain enough down wood to meet Old Growth Definition Task Force standards on harvested units in the long-term, a significant improvement over present requirements, and would be likely to distribute this component over a wide range of seral stages, contributing to species diversity.

Ecosystem Diversity

The first 20 years after harvesting have the highest loss rate of dead and down material. This is partially

due to the high rate of decay of smaller material. The past 20 years have also had the smallest amount of dead and down material remaining immediately after harvesting. The previous logging would show its greatest impact in the next 20 years. Therefore, it is expected that the benefits from silvicultural practices in Alternatives C, D, E, and the PRMP would only compensate for this past loss, causing a neutral change in the short-term. The decline would be greatest in Alternatives NA, A, and B in the short-term.

In the long-term, this decline would multiply itself in Alternatives NA, A, and B. This decline would be less as the long-term approaches in Alternatives C, D, E, and the PRMP. The estimation of material that could be produced on lands not allocated to timber production, combined with lands that are, as shown in Figure 4-3 for the RMP is considered potential dead and down woody material. This is dependent on acceptance of related Silvicultural practices and available funding. After combining cumulative benefits on the land impacted by management activities in these activities, the total would be an increase in the long-term. However, in the long-term those lands planned for regenerated 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 Alternatives NA, A, B, D, and E, and least under Alternatives C and the PRMP.

Landscape Diversity

Cumulative effects of the alternatives and actions from other lands in the planning area are expected to reduce the aggregate amount of dead and down woody material. Most adjacent landowners use intensive management practices and manage on short rotations, which reduce the amount of such material.

In Alternatives D and E the benefits on the lands impacted by management activities would only occur in smaller portions of the District. From the landscape diversity focal component, the benefits would not be as evenly dispersed and there would be a neutral impact.

Special Status Species

The present interest in endangered species underscores the high priority that plants and animals have been given by the scientific community, as well as the American public. Special status species are an especially important indicator of the success of management for biodiversity because of their rarity in the planning area. None of the special status species are restricted to the Eugene District, but land managed by BLM in the planning area provides for habitat and connectivity for many special status species. Regardless of the reasons for their low population levels, their increased probability of local or regional extirpation emphasizes the importance of maintaining those habitat features that are critical to species survival and proliferation. Under all alternatives, BLM would meet legal requirements to protect listed species.

Genetic Diversity

A species' genetic fitness can be characterized by assuming that a diverse gene pool increases the species' ability to survive and persist in suitable habitats over its natural geographic range, and through environmental disturbance. Reduction or elimination of populations from significant portions of the species' range can reduce the existing gene pools. Isolation of populations can lead to long-term genetic deterioration and loss within species. To maintain genetic diversity, planning alternatives that provide habitat for a greater number of individuals over a large area with opportunities for those populations to interact are preferable, from a genetic perspective, than those alternatives that restrict populations to small areas or maintain them at low numbers.

Special Status Animals: Alternatives NA, A, and B would reduce numbers of animals because of reduced habitat and restricted distribution for several of the special status animal species. Alternatives C, D, E, and the PRMP would provide suitable habitat over a wider area, and give a moderate to high level of confidence in species' genetic fitness for a majority of species.

Special Status Plants: In the short and long-term, Alternatives NA, A, B, and C would reduce known special status plant populations on the Eugene District. Alternative D, E, and the PRMP would provide management protection for special status plant species and would help to maintain the current levels of genetic fitness.

Fragmentation and loss of sensitive plant habitat on nonfederal lands, however, could affect the genetic fitness of special status plants on BLM administered lands because of the need to share genetic material with other plants not on BLM lands. The effectiveness of plant reserves in maintaining the species diversity and the adaptive capacity of plants to evolve to changing environmental conditions would be critical for the long-term viability of special status plant species. Optimum levels of seral stage distribution, both spatially and temporarily, have not been identified for the long-term success of special status plant species but would be crucial in successfully managing viable gene pools.

Species Diversity

This focal component refers to the total number of species within a given area, and the number of individuals within each of those species. For special status plants and animals, two measures of biodiversity are the ability of particular plan alternatives to prevent local or regional elimination of individual species, and the population density of plants and animals within suitable, occupied habitat.

Special Status Animals: Alternative A would severely reduce species dependent on mature and old growth forests, and further fragment and isolate the remaining old growth in the long-term, to the point of potentially eliminating some species from a significant portion of the planning area, and reducing the number of individuals dramatically in areas where populations persist. Similar comments can be made regarding Alternatives NA and B, but with adverse effects slightly reduced. Alternatives D and E would reduce distribution and populations in some areas, but recover habitat and populations in the long-term in others. Alternative C and the PRMP would provide the widest distribution of habitats, older seral stage forests (which currently is the primary limiting factor for most special status animals in the planning area), and the most flexibility to manage wildlife habitat through silviculture prescriptions. Impacts would be similar for other special status species not dependent on old growth, since the level of protection for their habitat parallels the protection given to old growth habitat.

Special Status Plants: In the short and long-term, Alternatives NA, A, B, and C would reduce known and future sites for special status plant populations. Loss of these plant sites could lead to the loss of the species within the planning areas. In Alternatives D, E, and the PRMP, special status species would be given management protection. Failure to undertake sufficient active management opportunities for species in the assessment species category in any alternative may create or add to the decline of these species.

Ecosystem Diversity

Although the majority of the Eugene District is dominated by a Douglas-fir ecosystem (See Vegetation in Chapter 3), there are a variety of special habitats within this ecosystem that contribute to the overall biological diversity of this community. These special habitats range from wetlands to riparian zones to dry meadows to rock formations. Retaining a wide range of forest seral stages contributes to biological diversity when these forest seral stages meet habitat requirements of plants and wildlife. Some special status plants and animals depend on these special habitats and on specific forest seral stages for their life needs and, therefore, ecosystem diversity contributes to their viability. The ability to maintain or enhance the functions of special habitats in all forest seral stages is a measure of an alternative's ability to promote ecosystem diversity.

Special Status Animals: Alternative A would severely reduce the amount of older forest seral stages, greatly increase the proportion of early seral stages, and provide little protection for special habitats. Thus, Alternative A would have significant adverse effects on biodiversity, through elimination of habitat for special status animals. Alternatives NA and B would have similar, though reduced effects, due to better protection of special habitats. Alternatives C, D, E, and the PRMP would provide much higher levels of ecosystem diversity, due to better protection levels of special habitats and development of a more proportionate, balanced distribution of seral stages over time. Alternative C and the PRMP would have the added advantage of flexibility of silvicultural prescriptions to accomplish habitat management goals.

Special Status Plants: In the short and long-term, Alternatives NA, A, B, and C would impact known and future sites for special status plant species. Those communities where sensitive plant species occur would be available for

resource development activities and subsequently could be lost or altered. Alternatives D, E, and the PRMP would provide management protection for special status plant species and their associated habitats. Alternatives D, E, and the PRMP would provide the largest buffers for special habitats and would protect these areas from adverse impacts. Some special status plant communities would need active management prescriptions to maintain or enhance sensitive plant habitat, such as in the use of prescribed burning of native grasslands or in the use of understory burning and density management in forested ecosystems. The PRMP would provide greater flexibility in accomplishing these goals and maintaining ecosystem complexity for special status plants.

Landscape Diversity

This focal component, as applied to special status plants and animals, refers to the distribution of these species throughout their native ranges within the planning area, so that each can be a functioning component of a biological community. Alternatives that provide for the broadest distribution of suitable habitat for the largest number of special status species would provide the greatest probability for maintaining viable populations across the landscape. They are preferable to alternatives that restrict species to small areas, or eliminate them from the landscape.

Special Status Animals: Alternatives A, B, and NA would have the smallest area where these species would be found in significant numbers, and may cause the elimination of some species on a landscape level. Alternatives D and E would provide significantly larger areas where these species would thrive. Alternatives C and the PRMP would provide the largest area for these species as a group, and allow the widest range of habitat development potential using silvicultural prescriptions. These two alternatives also would provide the best distribution of habitat, in terms of connectivity between habitats on adjacent BLM, Forest Service, and other lands that provide suitable habitat.

Special Status Plants: In the short and long-term, Alternatives NA, A, B, and C would reduce known and future special status plant sites and would reduce landscape diversity for sensitive plant species. Loss of landscape diversity could lead to such genetic problems as in-breeding depression and the eventual loss of a species. Alternatives D, E, and the PRMP would protect sites for special status plant sites and maintain the current level of landscape distribution of sensitive plant sites in the Eugene District.

The analysis of impacts on special status species is based on comparison of the existing situation and planning alternatives on BLM administered land. Considering these four focal components of biodiversity for special status animals, there is a disparity between Alternatives A, B, and NA, which suffer from lack of habitat development, landscape complexity, and special habitat protection, and Alternatives C, D, E, and the PRMP, which have varying degrees of potential to manage for biodiversity for special status animals. Alternatives C and the PRMP would have the advantage of allowing silvicultural flexibility to develop habitat components, and would provide the best distribution of habitats to promote gene flow and animal dispersal between populations.

In the short and long-term, Alternatives NA, A, B, and C would be detrimental to special status plant species and could lead to the need to list some of these species as threatened and endangered, as a result of the loss of biodiversity in the planning area. Alternatives D, E, and the PRMP would provide the most protection for special status plant species and would help to maintain and restore some elements of biodiversity within the Eugene District.

Effects on Vegetation

Under all alternatives, forest management activities would be the primary cause of the impacts on vegetation, other than those activities that may affect the viability of individual special status species (See Effects on Special Status Species, Chapter 4). For other effects on vegetation see the Riparian and Biological Diversity & Ecological Health sections in this chapter. Structure, composition, and function of the forest are discussed in detail in the latter. It is recommended that for a complete understanding of effects on vegetation, you refer to that section.

Under Alternatives NA, A, B, D, E, and the Proposed Resource Management Plan (PRMP), the BLM administered forest lands would continue to be primarily a patchwork of even-aged stands of various ages, but acreage in stands over 200 years of age would substantially decline in Alternatives A and B. Under Alternatives D, E, and the PRMP, some of the lands would continue to be characterized by this patchwork. However, in the long-term many areas

would remain intact, aging to old growth condition, altered only by natural disturbances such as wildfires, windstorms, disease, and insect infestations. Under Alternative C, the forest condition would be the most complex. Many lands would mature to old growth condition in the long-term, but some of those lands would contain many small patches of younger forest; other lands would resemble a patchwork of even aged stands of various ages, but with a scattered residue of standing live and dead trees.

Figures 4-1 and 4-2 in the Biological Diversity and Ecological Health section compare by alternative the percentage of coniferous forest that would occur in each of five seral stages at the end of 10 and 100 years (short and long-term).

The use of vegetation management practices, including herbicide application, would suppress target vegetation but not eradicate it. Other forest management practices such as thinning and fertilization would affect growth rates, particularly of Douglas-fir, and affect succession.

Some smaller vegetative communities that occur within special habitats (bogs, meadows, rock cliffs, and talus slopes) would be protected from direct impacts and somewhat protected from external influences by buffers under Alternatives C and D. The widest and most effective buffers (100-300 feet) would be maintained in Alternatives E and the PRMP (see Table 2-5 for buffering of special habitats for the PRMP). In Alternatives NA, A, and B, such buffers would not normally be maintained and the vegetation communities in small (less than one acre) pockets of special habitats would be particularly vulnerable to incidental disturbance from activities on adjacent lands.

None of the alternatives would substantially affect aquatic vegetation.

Although increased road construction, particularly in Alternatives A and B, would provide additional opportunities for the spread of noxious weeds, implementation of the weed control measures described in the Northwest Area Noxious Weed Control Program, Record of Decision (ROD) would stabilize noxious weed populations on BLM administered lands or result in their decline.

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 are expected to be converted to their highest economical potential such as farming, improved pasture, and rural homesites. Use would be restricted by State laws and local regulations and land use ordinances.

Effects on Special Forest Products

The alternatives would affect the availability of Special Forest Products (SFP) primarily in 2 ways.

1. The alternatives would effect the availability of SFPs by the degree to which they permit SFP harvest to occur. Acres closed to harvest or having seasonal restrictions could include Areas of Critical Concern (ACEC), Research Natural Areas (RNA), or other similar areas that would be determined with public input and a Districtwide National Environmental Policy Act (NEPA) assessment. Alternatives NA, A, and B would provide the largest number of acres open/ unrestricted for SFP harvest. Alternatives C, D, and E would have the fewest number of acres open/unrestricted. It is anticipated the PRMP would have approximately a median number of acres available while still being consistent with the Aquatic Conservation Strategy.

2. The alternatives would affect the availability of SFPs by their objectives and silvicultural systems chosen to meet those objectives, especially timber management and forest health objectives. In general, SFPs that are shade intolerant would be favored under Alternatives NA, A, and B. SFPs that are shade tolerant would be favored under Alternatives C, D, E, and the PRMP. Likewise, SFPs adapted to younger forests would be favored under Alternatives NA, A, and B. SFPs 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 SFP availability. Alternatives A, B, and D contain the greatest number of miles of proposed road construction, while Alternative E contains the least.

Effects of Special Forest Product Harvest

Effects of harvesting SFPs are unknown at this time. SFPs harvested under permit can be monitored for utilization. However, SFPs harvested without permit

cannot be monitored effectively. It is difficult to track where and how much of these SFP species are being taken off public lands. This could lead to potential impacts on species being collected, as well as indirect impacts on nonharvested species, and the areas being harvested. Impacts have generally been dispersed throughout the District as opposed to being 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. The harvest of firewood, a SFP measured in board feet/cords, would impact air quality. This impact is discussed in the Effects On Air Quality in this chapter.

Properly harvested, many SFPs can sustain repeated harvests with little or no short-term effects on resource availability. SFPs capable of repeated harvests are generally those with root systems that are not disturbed during harvest operations. These SFPs would include: perennials, species that grow from rhizomes, such as salal and Oregon grape, and many hardwoods that sprout from stumps. For some species light disturbance may stimulate growth of new vegetation and production of mushrooms.

As the demand for SFPs increases, the probability of impacts also increases. Table 4-7 displays potential effects that the SFP harvest has on the SFP resource. Management within an ecosystem based context is expected to maintain continued SFP availability.

Table 4-7 - Potential Effects of Special Forest Product Harvest on the SFP Resource

Product Harvested[1]	Potential Effects to SFP Resource
Products from conifers	Shift from one product type to another (e.g., sawlog to corral pole) Increased growth of remaining conifers
Products from hardwoods	Shift from one product type to another (e.g., veneer to firewood) Sprouting from stump or root crown Shift from tree form to multi-stem shrub form (e.g., tanoak, golden chinkapin
Christmas trees	None
Boughs	Little or none
Wildlings	Little or none
Cones	Little or none
Burls	Opportunity cost for future products from hardwood trees
Cascara Bark	Redistribution of size classes for cascara trees
Mushrooms	Unknown
Herbs	Unknown
Moss	Unknown
Huckleberry brush	Stimulation of new huckleberry growth
Ferns	Unknown
Beargrass	Stimulation of new beargrass growth
Greens	Species dependant

[1] Assumes harvest within guidelines for the species and at levels that provide for continued resource availability.

Effects on Riparian Zones

The effects of the alternatives on existing riparian zone conditions would vary depending upon the width of Riparian Management Areas (RMA) or Riparian Reserves (RR) and the amount of vegetative disturbance occurring in those areas.

The size of conifers in a riparian zone is a good measure of seral stage development and, therefore, a measure of the condition of riparian zones. This measure does not necessarily represent all the attributes and functions of riparian zones.

Expected conditions of riparian zones for perennial streams in the short-term for all alternatives are shown in Table 4-12. In the short term, under all alternatives riparian conditions for perennial streams would improve because of increasing maturity of riparian vegetation. At the end of the short-term, 33 percent of the riparian acres would be in minimal condition (classes 1 and 2), 31 percent in fair condition (class 3), and 36 percent in good/optimal condition (class 4).

Long-term conditions for perennial streams for all alternatives except A are also displayed in Table 4-12. At the end of the long-term, expected riparian conditions under Alternatives NA, B, C, D, E, and the Proposed Resource Management Plan (PRMP) would be good/optimal. However, due to edge effect and other incursions, optimal conditions may not be reached for all streams in any alternatives. The PRMP includes the most upland vegetation within any alternative's RMA or RR (see Figure 3-1), and this upland vegetation protects the riparian zone that, in turn, protects the aquatic zone. Conditions under Alternative A are expected to be fair due to narrow RMA widths.

Edge effects can impact development and maintenance of suitable environmental conditions for many species of plants and animals associated with the riparian area. These effects can increase or decrease microclimate conditions such as temperature, sunlight, and moisture. As an example, riparian areas opened to sunlight and, subsequently, higher temperatures as a result of removal of adjacent upslope vegetation often have rapid increases in brush species, particularly vine maple. Edge effects are most pronounced during periods with the most severe weather conditions, both hot and cold, a time when a greater number of species seek refuge in the riparian areas.

Table 4-12 - Estimated Condition of Riparian Zones

	Acres of Each Condition Class[1,2] by Stream Order									
	Existing Condition				Short-Term[3]				Long-Term[4]	
Stream Order	1 min.	2 min.	3 fair	4 good+	1 min.	2 min.	3 fair	4 good+	4 good+	Total Acres
3	1,099	2,055	997	1,805	374	1,856	1,802	1,925	5,956	5,956
4	471	1,365	779	1,156	160	1,062	1,300	1,249	3,771	3,771
5	162	500	252	585	55	382	447	615	1,499	1,499
6+	68	570	166	824	23	358	403	844	1,628	1,628
L	19	39	1	9	6	34	18	9	68	68
Total	**1,819**	**4,529**	**2,195**	**4,379**	**618**	**3,619**	**3,970**	**4,642**	**12,922**	**12,922**

[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/optimal condition)= 21 inch plus trees
[2] See Appendix Q for explanation of condition class
[3] End of short-term (10 years). Estimated changes from existing conditions:
66% of class 1 goes to class 2
45% of class 2 goes to class 3
12% of class 3 goes to class 4
[4] End of long-term (200 years); does not include Alternative A.

Source: District timber inventory.

Edge effects occur up to several hundred feet away from the edge. The presence of upslope vegetation can moderate the edge effect, depending on the density and height of the upslope vegetation. Under Alternative A, RMA widths are inadequate to maintain microclimate conditions. Alternatives NA, B, C, D, E, and the PRMP provide an increasing RMA or RR width and improving protection against edge effect. Alternative E and the PRMP provides the greatest protection to the microclimate and the associated riparian communities. The PRMP has the greatest buffer widths and Alternative E has the greatest length of streams being buffered. This is due to the difference in definitions as to what constitutes a stream for RMAs vs. RRs.

Under Alternatives NA, A, B, and C, riparian areas along all intermittent streams would be subject to vegetation removal, and along 1st order streams in Alternative D. Only Alternative E and the PRMP will protect riparian communities along most intermittent streams.

Most riparian communities were dominated by conifers prior to European settlement. Most have been converted from conifers to hardwoods, predominantly red alder and bigleaf maple, and to nonforest vegetative communities (mainly on private lands). In impact analyses of fisheries habitat and specialized habitats under wildlife (e.g., instream woody structure, snags and downed logs, and riparian zone stability), long-term beneficial impacts depend on reconversion of riparian communities to predominantly conifers. Inventory and monitoring of riparian areas in the District indicates that riparian areas dominated by hardwoods tend to remain as hardwoods for many decades, with conifers only very slowly colonizing under the hardwoods. Failure to undertake a hardwood conversion program may hinder achieving the recovery level of fish and wildlife habitat indicated. However, at the same time some hardwoods in the riparian zones are beneficial to various wildlife, and there could be disturbance to various resources during some restoration activity.

A detailed discussion of the impacts to the hydrologic functioning of riparian zones can be found in the Water section of this chapter.

Road and log yarding corridors through riparian zones would remove varying amounts of vegetation under all alternatives. These corridors would likely remove more vegetation under Alternatives NA, A, and B than under C, D, E, and the PRMP because of more logging on upslope areas (i.e., more need to cross streams). These impacts would be fairly localized, and adverse consequences would be partially mitigated by such actions as leaving downed trees in the riparian zone and by proper culvert construction.

Proposals for land tenure adjustments for riparian areas would permit BLM to more effectively manage for riparian associated values. Road closures would improve conditions for riparian dependent species. Development of new roads, recreational developments, or other management activities that alter or fragment riparian areas will have a detrimental impact on the riparian community. Proposed mineral exploration and development (see Appendix II) may increase fragmentation or reduce the width of riparian areas. Current placer mining in the Sharps Creek area has caused incursions into the riparian area primarily from access roads and campsites. Increased mining activity, particularly if bench placer mining occurs, would result in increased loss of riparian areas and associated values.

Effects on Wildlife

Introduction

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 acceptance; for example, elk (Wisdom et al., 1986) and cavity dwellers (Marcot, 1991; Neitro et al., 1985). Others were derived from 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 P. In cases where habitat models were unavailable or were not derived, analysis of impacts was based on literature references or expert testimony.

Effects 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 predicted availability of conifer seral stages and important habitat components, such as snags and down wood, and the results of special and riparian habitats management/protection under each alternative in relation to the existing condition. The impacts of road construction and access on all habitat are also analyzed. Effects on vegetation and biological diversity (including discussions of dead and downed wood and hardwoods) also affect wildlife and are addressed in the Timber, Riparian, and Biodiversity sections of Chapter 4. Effects on Special Status and SEIS Special Attention Species are addressed in this chapter.

Conifer

Conifer forests comprise the dominant habitat (95 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.

The current age class distribution in the District is dominated by a large amount of young age classes (Tables 3-39 and 3-33). Maintenance of the current distribution would limit the abundance and distribution of wildlife species preferring mature and old growth habitat. A forest dominated by young age classes would continue under all alternatives through the next decade (see Figure 4-2). This condition would be ameliorated in the long- term under Alternatives C, D, E, and the PRMP. Alternatives No Action (NA), A, and B would increase the percent of young age class or approximately maintain the existing percentage over the long-term. Habitat for species preferring early seral stages would likely be reduced under Alternatives D, E, and the PRMP in the long-term because more older forest habitat would be retained and allowed to develop from earlier age classes than in Alternatives NA, A and B. Currently there are over 50,000 acres of early-successional stage habitat (stands less than 20 years old) on the Eugene District, but this would decrease rapidly as the stands age and harvest levels decrease under the PRMP. Beginning in the second decade of the PRMP, approximately 7,000 to 10,000 acres of early-successional habitat would be maintained over the long-term on BLM lands. BLM administered lands in the District occur within a broader landscape of nonfederal lands where substantial early seral forests would be created through logging and other management activities. These lands may contribute to the development of early-successional forest habitat over time. Since much of the private land has been recently harvested, the early-successional forest would be developed in pulses tied to unknown private land harvest rotations that may cause "boom or bust" habitat levels for species that use this age class. Early-successional habitat would continue to be created in the matrix and on nonfederal land through logging and other management activity. 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 and how the density management techniques would be practiced. The intent of the PRMP, similar to Alternative C, would be to provide for the long-term creation and retention of older forest characteristics through the retention of habitat features such as snags, down logs, canopy layering, and tree species diversity, even in early seral stages. In the long-term, Alternatives C and E would allow for the largest acreage of older forests in the Eugene District, whereas the longest rotations (300 years or more) would occur in Alternatives D, E, and the PRMP. Deferral of some existing old growth stands (at least 8 decades) would occur in Alternatives C, D, E and the PRMP, during which research and applied silviculture (adaptive management under the PRMP) could be perfected to promote old growth functions.

In the long-term, Alternative C would likely provide moderate levels of habitat for old growth species and species preferring early seral stages, compared to the existing condition. Alternatives NA, A, and B would provide higher levels of habitat for early-successional species and lower levels of old growth habitat. Alternatives D and E would provide substantial older forest on BLM administered land in the long-term through set-aside of large blocks of existing older forest and adjacent younger stands indefinitely. Neither Alternative D nor E would provide optimal spacing and location of older forest stands when considering all old growth functional requirements for some wildlife species (e.g., dispersal habitat, cover areas for elk). Alternatives D, E, and the PRMP would provide higher levels of habitat for old growth associated species and lower levels of early- successional habitat. Populations of species preferring early seral stages, but not dependent on snags or down woody debris, would increase under Alternatives NA, A, and B due to the high level of timber harvest. The future of species that require snags in early seral stages depends upon how many snags are retained in Alternatives B, C, D, E, and the PRMP. All species of upland game

benefit from structural and plant species diversity within early and mid seral stage habitats. Of all the alternatives, only the PRMP and Alternative C specifically would provide for the maintenance of tree species diversity, including hardwoods, in all seral stages. In other alternatives, it is assumed that the presence of hardwoods other than red alder and bigleaf maple would be limited to acreage withdrawn from the timber base, or accidental occurrence in intensively managed stands.

All species of upland game benefit from structural and plant species diversity within early and mid seral stage habitats. Of all the alternatives, only the PRMP and Alternative C specifically provide for the maintenance of tree species diversity, including hardwoods, in all seral stages. In other alternatives, it is assumed that the presence of hardwoods other than red alder and bigleaf maple would be limited to acreage withdrawn from the timber base, or where they occur incidentally in managed stands.

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 clear cutting on private lands and harvest rates on public lands have 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 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, D, E, and the PRMP would be less detrimental to older forest habitat because of increased protection on BLM administered lands. Alternative D and the PRMP would lead to more mature and old growth habitat than currently exists on BLM administered lands over the long-term.

Special Habitats

The primary resource feature in special habitats (e.g., bogs, meadows, rock cliffs, and talus slopes) would be protected under each alternative. Intact forest buffers do not currently exist around some of these habitats. Alternatives NA, A, and B do not provide buffer protection for special habitats, whereas protected buffer areas under Alternatives C, D, and E would range from 100-300 feet. The PRMP provides ecologically significant protection for special habitats as described in Table 2-5 and based on interdisciplinary review on a case by case basis to protect the relevant values (including the habitat of species for which the SEIS/ROD provides protection buffers; Chapter 2 Special Status and SEIS Special Attention Species). PRMP buffer in the Eugene District would range from approximately 260 to 520 feet, often based on the height of site potential trees. Except for the SEIS/ROD buffers for selected species and habitats, this level of protection is equivalent to Alternative C. In addition, the PRMP, which tiers to the management direction adopted in the SEIS Record of Decision, includes survey, 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 and other organisms. 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 conditions for most riparian associated wildlife would gradually improve when compared to the existing condition under all alternatives except A, in the short-term, as a result of vegetation recovery and restoration of sufficient conifer cover to provide riparian and aquatic habitat. Under Alternative A, the riparian condition would remain about the same as the current situation. The amount of riparian habitat protected would vary by alternative. Progressive increases in protected riparian habitat would occur from Alternatives NA, A, B, C, D, E, and the PRMP (see Table 2-1), ranging from 8,700 acres in the NA to 173,000 acres under the PRMP. Wildlife species that prefer or are dependent on riparian habitat would be expected to increase in the long-term under Alternatives C, D, 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. Wetland riparian would be protected under Alternatives C, D, and E by 100-300 foot buffers and by 1 or 2 site potential tree heights under the PRMP. For example, in the Eugene District, a Site 2 Douglas-fir at 200 years old is estimated to be up to 260 feet tall, so buffers would range from 260-520 feet each side of the riparian or from each edge of

the wetland. Actual riparian widths would be determined by interdisciplinary review using the best site-potential tree information for that area. Silvicultural prescriptions under Alternative C and the Aquatic Conservation Strategy/Watershed Analysis under the PRMP would allow flexibility to protect and manage these riparian areas on a site specific basis. Effects of such actions would depend on the aggressiveness of treatments and the effectiveness of some of the currently untested treatments (see effects on riparian zones section for additional details). Cumulative effects would follow a similar pattern for the various alternatives.

General Habitat: Roads

Roads have major impacts on wildlife habitat by direct elimination of vegetation within road corridors and by mortality or disturbance of wildlife caused by vehicle traffic. Big game species are especially vulnerable to these road impacts (Brown, 1985). Approximately 1,920 miles of BLM controlled roads currently exist on the District, and at least an additional 4,000 miles of roads, which are controlled by other parties, exist on BLM lands and non-BLM lands. Under Alternative NA, approximately 269 miles of additional roads would be constructed to access timber harvest units. Approximately 291 miles, 261 miles, 227 miles, 145 miles, and 178 miles of roads would be constructed under Alternatives A, B, C, D, and E. Under Alternatives NA, A, and B, no restricted access for other resource objectives were identified. Under Alternative C about 300 miles of roads would be managed to protect other resource values, including elk calving areas, riparian zones, special habitats, and eagle and heron nest sites. An additional 220 miles of road or less could be built under the PRMP, dependent upon the extent and type of treatments within the Late-Successional Reserves, and dependent upon the results of access management plans that would be incorporated into watershed analysis.

Access management plans would be developed under Alternatives D, E, and the PRMP, primarily to protect habitat in elk emphasis areas, to control access on an estimated total of 750, 750, and 470 miles, respectively. PRMP access management would be dependent upon Off-Highway Vehicle plans and may vary from these estimates upon completion of those plans. Impacts would not be expected to exceed those that are estimated in the elk model for the PRMP. Road access management proposed under Alternatives C, D, E, and the PRMP would benefit wildlife on a site-specific basis by reducing disturbance and recovering lost habitat in specific cases. The emphasis on road controls and erosion prevention under the PRMP may also result in road closures or restrictions of existing roads, in addition to those addressed in Off-Highway Vehicles, Chapter 2, that could possibly result in a net decrease of roads in the District over the life of the RMP. The impacts on wildlife would depend on the amount and type of road control and where closures or controls would be implemented. Wildlife species that respond adversely to human disturbance and benefit from road restoration 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).

Effects on Priority Species

Priority wildlife species, associated habitats, and limiting factors are listed in Table 3-54. Impacts on populations of priority species are based on anticipated changes in these habitats and effects on species with limiting factors. Effects on forest seral stages through silvicultural prescriptions and rotation lengths in land use allocations are especially important. Another significant aspect of the successful management of these species is the ability to apply special management actions, such as access management; land exchanges and conservation easements; nest protection buffers; seasonal disturbance stipulations; the application of prescribed fire as a vegetation manipulation tool; and habitat development projects. The impacts stated below assume the successful implementation of these actions; monitoring of the actions to assess their effectiveness; and modifications of the prescriptions to increase their effectiveness under a wide variety of environmental conditions.

The following species' accounts describe anticipated impacts to priority wildlife species (or groups of species) that occur on the District and that would be influenced by proposed management actions. Table 4-13 summarizes the impacts to these species. Impacts, unless specifically addressed to the contrary, address BLM lands. In general, other lands across the planning area would be managed for agriculture, residential, or short rotation timber. Cumulative impacts from management of these combined ownerships the BLM management would be assumed to lead to similar or greater impacts on the habitat across the landscape than those addressed for BLM land alone, particularly impacts on older forest habitat, riparian, snags and down woody debris. Discussions of spotted owls, bald

eagles, marbled murrelets, and other special status species are included under Special Status and SEIS Special Attention Species Habitat, Chapter 4.

Roosevelt Elk

The assessment of impacts on Roosevelt elk habitat on BLM administered land was based on a modification of the elk habitat effectiveness model developed by Wisdom et al. (1986) (Appendix P). The Wisdom model was modified by dropping the spacing index (HEs) and by presenting values for each index rather than producing a composite score for all indices. Individual values for indices of roads (HEr), cover (HEc), and forage (HEf) are presented, rather than producing a composite score for all indices that was a modification agreed to by the Oregon Department of Fish and Wildlife (ODFW). Indices for forage and cover within each of 5 elk emphasis areas are calculated on BLM lands only, whereas indices for roads are calculated for all ownerships. Although the Wisdom model does not have the capability of predicting actual numbers of elk supported under existing cover and forage conditions, it presents potential elk habitat values on a relative scale, allowing a comparison of the effects of the several planning alternatives. Since the model has not been validated, its predictive capability is uncertain.

The three scores generated by this adaptation of the Wisdom model evaluate the quality of each habitat feature. Scores near 1.0 are considered optimum and scores near zero identify nonviable population parameters. Scores above 0.6 are considered highly viable population parameters, whereas scores below 0.5 are considered viable to marginal. Optimal conditions for elk management require a balance between the production of quality forage through timber management activities, the retention of quality cover areas close to forage areas, and the management of road systems through appropriate access management during critical time periods. Sustainability considerations dictate that temporal, as well as spacial development of forage production areas, be properly planned. The actual response of

Table 4-13 - Estimated Effects of Alternatives on Priority Wildlife Species

Species or Group	Short/Long-Term Impacts to Priority Wildlife[1]						
	NA	A	B	C	D	E	PRMP
Elk	-/-	-/-	-/-	-/+	-/+	0/0	0/+
Black-tailed deer	0/-	0/-	0/-	0/+	0/0	0/0	0/+
Black bear	-/-	-/-	-/-	-/+	-/+	0/+	0/+
Mountain lion	0/-	0/-	0/-	0/0	0/0	0/0	0/+
Carnivores/furbearers	0/-	-/-	0/-	0/+	0/+	0/+	0/+
Osprey	0/0	0/-	0/0	0/+	0/+	0/+	0/+
Golden eagle/red-tail	0/-	0/-	0/-	0/+	0/+	+/+	0/+
Great blue heron	0/-	-/-	0/-	0/+	0/+	+/+	0/+
Accipiter hawks	0/0	0/0	0/0	0/-	0/0	0/0	0/0
Other raptors	-/-	-/-	-/-	0/+	0/+	+/+	0/+
Woodpeckers	-/-	-/-	-/0	+/+	+/+	+/+	+/+
Secondary cavity users	-/-	-/-	-/-	+/+	0/+	+/+	+/+
Neotropical migrants	0/-	-/-	0/-	0/+	0/+	+/+	0/+
Waterfowl	-/-	-/-	-/0	0/+	0/+	0/+	0/+
Passerines and bats	-/-	-/-	-/-	0/+	0/+	+/+	0/+
Upland game birds	-/0	-/0	-/0	0/+	0/0	0/0	0/+
Insectivores/rodents	-/-	-/-	-/0	0/+	0/0	0/0	0/+
Amphibians	-/-	-/-	-/0	0/+	0/+	+/+	0/+

[1]Impacts to these species or group of species are summarized for the short-term and long-term using the following codes:
- = Declining habitat condition relative to current condition.
0 = No significant change.
+ = Improving habitat conditions relative to the current condition.

elk populations to habitat changes may be difficult to anticipate in the Eugene District. Elk were introduced into the District in several locations from which they had been extirpated early in the century, and they are still expanding in their former range, even though habitat conditions have been decreasing since their reintroduction. The model is not refined enough to anticipate accurate population levels under such contradictory trends but, in general, population expansion could be expected to continue under Alternatives D, E, and the PRMP.

Assessments of short-term impacts on elk habitat under the various alternatives are shown in Table 4-14. The habitat effectiveness scores for roads, cover, and forage for each of the 5 elk emphasis areas are presented, with the anticipated effects over the 10-year life span of the plan, for each plan alternative. Impacts on elk vary by watershed based on existing conditions of habitat relative to proposed actions. Generally, impacts would have more adverse effects under Alternatives NA, A, and B. This would be caused by higher levels of harvesting in watersheds already short on optimal thermal cover and more road construction in watersheds with already high road densities. Although Alternative C proposes fewer clear cut acres, elk would be adversely impacted by the outcomes of extensive thinnings, high road construction, and additional habitat modification. Thinnings tend to reduce thermal cover while not increasing forage levels significantly compared to clear cuts. However, forage levels on adjacent private lands may compensate because they are managed at younger age-classes, in general. Adverse impacts on elk would generally be less under Alternatives D, E, and the PRMP, due to lower harvest levels of optimal/thermal habitat, fewer roads being built, and possible road closures resulting from access management plans. Low amounts of quality forage on BLM administered lands under these alternatives would be partially balanced by the availability of forage in adjacent nonfederal lands.

Although long-term impacts on elk habitat were not quantitatively assessed (because a long-term timber harvest scenario was unavailable), improvements in habitat and populations under Alternatives D, E, and the PRMP are anticipated due to increased optimal/ thermal cover and potentially fewer timber harvest impacts. Optimal/ thermal cover would be available in Alternative C in restoration and retention areas; in Alternative D in habitat conservation areas; in Alternative E in 150-year and older stands; and other protected wildlife habitat. Optimal/thermal elk habitat in the PRMP would be managed in the elk emphasis areas that occur in Late-Successional Reserves, Riparian Reserves, and other reserves, and in Matrix-General Forest retention areas for fifth order watersheds and the best habitat areas within Matrix-Connectivity. The unthinned patches in density management treatments in Matrix-Connectivity would also provide high quality hiding cover interspersed with small patches of quality forage in regeneration areas. The density management patches are too specific to be captured in the general elk model

Table 4-14 - Assessments of Short-Term (10 year) and Long-Term (100 year) Impacts on Elk Habitat in the Elk Emphasis Areas

	Existing Conditions for Elk				Predicted Change After 10/100 Years By Alternative[1]						
Elk Mgmt. Emphasis Area	Road Density[2]	HEr[2]	HEc[3]	HEf[3]	NA	A	B	C	D	E	PRMP
Lake Creek	4.03[4]	0.28	0.29	0.16	-/-	-/-	-/-	-/+	0/0	0/0	0/+
Mosby Creek	5.04	0.16	0.58	0.24	-/-	-/-	-/-	-/+	-/+	0/0	0/+
Siuslaw River	4.32	0.24	0.60	0.19	-/-	-/-	-/-	-/+	-/+	0/0	0/+
Walker Creek	3.00	0.38	0.18	0.21	-/-	-/-	-/-	-/+	0/0	0/0	+/+
Wolf Creek	4.22	0.24	0.31	0.20	-/-	-/-	-/-	-/+	-/+	0/0	0/+

[1] Ratings for road density (HEr), cover (HEc) and forage (HEf) ratios based on existing condition. Predicted change based on projected increases/decreases of roads, cover and forage, using the following codes:
- = Declining condition relative to existing condition.
0 = No change.
+ = Improving condition.

[2] Road miles calculated on all ownerships within elk emphasis areas.

[3] Calculated for BLM and non-BLM administered lands within elk management areas.

[4] Road miles per square mile, compared to ODFW benchmark of 1.5 miles per square mile.

analysis, but could be important to elk on a local scale.

Short-term 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 numbers of elk under Alternatives NA and A, B, and C (Table 4-15). This expected decline is due to anticipated high levels of road construction and low levels of optimal and thermal cover. An improvement in habitat quality and elk numbers would be anticipated under Alternatives D and E despite less than optimal conditions on private lands. Elk habitat on private lands primarily consists of younger seral stages that provide abundant low quality forage and currently increasing amounts of hiding cover, but very little optimal or thermal cover.

An anticipated 517 acres of optimal habitat would be harvested under the PRMP during the first decade of the plan but, during the same period, mature habitat is expected to develop into optimal habitat for a net increase of 1.489 acres in optimal habitat during the first decade. The accretion of optimal habitat continues throughout the plan under the PRMP scenario. The amount of optimal habitat is considered an important component of elk habitat (Brown, 1985). Less than 200 acres of optimal habitat would be expected to be harvested from the Elk Emphasis Areas, as they are currently delineated under the PRMP (Table 4-15), since many of the Elk Emphasis Areas occur in Late-Successional Reserves. The actual amount of elk habitat treated under the PRMP in Elk Emphasis Areas would be determined through the watershed analysis process, which would also refine the boundaries of those areas, if necessary, to reflect changes in the Oregon Elk Management Plan and provide better information on habitat conditions within the watershed. Additional optimal habitat is expected in Late-Successional Reserves over time as younger habitat matures into the 150+ age class.

Dominant Woodpeckers

Dominant woodpeckers within the planning area include the hairy woodpecker, downy woodpecker, pileated woodpecker (see Special Status, Chapter 4), northern flicker, and red-breasted sapsucker. There are no SEIS special attention woodpeckers in the Eugene District. All of the dominant woodpecker species depend on excavating nest cavities in dead trees or live trees with dead tops or branches. The downy and pileated woodpeckers require nest snags in forested stands while the others may nest in snags of more open habitats. Impacts of the alternatives on these species depend on the management direction intended for specific land allocations (e.g., number, size, and condition of snags and trees planned for retention) and the changes in number and condition of these snags over time. Snag creation would be an important factor in the Eugene District, because of the large acreage of younger seral forest, which

Table 4-15 - Acres and Percent of Total Acres Available of Cover Type (in Elk Habitat) That Would be Regeneration Harvested During the Next Decade, Under Each Alternative

Planning Alternative	Acres of Habitat/Percent of Habitat Harvested in Decade[1] Optimal Acres	Pct.	Thermal Acres	Pct.	Hiding Acres	Pct.
NA	9,000	51.2	5,000	32.5	12,000	27.5
A	10,477	68.2	4,339	20.7	12,715	29.5
B	7,780	51.2	6,809	32.5	11,841	27.5
C	3,810	24.8	4,241	20.2	2,796	6.5
D	91	0.6	815	3.9	2,509	5.8
E	137	0.9	1,850	8.8	2,323	5.4
PRMP	200[2]	1.3	600[2]	0.9	2,300[2]	5.3
Total Acres Available in Cover Habitat Type:	**15,371**		**20,977**		**43,036**	

[1] Acres harvested under the No Action Alternative are approximate.
[2] PRMP Optimal, Thermal and Hiding Acres were estimated from general objectives from the PRMP, since the location of treatment units would be determined through landscape analysis, and 7/94 acreage calculations were not available categorized by Elk Emphasis Units. Although the values for Optimal, Thermal, and Hiding cover acres may change as harvest units are located, the overall impacts of the PRMP would be the same as the general evaluations estimated in Table 4-14.

currently have low snag numbers. The PRMP is the alternative that emphasizes the most habitat enhancement (including snag creation).

Snag Modeling on Lands Allocated for Planned Regeneration Timber Harvest

On lands allocated to intensive and restricted timber harvest in Alternatives NA, A, and B, only snags and unmerchantable green trees would be retained in regeneration harvest units. During the past decade, the NA alternative resulted in the retention of approximately one snag or green tree per acre on 20 percent of harvest units. These retention trees, left under the previous land use plan, were generally green trees remaining in the East-West Corridor, an area that stretched across the District between the Cascades and Coast Range. A few scattered snags and culls were left throughout the rest of the harvested timber base, but are too few to quantify, and primarily benefit woodpeckers and secondary cavity users that nest in open areas. Many of the snags retained under the NA are soft snags and likely would decay and fall down in the short-term. Modeling indicated this management direction is not adequate to retain appropriate levels of snags needed by woodpeckers or secondary cavity dwellers. This direction would result in few or no nest sites available on these lands after 40 years.

Currently, woodpecker population levels are estimated to be at approximately 44 percent of optimal levels. The present condition reflects the lack of snag retention in early and mid seral stages on the District, following past harvest. From forest inventory data, mature and old growth stands are shown to be at or near 100 percent potential nesting population levels, whereas early seral, mid seral and late seral stages retain about 22 percent, 21 percent, and 43 percent of potential nesting populations, respectively.

In the short-term, Alternatives NA, A, and B indicate declines in potential population levels. Management under C, D, E, and the PRMP is predicted to have minor net increases in potential population levels (<10 percent) over the short-term. Predictions of optimum populations across the BLM landscape in the Eugene District indicate that Alternatives NA, A, and B would fail to meet the 60 percent population level. However, Alternatives C,D, E, and the PRMP would exceed 60 percent levels over the long-term based upon recovery of reserve areas, the protection and/or maturing of riparian zones/reserve areas, and habitat enhancement projects.

In addition to the quantity of habitat (acres), another consideration in evaluating management options to provide habitat for woodpeckers is the quality of the habitat (size and seral stage distribution of snags) that is retained. Under Alternatives NA, A, and B the average size of retained snags is likely to decline after each rotation, as more late and mid seral stage stands undergo final harvest. Large snags would be available only in the relatively small amount of mature and old growth stands existing at the end of 10 decades. In the long-term, a short rotation would mean that nearly all new snags would be near the lower size limit (15 inch dbh) of useful nesting snags. Nearly all snags would be in early and mid seral stage forests, and none would be in late seral stage, which would have highly adverse impacts to species of woodpeckers and other cavity dwellers that rely heavily on late seral stage for other life needs.

Alternative C would produce a much wider distribution of snag diameters, Districtwide, over all seral stages, in both the short and long-term, such that representative diameters are retained on harvest units for creation of snags. Also, the distribution of harvest units, both spatially and temporally, provides a well distributed pattern of snags throughout the District, so that snags are available to woodpeckers in all forest seral stages. The PRMP would provide similar size and spacing of snags and retention trees, and would similarly benefit woodpeckers. Alternative D would provide beneficial impacts to woodpeckers, but spatial distribution would emphasize mature and old growth only in HCAs in the long-term. Alternative E would provide benefits as well, but would provide only low amounts of older habitat in the long-term Districtwide.

Cumulative effects of the alternatives and actions on other lands in the planning area are expected to maintain low snag abundance and woodpecker populations. Within the BLM operating area, where Federally managed lands comprise less than 50 percent of the total landscape acreage, most suitable habitat would be found on BLM lands, due to the lack of snag retention on nonfederal lands. Wildlife trees retained on BLM administered land and other public lands frequently comprise the majority of snag and large green tree habitat available for woodpeckers within an area of mixed public and private ownership. Under Alternative A, population extirpation over significant portions of the landscape is likely for some species of woodpecker, especially species such as pileated woodpecker, which require late seral, mature, and old growth forests with large snags. Under Alternatives NA and B, populations would likely be severely depressed over much of the District, so that these species are in danger of local

elimination at some time. Alternatives C, D, E and the PRMP, although supporting 60 percent or more of optimal woodpecker populations on BLM lands, would still lack significant populations of these species on intervening nonfederal lands.

In summary, Alternatives NA, A, and B are likely to have significant adverse effects on woodpecker populations in the BLM operating area, due to the low number of retained snags and/or the lack of snags in all seral stages. Alternatives C, D, E, and the PRMP would provide substantial gains in the population levels and the distribution of woodpeckers, as well as the host of secondary cavity nesters that use snags as habitat on BLM lands.

Landscape Evaluation

Snag densities were estimated for BLM administered lands using procedures outlined in Appendix P. Snag density levels for the various age classes were adjusted to fit the wildlife tree retention standards of each of the planning alternatives. Snag densities can be related to population levels of woodpeckers by the use of a model developed by Thomas (1979) and further developed by Neitro et al. (1985). Because the model addresses only nest tree requirements, its predictive capability for meeting all habitat needs for woodpeckers, including foraging habitat, is uncertain. True cavity dweller populations are related to the following: existing snag densities and foraging conditions; competition with other woodpeckers for nest trees and forage areas; competition with secondary cavity dwellers, including rodents or bats that may interfere with nesting or foraging; insect availability and distribution; and unknown factors during the winter and migratory season. The snag models currently available fail to consider all these variables, and have not been adequately validated for the factors they do address. As such, they should be considered a predictive tool, to be adapted as better research data becomes available.

This analysis compares woodpecker population levels to the optimal nesting condition, which is defined as the situation where woodpecker populations are not limited by the availability of potential nest sites, and to the present conditions. Densities were estimated for 10 and 100-year intervals. Anticipated snag density levels within various age classes under the various alternatives were used in this analysis.

In the short-term, under all alternatives, current populations of dominant woodpeckers are expected to remain low due to the current scarcity of snags of suitable size, decay class, and distribution (Table 4-17). In the long- term, population levels of dominant woodpeckers are expected to decrease or remain at current low levels under Alternatives NA, A, and B. Although harvest units would be managed for only 40 to 60 percent of optimum cavity dweller population levels under Alternatives C, D, E, and the PRMP (see Chapter 2), snags developing in reserve areas plus the retention of snags where safety permits, should lead to long-term population levels that meet or exceed 60 percent of optimum potential population levels across the BLM landscape. Snags and large trees would be developed slowly through natural means in the reserve areas and through snag and green tree replacement measures under the PRMP. Long-term population levels may exceed 60 percent under the PRMP in a shorter period if snags are actively developed and created, although treated trees take several years to develop usable snag characteristics, and may not last as long or have the same ecological function as snags created by natural means.

Table 4-17 - Estimated Percent of Optimum Potential Population Levels[1] of Woodpeckers on BLM Administered Land for the Existing Condition and for Each Alternative at End of 10 Years

	Existing Condition	NA	A	B	C	D	E	PRMP
Short-term	44	37	34	39	47	48	48	>48[2]
Long-term	44	37	23	50	70	80	86	>69[2]

[1] See Appendix P for description of technique used to calculate population levels.
[2] Population levels for the PRMP would exceed levels estimated in the Draft RMP, but exact levels would depend upon the locations of treatment units, which would be determined through watershed analysis, and the degree of habitat enhancement that would occur under the PRMP in the short-term or long-term.

Cumulative effects of the alternatives and actions on other lands in the planning area are expected to support low snag numbers and cavity-user populations in the short-term and, without active replacements, the few existing snags on private lands would be expected to decrease over time due to decay and blow-down. Few large trees are left on private lands clear cut in the last 30 years, except in State mandated buffer strips. This situation would likely continue in the foreseeable future. Wildlife trees retained on BLM administered land and other public lands comprise the majority of snag and large green tree habitat available for cavity dwellers within mixed public and private ownership on the Eugene District.

Secondary Cavity Users

For purposes of this analysis, priority species of secondary cavity users are those identified on Table 3-54 as requiring tree cavities for reproduction. Most of these species depend on woodpeckers to provide the necessary tree cavities, and it is assumed that management to maintain woodpecker populations at 60 percent of optimum levels would provide for nesting habitat to retain viable populations of all secondary cavity-using species, provided that snags are present in all seral stages and other essential life requirements are available. Anticipated impacts for the group as a whole parallel those of woodpeckers, that is, (1) continuing population declines in the short-term for all alternatives; (2) severe population reductions and probable local extirpations over the long-term for Alternatives NA and A, with low population levels in B; and (3) increasing populations over the long-term for Alternatives C, D, E, and the PRMP.

Although few studies are available, it is assumed that the needs of individual species within this group vary greatly, and the alternatives are not equal in their ability to provide for the needs of all species. Due to the limited data available to fully assess all aspects of alternative capabilities for all species, it is assumed that the alternative that provides the greatest overall habitat diversity is most likely to avoid or minimize habitat loss for older forest dependent species while providing future habitat for species dependent upon early seral stage habitats with high structural and plant species diversity. The PRMP and Alternative C are believed most capable of meeting these goals. Alternatives NA and A do not meet these goals, while Alternatives B, D, and E would provide varying degrees of diversity.

Other Priority Species

Accipiter Hawks

Cooper's and sharp-shinned hawks prefer dense, unthinned stands for nesting (Reynolds, 1983), primarily in the mid and late seral stages (20-90 years old). Effects on northern goshawks are discussed in the Special Status and SEIS Special Attention Species section of this chapter. Currently, in the District there are approximately 141,000 acres of unthinned forest habitat in the 25 to 75 year age class. Thinnings in these stages may have adverse impacts on accipiters. Though section-sized areas of this habitat are not available for nesting, stands in this age class are available over the majority of the District (Table 4-16). Under the PRMP, commercial or density-management thinning would occur on approximately 7,300 acres in Matrix-General Forest

Table 4-16 - Thousands of Acres of Unthinned Stands (25 to 75 Years), Capable of Meeting Nesting Needs of Accipiter Hawks

	Acres Unthinned in Age Classes 25 to 75, by Alternative						
	NA	A	B	C	D	E	PRMP
Existing Condition[1]							
Short-Term (10 years)	133	133	133	121	132	133	150[1]
Long-Term (100 years)	80	62	97	3	64	35	22[1]

Note: This table reflect data as of the 1992 Draft RMP.

[1] 7,300 acres are planned to be thinned in Matrix-Connectivity and Matrix-General Forest in the short-term. Some thinning may occur in Late-Successional Reserves to meet Late-Successional Species Desired Future Conditions, but the amount and location would be dependent upon watershed analysis and evaluations of resources other than timber, of which Accipiters would be one. A similarly unpredictable situation would occur over the long-term. In general, habitat projections for the 25-75 age class would decline under the PRMP to 22,000 acres after 100 years, some of which may remain unthinned.

and Matrix-Connectivity areas over the short-term. Additional acres of various stand density treatments could occur in Late- Successional Reserves, depending upon watershed analysis. Density management thinnings are more variable than commercial thinnings and have unthinned patches that could be designed through the silvicultural prescription to reduce impacts to accipiter nest stands. Impacts to accipiters would vary depending upon the effectiveness of the interdisciplinary teams to plan for accipiters along with other resource values in density-managed stands under the PRMP.

Although thinnings would be an important activity under the PRMP to promote development of old growth like conditions, eventually these stands would attain old growth characteristics (large, tall open-grown trees, and multi-storied canopies, snag and down wood retention/development). The long-term trend in Late-Successional Reserves would be towards older seral stages, which are not favorable to Cooper's or sharp-shinned hawks. Under Alternative C, about one percent of BLM stands aged 25 to 75 years would remain unthinned, leaving little quality accipiter habitat. Alternative E would provide for 15-acre patches of unthinned habitat to provide for accipiters. All other alternatives would provide an abundance of the appropriate age classes, but the distribution of quality habitat may not meet accipiter needs.

The cumulative effects would be cyclical in many areas as the private lands tend to be harvested within a span of a decade or less, leaving a period where they provide no such habitat. In other areas, however, the intermingled private lands are owned by timber companies to the extent that they equal or exceed the amount of BLM land. These forests are also subject to thinning at periodic intervals, resulting in increased cumulative impacts to these species.

Golden Eagle and Red-tailed Hawk

The abundance of golden eagles and red-tailed hawks in western Oregon appears to be related to the availability of early seral stages as foraging sites and mature/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 D and E would probably result in maintenance of current levels of golden eagles and red-tailed hawks because known and potential nest sites are protected. Forage habitat would likely be available on adjacent private lands even under Alternatives C, D, E and the PRMP but, because of skewed age distributions, prey species living in early seral areas would exhibit "boom or bust" conditions. Alternatives NA, A, and B would likely result in very low populations in the Eugene District. The PRMP would probably increase habitat for golden eagles and provide for site specific options to protect red-tailed hawk nests. The cumulative effect of Alternatives NA, A, and B would likely cause reduced numbers of golden eagles and red-tailed hawks. Numbers comparable to existing levels might be anticipated under other alternatives.

Great Blue Heron

Great blue heron abundance is dependent on the availability of suitable undisturbed nesting habitat close to riparian areas that support adequate prey. In the short and long-term, Alternatives NA, A, and B would be expected to reduce nesting populations in the District because of intensive timber management practices resulting in less potential nesting habitat. Heron habitat would be expected to increase under Alternatives C, D, and E, and herons populations would be expected to increase if suitable habitat is protected from disturbance through access management, suitable nesting habitat increases, and riparian and wetlands develop mature habitat through better riparian protection. Abandoned heron rookeries may reestablish under the Aquatic Conservation Strategy objectives of the PRMP. The active rookeries on BLM administered lands are nominated for Area of Critical Environmental Concern (ACEC) status under the PRMP.

Riparian habitat on private lands currently receives less protection than on Federal lands and little mature/old growth habitat remains on private lands. The Oregon Forest Practices Act (OFPA) protects existing great blue heron rookeries to some degree, but there is little allowance for maintenance or development of potential habitat. The cumulative effect of Alternatives NA, A, and B would adversely affect heron habitat. Better conditions for heron habitat would result from Alternatives C, D, E, and the PRMP.

Other Raptors

American kestrels, pygmy owls, western screech owls, and barred owls are other raptors affected by one or more of the alternatives. They depend upon tree cavities for nesting, and the pygmy owl, western screech owl, and barred owl use older forest habitat for one or more life needs. Alternatives C, D, E, and the PRMP are expected to maintain viable populations of these species, whereas Alternatives NA, A, and B are likely to result in major population

reductions throughout the District. Alternatives A and NA would reduce nesting habitat within Key Raptor Areas to mature and old growth forests in the riparian zones.

Neotropical Migrant Birds

There has been increasing concern in recent years about apparent widespread population declines of neotropical migratory bird species that migrate between Central/South America/Mexico, and North America (French, 1991). Causes of the declines are unknown but include: loss of habitat on the breeding or wintering ranges or along migratory routes; decreases in insect prey and secondary poisoning resulting from pesticides; and competition with nonnative species.

Of the 38 species of birds listed as priority species on Table 3-54, 23 are neotropical migrants, although many other neotropical and resident song birds also occur on the District throughout the nesting season or during annual migrations. Of these 23 species, 6 (26 percent) depend upon tree cavities or dead trees for reproduction, and 15 (65 percent) use older forests as their primary habitat for one or more life needs. Anticipated impacts to these species parallel those to passerines and secondary cavity users, as described above; Alternatives NA, A, and B are likely to result in population reductions of some species over large areas, while Alternative C and the PRMP are likely to have the best long-term affects for those species that use older forest as their primary habitat. Alternatives D and E are also likely to have favorable impacts on these species. The Alternatives that emphasize ecosystem diversity and site-specific habitat options would best meet the varied needs of neotropical migratory birds. Alternatives C and the PRMP would best meet the mix of habitats used by neotropical migrants, largely due to their approach to diversity. The PRMP identifies special habitat enhancement and monitoring for neotropical migrants that should lead to improved population trends of neotropical migrants.

The cumulative effects of RMP alternatives on neotropical migrants is complicated by the recent large-scale habitat changes on Federal and private ownerships, urban development in the Pacific Northwest, and habitat loss and pesticide use on the wintering grounds in Mexico, Central, and South America. 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, although limited breeding surveys in Oregon indicate declining population trends on many of these species (Andelman and Stock, 1993).

Osprey

Osprey abundance is dependent on the availability of suitable nesting habitat near reservoirs, lakes, and major rivers and streams that provide adequate prey. Although ospreys frequently nest in riparian areas, they also may nest in upland areas in proximity to large bodies of water (Witt, 1990). Upland areas would likely be affected by intensive timber harvesting to a greater degree than riparian areas that receive variable protection levels under all alternatives. The effect of intensive timber harvesting in upland areas can be reduced by leaving large broken-topped wildlife trees after timber harvest.

In the short-term, osprey populations are likely to maintain present levels under all alternatives, due to nest site protection. In the long-term, populations may decline under Alternative A due to possible nest site reduction from narrow riparian corridors. Alternatives NA and B are likely to retain similar population levels of osprey in the long-term. Alternative C would provide a broader distribution of habitat in the long-term. Alternative D would provide good to excellent habitat protection within the HCAs, and adequate protection elsewhere. Alternative E would provide the most short-term protection, but would limit the distribution of nest sites in the future due to the lack of older forest restoration outside of existing reserves. Alternative E and the PRMP would provide the best potential for long-term productivity of ospreys because of fish habitat/ riparian protection levels.

The cumulative effect of Alternatives NA, A, and B and actions on adjacent ownerships would likely result in fewer ospreys or numbers comparable to existing levels. Greater numbers of ospreys might be anticipated under other alternatives.

Waterfowl

The waterfowl identified as priority species in Table 3-54 are of concern because they use large trees with cavities located close to fish bearing streams. Impacts to these species are related to the amount of riparian habitat along larger streams managed for old growth conditions. Riparian management on BLM lands is expected to improve habitat conditions for these species under all alternatives except A where riparian habitat conditions would decline. Riparian/

wetland habitat acquisitions and management for older forest conditions under all alternatives except NA and A, would benefit waterfowl. Habitat enhancement projects, when implemented to meet the Aquatic Conservation Strategy and Riparian Initiative objectives under the PRMP would benefit waterfowl.

Amphibians

(See also the Special Status and SEIS Special Attention Species Habitat section of Chapter 4). Because some amphibians depend on surface water for breeding and others deposit their eggs in moist situations on land, the abundance and diversity of amphibians is related to the availability of stable, damp conditions in the riparian zone adjoining streams and ponds, in forest habitats adjacent to riparian zones, in talus areas, and in dead and down woody debris. Water quality is important for the survival and development of amphibian eggs and larvae. Cool, moist riparian habitat is crucial to the survival of adults (Nussbaum et al., 1983). Under all Alternatives A, B, and C, amphibian habitat would be lost, or quality diminished, although implementation of Best Management Practices (BMP) (refer to Chapter 2, Water Quality), would help mitigate the impacts. Tree frog habitat under Alternatives A, B, and C would likely be improved because of tree frog preference for early seral habitat. Habitat quality for Pacific giant salamanders would likely be reduced under Alternatives A, B, and C. Alternatives D, E, and the PRMP would provide greater aquatic and riparian protection. This and the greater retention of down wood would favor the maintenance of some native amphibians. Habitat damage would be greatest in 1st and 2nd order drainages under all alternatives.

Restoration of stream/riparian habitat previously damaged by management activities would vary by alternative and recovery rates of amphibian populations would similarly vary. Recovery would be slowest in Alternatives NA, A, and B, and more rapid in Alternatives C, D, E, and the PRMP that retain more of the adjacent upland habitats in older forest condition. Intensive harvest in subbasins dominated by BLM ownership such as Bear, Marten, or Greenleaf Creeks, which have rich amphibian communities, would result in a decline or a loss of these amphibians during the short-term and possibly the long-term.

Alternative E, which retains riparian vegetation along all streams, provides the widest riparian zones, and maintains a large number of 1st and 2nd order drainages in an undisturbed condition, would provide a high degree of protection for riparian-dependent amphibians in both the short and long-term. The PRMP would also provide a high degree of protection because it would also retain a large number of 1st and 2nd order drainages in an undisturbed or minimally disturbed condition. Alternative D would retain riparian vegetation along 2nd order and larger streams, but would retain fewer undisturbed 1st order drainages. The other alternatives retain riparian habitat along perennial streams, but lack significant protection of temperature and moisture regimes within the riparian zones because of less riparian protection and retention of adjacent upslope habitat.

Risk of population losses and extirpations of stream/riparian associated species is greatest in Alternatives NA, A, and B. Alternative E and the PRMP have the greatest riparian zone widths and the most undisturbed 1st and 2nd order drainages and provide the greatest protection of riparian microclimate. In the short-term, more amphibians would be expected under Alternatives B, C, D, E, and the PRMP than under NA and A. These alternatives would also provide increasing protection of upslope habitat and small, headwater streams important to some amphibians. Alternative E provides the best protection to ephemeral streams, although the PRMP could provide similar protection through the implementation of BMPs. In the long-term, riparian habitat conditions would improve with progressively increasing protection under Alternatives B, C, D, E, and the PRMP, as the streamside vegetation is allowed to grow toward a mature, stable, undisturbed condition.

Assuming management of BLM lands under Alternatives C, D, E, or the PRMP, the cumulative effects of the alternatives and actions on other lands in the BLM operating area would not likely improve the condition of amphibians in the long-term due to the dearth of older forests and riparian habitat on nonfederal lands, but may maintain remnant populations that occur on BLM lands. With BLM lands managed under Alternatives NA, A, and B, management of nonfederal lands over the long-term using short-cut cycles would contribute to declines in many amphibian populations and increase the risk of extirpation of some species over wide areas. Habitat loss and population declines would result from direct mortality due to timber management activities on short-cut cycles, loss of cover provided by older seral stages, and inability of short-cut cycles to provide replacement habitat.

Black Bear

Black bears are forest-dwelling omnivores and forage heavily on fruit, nuts, and green succulent forage that tend to be more prevalent or productive in younger seral stages and riparian zones. Because black bears use large rootwads as den sites, they should also benefit from areas of mature forests (Noble et al., 1990).

Hunting, poaching, and mortality resulting from disturbance of denning females and bear damage trapping are probably the greatest factors affecting bear populations in this area. Management that provides diverse vegetation, protects snags, and dead and down woody material; provides areas secure from human intrusion; should maintain bear habitat over the short-term; and improve the amount of quality den sites and foraging areas in the long-term. Moderate to high populations of bears would be anticipated in areas with a good mixture of younger seral stages for food and mature stands for denning habitat, if they are protected from poachers and mortality related to intolerance by adjacent landowners.

In the short and long-term, Alternatives NA and B would be expected to reduce populations of black bears due to lack of dead and down woody material of sufficient size to provide secure den sites and increased disturbance resulting from road density. Alternative A would have more detrimental impacts, due to the highest reduction of older forests. Alternatives D and E may provide higher populations based primarily on increased denning capabilities, wider riparian protection, and fewer roads. The PRMP and Alternative C would increase black bear abundance through silvicultural prescriptions that would stimulate quality forage, retain down wood and snags for dens, and control road access at critical times of the year.

Cumulative effects of the various alternatives across the landscape combined with habitat alterations by intermingled land owners would be expected to maintain at least moderate bear habitat and population levels, provided illegal harvest is controlled, and bears are tolerated by private landowners.

Black-tailed Deer

Current densities of black-tailed deer are believed to be high in the District, and habitat conditions are not expected to change significantly during the next decade. In the short-term, the abundance of black-tailed deer would be roughly comparable under all alternatives. 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 initially high abundance of forage in response to overstory canopy removal, followed by low forage production in the shade from the overstory canopy. Deer populations tend to increase during periods of high browse availability and decline when browse is scarce or poor quality.

In the long-term, Alternatives NA, A, and B would probably maintain highly fluctuating populations of black-tailed deer. Alternatives D and E would likely support fluctuating populations of deer outside of northern spotted owl Habitat Conservation Areas (HCA) (Thomas et al., 1990), and older forest blocks, and low but stable populations within HCAs (Alternative D). Alternative C and the PRMP would provide greater stability, although lower peak level, of black-tailed deer populations by reducing the amount of clear cutting and by increasing the availability of mature and old growth cover. Adequate amounts of forage should be available under Alternatives C, D, E, and the PRMP because of intensive forest management on intermixed private lands. The PRMP would increase black-tailed deer habitat on BLM lands over the long-term.

Cumulative effects of Alternatives NA, 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 in the PRMP.

Mountain Lion

Mountain lion numbers are partially dependent upon the abundance of deer because deer are their major prey in this area. Legal hunting is an additional, but probably minor, impact on mountain lions in this area. Illegal harvest may also occur, but impacts are unknown. In the short-term, mountain lion populations are expected to remain comparable to existing levels. In the long-term, Alternatives NA, A, and B would be expected to reduce current mountain lion 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 should support potentially higher, more stable mountain lion populations. Under the PRMP, mountain lion populations would be expected to increase due to stable deer populations, retention of potential den sites and reduced road levels and reduced disturbance. In the long-term, mountain lion numbers would be expected to be loosely correlated with deer numbers, if hunting pressure remains constant. Cumulative effects would follow similar patterns for all alternatives.

Carnivores/Furbearers

The gray fox, raccoon, and bobcat use dead and down woody debris for cover and reproduction; large material provides the best habitat quality. Alternatives C, D, E, and the PRMP would provide adequate habitat for viable populations of these species over both the short and long-term. Alternatives NA, A, and B may be expected to result in significant population losses over large areas remote from 3rd order, and larger streams/riparian zones, where suitable dead and down woody material would be retained and abundant food supplies are available.

Upland Game Birds

The habitat used by upland game birds listed as priority species in Chapter 3 would be affected differently based on the specific habitat needs of each species. Wild turkeys are expected to have minor effects under all alternatives based on their current limited distribution and abundance within the planning area. Mountain quail are addressed in the Special Status and SEIS Special Attention Species section. California quail are found at low elevations largely away from BLM administered lands and are expected to be little affected by the various alternatives. Ruffed grouse prefer hardwoods often in riparian areas. Their habitat is expected to be somewhat more abundant compared to the existing situation under all alternatives except NA, A, and B where intensive timber management, including stand conversion, could reduce habitat. Blue grouse use openings for nesting and mature forest cover in winter roosting.

All 6 species of upland game birds listed as priority species on Table 3-54 are associated with the presence of hardwoods in their primary habitats; 3 of the 6 also depend upon older forest habitats for one or more life needs; one species (band-tailed pigeon) must have a suitable mineral spring within close proximity of its nesting habitat. The only known mineral spring on BLM lands in the District is within lands nominated for ACEC status. Populations of upland game birds are expected to be highest under Alternative C and the PRMP in the short and long-terms. Alternatives B, D, and E may be expected to maintain viable populations of all species over the short and long-terms. Some population reductions may be expected under Alternatives NA and A during the long-term.

Insectivores/Rodents

As a group, the 12 priority species identified on Table 3-54 are most closely associated with dead and down woody debris, tree cavities, and hardwoods, all in older forest habitats. Alternatives C, D, E, and the PRMP would provide adequate habitat for viable populations over both the short and long-term. Alternative E and the PRMP would provide high amounts of habitat protection in the short-term. The PRMP would produce the most habitat over the long-term. Severe reductions in populations of these species, and increases in populations of other (nonpriority) species oriented towards highly simplified habitats (e.g., meadow vole) could be expected under Alternatives NA, A, and B.

Beaver

Beavers would be managed incidentally under all alternatives except the PRMP, where the ecological function of beavers in riparian/aquatic systems would be specifically addressed under the watershed analysis plans. Beaver populations would be managed through coordination with Oregon Department of Fish and Game levels consistent with historical population levels to the extent consistent with the Aquatic Conservation Strategy and other resource concerns.

Other Wildlife

Only under the PRMP would habitat be specifically managed to represent a diverse mosaic of conditions that fall within natural ecological perturbations, to the extent that these variations are known, in order to provide for viable populations of native wildlife across the region, if not the planning area. Not all native wildlife would be expected to occur in all land-use allocations or in all watersheds, but watershed analysis would address the potential of species occurrence and the importance of the watershed in providing habitat necessary for viability. Alternatives D, E, and the PRMP would emphasize older seral species. Alternative C would provide large amounts

of older seral habitat but, due to the low reserve levels, would favor species that are tolerant to management activities. Alternatives A and B may lead to local extirpations of some species, particularly those with low tolerance to early seral conditions, and would generally favor species with general habitat requirements. The biological diversity emphasis of Alternative C would provide habitat for additional species. Alternatives D, E, and the PRMP would provide the greatest amounts and greatest protection of the age classes and habitat components thought to be most limiting to priority wildlife on the District (older aged forests, snags, down wood, and riparian). Under all alternatives, management activities would be restricted if the action would lead to endangered species listing of any species (see Special Status/ SEIS Special Attention Species Habitat, Chapter 4).

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 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 (BMP) 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 single most important 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 (RMA) 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 that contain 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 10 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 could result in reduced Riparian Reserve widths for intermittent streams (dependent on an analysis of existing conditions in watersheds), this would take place only if the best information available showed that aquatic habitat values could be maintained with reduced Riparian Reserve widths. By including greater protection of intermittent streams, the PRMP could provide for greater overall watershed protection of upslope, riparian, and downstream areas than other alternatives. This would 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 regarding 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 would increase through watershed restoration.

In the long-term, aquatic habitat would continue to recover under all alternatives except Alternative A. Based on comparisons with the SEIS, recovery would 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 if changes in land management practices and comprehensive restoration were initiated, it is possible no option would completely recover all aquatic systems within the next 100 years.

The productive capability of fish is directly correlated to 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 currently well below the potential. This is due, in part, to impacts or cumulative effects on species viability from nonfederal activities and to activities in other habitat sectors where the species might spend portions of their life cycles (FEMAT, 1993). 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 natural riparian vegetation recovery, which relies on creation of large conifer trees to produce large woody debris, it would 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 3rd 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.

Locatable mineral activity during the past decade has centered on Sharps Creek. Because they are guided by the Aquatic Conservation Strategy, anticipated leasable mineral activities are not expected to impact aquatic habitat. Potential mining development, as described in Appendix II, 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 would reduce the threat to these fish. Increased recreational development in some areas would 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.

Effects on Special Status and SEIS Special Attention Species and Habitat

Introduction

Refer to the SEIS for information on the effects of the alternatives for SEIS Special Attention plant and animal species throughout the range of the northern spotted owl. Special Status plant and animal species known or suspected within the Eugene District are described in Chapter 3 and listed in Tables 3-30 and 3-31. SEIS Special Attention Species are noted in Table 3-54, listed in Appendix O, and some are described in Chapter 3. The discussion of impacts by alternative for Special Status plants is followed by the discussion for Special Status animals. Special Status Species animals are discussed individually or by groups.

In the following discussion of impacts to Special Status Species, an implicit assumption is that the various silvicultural and harvest prescriptions designed for use under each of the planning alternatives would achieve desired goals of forest regeneration and structural development. Some prescriptions to be implemented in Alternative C and the PRMP are experimental in nature, and would require substantial monitoring (and probable revisions) to evaluate the success of the prescriptions toward meeting plant and wildlife habitat management goals.

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 Special Status category of the species (i.e., Federal Candidate, Bureau Sensitive, Bureau Assessment, or State Listed), the occurrence of these species on commercial or noncommercial forest land, and on O&C or public domain lands, and the limited knowledge of what is needed to maintain the viability of many species. Many Special Status Species occur in special habitats such as wetlands, talus, dry meadows, or Riparian Zones. The degree of protection afforded these habitats would vary under each alternative.

Plants

Impacts, both direct and indirect, to Special Status plants and their habitats could occur from a variety of activities that take place in the planning area, in conjunction with the management of other resources. Negative impacts could alter the structure, function, and composition of both the Special Status plant species population and the associated habitat. Activities that exhibit the greatest threats are those activities associated with timber management. Timber management activities that could destroy or alter habitats of Special Status plant species include brushing timber sale unit boundaries; timber removal, including clear cut harvesting; precommercial thinning; commercial thinning; other density management techniques; and mortality salvage.

Other timber-related activities that change plant populations and associated habitat include vegetation control, fertilization, road construction, and rock quarry development. Reciprocal right-of-way agreements, where the Bureau lacks discretionary authority to mitigate impacts to a Special Status plant site within a project area, could cause negative impacts to Federal Candidate or Bureau Sensitive plant species and the associated habitat.

Other potential surface disturbing activities that can occur in the planning area but which occur in less frequency are activities associated with mining, wildlife improvement projects, recreational development, grazing, archaeological excavations

conducted in support of other management activities, and maintenance of utility corridors. Of increasing interest in the planning area is the harvesting of special forest products for personal and commercial use. Actions associated with this program could cause inadvertent damage to Special Status plant species and the associated habitat. Mineral development could destroy plants and alter habitats by activities such as mineral exploration, mineral removal, road construction, and assessment work. Recreational development could create threats for Special Status plants, including development of hiking trails, parking areas, and other visitor facilities. Activities such as Off-Highway Vehicle (OHV) use, mountain biking, hiking, horseback riding, and hunting could cause inadvertent damage to plant populations or plant habitats. Where any ground-disturbing activities occur, conditions favorable for noxious weed invasion could result in undesirable ecological conditions for native flora.

Bureau actions, including natural resource interpretation associated with recreation and ground level botanical evaluations conducted prior to authorizing any Bureau administered activities, could result in a decrease in potential damage to Special Status plant species and their associated habitats, depending on the level of protection and on the level of active management afforded each species.

Selected sensitive plant species may benefit from some level or type of human caused disturbance. Disturbances may create habitat conditions similar to naturally occurring disturbances and, therefore, provide habitat for some species. For example, historical fires frequently occurred in portions of the Eugene District due to lightning strikes and intentional burning by Native Americans. With the advent of fire suppression in portions of the planning area, sensitive plant habitat has been reduced and the maintenance of certain seral stages, critical for some plant species, can only be maintained with the reintroduction of prescribed burning or other method(s) that would produce similar ecological conditions (see Chapter 4, Fire Effects). The disturbance ecology of most Special Status plant species, however, is not well understood, and data is often lacking to make effective management decisions concerning such actions. In addition, actions such as prescribed burning may not be considered desirable from smoke management perspectives and may be difficult to implement without public support.

For some sensitive plant species, acquisition or some other form of conservation strategy for privately owned plant sites may be critical to the long-term viability of a species. This is particularly important for species that are referred to as obligate or facultative out-crossers, which utilize other populations for exchange of genetic material. Where acquisition or conservation strategies are not pursued, nonfederal sites for Special Status plant species may be altered or destroyed. The resulting long-term consequence of this may be the loss of viability of some Special Status plant species on Bureau lands.

Protection by Alternative

Where protection for Special Status plants is given, protection implies that adequate buffers would be established to mitigate physical and biological changes to the interior core areas where Special Status plants occur and, where possible, provide additional adjacent suitable habitat for the species to be managed and enhanced to maintain viable populations. Protection implies active management attention including mitigation of negative impacts to the population and monitoring to assess the condition of the population.

Because so little is known about most Special Status plant species, it is difficult to evaluate the long-term implications of modifying habitats for sensitive plants across a landscape, even when protecting individual Special Status plant sites. Recent research has indicated that the conservation of rare plant species depends on the patterns and distribution of plant reserves, the habitat and composition of the reserve, and the connectivity and land use patterns between reserves (Miller et al., 1992). The vegetation patterns on the Eugene District and the present occurrence of Special Status plant species are probably a result of historic disturbances of varying types and intensity. Climate and a variety of other ecological inputs were all critical in the development of plant associations and seral stage distribution necessary for Special Status plant species. Some proposed land-use allocations and the associated management treatments for each allocation may or may not result in the ecological components necessary for long-term viability of rare plants. When given the varying biological and ecological elements that plants require such as complex pollination, dispersal, and plant establishment strategies, etc., it presently would be difficult to predict the long-term success of a given Special Status plant species within specific land use allocations. Monitoring would be critical in assessing how plant populations are responding to small and large land use changes to prevent the need to list plant species as threatened or endangered.

No Action Alternative

Under the No Action (NA) alternative all Federally listed Threatened and Endangered, Federal Candidate, and Bureau Sensitive plant species would be protected. No known or future sites for these species would be impacted. Assessment species would be actively managed where needed to prevent increases in status listing to Bureau Sensitive or Federal Candidate levels.

Alternative A

Under Alternative A, harvest of timber stands and other activities associated with timber production may impact the quality and quantity of habitats of all categories of Special Status plants, except those that are officially listed and have a critical habitat designation or recovery plan in place. In the short-term and long-term, approximately 270,000 acres would be available for timber harvest. One officially listed plant species, *Lomatium bradshawii* (Bradshaw's lomatium) occurs on O&C land in the planning area. A Lomatium Recovery Plan has been prepared by the U.S. Fish and Wildlife Service for this species. The site, along with several other Special Status plant species sites, occurs in Special Habitats other than commercial forest lands and would receive some inadvertent protection. Adequate buffers for special habitats, however, which could require commercial forest lands, may not be established (see Wildlife, Chapter 2, Table 2-5 - Buffering of Special Habitat). Species such as Federal Candidate 2 species, *Aster vialis* (wayside aster), and Federal Candidate 2 species, *Cimicifuga elata* (tall bugbane), which occur in the forested ecosystem, would be impacted under Alternative A. No special protection or active management would be directed for these species. A total of 524 acres of known Special Status plant species would be subject to impact under Alternative A. Loss of Special Status plant sites could lead to the need to list some of these species as threatened or endangered.

Alternative B

Impacts under Alternative B would be similar to Alternative A, except for some additional protection on Public Domain lands and reserved old growth blocks where timber harvest would be restricted. A total of 521 acres known for Special Status Species plant habitat would be subject to impact under this alternative. To date, few Special Status plant species are known to occur on the Eugene District Public Domain lands. The addition of reserved old growth blocks may allow for some inadvertent protection of known sites for Federal Candidate 2 species, *Aster vialis* (wayside aster), and for Federal Candidate 2 species, *Frasera umpquaensis* (Umpqua swertia), but the Bureau would not be directed to actively manage for these species under Alternative B because the plant species are known to occur off of Bureau lands. Loss of other known and future Special Status plants including Federal Candidate 2 species, *Aster vialis* (wayside aster), and Federal Candidate 2 species, *Cimicifuga elata* (tall bugbane), and the lack of active management for Special Status plant species under Alternative B could lead to the need to list some of these species as threatened or endangered.

Alternative C

Alternative C would be similar to Alternative B except that varying sized blocks of mature and old growth would be selected where Special Status plants and animal species cluster or where a forest seral stage balance with spatial distribution could be achieved. A total of 521 known acres of Special Status plant species habitat would be subject to impact under this Alternative. Known plant species sites do not cluster well with Special Status animal species sites on the Eugene District and would receive little protection under Alternative C. Where Special Status plant sites do occur in the Alternative C forest blocks, some inadvertent protection would occur for these species, but the Bureau would not be directed to protect these species or to provide active management because the species are known to occur off of Bureau lands. Loss of other Special Status plant sites including Federal Candidate 2, *Aster vialis* (wayside aster), and Federal Candidate 2 Species, *Cimicifuga elata* (tall bugbane), and the lack of active management where plants occur in forest blocks under Alternative C, could lead to the need to list some of these species as threatened or endangered.

Alternatives D and E

Under Alternatives D and E, known locations of Special Status plant species (538 acres) and an unknown number of future locations of Special Status plant species would be protected and buffered. Alternatives D and E would be consistent with current Bureau policy on sensitive plant species (BLM Manual 6840; Instruction Memo OR-91-57). Bureau policy would direct management to mitigate adverse actions on Special Status plant species and to prevent the need for future listing as a Threatened or Endangered species in all land use allocations in

Alternatives D and E. All known Special Status plant sites would receive protection, including Federally listed or proposed species, Federal Candidate plant species, Bureau Sensitive plant species and Assessment species. Future sites of Federally Listed or proposed, Bureau Sensitive and Federal Candidate plant species, if identified, would receive protection and active management attention. Assessment species would be actively managed where needed to prevent increases in status listing to Bureau Sensitive or Federal Candidate levels.

Proposed Resource Management Plan

Under the PRMP, all known locations of Special Status plant species (1,044 acres) and an unknown number of future locations of Special Status plant species would be protected and buffered. The PRMP would be consistent with current Bureau policy on sensitive plant species (BLM Manual 6840; Instruction Memo OR-91-57). Bureau policy would direct management to mitigate adverse actions on all Special Status plant species and to prevent the need for future listing as a Threatened or Endangered species in all land use allocations including Late-Successional Reserves; Riparian Reserves; Adaptive Management Areas; and Matrix lands, including General Forest Management Areas and Connectivity/ Diversity Blocks. All known Special Status plant sites would receive protection, including Federally listed or proposed species, Federal Candidate plant species, Bureau Sensitive plant species, and Assessment species. Future sites of Federally listed or proposed, Bureau Sensitive and Federal Candidate plant species, if identified, would receive protection and active management attention. Assessment species would be actively managed where needed to prevent increases in status listing to Bureau Sensitive or Federal Candidate levels. Late-Successional Reserves, increases in riparian buffer widths, and emphasis on protection of Special Habitat features, including such areas as rock outcrops, etc., would benefit Special Status plant species. Even with the addition of these protection measures, viability of some Special Status plant species such as *Aster vialis* (wayside aster) may decline. Actions such as acquisition or development of conservation easements for non-BLM *Aster vialis* (wayside aster) sites, and implementation of adaptive management techniques designed to enhance populations, etc., would help to mitigate the negative impacts for this species.

In summary, effects resulting from the lack of protection and active management in Alternatives A, B, and C would be detrimental to Special Status plants. Several known sites for sensitive plants would not be given specific protection under these alternatives and Special Status plant sites located in the future would not be given management attention. Over time these species and others could be lost within the planning area.

Alternatives D, E, and the PRMP would protect known and future Special Status plant species and the habitats these species occupy. As more information is gained about some of these species, research may suggest that management activities such as density management, prescribed burning, etc. may be compatible with reproducing the structure, function, and composition of habitats that support Special Status plant species. Habitat enhancement to protect and to manage for viable Special Status plant populations would be implemented over all land use allocations. Alternatives D, E, and the PRMP would provide active management for Special Status plant species and would direct the Bureau to broaden the present data base on these species and to develop conservation plans for maintaining and monitoring long-term population viability.

There is no protection for Special Status plants on private lands. Some Special Status plant species on the Eugene District occur on neighboring National Forest lands and adjacent BLM Districts. Federal protection and management of Special Status plant species is critical for the long-term survival of these species. Special status plant conservation strategies that include the efforts of several National Forests and BLM Districts could be necessary to ensure a species' long-term success. Population modeling, however, to determine minimum viable populations and extinction probability has not yet been implemented for most Special Status plant species. It is not known what percentage of a population could be eliminated and still remain viable. If impacts reduce populations below minimum viable population levels, and the species do not have such attributes as a sufficient soil seed bank, proper habitat conditions, sufficient exchange of genetic material, etc., to support recovery, the population would become vulnerable to extinction. If recovery does not occur, long-term impacts could result in an irreversible and irretrievable commitment of the resource leading to extinction of the species.

SEIS Special Attention Plant and Fungi Species

The analysis of the PRMP also incorporates by reference the conclusions in Appendix J2 of the SEIS with reference to lichens, bryophytes (mosses, liverworts, and hornworts), and fungi. The SEIS was adopted in the PRMP.

Bryophytes

Alternatives NA, A, and B

Alternatives NA, A, and B would have the greatest impacts to SEIS Special Attention bryophytes that are dependent on late-successional forests. These habitats would be afforded less protection, riparian buffers would be narrower, and green tree retention would be less. These alternatives do not propose any "survey and manage" strategies for bryophytes, and Special Habitats would not be buffered in Alternatives A and B.

Alternatives C, D, and E

Alternatives C, D, and E would have less impacts to bryophytes through more protection of late-successional forests; wider riparian buffers; retention of green trees, snags, and coarse woody debris; and buffering of Special Habitat features. These alternatives, however, do not propose any "survey and manage" strategies for bryophytes.

Proposed Resource Management Plan

The PRMP affords fairly high protection to bryophytes in the form of "survey and manage" measures. After application of these mitigating measures under Alternative 9 to afford protection for bryophytes, only 3 species remained of concern and no SEIS alternative would remove these concerns. The status of these 3 species (*Tritomaria exsectiformis*, *Marsupella emarginata* var. *aquatica*, and *Diplophylum plicatum*) on Eugene District administered lands is unknown.

Buxbaumia viridis (moss) is the only known SEIS Special Attention bryophyte species known to occur on the District. The species would be afforded protection through buffers and mitigation as outlined in SEIS/ROD if the historic site for this species is verified.

Surveys for bryophytes on the Eugene District administered lands are not adequate at this time to fully gauge the effects of the PRMP on these species. The PRMP would, however, provide the greatest protection for bryophytes through the development and implementation of the "survey and manage" strategies for all land use allocations and through greater protection of late-successional forests that support these species. The "survey and manage" strategies would protect all known and newly located occurrences of rare Special Attention Species that are identified in Appendix O. The "survey and manage" strategy also directs the development and implementation of survey protocols. Implementation of surveys would benefit these species by identifying the distribution and abundance of the organisms and need for special management. The increased protection of late-successional forests through the establishment of Late-Successional Reserves, retention of scattered old growth in 5th field watersheds, 100-acre habitat areas around spotted owl activity centers, Riparian Reserve areas and identification of Connectivity/Diversity blocks would also benefit bryophytes by providing greater amounts of habitats for those species dependent on these areas. Increased protection and management of Special Habitat features would benefit bryophytes. Green tree, snag, and coarse woody debris retention for all land use allocations under the PRMP would help provide appropriate microclimates for bryophyte survival, and would provide suitable habitat for those species that are dependent on decaying wood. Monitoring, however, would be essential towards determining the effectiveness of retention trees for the maintenance and dispersal of bryophyte species. Some risk to these species would remain due to activities on nonfederal lands.

Restrictions on the collection of some Special Forest Products, including bryophyte collection (mosses, liverworts, and hornworts), would be identified in a District Environmental Assessment that would identify any mitigating measures necessary to prevent the incidental collection of any of the SEIS Special Attention species considered rare in Appendix O in all land use allocations. All collection would be in compliance with the Aquatic Conservation Strategy objectives for maintaining resource sustainability and late-successional conditions.

Lichens

Alternatives NA, A, and B

Alternatives NA, A, and B would have the greatest impacts to SEIS Special Attention lichens that are dependent on late-successional forests. These habitats would be afforded less protection, riparian buffers would be narrower, and green tree retention would be less. The alternatives do not propose any survey and manage strategies for lichens, and Special Habitat features would not be buffered in Alternatives A and B.

Alternatives C, D, and E

Alternatives C, D, and E would have less impacts to lichens through more protection of Late-Successional forests; wider riparian buffers; retention of green trees, snags, and coarse woody debris; and protection of Special Habitat features. These alternatives do not propose any survey and manage strategies for lichens.

Proposed Resource Management Plan

The survey and manage measures for lichens under Alternative 9 do not remove or substantially reduce the risk of extirpation of lichen species. Under the PRMP some risk to these species would remain due to activities on nonfederal lands and to effects unrelated to forest management activities such as acid rain, pollution, and global warming.

Surveys for lichens on the Eugene District administered lands are not adequate at this time to fully gauge the effects of the PRMP on these species. SEIS Special Attention lichens, however, would be afforded the most protection under the PRMP. The survey and manage strategies would protect all known and newly located occurrences of rare Special Attention Species that are identified in Appendix O. The survey and manage strategy also directs the development and implementation of survey protocols. Implementation of surveys would benefit these species by identifying the distribution and abundance of these organisms and need for special management. The increased protection of late-successional forests through the establishment of Late-Successional Reserves, retention of scattered old growth in 5th field watersheds, 100-acre habitat areas around spotted owl activity centers, Riparian Reserve areas, and identification of Connectivity/ Diversity blocks would benefit lichen species dependent on these habitats. Increased protection and management of Special Habitat features would benefit lichens. The greater retention of large green trees for all land use allocations would help maintain habitat for those lichen species that are canopy dependent and would also provide a source of propagules for lichen dispersal into adjacent managed stands when conditions become available. Retention of green trees termed "legacy trees" that include attributes such as complex canopy structures, leaning boles, and large lateral limbs may act as refugia for many lichen species and provide a dispersal mechanism. Green tree retention along ridgelines, key areas for lichen dispersal, would benefit these species under the PRMP. Monitoring, however, would be essential towards determining the effectiveness of retention trees for maintaining and dispersing lichen species.

Restrictions on the collection of some Special Forest Products (SFP), including lichen collection, would be identified in a District Environmental Assessment, which would identify any mitigating measures that would be necessary to prevent the incidental collection of any of the SEIS Special Attention species considered rare in Appendix O in all land-use allocations. All collection would be in compliance with the Aquatic Conservation Strategy objectives for maintaining resource sustainability and late-successional conditions.

Fungi

Alternatives NA, A, and B

Alternatives NA, A, and B would have the greatest impacts to SEIS Special Attention fungi that are dependent on late-successional forests. These habitats would afforded less protection, riparian buffers would be narrower, and green tree retention would be less under Alternatives NA, A, and B. These alternatives do not propose any "survey and manage" strategies for fungi, and Special Habitat features would not be buffered in Alternatives A and B.

Alternatives C, D, and E

Alternatives C, D, and E would have less impacts to fungi through more protection of late-successional forests; wider riparian buffers; retention of green trees, snags, and coarse woody debris; and protection of Special Habitat features. These

alternatives do not propose any survey and manage strategies for fungi.

Proposed Resource Management Plan

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. Increases in commercial harvest of edible species and the ability to determine and maintain species viability as well as the potential for deteriorating air quality may result in a decrease in species' viability under any alternative (SEIS).

Choiromyces venosus (rare truffle) is the only known SEIS Special Attention fungi known to occur in the District. The species is afforded protection through buffers and mitigation as outlined in the SEIS/ROD.

Surveys for SEIS Special Attention fungi on the Eugene District administered lands are not adequate at this time to fully gauge the effects of the PRMP on these species. Fungi, however, would be afforded the most protection under the PRMP. The survey and manage strategies would protect all known and newly located occurrences of rare Special Attention Species that are identified in Appendix O. The survey and manage strategy also directs the development and implementation of survey protocols. Implementation of surveys would benefit these species by identifying the distribution and abundance of these organisms and need for special management as the "survey and manage" guidelines are developed and implemented. The increased protection of late-successional forests through the establishment of Late-Successional Reserves, retention of scattered old growth in 5th field watersheds, 100-acre habitat areas around spotted owl activity centers, Riparian Reserve areas, and identification of Connectivity/Diversity blocks would benefit fungal species dependent on these habitats. Increased protection and management of Special Habitat features would benefit fungi. The retention of green trees (especially when clumped) would help to maintain the microclimate and associated habitats for late-successional fungi. The maintenance of coarse woody debris would provide favorable microclimates and a suitable substrates for those fungi dependent on decaying wood. Monitoring, however, would be essential towards determining the effectiveness of retention trees and coarse woody debris for maintaining and dispersal of fungal species. Some risk to these species would remain due to activities on nonfederal lands and effects unrelated to forest management activities such as global warming.

Restrictions on the collection of some Special Forest Products (SFP), including fungi collection, would be identified in a District Environmental Assessment that would identify any mitigating measures that would be necessary to prevent the incidental collection of any of the SEIS Special Attention species considered rare in Appendix O in all land-use allocations. All collection would be in compliance with the Aquatic Conservation Strategy objectives for maintaining resource sustainability, including sustainable harvests of species such as *Cantherellus cibarius* (golden chanterelle). Harvest levels (if applicable) for commercially edible species would be consistent with maintenance of late-successional conditions within the Late-Successional Reserve.

Vascular Plants

Alternatives NA, A, B, C, D, and E

All Alternatives, except the PRMP, would have impacts to SEIS Special Attention vascular plant species. Protection of those SEIS Special Attention that are also BLM Special Status Plant species would be given protection under BLM's Special Status Plant policy. One species, *Aster vialis* (wayside aster), is both a SEIS Special Attention Species and a BLM Special Status plant species (see Chapter 4, Effects on Special Status Plant Species). Even with full protection under BLM's policy on Special Status plants in some of the alternatives, some long-term risk to species viability may occur due to fragmentation of habitat. These alternatives do not propose any survey and manage strategies for SEIS Special Attention vascular plants, and Special Habitat features in some of the alternatives would not be buffered.

Other vascular plants that are dependent on older forest conditions would benefit more in Alternatives C through E, where more protection is given to late-successional forests, wider riparian buffers, and protection of Special Habitat features.

Proposed Resource Management Plan

Alternative 9 raises concerns for 5 of these vascular plants where there is risk of future potential extirpation. One of these species is known

historically to occur on the Eugene District administered lands:

Cypripedium montanum (mountain lady's slipper): This species is more abundant on the east side of the Cascades than on the west side. Additional standards and guidelines, including the protection and management of known sites, should benefit this species. However, even with these standards and guidelines in place there would still be some risk of extirpation due to fragmentation of habitat, etc. This species would be identified and managed under the survey and manage strategies. Surveys prior to any ground disturbing activities would benefit these species by protection and management of known locations and identification of new sites.

The long-term viability of vascular plant species *Aster vialis* (wayside aster) and *Allotropa virgata* (sugar stick) may also be in question under the PRMP. Fragmentation of habitat on nonfederal land may result in population reductions and risk of extirpation from Federal lands under any of the alternatives. For *Allotropa virgata* (sugar stick), the species distribution is not well known, and the extent of risk is difficult to judge (SEIS).

All SEIS Special Attention vascular plant species would be identified and managed under the survey and manage strategies, and would benefit by these actions in the PRMP. Surveys prior to any ground disturbing activities would benefit these species by protection and management of known locations and identification of new sites.

The increased protection of late-successional forests through the establishment of Late-Successional Reserves, retention of scattered old growth in 5th field watersheds, 100-acre habitat areas around spotted owl activity centers, Riparian Reserve areas, and identification of Connectivity/Diversity blocks would benefit many vascular plant species dependent on these habitats. Increased protection and management of Special Habitat features would greatly benefit botanical diversity within the Eugene District.

Early-Successional Species

Alternatives NA, A, B, C, D, and E

Early-successional species would benefit from Alternatives NA through E where acres scheduled for timber harvest are higher than that for the PRMP, resulting in early seral conditions that support these plant species.

Proposed Resource Management Plan

Species that find optimum habitat in early-successional habitats would likely be maintained under the PRMP. Early seral conditions would be sufficiently maintained on both private and Federal lands. Under the PRMP, matrix lands would be available for timber harvest activities, resulting in early seral plant communities.

Special Status Animal Species (see Table 3-31)

Peregrine Falcon (Federal Threatened)

None of the alternatives are expected to have short-term or long-term impacts on this species. No peregrine falcons are known to nest on BLM administered lands in the Eugene District. Potential peregrine falcon habitat is limited on the District.

Spotted Owl (Federal Threatened)

Information on the habitat and populations of the northern spotted owl is discussed in Chapters 3 and 4 of the SEIS. The discussions in this EIS would incorporate the SEIS by reference and further supplement SEIS information by subsequent discussions specific to the Eugene 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 that could affect spotted owls or their habitat include the following:

- Mining
- Road construction or other activities that remove or alter coniferous forests
- Recreational use and development
- Blasting or other types of activity generating loud noise that could disturb nesting and ultimately reproductive success
- Granting of rights-of-way or road use permits that could lead to habitat loss on federal and nonfederal lands
- Land exchanges that 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 (ITSC) 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 (e.g., 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.

There are about 59,001 acres of Habitat 1 and 52,302 acres of Habitat 2, for a total of 111,303 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 than if there was 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 analytical purposes.

Future habitat suitability was estimated by aging existing stands and projecting the location and timing of future harvests using the 10 year timber management scenario for the short-term projections and random selection from lands available for harvest in each alternative for the long-term projections. The effects of silvicultural prescriptions, such as density management, were also considered. A natural disturbance-caused rate of habitat loss of 0.4 percent per decade was also included in the projection by random selection.

The projected development of future spotted owl habitat over time is given in Table 4-19. In estimating the rate of development of future habitat, forecasts 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 beneficially effect spotted owl habitat. The intent of any prescriptions would be to accelerate the development of old growth

Table 4-19 - Stand Ages or Period After Regeneration Timber Harvest, When Suitable Spotted Owl Habitat is Attained.

	Age or Period of Years
Unmanaged Stands [1]	
Naturally Established	70
Established by Even-Aged Harvest	100
Managed Stands	
Even-Aged (Rotation 100 Years or Less)	N/A
Restoration and Retention Blocks (Alt.C)	[2]
35+% Basal Area Retention (Alt. C)	50
15 - 20% Basal Area Retention (Alt. C)	70
Late Successional Reserves (PRMP)	[2]
Matrix-Connectivity Areas (PRMP)	70
Matrix-General Forest Management Areas (PRMP)	70

[1] Also applies to existing stands managed under approaches designed to emphasize biological diversity.
[2] These stands initially would become habitat at the same age as unmanaged stands.

forest characteristics, which should also enhance spotted owl habitat.

The analysis assumed that in the future nonfederal lands would have no suitable habitat for spotted owls. This is a worst case scenario, but it would likely be true for the vast majority of those lands since they would probably 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 4-20. The data was stratified by spotted owl physiographic provinces (Thomas et al., 1990; USDI, 1991). The planning area occurs within the Oregon Coast Range, Western Oregon Cascades and Willamette Valley provinces, although so little habitat occurs in the Willamette Valley Province, it is split between the Cascades and Coast Range Provinces for analysis purposes.

Since the No Action (NA) Alternative is not mapped in BLM's Geographic Information System (GIS) database, habitat data could not be calculated, but the outcome would be similar to that of Alternative B.

Effects on Suitable Habitat Within the Eugene District

Habitat conditions for spotted owls would change over time under all alternatives. In the short term, suitable habitat would decline under all alternatives compared to the existing situation, but would vary by alternative in later decades. Under Alternatives NA, A, B, and C the amount of suitable habitat in the Coast Range and Western Cascades provinces would decline on BLM administered lands throughout the first five decades. Then it would increase slightly by the tenth decade through at levels below the current situation. In the long-term, these alternatives, except for C, would provide low levels of suitable habitat in both the Coast Range and Western Cascade provinces. The amounts of suitable habitat provided long-term by the NA, 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 NA, 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 Table 4-21.

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 100 years, Alternative C provides the greatest acreage of suitable habitat, followed closely by the PRMP, E, and D. In Alternative C the habitat levels result from the management prescription that calls for regeneration harvests of younger stands for the first 3 decades. This results in a growth surge of suitable habitat between 70 and 100 years in the future. This

Table 4-20 - Suitable Spotted Owl Habitat on BLM Lands (Eugene District) by Alternative (1,000 acres)

Current						
Coast Range Province			54			
W. Cascades Province			57			
Total			**111**			
			Alternatives			
After 10 Years	**A**	**B**	**C**	**D**	**E**	**PRMP**
Coast Range Province	32	37	51	53	53	54
W. Cascades Province	39	42	56	54	54	54
Total	**71**	**79**	**107**	**107**	**107**	**108**
After 50 Years						
Coast Range Province	9	23	34	63	66	89
W. Cascades Province	7	17	33	50	56	68
Total	**16**	**40**	**68**	**114**	**122**	**157**
After 100 Years						
Coast Range Province	12	28	138	80	84	142
W. Cascades Province	9	20	136	63	67	93
Total	**21**	**48**	**274**	**143**	**151**	**235**

phenomenon, along with the assumption that high retention harvest would 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 would be attained). The effects of this habitat growth surge 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.

Under 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 over the landscape. Most of the suitable habitat under this alternative would be in managed forest stands after 100 years, under either the high or low retention regimes. Approximately 9 percent of the suitable habitat would result from unmanaged stands.

The PRMP would yield the second-largest amount of suitable habitat in the long-term. In this alternative, approximately 22 percent of the BLM administered forest lands within the planning area would be available for timber management. Suitable habitat would dominate the planning area, with unsuitable habitat occurring only on the more scattered BLM administered lands and in patches in the larger blocks of BLM ownership. The vast majority of suitable habitat would be in unmanaged stands.

Alternative D would provide 143,000 acres of suitable habitat in the long-term, or 48 percent of the forested land base. Alternative E would provide 151,000 acres (50 percent of the forested land base), and the PRMP would provide 235,000 (78 percent of the forested land base) (Table 4-20). Under Alternative D, approximately 60 percent of the suitable habitat would occur within the Habitat Conservation Areas (HCA). In the PRMP, 72 percent would occur within the Late-Successional Reserves. This relative concentration of habitat within large areas would result in a lower degree of habitat fragmentation within the HCAs and Late-Successional Reserves, respectively. Under Alternative D, suitable habitat outside the HCAs would be more scattered and fragmented than in Alternatives C, E, and the PRMP. The suitable habitat within the HCAs in Alternative D and the Late-Successional Reserves in the PRMP would be unmanaged.

In conclusion, all alternatives reduce the amount of suitable habitat available in the short-term. The

Table 4-21 - Suitable Spotted Owl Habitat on BLM Lands in Western Oregon by Alternative (1,000 acres)

Decade/Province	USFS[1]	BLM					
Current							
E. Cascades	419	19					
Klamath	421	354					
Coast	239	249					
W. Cascades	1,780	281					
Total	**2,859**	**948**					
					BLM Alternatives [2]		
After 10 Years		**A**	**B**	**C**	**D**	**E**	**PRMP**
E. Cascades	NA	12	13	14	14	19	18
Klamath	NA	79	85	314	328	348	339
Coast	NA	190	208	272	290	290	287
W. Cascades	NA	198	210	262	260	277	263
Total	**NA**	**479**	**516**	**862**	**892**	**934**	**907**
After 50 Years							
E. Cascades	[3]	1	6	22	9	36	16
Klamath	1,690	55	129	297	315	483	409
Coast	207	58	119	154	304	321	422
W. Cascades	1,728	38	96	178	236	320	297
Total	**3,625**	**152**	**350**	**651**	**864**	**1,160**	**1,144**
After 100 Years							
E. Cascades	1,062[4]	1	7	39	25	42	19
Klamath	1,026	65	62	596	442	588	541
Coast	554	82	151	558	402	431	694
W. Cascades	2,618	50	119	454	286	402	422
Total	**5,260**	**198**	**339**	**1,647**	**1,155**	**1,463**	**1,676**

[1] From unpublished data in FSEIS files
[2] The No Action (NA) was assumed to be comparable to Alternative B
[3] Data was not available; acres are included in Western Oregon Cascades
[4] 100 year owl habitat projections on USFS land were estimated on the assumption that all reserved acres would provide habitat and that no habitat would be provided in Adaptive Management Areas or Matrix Lands

short-term habitat loss is most acute in Alternatives NA, A, and B.

Alternatives NA, 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 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 widest distribution of habitat in the long-term in a mosaic of concentrated habitat blocks (Late-Successional Reserves), and Matrix-connectivity reserves and Riparian Reserves that occur on the lands between the habitat blocks.

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.

In western Oregon the NA, 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 3 alternatives.

The PRMP would provide the greatest amount of suitable habitat in the long-term, but would only be approximately 32 percent as much as is projected for Forest Service lands. Alternative C provides 31 percent as much suitable habitat over the long-term as is projected for Forest Service lands. Alternatives D and E would contribute smaller acreage, 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 (see Table 4-21). BLM administered lands are most important in the Coast Range, where these lands currently contain more suitable habitat than Forest Service lands. Under the NA, A and B alternatives, suitable habitat on BLM administered lands in the Coast Range would be significantly reduced from current acres.

In the long-term, the Coast Range BLM administered lands under Alternatives C, D, E, and the PRMP would produce more suitable habitat than currently exists. Alternatives C, D, and E would produce less suitable habitat in the Coast Range province than the PRMP. As shown in Table 4-21, 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.

Effects on Dispersal Habitat

Habitats 1 and 2 provide nesting, roosting, and foraging habitat and are concentrated in the HCAs 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. Older-aged forested riparian areas contribute significantly to dispersal habitat and may also provide an added measure of nesting, roosting, and foraging habitat. Forest habitat that facilitates 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 ISC (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 ISC to define a prescription for management of dispersal habitat under a strategy using large habitat blocks separated by distances of 8 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 (9 square miles) were the suggested scale from which to assess this standard.

Effects on Dispersal Habitat Within Eugene District

Within the Eugene 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 NA, A, and B would result in the fewest habitat patches.

The dispersal habitat condition of forest land outside of these patches and strips would vary dramatically among the alternatives. The NA, A, and B alternatives would likely result in most, if not all, of the quarter townships within the planning area not meeting the 50-11-40 rule, within both the short and long-term decades. This is due to the large amount of young seral habitat in the current situation, large 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 distance involved would be likely to have a negative effect on both the survival rates of dispersing owls and the percentage that establishes territories and reproduction.

Dispersal habitat conditions would be substantially improved under Alternative C, especially within the corridors where restoration and retention blocks and high retention silvicultural prescriptions would retain existing dispersal habitat and develop additional habitat. Outside the corridors, the low retention system 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 5 or 6 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 habitat quality would improve for owls that would be dispersing through it. It would not only meet the 50-11-40 criteria but, in many instances, it would eventually 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 ISC report recommendations and would require compliance with the 50-11-40 rule when planning timber harvest (Table 4-22). The distance that 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 and 2 HCAs. The large HCAs, along with the improved dispersal habitat conditions, would facilitate adequate dispersal as prescribed under the ISC conservation strategy. It would take approximately 40-50 years for all quarter townships with the potential to meet the 50-11-40 recommendation to develop adequate habitat to do so. For Alternative E, dispersal habitat is likely to recover in a manner similar to Alternatives A and B, outside of existing older forest stands and stands 50 years or older within 1 mile of owl sites. 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 ISC 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. An exception to this generality occurs in the Eugene District, where nearly two townships exist between the older forest reserve areas that have low Federal ownership, few older seral riparian buffers, and little suitable habitat. The habitat that does occur in this area, which was identified by the USFWS as the Southern Willamette-North Umpqua Regional Area of Concern, exists in small patches mostly on BLM lands. In partial recognition of this gap between owl reserve areas, Alternative D identified an HCA 2 near the middle of the Area of Concern. The PRMP identified Matrix-connectivity reserve blocks that would preserve the best older forest habitat in those blocks until Riparian Reserves and other reserves mature into suitable habitat for owls, and other plants and animals that require the older forest habitat in this low elevation region of the Willamette Physiographic Province.

Table 4-22 - Percent of Quarter Townships (Eugene District) Meeting 50-11-40 Rule Standard

	Total Quarter # Townships	Currently # Meet	Currently % Meet[1]	After 10 Years # Meet	After 10 Years % Meet[1]
Alternative D					
Coast Range Province	92	51	55	63	68
W. Cascades Province	118	73	62	88	75

[1] Outside Habitat Conservation Areas (HCA)

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 over the short-term if these areas currently have suitable habitat, and over the long-term as harvested riparian areas develop mature habitat. Riparian Reserves reduce potential harvest unit sizes and the amount of total land available for harvest. The dispersal habitat conditions under the PRMP would 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 over the adequacy of dispersal habitat conditions in a given locale, the BLM would informally consult with the U.S. Fish and Wildlife Service to evaluate the situation.

In conclusion, Alternatives NA, 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 Alternative 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 BLM checkerboard ownership pattern yields 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 would be sufficient to provide successful dispersal of owls between suitable nesting areas. This situation was recognized by the ISC (Thomas, 1990:327), when they recommended that the 50-11-40 rule be prorated by ownership for the first 3 years and then be reevaluated "as it applies to multiple-ownership areas." The BLM would 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 1,066,004 acres are administered by the BLM. Within the Eugene District planning area there are 10 Critical Habitat Units with a combined BLM acreage of 139,490 acres. All proposed actions that might 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 would not implement any action that through consultation the Fish and Wildlife Service determines 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 indicated that the Probable Sale Quantity (PSQ) would be reduced by 28 percent (see Chapter 4, Timber, Sensitivity Analysis).

Effects on Populations

This PRMP 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 and 4, pages 212 to 237. An in-depth 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 supports 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 PRMP 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 over whether the population of northern spotted owls could survive over the transition period until habitat recovery occurred. These were based largely on the declining survival rates detected 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, which it passed, would result 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 population 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 SEIS. 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 owl range 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 would 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. There is no other evidence that the owl population losses would 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 adopted 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 NA, 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 Alternative D, is greater due to the large increase in suitable habitat that occurs. In the long-term, the PRMP would exceed Alternative D in amount of suitable habitat and overall habitat capability. Alternative C, although it projects more "suitable" owl habitat over the long-term, includes uncertainty that silviculture would be successful in recreating habitat over large portions of the landscape. Under Alternative E, the allocations perpetuate the skewed habitat conditions of today and do not afford opportunity for regrowth of habitat in areas presently deficient, thus resulting in a habitat area of lesser extent across western Oregon than Alternatives C, D, and the PRMP.

Bald Eagle (Federal Threatened)

Assessment of impacts on bald eagle habitat is based on the number of known and potential bald eagle breeding and winter roosting sites that would be maintained under each alternative. Bald eagle habitat (including 3 existing nest sites, 2 winter roost complexes and several potential nest sites for 7 additional territories) that are identified under the Pacific Bald Eagle Implementation Plan (USFWS, 1989) would be protected under all alternatives.

In the short-term, all alternatives would retain all occupied habitat. All alternatives, except the PRMP, retain all identified suitable-but-unoccupied habitat. One tract, previously identified as suitable-but-unoccupied in the DRMP and which was not protected under the PRMP, was subsequently reevaluated and deemed unsuitable due to nearby development. Tracts provide enough nesting habitat to meet desired future conditions for the potential territories. Assuming adequate protection from roads and off-site disturbance, bald eagle populations on BLM administered lands would probably increase under all alternatives due to protection of all occupied and most designated suitable-but-unoccupied habitat.

In the long-term, the availability of additional suitable habitat would also depend on the amount of habitat allowed to regrow into old growth/mature forest habitat and riparian zones. Alternatives C, D, E, and the PRMP would provide additional suitable habitat in the long-term whereas Alternatives NA, A, and B would provide little, if any, additional potential habitat. Bald eagle populations could increase to a maximum of 10 active nests in the long-term under all alternatives due to the retention of existing suitable-but-unoccupied habitat. Development of additional old growth forest structure over the long-term, particularly in Key Raptor Areas under the PRMP, would increase the potential for maintaining additional nest sites within identified potential territories.

Cumulative effects of Alternatives NA, A, and B and actions on other lands in the planning area would likely maintain current low levels of bald eagle habitat and populations. Because of current forest management practices, bald eagle habitat and populations are not expected to increase from already low levels on private lands in the short and long-term. Because additional older forest and riparian protection would be available under Alternatives C, D, E, and the PRMP, the cumulative effects would result in higher amounts of bald eagle habitat within the BLM operating area, thereby increasing the potential for achieving 10 active nests.

Marbled Murrelet (Federal Threatened)

The assessment of impacts on the marbled murrelet focuses on the amount of suitable nesting habitat that would be available within 50 miles of the Pacific Coast in the short and long-term. The habitat of marbled murrelets is not well defined due to the small amount of research that has been done on this species. Limited inventory work has been completed on this species on the Eugene District, primarily as part of timber sale biological evaluations. Based on the available data and research reports, suitable habitat for this species is presently defined by 3 primary criteria:

1. Stands occupied by large to very large trees (median size 50+ inch), and individual trees with large, mossy limbs high in the canopy

2. The primary canopy layer (stand age) at least 120 years of age, on average

3. All stands within 50 miles of the Pacific Coast, with highest priority stands within 30 miles of the coast

Table 4-26 displays, by alternative, the current estimated acres of suitable nesting habitat, the projected loss of habitat due to timber harvest over the first decade, and the acres of land that would be expected to provide nesting habitat in the long-term. In the short-term, all alternatives would remove suitable nesting habitat. Impacts would be expected to be greater under Alternatives NA, A, and B and less under C, D, E, and the PRMP, as a result of greater protection levels for the older forests in the latter alternatives. All stands occupied by murrelets would 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 protected and the amount that would grow into suitable nesting habitat conditions. 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, D, E, and 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, D, E, and 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 Alternatives C, D, E, and PRMP, the cumulative increase would result in only slightly higher amounts of habitat and numbers of murrelets in the planning area. 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 would 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

Table 4-26 - Impacts During the First Decade Under the Various Alternatives to Known Murrelet Use Sites and 10 Year Projections of Murrelet Habitat Under the PRMP

Murrelet Site[1]	Potential Harvest Acres Over Next Decade/Impact[2]						
Alternatives	**NA**	**A**	**B**	**C**	**D**	**E**	**PRMP**
1	0/+	234/-	247/-	0/+	0/+	0/+	0/+
2	0/+	93/-	0/+	0/+	0/+	0/+	0/+
3	0/+	0/+	59/-	59/-	0/+	0/+	0/+

PRMP Projections

Current Habitat	**29,326**	
Habitat in 10 years	**29,144**	
1st decade change in acres (%)	**-182**	**(-1.0%)**

Source: District wildlife inventory; 10-year timber harvest scenarios.

[1] Sites 1 and 2 have known nests; other site includes area where murrelets have been observed, but no nest has been located.
[2] Impacts:
- = high to moderate impact
0 = low impact
+ = no Impact

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 3,005,000 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 109,000 acres in the planning area and 543,000 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 Alternative C and the least impact on Alternatives D, E, and PRMP. Under all alternatives, the BLM would conference with the Fish and Wildlife Service on all actions that "may adversely affect" proposed critical habitat. If it is designated, the BLM would consult on all proposed actions that "may affect" critical habitat. The BLM would not carry out any action that is determined by the U.S. Fish and Wildlife Service to adversely modify or destroy designated critical habitat.

Other Special Status Animals and Habitat

In general, nonfederally listed special status species (Federal Candidate, State Listed, Bureau Sensitive, Bureau Assessment) (Table 4-18) would be less impacted by BLM actions under Alternatives C, D, E, and the PRMP than under Alternatives NA, A, and B. Alternatives C, D, E, and the PRMP reserve more forested habitat and implement fewer intensive activities than Alternatives NA, A and B. Under all alternatives, special status species that occur in areas managed primarily for timber production could be directly or indirectly adversely affected by timber harvest and associated practices. However, individual site recommendations would be incorporated to reduce impacts where compatible with the land use allocation and alternative objectives. Where the alternative would not allow mitigation or modifications to avoid impacts for special status species, BLM would determine if the proposed action would contribute to the listing of affected species prior to the action. If an action was determined to contribute to listing, the planned action would be modified or cancelled.

Some species that occur primarily on private land within or adjacent to the District boundaries, occur only rarely as incidental species, or have been extirpated from the District are not specifically analyzed under any of the alternatives primarily because site-specific information would be required to determine if their limited habitat and/or distribution and/or potential recovery on BLM administered lands would be affected. Under any alternative selected, site specific actions that may affect these species during the times these species may occur (or may be reintroduced) would be analyzed for impacts when those essential details are known and can be assessed. These species are listed at the end of Table 4-18. Not enough information was available to assess the effects of the alternatives on all of the special status invertebrates (e.g., caddisflies, butterflies, beetles, etc.). The following narratives refer to species or groups of species for which impacts are anticipated and refer to impacts on BLM land. In general, private lands in the planning area are assumed to be managed as agricultural, residential, or short-term rotation timber lands, which are assumed to create impacts across the landscape equal or greater than the impacts on BLM land.

Northern Red-Legged Frog (Federal Candidate 2)

Populations of red-legged frogs are likely to be adversely impacted under Alternatives NA, A, and B (see amphibians in the Wildlife Section of Chapter 4). Progressively improved red-legged frog habitat would be expected under Alternatives C, D, E, and PRMP in the long-term due to wider riparian buffer widths, increased retention of adjacent conifer upland habitat, and improved riparian habitats as older seral stage forest develop within Riparian Reserves/ Management Zones. Emphasis on the control of introduced species and the improvement of water quality under the PRMP would benefit red-legged frogs. Additional global factors that may be unrelated to forest management, such as acid precipitation and ozone thinning, could potentially affect amphibians.

Harlequin Duck (Federal Candidate 2)

All alternatives are likely to provide minimum protection of riparian zones for nesting purposes (species nests close to streambanks and wide buffers may not be required) in the short-term, although impacts of logging immediately adjacent to nesting areas are not well documented. Alternatives A, NA, B, C, D, and E would provide progressively better protection to nesting habitat, respectively. The PRMP would provide a level of nest protection intermediate between Alternatives D and E. Riparian protection on non-BLM lands is unlikely to provide for adequate nesting habitat. Adverse impacts due to

Table 4-18 - Impacts to Special Status Animal Species During the Short-Term (10 years) and Long-Term (100 years) Under the Various Alternatives

Special Status Species[1], [3]	Potential Impacts[2] To Special Status Species Over Next 10 Years/100 Years						
	NA	A	B	C	D	E	PRMP
Cascades frog	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Clouded salamander*	-/-	-/-	-/-	-/+	0/+	0/0	0/+
Foothill yellow-legged frog*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Northern red-legged frog*	-/-	-/-	-/-	0/+	-/+	0/0	0/+
Oregon slender salamander*	-/-	-/-	-/-	-/0	0/+	0/0	-/0
Spotted frog*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Tailed frog*	-/-	-/-	-/-	-/0	-/+	0/+	-/+
Northwestern pond turtle*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Painted turtle	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Sharptail snake*	-/-	-/-	-/-	0/0	0/0	0/0	0/+
Steelhead trout	+/+	0/0	+/+	+/+	+/+	+/+	+/+
Oregon chub	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Coho salmon	+/+	0/0	+/+	+/+	+/+	+/+	+/+
American peregrine falcon*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Bald eagle*	0/0	0/0	0/0	0/+	0/+	0/+	0/+
Barrow's goldeneye	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Black swift*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Black-backed woodpecker	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Brown pelican	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Dusky Canada goose	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Fork-tailed storm petrel	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Great gray owl*	-/-	-/-	-/-	0/+	0/+	0/+	0/+
Harlequin duck*	0/0	0/0	0/0	0/0	0/0	0/+	0/0
Lewis' woodpecker*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Loggerhead shrike	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Marbled murrelet*	-/-	-/-	-/-	-/+	0/+	0/+	-/+
Mountain quail*	0/0	0/0	0/0	0/+	0/0	0/0	0/+
Northern goshawk*	-/-	-/-	-/-	-/+	-/+	0/+	-/+
Northern saw-whet owl*	-/-	-/-	-/-	0/+	0/+	0/0	-/+
Northern spotted owl*	- /-	- /-	- /-	- /+	- /+	- /+	- /+
Pileated woodpecker*	-/-	-/-	-/-	-/+	0/+	0/0	-/+
Purple martin*	-/-	-/-	-/-	0/0	0/+	0/+	0/+
Three-toed woodpecker	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Western bluebird*	-/-	-/-	0/0	0/+	0/+	0/+	0/+
Western snowy plover	0/0	0/0	0/0	0/0	0/0	0/0	0/0
California wolverine	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Columbian white-tailed deer*	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Fringed myotis bat*	-/-	-/-	-/-	-/+	-/+	0/+	-/+
Marten*	-/-	-/-	-/-	-/0	-/+	0/0	-/+
Northern sea lion	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Pacific fisher*	-/-	-/-	-/-	-/0	-/+	0/0	-/+
Pacific pallid bat*	0/0	-/-	-/-	0/0	0/0	0/0	0/0
Pacific west. big-eared bat*	0/0	-/-	-/-	0/0	0/0	0/0	0/0
White-footed vole*	0/0	-/0	0/0	0/0	0/0	0/0	0/0

[1] Special Status Species include all Federal listed, proposed, and candidate species, as well as Bureau Sensitive and Bureau Assessment.
[2] Impacts: - = high to moderate impact 0 = low impact + = beneficial impact
[3] Species marked by asterisk (*) have been specifically addressed in Chapter 3.

logging (silt loads) also contribute to habitat degradation. Management activities should be aimed at preserving adequate aquatic invertebrates, a primary harlequin duck food source.

Mountain Quail (Federal Candidate 2)

Alternatives NA, A, and B would likely provide abundant habitat given projections for increased early seral stage habitat, if sufficient brush and herbaceous species would persist after site preparation. Alternative C and the PRMP would likely have minimal impacts on the species, given sufficient brush and herbaceous vegetation on harvested units. Alternatives D and E would have some impacts to the species, primarily due to the low flexibility of the silvicultural prescriptions to develop or maintain habitat.

Northern Goshawk (Federal Candidate 2)

Little mature or old growth habitat would be retained in the short-term and less would be developed over the long-term under Alternatives NA, A, and B. As a result, northern goshawk habitat would be expected to decline further. Alternatives C, D, E, and PRMP (in increasing order of protection) would retain some or all of existing habitat and would allow the development of more favorable habitat over the long-term. The land ownership pattern on the Eugene District is such that it is unlikely to develop enough contiguous acreage of suitable mature forested habitat (estimated nest stands are 500+ acres) on BLM to affect goshawk populations on a regional level. Although in limited locations of the District where BLM owns sufficient blocks of habitat or where adjacent landowners manage on a long-term rotation, goshawks may expand on a local scale under Alternatives C, D, E, and the PRMP.

Cumulative effects on northern goshawks would be detrimental under Alternatives NA, A, and B. They would be less detrimental under Alternatives C, D, E, and the PRMP. This is due to greater retention of existing older forest and greater allowance for future stands to develop to older forest conditions on BLM administered lands. The emphasis on watershed analysis and land acquisition through conservation easements, purchase, or exchange under the PRMP may lead to opportunities to manage for goshawk habitat over the long-term that may affect regional population levels. Additional habitat would also be available on adjacent Forest Service land as a result of decisions made in the SEIS. Little habitat is anticipated on private lands.

White-footed Vole (Federal Candidate 2)

This species, the rarest of North American microtine rodents, use a wide range of successional stages in moist riparian zones, when dense vegetation and down woody debris is present. Common forest types used are red alder, Douglas-fir and western red cedar. Impacts to this species are difficult to predict, given the limited amount of information about its ecology. The direct impacts of logging activity would be slight under all alternatives, given riparian protection levels in each, with progressively less impacts under Alternatives C, D, E, and the PRMP, as opposed to NA, A, and B.

Fish (Petitioned Species Treated by BLM as Federal Candidate 2)

Declines in petitioned stocks, (6 of which occur in the Eugene District in the Siuslaw and Willamette Basins), are probably related to a variety of factors that have led to declines coastwide. Habitat for these stocks would likely improve under all alternatives except A. The most rapid recovery would be expected under the PRMP. Due to the mixed land ownership patterns and impacts of activities on nonpublic lands, it is not possible at this time to estimate the impacts of implementation of the RMP alternatives on individual fish stocks. Current and potential Oregon chub habitat within the District would not be impacted under any alternatives.

Pacific Fisher (Federal Candidate 2)

Alternatives NA, A, and B are likely to preclude any populations from becoming reestablished on the District, and Alternative C would have questionable utility due to the scattered nature of the old growth and mature stands in Old Growth R&R blocks, and the uncertainty of high retention prescriptions to provide suitable habitat. Alternative D would provide potential habitat areas, coincident with the spotted owl HCAs, throughout the District in the long-term. Alternative E, while protecting the best (oldest) habitat in the short-term, likely would not provide the best distribution of habitat in the long-term. The PRMP would provide the highest quality and most acreage of habitat long-term by protecting the best (least fragmented) habitat and by developing older forest characteristics through silvicultural prescriptions. The highest impacts of Alternatives C,

D, E, and the PRMP would occur within the Bear Creek and Marten Creek drainages in the McKenzie Resource Area, which would be heavily impacted through fragmentation of well-blocked mature forests (120 to 150 year old). Some large blocks would be protected as ACEC in this area under the PRMP, which could maintain and further develop some potential fisher habitat. Alternative D protects significant acreage in the Bear Creek drainage in the long-term.

Townsend's (Pacific Western) Big-eared Bat (Federal Candidate 2)

This bat species feeds on flying insects in a variety of habitats in forested areas. The primary habitat concern is caves, rock outcrops, and abandoned mines, which form hibernacula year-around. The species, similar to other bat species, is very intolerant to disturbance, especially in the maternal colony. Under Alternatives NA, A, and B, the protection level of hibernacula is insufficient to protect this habitat. Alternatives C, D, E, and the PRMP would protect the habitat, given seasonal stipulations to avoid disturbance. The PRMP provides the greatest protection for this species, partially through SEIS/ ROD guidelines for bats.

Cascades Frog (Federal Candidate 2)

This species may occur in the highest elevations of the South Valley and McKenzie Resource Areas. The primary habitats are streams, bogs and ponds with aquatic vegetation, rocks, and logs, above the 2,600 foot elevation. Under all alternatives, the primary habitats would be protected. Under Alternatives NA, C, D, E, and the PRMP, an additional buffer of 100+ feet would be protected, enhancing the quality of the primary habitat. Alternatives A and B would protect no additional buffer of ecotonal habitat, and result in temporary declines in habitat quality of the primary habitat, due to water temperature increases from reduced shade.

Foothill Yellow-Legged Frog (Federal Candidate 2)

This species occurs in the Smith River drainage south of the Eugene District and has been documented from foothill areas of the Cascades on the Eugene District. It may occur on other streams within the District, but inventory data are lacking. The primary habitat is low to moderate gradient streams, normally 4th order or larger, with a gravelly or rocky substrate, and some open sunlit open areas. This species is not known to venture far from water, in contrast to the red-legged frog. The stream protection provided under all alternatives is likely to provide protection adequate to maintain existing populations and, in the long-term, recover some habitats due to increases in water quality, (if populations are afforded adequate habitat to protect them from exotic predators and late spring floods).

Northwest Pond Turtle (Federal Candidate 2)

This reptile favors quiet waters in small lakes, ponds and streams, with logs and rocks exposed for basking areas. The species is known to occur along some of the slow moving stream sections and in ponds on the District. The species lays its eggs in the ground in loose soil, as far as 1,500 feet from water. Major mortality factors in the Willamette Valley are destruction of nests, predation on juvenile turtles by introduced bullfrogs, and habitat degradation. All of the alternatives would provide increasing protection of wetlands and riparian areas, but would not necessarily provide protection to nesting areas. The alternatives would have minor impacts due to the distribution of the species away from most BLM forested areas.

Clouded Salamander (Bureau Assessment)

Impacts to this species are anticipated to follow the same pattern as for the Oregon slender salamander, although lesser in scale, due to the species' ability to inhabit a wider range of habitat seral stages. The factors affecting this species would be retention of large woody debris and snags, and maintenance of a humid microclimate, which would be accomplished over the widest distribution under Alternative C and the PRMP.

Tailed Frog (Bureau Assessment)

On BLM lands, under Alternatives NA, A, and B, water quality is expected to decline enough to adversely affect all known and suspected populations of tailed frogs in all watersheds. Alternative C may protect some populations in the long-term, while losing populations in other areas. Alternative D would provide good protection within northern spotted owl HCAs (ISC report, Thomas et al., 1990), but it would result in population loss elsewhere. Alternative E would provide maximum likelihood of protecting known and suspected populations due to the high degree of protection afforded to all forest

stands greater than 150 years of age, and protection of riparian vegetation on all intermittent, as well as perennial streams. However, Alternative E would eliminate some mature forests that could be tailed frog habitat, and would result in distribution fragmentation in some portions of the District. The PRMP would provide protection within the Late-Succession Reserves and Riparian Reserves, and would provide habitat over the long-term.

The major impact of Alternatives NA, A, B, and E would be the habitat alteration and possible elimination of the tailed from the Bear Creek and Marten Creek drainages in McKenzie Resource Area, the largest and one of the few known locations of this species on BLM lands in the District. Under these alternatives, substantial acreage would be logged during the next decade in both drainages. Under Alternative D, the Marten Creek drainage would be heavily impacted due to logging, whereas Bear Creek drainage would be protected due to inclusion in a spotted owl HCA. Under Alternative C, both drainages would receive moderate impacts due to a lower harvest level than other alternatives in the short-term, but long-term impacts may be substantial after continued harvest. Part of this drainage would be protected under the PRMP as a proposed ACEC and through the Aquatic Conservation Strategy, by the inclusion of the area in the Tier 1 Key Watershed and incorporation of the drainage in the Central Cascades AMA. Tailed frogs would be addressed and protected under these management categories. Under all alternatives, the quality of habitat would be influenced by the water quality standards and forest management practices upstream and upslope from mature and old growth habitat areas.

Sharp-tailed Snake (Bureau Assessment)

This species occurs in scattered populations at low elevations (below 1,500 feet) in and near the Willamette Valley wherever oaks are a partial to dominant component of the forest stand. The species would use many seral stages where there is a component of down woody material for hiding cover. Areas with oaks are gradually being replaced by Douglas-fir forests as a result of both natural forest succession in the absence of anthropogenic fire and type conversion from intense management activities. Habitat on non-BLM lands is being lost through these influences, as well as agricultural and urban development especially grazing by domestic livestock.

The intensive forest management activity on Alternatives NA, A, and B would likely have substantial negative impacts in both short-term and long-term. Alternatives C, D, and E, while protecting some habitat from timber harvest, would provide no options to maintain oak forest types as sharptail snake habitat. The PRMP would provide identification and maintenance of oak habitats that would facilitate long-term sustainability of this species.

Northern Saw-whet Owl (Bureau Assessment)

Alternatives NA, A, and B would have highly adverse impacts to this species in both short-term and long-term. Alternatives C, D, and the PRMP would have low to moderate impacts during the first decade, and Alternative E would have very low impacts. Alternative C would have some impacts in low retention areas in the long-term, and Alternatives D and E would have some adverse effects, but for the most part would retain some good quality habitat, long-term. Alternative C and the PRMP would provide the broadest distribution of this species on the District in the short and long-term within retention/ reserve areas.

Pileated Woodpecker (Bureau Assessment)

In the short-term, Alternatives NA, A, and B would have highly adverse impacts on this species (as well as other species dependent on their cavities); Alternative C would have moderately adverse impacts; and Alternatives D and E would have low to moderate impacts. The PRMP would have moderate impacts to this species over the short-term due to the removal of suitable habitat in the matrix (because snag retention would not by itself provide for adequate pileated habitat).

In the long-term, Alternatives NA, A, and B would have highly adverse impacts to this species, probably eliminating the species from substantial portions of the District. Alternative C would provide some habitat over a wide range of the District. Alternative D would provide substantial habitat within owl Habitat Conservation Areas (HCA), and Alternative E would provide only slightly more habitat in the long-term over existing conditions. Alternative C and the PRMP would provide the widest distribution of habitat for this species in the long-term. Under the PRMP, retention of all snags plus enough green trees to provide for 40 percent of optimum population levels

of cavity dwellers throughout the first 3 decades, projects to create snags, and the development of snag and down wood components in the Late-Successional Reserves should lead to improved pileated habitat across the landscape in the long-term (see Woodpeckers, Wildlife Section, Chapter 4).

Purple Martin (Bureau Assessment)

In the short-term, Alternatives NA, A, and B would result in a reduced amount of potential habitat due to minimum snag retention following timber harvest. Alternatives C, D, E, and the PRMP would result in maintenance of habitat provided that soft snag retention efforts on harvest units are successful. In the long-term, Alternatives NA, A, and B would provide little potential nesting habitat, and Alternatives C, D, E, and the PRMP would provide an increasingly improved situation for potential nesting habitat.

Western Bluebird (Bureau Assessment)

Alternatives NA, A, and B, while resulting in the creation of high levels of early-successional stages required by this species through timber harvest, are not likely to produce enough snags of the proper condition to provide minimum nesting conditions. Use of nest boxes in early-successional stages would benefit this species. In the short-term, Alternatives C, D, E, and the PRMP would likely leave sufficient snags to maintain nesting trees, but could suffer somewhat from distribution problems (as in Alternatives D and E), and reduced controlled fires to promote foraging habitat (Alternative C and the PRMP). In the long-term, the PRMP should provide the most benefit to this species followed by Alternatives C, D, and E.

American Marten (Bureau Assessment)

Impacts to this species are anticipated to be similar to the fisher previously discussed, although the potential of martens occurring in or reestablishing populations in the District are greater than the potential of fisher reestablishment.

Pacific Pallid Bat (Bureau Assessment)

Similar to the Townsend's big-eared bat, this species utilizes a variety of habitats, and is highly dependent on caves to provide winter hibernation sites and nursery colonies. Little is known of this species within the Eugene District. However, the same impacts are anticipated for this species as those previously described for the Townsend's big-eared bat. The PRMP provides protection for caves, mines, and abandoned wooden bridges and buildings used for roosting by this species.

Fringed Myotis Bat (Bureau Sensitive)

This bat species, similar to the species above, depends on undisturbed conditions of hibernacula to successfully reproduce and hibernate. In addition, the species forages on flying insects in old growth stands, which makes it more susceptible to alternative prescriptions. Alternatives NA, A, and B would likely have adverse impacts to the species due to intense old growth timber harvest and reduced protection of rock areas used for hibernacula. Alternatives C, D, E, and the PRMP would likely provide better protection to hibernaculae, as well as destroy less habitat in timber harvest.

Oregon Slender Salamander (Bureau Sensitive)

Although this species has not been confirmed on the District, the habitat and range of the species suggest that it occurs or used to occur in the Eugene District. Alternatives NA, A, and B could cause a substantial reduction in potential habitat for this species. Alternative C might retain some populations of Oregon slender salamanders over the long-term but few of the old growth restoration and retention blocks have been adequately inventoried. Areas proposed for high retention of overstory canopy and longer rotation lengths may provide suitable habitat conditions in the future, but this is currently unproven. In the long-term, Alternative D would protect and create habitat for this species within the northern spotted owl HCAs. Alternative E would provide protection for forest stands older than 150 years of age, but would maintain the current fragmented distribution of the habitat. The PRMP would provide the greatest protection in the long-term in the Late-Successional and Riparian Reserves. Global effects, unrelated to forest management, such as acid precipitation could potentially affect amphibian species.

SEIS Special Attention Animal Species

Many species addressed in the SEIS/ROD are also classified in one or more categories of Special Status Species (see Table 3-54). Eugene District SEIS Special Attention Species are noted with an SA. Effects of Alternatives A, B, C, D, and E would be as described above for those Special Status Species or groups of species (see Table 4-18). The bats that do not fall into a protected special status category would receive only incidental protection under the provisions of each alternative and would probably decline under Alternatives A, NA, B, and be maintained on a site-specific basis under Alternatives C, D, and the PRMP. Only the PRMP highlights bats as a special category of attention, which would increase the probability that important bat habitat would be located and protected. Red tree voles are a SEIS Special Attention species that are not covered under other Special Status Species designations. Only the PRMP would provide special habitat provisions for this species, although it is suspected that wider riparian zones of Alternatives E and D and older habitat reserves of Alternatives C, D, and E would benefit red tree voles.

Most special status and SEIS/ROD special attention species are rare or associated with limited or disjointed habitat. Knowledge of their presence could lead to protection stipulations or mitigation that could be consistent under management constraints of most of the alternatives. Only the PRMP identifies the importance of inventories, monitoring, and regional data exchange on these species. Better knowledge of the occurrence and range of these rare species should lead to improved management.

Effects on SEIS Special Attention Species—Western Oregon

The analysis of impacts of the PRMP 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: Alternatives NA, A, B, C, D, E, and the PRMP would not affect the Oregon chub. Known and potential Oregon chub habitat managed by the Eugene District would be protected under all alternatives. The SEIS identified 136 salmonid stocks at risk or of special concern within the BLM Districts in western Oregon. Of these, 6 stocks occur in streams managed by the Eugene District in the Siuslaw and Willamette river basins. These include coastal coho salmon and steelhead trout. All alternatives except A would improve aquatic habitat on BLM lands, helping support stable, well-distributed populations of coho salmon, fall and spring chinook salmon, summer and winter steelhead trout, sea-run cutthroat trout, resident rainbow and cutthroat trout, nongame fish species, and other aquatic species (see Chapter 4, Fish).

Arthropods: Alternative 9 would provide fairly high habitat protection to the various arthropod functional groups in addition to those assessed in the SEIS, by leaving more older forest reserve areas as compared to the other alternatives. Standards and guidelines were incorporated into Alternative 9.

Mollusks: Alternative 9 provides habitat protection to mollusks. Riparian Reserves are important to the maintenance of habitat for freshwater snails and clams, and Alternative 9 rated well for these species. Standards and guidelines were incorporated into Alternative 9 to improve or maintain the habitat components important to many of these species, including the retention of down woody debris and the retention of large and small reserve areas across the District, which should benefit terrestrial mollusks. Seven mollusk species in the Survey and Manage Strategy 1 are thought to occur on the Eugene District, and would receive special attention under this strategy. Nonfederal lands are an important consideration for the persistence of some mollusks, and substantial risks of extirpation of some of them may remain even with significant conservation measures in place on Federal lands. Species with especially high risk are associated with large rivers.

Amphibians: Alternative 9 provides habitat components for amphibians. Standards and guidelines were incorporated into Alternative 9 that might benefit all amphibians assessed in the SEIS. For example, for the Cascade (Olympic) torrent salamander, southern (variegated) 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.

Birds: Alternative 9 benefits birds since it provides a set of allocations and management practices that

produces habitat components for a wide diversity of forest-dwelling birds. Standards and guideline incorporated into Alternative 9 would benefit the black-backed woodpecker. All of the birds considered in the SEIS occur on both Federal and nonfederal lands. Some are neotropical migrants that migrate to Mexico or Central/South America for the winter. For 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, although partnerships and cooperative working relationships like Partners in Flight under the PRMP can benefit migratory birds across the Americas. Because the common merganser occupies low elevation waterways and riparian habitat primarily on nonfederal lands, its persistence cannot 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 habitat components for those species assessed in the SEIS. Standards and guidelines were incorporated into Alternative 9 that would 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 management 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 would maintain and enhance the habitat components needed by bats in the District. Two standards and guidelines, including protection of caves, 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 early-successional habitat on BLM administered lands. The BLM administered lands in the District occur within a border landscape of nonfederal lands where substantial early-seral forests would be created through logging and other management activities. Private lands may contribute to the maintenance of early-successional forest habitat over time.

Effects on Special Areas

Resource management impacts and protection of Existing and Potential Special Areas would vary depending on land status, Timber Production Capability Classification (TPCC), special habitats such as rock outcrops and meadows, and other existing authorities such as the Endangered Species Act.

Table 4-27 displays probable changes in acres of potential and proposed Special Areas by alternative and describes land allocations for each Special Area.

No Action Alternative

Under the No Action (NA) Alternative, all 10 Existing Special Areas would be designated. Sixteen potential Special Areas would not be designated nor would proposed adjustments be made to 4 Existing Areas of Critical Environmental Concern (ACEC) and to Resource Natural Areas (RNA). Special Areas not designated would be subject to varying degrees of protection and/or commodity development, depending upon resource conditions or 1983 primary land use allocations. Some protection could be provided if Special Areas contain special habitat features such as rocky outcrops, meadows, etc., since under the NA Alternative such areas would be given 100-foot protective buffers (see Chapter 2, Table 2-5 - Buffering of Special Habitats) and/or by allocations such as Riparian Management Areas (RMA) (see Chapter 2, Table 2-1 - Protection of Riparian Management Areas). Occupied bald eagle habitat and designated suitable-but-unoccupied habitat areas would receive protection under the Pacific Bald Eagle Recovery Plan. Some of these allocations, however, may not prevent all negative impacts from occurring in the harvesting of Special Forest Products (SFP), timber removal through salvaging operations, edge effects on interior forest, or mineral development, etc. Where commodity values are present outside these other land-use allocations, areas would be available for a variety of resource development activities that could impact the primary values of a potential Special Area.

RNA cells are the basic units that must be represented in a natural area system. These cells can be an ecosystem, community, habitat, or organism. (Cells are artificial constructs used by the

Table 4-27 - Proposed Land Allocations (acres) for Special Areas

Special Area	Current Designation	Potential Designation	Proposed Allocation/Acres NA	A	B	C	D	E	PRMP
Lake Creek Falls	ACEC	ACEC/ONA	3	3	3	3	3	3	3
Lake Creek Addition	Rec.Site	ACEC/ONA	0	55	55	55	55	55	55
Long Tom	ACEC	ACEC	7	0	0	0	7	7	7
Horse Rock Ridge	ACEC	ACEC/RNA	191[1]	0	191[1]	191[1]	191[1]	191[1]	191[1]
Horse Rock Ridge Addition	None	ACEC/RNA	0	0	187	187	187	187	187
Mohawk	ACEC/RNA	ACEC/RNA	292[1]	0	292[1]	292[1]	292[1]	292[1]	292[1]
Camas Swale	ACEC/RNA	ACEC/RNA	280[1]	0	280[1]	280[1]	280[1]	280[1]	280[1]
Camas Swale Addition	None	ACEC/RNA	0	0	34	34	34	34	34
Upper Elk Meadows	ACEC/RNA	ACEC/RNA	207[1]	0	207[1]	207[1]	207[1]	207[1]	207[1]
Upper Elk Meadows Addition	None	ACEC/RNA	0	0	16	16	16	16	16
Fox Hollow	ACEC/RNA	ACEC/RNA	160[1]	0	160[1]	160[1]	160[1]	160[1]	160[1]
McGowan Creek EEA	EEA	EEA	229	0	229	229	229	229	79
Vik Road EEA	EEA	EEA	178	0	178	178	178	178	0
Row River EEA	EEA	Rec. Site	25	0	25	25	25	25	0
Cannery Dunes	None	ACEC/ONA	0	0	40	40	40	40	0
Heceta Sand Dunes	None	ACEC/ONA	0	0	218	218	218	218	218
Cougar Mountain Yew Grove	None	ACEC	0	0	0	40[1]	40	40	10[1]
Hult Marsh	None	ACEC	0	0	167	167	167	167	167
Grassy Mountain	None	ACEC	0	74[1]	74[1]	74[1]	74[1]	74[1]	74[1]
Coburg Hills BEHA	None	ACEC	0	0	0	0	1204	1204	0
Coburg Hills RFI	None	ACEC	0	0	0	854	854	854	804
Fall Creek Res. BEHA	None	ACEC	0	0	0	0	746	746	0
McKenzie River RFI	None	ACEC	0	0	0	0	2037	2037	0
Dorena Lake BEHA	None	ACEC	0	0	0	0	611	611	0
Dorena Lake RFI	None	ACEC	0	0	0	209	209	209	18
Siuslaw River BEHA	None	ACEC	0	0	0	0	282	282	0
Fern Ridge Lake BEHA	None	ACEC	0	0	0	0	166	166	0
Triangle Lake BEHA	None	ACEC	0	0	0	0	538	538	0
Triangle Lake RFI	None	ACEC	0	0	0	810	810	810	0
Cottage Grove Lake RFI	None	ACEC	0	0	0	232	232	232	53

BEHA = Bald Eagle Habitat Area
RFI = Relict Forest Islands
EEA = Environmental Education Area

[1] Title Plat Acres

Natural Heritage Program to inventory, classify, and evaluate natural areas in Oregon. Cells contain one or more Ecosystem elements.) Typically, a RNA aggregates several cells that need representation. The failure to maintain a RNA cell in an undisturbed condition would diminish, if not destroy, values for research, education, and for monitoring changes in unmanaged baseline areas compared to managed areas. By failing to gain knowledge of ecosystem structure, function, and composition, the quality of future management may be diminished. In the NA Alternative, 1 potential RNA cell would not be filled using BLM land. There are no other known localities where this cell could be filled.

Alternative A

Under Alternative A, 1 Existing Special Area and 1 Potential Special Area would be designated. Also, 9 Existing and 15 Potential Special Areas would not be designated as Special Areas and could be available for resource development activities or other actions not compatible with maintaining Special Area values, such as road construction, timber harvest, mineral development, Special Forest Products removal, Off-Highway Vehicle (OHV) use, etc. These activities could cause the loss of or damage to special values for which the areas were proposed for designation. Some protection could be provided by conditions such as special habitat features, allocations such as RMA, and/or protection under existing authorities such as the Pacific Bald Eagle Recovery Plan. Under Alternative A, special habitat features would not be given protective buffers. Specific management to maintain the primary values for which the Special Areas were nominated would not be implemented within these other land-use allocations, except for those areas subject to the Endangered Species Act. Protection of 4 existing RNA would cease, and 1 potential RNA cell would not be filled using BLM land. There are no other known localities where this RNA cell could be filled (see the NA alternative for consequences of not maintaining RNA cells).

Alternative B

Under Alternative B, 9 Existing Special Areas and 4 Potential Special Areas would be designated. One existing Special Area would not be designated but would be protected under the Endangered Species Act, and 12 Potential Special Areas would not be designated and could be available for resource development activities such as road construction, timber harvest, mineral development, Special Forest Products removal, OHV, etc. These activities could cause the loss of or damage to special values for which the Special Areas were designated or proposed for designation. Some protection could be provided by conditions, such as special habitat features, allocations such as RMA and/or Alternative B old growth blocks, or could be protected under existing authorities, e.g., the Pacific Bald Eagle Recovery Plan. Under Alternative B, special habitat features would not be given protective buffers. All Special Areas, not designated in Alternative B, do not occur in Alternative B old growth blocks and would not be afforded protection in this land-use allocation. Specific management actions designed to maintain all the primary values for which the Special Areas were nominated would not be implemented within these other land use allocations, and Special Area values could be lost or damaged. Protection of 4 existing RNA would cease, and 1 potential RNA cell would not be filled using BLM land. There are no other known localities where these RNA cells could be filled (see the NA alternative for consequences of not maintaining RNA cells).

Alternative C

Under Alternative C, 9 existing Special Areas and 9 potential Special Areas would be designated. One of the 9 existing Special Areas would not be designated, but would be protected under the Endangered Species Act, and 7 potential Special Areas would not be designated and would be available for varying resource development activities, such as road construction, timber harvest, Special Forest Products removal, etc. These activities could cause the loss of or damage to special values for which the areas were designated or proposed for designation. Some protection would be provided by conditions, such as special habitat features, allocations such as RMA and/or Alternative C old growth blocks, or protection under existing authorities, e.g., the Pacific Bald Eagle Recovery Plan. Special habitat features would be given 100-foot buffers in Alternative C. All Special Areas, not designated in Alternative C, do not occur within Alternative C old growth blocks and would not be afforded protection within this land-use allocation. Specific management actions designed to maintain all the primary values for which the special areas were nominated, would not be implemented within these other land-use allocations. All existing and potential RNA cells would be filled using BLM land.

Alternatives D and E

Under Alternatives D and E, all existing and potential Special Areas would be designated. No Special Areas would be adversely impacted by resource development activities. Essential wildlife and other inventories would be performed and site specific management plans developed to prevent the primary values within all Special Areas from degrading. Benefits include the provision of educational and research opportunities for present and future needs from the designation of RNA cells listed in the Oregon Heritage Plan (1988), and the commitment of special management attention to unique and irreplaceable resources from the designation of RNA nominated through the Bureau's ACEC screening process.

For example, designation of areas such as Relict Forest Islands (RFI) would provide specific management attention to the needs of raptors within nationally recognized (BLM) Key Raptor Areas (Olendorf, 1989), as well as other old growth values. Inventories and plans would evaluate whether actions, such as salvage logging or the harvest of Special Forest Products are appropriate for maintaining the primary values for which the areas were nominated. Designation would be consistent with the Pacific Bald Eagle Recovery Plan recommendation to designate bald eagle habitat as ACEC.

Proposed Resource Management Plan

Under the PRMP, 15 proposed Special Areas would be designated including the following: Coburg Hills RFI ACEC (804 acres); Cottage Grove Lake RFI ACEC (53 acres); Dorena Lake RFI ACEC (18 acres); Cougar Mountain Yew Grove ACEC (10 acres); Grassy Mountain ACEC (74 acres); Hult Marsh ACEC (167 acres); Long Tom ACEC (7 acres); Camas Swale ACEC/RNA (314 acres); Fox Hollow ACEC/RNA (160 acres); Horse Rock Ridge ACEC/RNA (378 acres); Mohawk ACEC/RNA (292 acres); Upper Elk Meadows ACEC/RNA (242 acres); Heceta Sand Dunes ACEC/ONA (218 acres); Lake Creek Falls ACEC/ONA (58 Acres); and McGowan Creek EEA (79 Acres). For those areas listed above, boundary modifications would be implemented for 5 of the previous existing Special Areas and would be implemented for 1 new ACEC to better protect or manage for the primary values of the areas. No impacts are expected in the PRMP for those areas that would be carried forward as Special Areas. See Table 2-6-Management of Proposed Special Areas and Chapter 2, Special Area Management Actions/ Direction.

The following 11 potential Special Areas would not be designated: Fawn Creek (100 acres); Coburg Hill (100 acres); Bunker Hill (36 acres); Coburg Hills BEHA (1,502 acres); Cottage Grove Lake BEHA (177 acres); Dorena Lake BEHA (177 acres); Fall Creek Lake BEHA (881 acres); Fern Ridge Lake BEHA (192 acres); Row River EEA (25 acres); Vik Road EEA (178 acres); and Cannery Dunes (40 acres).

Five ACEC nominations for Bald Eagle Habitat Areas (BEHA) were not carried forward under the PRMP as ACECs, although this is a suggested action under the Bald Eagle Recovery Plan. The BEHA would be classified as critical habitat and administratively withdrawn to protect existing eagles and protect or develop suitable habitat to help meet the recovery goals of the Pacific Bald Eagle Recovery Plan. Site plans would be written for each bald eagle complex to identify recovery plan objectives. Acquisition through conservation easements, purchase, or exchange of adjacent non-BLM lands critical to long-term recovery of bald eagles may occur under the PRMP.

Fawn Creek, Coburg Hill, and Bunker Hill are 3 Special Areas that did not qualify under BLM's ACEC criteria of Relevance and Importance and did not warrant Special Area Status. Proposed management of these areas would be managed consistently with the SEIS/ROD for upland and riparian forests within the Matrix. Special management attention under the Special Areas program would not be implemented for the management of these areas. The values for which these areas were nominated may not be maintained and would be subject to various forest management activities.

Row River and Vik Road are 2 Environmental Education Areas that would not be carried forward as EEA. Row River would be managed as a Botanical Reserve Area for Special Status Plants. Vik Road would be managed consistently with the SEIS/ROD for upland and riparian forests within the Matrix. Special management attention under the Special Areas program would not be implemented for the management of these areas. The values for which these areas were nominated may not be maintained and could be subject to various forest management activities. Row River would be managed for the conservation of Special Status plant species, and as such may be available for various adaptive

management techniques designed to enhance habitat for the species of concern.

One potential ACEC/ONA, Cannery Dunes, would not be designated in the PRMP. The area would be available for consideration for transfer under the R&PP (Recreation and Public Purposes) Act to the City of Florence, Oregon. This action would be subject to the normal NEPA review process. If transfer were pursued, the management of this parcel would be negotiated between the BLM and the applicant. The area is currently closed to locatable mineral development. Dune stabilization activities are occurring adjacent to this area, with the subsequent dispersal of exotic grass species onto the BLM parcel. Without designation into ACEC status, a specific management plan identifying management actions necessary to maintain or highlight the values of this area would not be developed by BLM. Resource values could decline and actions such exotic pest plant control may not be implemented without Special Area designation.

Four Special Area nominations would be carried forward as potential ACECs and would not be designated in this Plan, but would be managed in the interim until a plan amendment or new planning process is initiated. Interim management, where needed, would prevent negative impacts from occurring within the following potential Special Areas: Cottage Grove Old Growth potential EEA, Lorane Ponderosa Pine potential ACEC, Low Elevation Headwaters of the McKenzie River potential ACEC, and Dorena Prairie potential ACEC.

Effects on Cultural Resources

The potential for impact upon sites and artifacts varies with the amount of surface disturbing activity permitted under each alternative. Alternatives emphasizing maximum timber harvest/production and/or extensive Off-Highway Vehicle (OHV) recreation (whether motorized or nonmotorized) have a high potential for impact on cultural values, while alternatives emphasizing reduced timber harvest and little OHV recreation have reduced potential for such impact.

Alternatives NA, A, and B, which propose high levels of surface-disturbing activity, would have the highest potential for impact on undetected cultural resources. Alternatives C, C, E, and the PRMP would have reduced potential for such impact. Some impact on cultural values would occur regardless of which alternative is selected for implementation.

Effects on Visual Resources

Impacts to Visual Resources are definable as management actions that alter the existing landscape and, in so doing, affect scenic quality. The most common management actions that affect scenic quality (visual resources) in the Eugene District are associated with timber management.

Clear cutting, road construction, and most other timber management practices change vegetative patterns, alter species composition, disrupt 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; and visibility of disturbed areas. The preharvest condition (i.e., scenic quality) of a viewshed is also a determining factor. 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 timber management practices can be beneficial. Examples are thinning foreground vegetation to create pleasing views and the manipulation of contrasting cutting boundaries, especially on ridge tops.

In each of the alternatives, the Visual Resource Management objectives differ from the inventory classifications of areas shown in Map 3-8 (Chapter 3). The VRM classes of an alternative are designed to fit into the overall resource management emphasis of the alternative. Revisions of the inventory classes were either downgrades (e.g., Class II to III or IV) or upgrades (e.g., Class IV to III). An alternative that upgrades VRM inventory classes would provide more restrictive management objectives (i.e., less vegetative disturbance) for affected areas. This would normally have a positive impact on the affected area by enhancing the scenic values. Downgrading would have the opposite effect and, consequently, could result in a high level of vegetative disturbance. This could cause a negative impact on the affected area by diminishing the scenic values, depending on the surrounding landscapes. BLM's ability to manage

and influence an area's overall scenic quality depends to a large extent on the management of adjacent lands. Most of the Eugene District lands are intermixed with other ownerships, of which a majority utilize the land for intensive timber management practices. This checkerboard ownership limits the District's ability to effectively manage and influence the overall scenic quality of an entire area or viewshed. Table 4-28 shows probable changes in visual resource conditions from management activities under each alternative.

Ratings of change (+, -, 0) represent the anticipated effect of timber management and other commodity developments of 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 developments.

Table 4-29 displays a ranking system to show which alternatives would have the most or least visual impacts. This table is based on timber Table 4-39 located in Appendix FF.

Common to all Alternatives

Under all alternatives, the management objectives for VRM Classes I through IV remain the same. Due to the upgrading and downgrading of inventory classes and the parameters given in the State Director's Guidance (see Chapter 1, Appendix B), VRM management on BLM administered lands would vary in each alternative.

No Action Alternative

Under the No Action (NA) Alternative, general visual resource conditions on BLM administered land would continue in a moderate decline. All forested lands would be managed at VRM Class IV standards with the continuation of timber harvest levels and prescriptions established in 1983. An exception would be 300 acres of the McKenzie River Corridor, which would continue to be managed under VRM Class III with a timber rotation of 120 years and 400 acres of VRM Class I, consisting of 2 Areas of Critical Environmental Concern (Upper Elk Meadows ACEC/ RNA and Horse Rock Ridge ACEC). Even-aged cutting and commercial thinning management would be operational in this alternative, affecting over 85,000 acres within the planning period. This alternative ranks the highest (seventh) in impacting visual resources due to the quantity of harvest acres (refer to Table 4-29).

Alternative A

Alternative A would be the next detrimental alternative for visual resources, ranking sixth (Table 4-29). This alternative takes all available forested lands and manages them as VRM Class IV. An exception would be Class I lands within an existing boundary designated by congress for exclusive management, or nonforested lands inventoried as Class I, however, the Eugene District does not have any of these congressionally designated areas. Approximately 37,760 acres of previously prescribed VRM Class II area and 65,950 acres of Class III would be downgraded. Even-aged cutting and commercial thinning management would be operational in this alternative, affecting over 58,000

Table 4-28 - Probable Changes in Visual Resource Conditions

Scenic Qualities[1]	Visual Resource Condition Changes by Alternative[2] NA	A	B	C	D	E	PRMP
high	-	-	-	+	+	+	+
moderate	-	-	-	+	+	+	+
low	0	0	0	+	+	+	+

[1] Quality determined by District Inventory:
high = slightly altered viewsheds
moderate = moderately altered viewsheds
low = viewsheds with low scenic value

[2] + = beneficial, 0 = none or negligible, - = adverse.

Table 4-29 - Ranking Value for Timber Management Practices Affecting Visual Impacts Per Alternatives

Alternatives	Even-Aged Acres	Structural Retention Acres	Structural Retention Preferred Alternative Acres	Shelterwood Retention Acres	Commercial Thinning/ Density Mgmt Acres	Total Rating	Ranking[4] Value
No Action	3,750[1]				4,840	23,590[2]	7
A	4,410				1,410	23,460	6
B	3,890				1,480	20,460	5
C		1,120			2,640	7,120	2
D	1,570				800	8,650	4
E	1,490			200 (VRM II)	790	8,640	3
PRMP	570		0		730	3,580	1
Rating[3]	5	4	3	2	1		

[1] Numbers are from Timber section, Chapter 4, Table 4-39 (Note: acres are annual or per year as displayed on the timber table, not for the planning decade (10-year planning)
[2] 3,750 x rating (5) + 4840 x rating (1) = 23,590 total rating
[3] Rating given to reflect most (5) to least (1) visual impacts per management practices
[4] Ranking given to reflect most (7) to least (1) visual impacts per alternative, based upon the Total Rating colum

Management Direction:
Even-Aged = clear cuts
Structural Retention = leaves 15-50% of timber after harvest (leaving 16+ trees/acre)
Structural Retention (Preferred Alternative) = small patch cuts, 5-acre maximum (leaving 6-8 trees/acre)
Shelterwood Retention = 20-25 trees/acre left after harvest (only for VRM II)

acres within the planning period. This alternative has the most acres (4,410 per year) in even-aged management that would impact visual resources.

Alternative B

Under Alternative B, visual impacts would occur, ranking fifth (Table 4-29). Even-aged cutting and commercial thinning management would be operational in this alternative, affecting over 53,700 acres within the planning period. This alternative would result in approximately 32,820 acres of previously prescribed VRM II and 53,400 acres of VRM III being downgraded.

Alternative C

Under Alternative C, visual impacts would be least severe, ranking second (Table 4-29). Management would be the same as in Alternative B, except for two differences. BLM lands within one-quarter mile of designated Rural Interface Areas (RIA) of private lots up to 20-acre lot size and BLM administered lands in viewsheds consisting of more than half ownership would be managed to retain scenic quality as inventoried. Timber management would have structural retention (15-50 percent trees are left, approximately 16 plus trees per acre, after harvest) and commercial thinning affecting over 37,000 acres. Even-aged harvest would not be practiced in this alternative, greatly reducing the visual impact on the landscape. This alternative would result in approximately 24,390 acres of previously prescribed VRM II and 40,860 acres of VRM III being downgraded, which is less than Alternatives A, B, and the PRMP. Even though there are upgrades of VRM classes in Alternatives D and E, clear cutting is allowed in those alternatives, creating stronger contracts to the landscape than Alternative C.

Alternative D

Under Alternative D, all BLM lands would be managed as inventoried. Table 4-29 shows this alternative ranking fourth for visual impacts. In addition, all BLM lands within one-quarter mile of 1-20 acre private lots would be managed as VRM

Class II. The results of this alternative, theoretically, would maintain or enhance scenic qualities on BLM administered lands and there would be no downgrading of acres. Timber management would include even-aged and commercial thinning practices affecting over 23,000 acres. Alternative D is based on the 1983 MFP inventoried acres. If this alternative were selected, the District would need to reinventory its lands to reflect the current scenic qualities, and then proceed accordingly with VRM management of these lands. Alternative D would maintain scenic quality and possibly upgrade some viewsheds near RIAs.

Alternative E

Under this alternative, management would be the same as Alternative D except for three changes. All VRM IV acres would be upgraded to VRM III standards. All BLM lands within one-quarter mile of State and Federal highways and developed BLM recreational sites would be managed as VRM I. All BLM lands within one-half mile of RIAs would be managed as VRM II. Timber management would include even-aged, shelterwood retention (20-25 trees left per acre after harvest for VRM II only) and commercial thinning affecting 23,000 acres. Under this alternative, visual resources ranks third in least impacting the visual qualities of the landscape (refer to Table 4-29). Unharvested areas would be maintained at inventory scenic quality 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 may improve due to VRM Class IV management being nonexistent or upgraded to VRM I, II, and III. This alternative would result in acre increases of VRM I (4,580), VRM II (33,620), and VRM III (162,250).

Proposed Resource Management Plan

The PRMP least impacts the visual qualities of the landscape as shown in Table 4-29. Compared with the other alternatives, the PRMP has the least amount of acres being managed for timber production per year, which could benefit visual resources. At the same time, VRM I is not prescribed for any area and VRM II and III have downgrades from the 1983 inventory base. While these downgrades are more than what Alternatives C, D, and E propose, they are less than Alternatives NA, A, and B. It is reasoned that the reduced timber activity level of the PRMP would be more crucial for managing visual resources than the downgrades proposed. Timber management practices would include even-aged, structural retention (small patch cuts of 5 acres or less, leaving 6-8 trees per acre), and commercial thinning, affecting 1,300 acres per year. Bench placer mining could occur within the District, affecting the visual qualities.

Effects on Wild and Scenic Rivers

Background

The impacts on river related qualities from BLM resource management activities vary by alternative. To be eligible for inclusion as a component of the National Wild and Scenic River System (NWSRS), a river or river segment must be free-flowing and possess at least 1 river-related Outstandingly Remarkable Value (ORV). 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 river segment, or degrade the segment's river-related ORVs, the change created would be adverse. Table 4-30 shows probable changes in the ORVs of each of the 9 assessed river segments by alternative. The rationale supporting Table 4-30 can be found in Appendix 4-I of the Draft RMP. Suitability determinations within each alternative are displayed in Chapter 2 (Table 2-1). In the Eugene District planning area there are currently no Federally designated river segments or State Scenic Waterways.

Six of the 9 eligible river segments that were assessed (see Appendix H in the Draft RMP) and found not suitable for inclusion as components of the NWSRS are: Bear, Fish, Greenleaf, Marten, Sharps, and Whittaker Creeks. These river segments would be released from interim protection upon completion of the ROD for this PRMP, and they would then be managed under regular riparian management practices. Therefore, these river segments could be impacted from other resources in all the alternatives except for the PRMP.

Table 4-30 - Probable Short-Term Changes in Outstandingly Remarkable Value (ORV) Conditions for Assessed River Segments Under Each Alternative

Study River Name	Highest Potential Classification	Outstandingly Remarkable Value	Probable Changes by Alternative[1]						
			NA	A	B	C	D	E	PRMP
McKenzie River (Segment A)	Recreational	Fish	0	0	0	0	0	+	0
		Recreation	+	-	-	+	+	+	+
		Scenic	0	-	0	+	+	+	+
		Wildlife (T&E)	+	-	-	+	+	+	+
Siuslaw River (Segment B)	Recreational	Fish	0	0	0	0	0	+	0
		Wildlife (T&E)	0	-	-	0	+	+	+
Siuslaw River (Segment C)	Recreational	Recreation	+	-	-	+	+	+	+
		Wildlife (T&E)	0	-	-	0	+	+	+
Bear Creek	Wild	Fish	-	-	0	-	0	+	NA
Fish Creek	Recreational	Fish	0	0	0	0	0	+	NA
Greenleaf Creek	Recreational	Fish	0	0	0	0	0	+	NA
Marten Creek	Wild	Fish	-	-	0	-	-	+	NA
Sharps Creek	Recreational	Recreation	0	-	-	+	+	+	NA
Whittaker Creek	Recreational	Fish	0	0	0	0	0	+	NA

[1] + = beneficial; - = adverse; O = none or negligible; NA = not applicable

Common to all Alternatives

Addressing first the impacts of BLM resource management activities on flow characteristics, none of the alternatives would adversely affect the free-flowing condition of the 9 study river segments. However, under alternatives where a river or river segment is found not suitable for inclusion as a component of the NWSRS, an externally proposed project, such as a dam, may be determined consistent with the RMP. Under this circumstance, a proposed project could be approved and ultimately constructed, thereby interrupting the segment's free-flowing condition. Currently, there are no known proposed projects for any of the study river segments.

The impacts of probable changes to the ORVs within each of the 9 assessed rivers corridors are summarized below.

No Action Alternative

Under the No Action (NA) Alternative, the 16 river segments determined to be eligible for inclusion as components of the NWSRS would receive interim management to specifically protect identified ORVs.

Outside the protective land allocations prescribed under the NA Alternative and the protection of ORVs, most BLM administered lands within the 9 river corridors in the study would continue to be managed by way of multiple use prescription, including timber management.

During the 10-year planning period, it is probable that some prescribed management activities, primarily timber harvest and road construction, would adversely affect the highest classification status of Marten and Bear Creeks. Depending on the amount of activity, the classification of wild could drop to scenic or to recreational for the entire segment. While the eligibility status would not change for the McKenzie River, Segment A, management activities could enhance recreation and wildlife values. The Siuslaw River, Segment C, recreation value could be enhanced with the development of other recreational facilities.

Alternative A

Outside the Riparian Management Areas (RMA) prescribed under Alternative A, most BLM administered lands within the 9 river corridors in the study would continue to be managed by way of multiple use prescription, including timber management. It is probable that some prescribed management activities, primarily the estimated 166 timber harvest units totaling just over 4,018 acres (out of 12,482 BLM acres), and an estimated 14 miles of new road construction, would adversely affect the ORVs for which the study river segments were determined eligible. Under this alternative, the impacts of management activities on the eligibility status and classification of the 9 rivers in the study would be negligible to adverse. Land exchanges would only be allowed for timber uses. Acquiring lands for better management of a corridor would not be possible under this alternative. Bear and Marten Creeks' highest classification of wild could be reduced to scenic or to recreational for the entire river segment. Recreational opportunities on the McKenzie and Siuslaw Rivers would remain stagnant or inadequate due to the lack of developed facilities. Sharps Creek's only ORV, recreation, could be diminished and, if so, would cancel the eligibility status of the segment. Scenic values would be diminished or lost on the McKenzie River and wildlife values would be diminished on the McKenzie and Siuslaw River segments.

Alternative B

Outside the RMAs prescribed under Alternative B, most BLM administered lands within the 9 river corridors in the study would continue to be managed by way of multiple use prescription, including timber management. It is probable that some prescribed management activities, primarily the estimated 154 timber harvest units totaling 4,003 acres, and an estimated 10 miles of new road construction, would adversely affect the ORVs for which the study river segments were determined eligible. Under this alternative, the impacts of management activities on the eligibility status and potential classification of the 9 rivers in the study would be similar to those described for Alternative A. The exception would be more protection for scenic values. State Highway 126 parallels the McKenzie River. Those BLM lands within one-quarter mile from the highway would be managed as inventoried (in this case VRM II). Also, any BLM lands within one-quarter mile of Rural Interface Areas (RIA) of private lots of 1-5 acres would be managed as VRM III.

Alternative C

Under Alternative C, 56 timber harvest units (895 acres) would be available and 7.6 new miles of road construction within the 9 river corridors. Management activities could reduce the highest potential classification for Bear and Marten Creeks from wild to scenic or to recreational, depending upon the intensity of harvests. Alternative C management impacts on the 9 study rivers' ORVs would be negligible to beneficial. In Alternative C, recreational values would be enhanced on the McKenzie River and the Siuslaw River, Segments B and C, due to the establishment of the proposed special recreational management areas within those river segments. Land exchanges would be allowed for nontimber, as well as timber uses. This would enhance management opportunities within river corridors. Scenic values would be enhanced, as well as wildlife, due to less timber harvest activities (see Probable Management Practices in Appendix 4-I in the Draft RMP).

Alternative D

Under Alternative D, 18 timber harvest units (265 acres) would be available, and 1.6 new miles of road construction within the 9 river corridors. Management activities would impact the ORVs negligibly to beneficially, and would not affect the highest classification for each study river. The highest classification of wild for Marten Creek could be reduced to scenic or recreational, depending on the intensity of harvest. Bear Creek in this alternative does not have any available timber harvest and, therefore, would not lose its highest classification of wild. Land exchanges would be allowed for nontimber uses. This would enhance management opportunities within river corridors.

Alternative E

Under Alternative E, 20 timber harvest units (156 acres) would be available, and 3.1 new miles of road construction within the 9 river corridors. Management activities could affect the highest potential classification of Bear and Marten Creeks, depending on the intensity of timber harvest activity. ORVs for all study rivers would be enhanced under this alternative. The fish value is better protected in this alternative because the 1st and 2nd order tributaries have a riparian buffer zone. Timber harvest and new road construction are reduced within the river corridors or are nonexistent. Many recreational opportunities and facilities are available for development. Land exchanges would be allowed for nontimber uses, enhancing management opportunities within river corridors.

Proposed Resource Management Plan

Under the PRMP, McKenzie River, Segment A, and the Siuslaw River, Segments B and C, are found suitable (see Appendix Y of Chapter 2 for suitability assessments). Under this alternative, the two congressionally established criteria, free-flowing and ORVs, used to judge changes in resource conditions would be either enhanced or maintained. These two criteria would be managed compatible with the objectives of the Aquatic Conservation Strategy and watershed analysis.

Summary

Alternatives C, D, E, and the PRMP maintain or enhance all identified ORVs. The fish value is better protected in the PRMP by using the Standards and Guidelines for Riparian Reserve areas. Alternatives A and B have the most negative impact on identified values due to other allowable management activities. In general, the NA Alternative maintains most of the ORVs at status quo, with some values enhanced. The PRMP protects all ORVs during the planning period, safeguarding the eligibility status of those river segments identified and assessed.

Effects on Recreation

Background

Visitors recreate on BLM administered lands to participate in satisfying outdoor experiences. Visitors could achieve their diverse experiences if assorted recreation opportunities are available to them. 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 that tend to improve recreational opportunities for some visitors, may diminish opportunities for others, due to expectations that vary greatly from one recreation user group to the next.

The primary impacts of BLM resource uses and management practices (e.g., timber harvests, construction of roads and structures, and mineral developments) on recreation are related to changes in settings. These changes may be physical alteration of the resources available, different opportunities for social interaction with other forest visitors, or limitations such as road closures or time limits on visits that may be imposed in a particular area or site. These changes in settings 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 change in setting would provide easier and increased access, allow use of recreation vehicles and equipment not previously possible in an unroaded setting, and foster additional social interaction among the area's visitors. On the other hand, use of this area for past desired recreation purposes (such as pristine wilderness) could no longer be realized by those visitors. When recreational expectations cannot be satisfied in a particular area, people's natural inclination is to seek other places to fulfill their recreational experiences.

Common to All Alternatives

Widespread diverse dispersed recreation activities on BLM administered land throughout the planning area would increase, relative to visitor demand under the chosen alternative. 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, waters, and road systems providing access to these areas are extensive, and would not be used to capacity during the short-term period under any alternative. Even Alternatives D and E, which limit some motorized vehicle use, would continue to provide more than adequate opportunities for recreation activities without depreciating the quality of experience.

Table 4-31 shows anticipated short-term capability of BLM administered facilities and resources to meet projected recreational demand for the 11 major use categories by alternative. Projected demand for snowmobiling and winter sports categories would consistently not meet projected demand, since the District's low elevation topography, resulting in low to no snowpack, discourages development of permanent snowplay/winter sports facilities. The remaining 7 major categories would vary by alternative.

No Action Alternative

Under the No Action (NA) Alternative, demand would be met for most recreational categories in the planning period with a few exceptions. Nonmotorized travel use (primarily travel related to developed trail systems) would not be adequately met because several potential trails capable of handling hiking, horseback riding, and mountain biking demands were not included as part of the current operating land use plan of 1983. The demands in the recreational categories of camping (all modes), boating (nonmotorized) and other land-based activities (picnicking, studying nature, wildlife viewing, etc.)

Table 4-31 - 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-Highway Vehicle (OHV) travel (driving motorcycle, ATV and 4x4 vehicles OHV) ATV and 4X4 vehicles off the road)	56,280	5	5	5	4	4	3	4
Motorized travel (sightseeing and exploring)	427,690	3	3	3	3	3	3	4
Nonmotorized travel (bicycling, day hiking/backpacking and horseback riding)	626,310	2	1	1	3	4	4	4
Camping (all modes of overnight camping)	121,290	2	1	1	3	4	4	4
Hunting (big and small game, bow and gun)	33,260	2	2	2	3	3	4	3
Other land-based use (picnicking, studying nature, and viewing wildlife)	394,300	2	1	1	3	4	4	4
Fishing (from boat or bank)	83,930	3	2	2	4	4	4	4
Boating (nonmotorized)	26,940	2	1	1	3	3	3	3
Other water-based use (swimming, general waterplay, tubing)	15,450	3	2	2	5	5	5	5
Winter sports (cross-country skiing, snowshoeing and sledding/snowplay)	11,720	1	1	1	1	1	1	1
Snowmobiling	0	0	0	0	0	0	0	0
Total	**1,797,170**							

0 = no opportunity to meet demand
1 = least able to meet demands
5 = best able to meet demands
[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.

would also not be adequately met. Off highway travel would be favorably met under this alternative, as most areas and roads would be open to the public. Management actions carried out under the NA Alternative would adequately meet the recreational expectations of half the use categories.

Alternative A

Under Alternative A, projected demand would not be met in the short-term for most recreation uses dependent on existing developed recreation sites and facilities. Since 10 recreation sites (including Recreation and Public Purposes leases and boat landings), and 3 trails (including the Shotgun Trail system and one right-of-way) would be managed and/or retained under Alternative A, projected demand for facility dependent activities would not be met other than for those dispersed recreation activities requiring additional miles of road access. The management decision to not develop any new recreation sites and trails, and to keep 3 currently closed recreational sites shut down, would adversely affect visitor experience expectations to the point that participation in facility-dependent recreation activities would be sought out on other lands. Land exchanges within this alternative would be for timber uses only and not for enhancing recreation management. This could hinder management opportunities for recreational areas needing a unified land base. Recreational use categories of camping, other land base, nonmotorized travel, and boating (nonmotorized) would be the most severely affected by management under this alternative. Over the planning period, timber harvest may not adversely affect either dispersed or facility-dependent recreation opportunities. However, over the long-term, allocations to timber management/harvest of land that was once dedicated to developed recreation sites and facilities may adversely affect these recreation opportunities. Some of the special benefits of these sites would be lost if substantial harvest occurred within (one-quarter mile) or in proximity (one-half mile) to the existing temporarily closed or potential (undeveloped) recreation sites during the short-term period.

Alternative B

Under Alternative B, projected demand would be identical to Alternative A with the exception of 2 currently closed sites, Haight Creek and Lake Creek, which could be reopened. The same adverse effects would remain for Alternative B as for A. The allocation for timber harvest would expand near some recreational sites, increasing the probability of losing those recreational site values in the long-term. During the short-term period, it is probable that some prescribed management activities, primarily the 22 timber harvest units totaling more than 1,977 acres and 4 miles of new access roads within one-quarter mile of the District's existing developed recreation sites, would adversely affect visitor experience expectations. If visitors' expectations are not met or are diminished, they may seek their preferred participation on other lands.

Alternative C

Under Alternative C, the District would be able to adequately meet the projected demand for 9 use categories (see Table 4-31) during the planning period. Nine new potential recreational sites and 5 proposed Special Recreational Management Areas (SRMA) could be developed. Nine additional trails could be developed. Other water-based activities would be met due to the above additions. Some roads and areas would be closed or limited to Off-Highway Vehicles (OHV); however, these restrictions are not anticipated to hinder OHV use. Land exchanges for nontimber and timber uses would be allowed within this alternative. This would enhance recreational management opportunities for recreational areas needing a unified land base. Placer exploration and bench placer mining, as described in Appendix II, could affect recreational mining within the District. It is anticipated that management actions carried out under this alternative, in general, would not adversely affect the experience expectations of forest visitors, either for preferred dispersed recreation activities or for activities dependent on developed recreation facilities.

Alternatives D and E

Alternatives D and E are similar except for OHV activity. Off highway travel and road closures would be more restricted in Alternative E due to wildlife concerns; however, these restrictions are not anticipated to hinder general OHV use. Hunting, hiking, horseback riding, nature study, and viewing wildlife are all activities that would be benefitted by selective road closures and off highway travel restrictions in areas providing these opportunities. While hunting quality would increase (habitat improvement, in turn, would increase number of game), hunting access by roads would be limited in some areas (see the section on Wildlife, Impacts on Priority Species). Placer exploration and bench

placer mining, as described in Appendix II, could affect recreational mining within the District. Projected demand for recreation categories of nonmotorized travel, camping, and other land base in the short-term would increase again (see Table 4-31). Seven additional proposed recreational sites could be developed, as well as 10 more trails supporting this increase in meeting demand.

Alternatives D and E provide for land exchanges for nontimber usage enhancing recreational management opportunities. Other than off highway travel activity in selected areas, it is anticipated that management actions carried out under these alternatives would not adversely affect the recreational expectations of forest visitors, either for preferred dispersed recreation activities or for activities dependent on developed recreation facilities.

Proposed Resource Management Plan

The Proposed Resource Management Plan (PRMP) is able to adequately meet the projected demand for the 9 recreation use categories (see Table 4-31). This conclusion appears valid, even though the FSEIS (U.S. Department of Agriculture, U.S. Department of the Interior, Interagency SEIS Team, 1994) indicates that the supply of landscape settings with little development, little management activity, and nonmotorized access would not meet anticipated demand over the short-term. The FSEIS assessment considered recreation needs in terms of total acres within specific settings. Table 4-31, on the other hand, considers recreation demand in terms of total visitation by specific activity groupings. These separate evaluations cannot be compared for consistency since the conclusions reached are based on very different sets of data. The PRMP would make available for development all proposed recreation sites, SRMAs, and trails. Nine proposed byways would be constructed, meeting demand for motorized travel. The limited designations for OHV use would encompass most of the planning area, unlike the other alternatives. However, the limited restrictions are not anticipated to hinder general OHV use (refer to Appendix T). Mining notices filed pursuant to the regulations in 43 CFR 3809 would be considered an authorization to use Off-Highway Vehicles for mining operations in areas designated as limited to OHV. Allowing land exchanges for nontimber uses would enhance recreational management opportunities. Placer exploration and bench placer mining as described in Appendix II could affect recreational mining within the District. It is anticipated that management actions carried out under this alternative would increase and/or enhance the experience expectations of most recreation use categories, either for preferred dispersed recreation activities or for activities dependent on developed recreation facilities.

Effects on Timber

Timber is an important component of the resources managed by BLM in western Oregon. Each of the 7 alternatives described in Chapter 2 would affect BLM's timber resource and its availability for harvest in a different way. Each alternative would directly affect the age, size, type, distribution, and productivity of the District's timber stands and the way they change over time. The alternatives could result in different levels of forest health and responses to disturbances such as fire, wind, insects, or disease that, in turn, could affect the long-term timber production of the forest. Timber harvest and related silvicultural practices associated with each of the alternatives would also have effects on other components of the environment. These effects are described and analyzed in other sections of Chapter 4. This chapter describes the effects of the alternatives on the timber resource.

The most measurable effects between alternatives are:

- Acres of land available for timber production
- Probable Sale Quantity (PSQ)
- Acres harvested per decade
- Acres of forest land converted to roads
- Age class distribution in the future forest

Acres of Land Available for Timber Production

The suitability of land for timber production is determined through the Timber Production Capability Class (TPCC) inventory that is described in the Timber Resources section of Chapter 3. Sites considered suitable for timber production include two categories: Suitable Commercial Forest Land (SCFL) and Suitable Woodland (SWL).

SCFL 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 PSQ calculations under all alternatives, unless excluded for other reasons. Allocation of SCFL lands for

protection or enhancement of nontimber resource values reduces the number of acres available for timber production, which reduces the PSQ.

Some SWL sites may be capable of producing a sustained yield of forest products, but would generally require a longer regeneration period due to difficulty in achieving reforestation standards and/or a longer rotation due to low site quality to produce a commercial product. Other SWL sites are capable of producing a sustained yield of commercially valuable hardwoods or noncommercial species. Under Alternatives A, B, and C, some categories of SWL sites are included in PSQ calculations.

Table 2-1 in Chapter 2 displays the acres available for intensive management, constrained management, and management for enhancement of other uses for each alternative. See Table 4-50 (District Acreage Summary by Alternative) for net timber production acres.

One general method for assessing impacts to the PSQ, when the TRIM-PLUS model (see Appendix AA) is not used, is to identify the number of acres not allocated to timber production. For every 1,000 acres of potential timber production land not allocated, there is a reduction in the annual PSQ of approximately one MMBF. Impacts to the PSQ are usually associated with the reduction of timber production acreage for the enhancement or protection of other resource values such as water quality, special areas, recreation, or wildlife. Because many of the areas allocated for the protection or enhancement of other resources are overlapping (e.g., Riparian Reserves (RR) within Late-Successional Reserves (LSR) or Special Areas), they are not individually displayed.

Anticipated mineral entry under all of the alternatives is not expected to have a significant impact on timber resources. For leasable mineral activities, less than 200 acres of the surface resource is expected to be impacted by any alternative. Less than 100 acres of the surface resource would be affected by locatable or salable mineral activities. Few, if any, acres allocated to timber production would be disturbed in mineral exploration or development. For the next decade, mineral impacts are anticipated to be similar to those of the last decade.

Recreation opportunities under the various alternatives would have a minor impact on lands allocated for timber production, as most of the existing or proposed recreation sites are located in areas where timber production is either prohibited or restricted for other reasons. It is possible, however, that some recreation sites could be expanded through land exchanges, which could result in a net loss of timber production land and a reduction in the PSQ. The potential recreation land that could reasonably be acquired under any alternative involves less than 1,300 acres, not all of which would involve a land exchange. Some land acquisition could be accomplished through purchase or donations. Considering these various factors, the impacts on the timber resource would be negligible.

Designation of 9 Back Country Byways would not impact the PSQ as timber management activities along the byways would be similar to adjacent timber management lands.

Designation of potential ACECs and RNAs under Alternatives B, C, D, and E could remove up to 10,100 acres of Commercial Forest Land (CFL) from timber production that would reduce the annual PSQ by 10 to 11 MMBF. Impacts under Alternative A would be insignificant, as less than 130 acres of CFL would be withdrawn from timber production. Under the PRMP, about 2,860 acres of CFL would be unavailable for timber production due to designation of special areas; however, based upon the premise that some acres may become available for limited harvesting after development of site-specific ACEC management plans, a 2 MMBF reduction in the annual PSQ is projected.

PSQ Levels

The PSQ level for the life of the plan 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 stands. Based on these parameters, 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 level of PSQ would be highest under Alternative A and lowest under the PRMP, with the PSQ for the other alternatives arrayed between them. The PSQ is defined as an estimate of annual timber sale volume likely to be achieved from lands allocated to sustainable harvest.

Table 4-50 District Acreage Summary by Alternative

	PRMP	NA	A	B	C	D	E
Enhancement of Other Uses or Unavailable							
Congressional Reserves	0	0	0	0	0	0	0
Late-Successional Reserves	51,500						
District Defined Reserves [1]	1,800						
Riparian Reserves [2] or Riparian Management Areas	172,900	8,700	10,500	13,000	18,400	34,700	46,300
Other [3]	19,000	33,900	27,100	43,600	72,800	88,100	55,900
Subtotal	245,200	42,600	37,600	56,600	91,200	122,800	102,200
Forest Management Areas							
Intensive Management							
General Forest Management Area	37,900	260,000	274,000	249,000	0	0	100,000
Adaptive Management Area	4,400						
Constrained or Restricted Management		12,000	0	1,000	207,000	144,200	18,400
Connectivity/Diversity Block	23,800						
Adaptive Management Area	1,100						
Rural Interface Areas	2,100					6,800	19,600
VRM 2	100	0	3,000	8,000	16,400	40,800	74,400
Subtotal	69,400	272,000	277,000	258,000	223,400	191,800	212,400
Total District Lands	**314,600**	**314,600**	**314,600**	**314,600**	**314,600**	**314,600**	**314,600**

[1] District Defined Reserves include areas designated for Special Management Areas (Bald Eagle Habitat Areas and Relic Forest Islands), and TPCC unavailable lands.
[2] These are estimated (may be adjusted after watershed analysis) District Riparian acres.
[3] Includes Nonforest, Nonsuitable Woodlands, Roads, T&E outs, ACEC, VRM outs, and Special Habitats.
Note: All land use allocations are net (exclude the other land use allocations like Riparian Reserves) acres. Under the PRMP, Riparian Reserves were carved out of the other land use allocations. [Gross mapped land use allocation acres, which include Riparian Reserve acres, are: Late-Successional Reserves - 136,500 acres; Connectivity/Diversity Blocks - 58,500 acres; General Forest Management Areas - 100,400 acres; District Defined Reserves - 3,000 acres; and Adaptive Management Areas - 16,200 acres.]
See Figure S-2, Land Use Allocations, for a graphic representation.

The probable nondeclining even flow of timber (PSQ) could increase over time as progress is made toward a balanced age class distribution of timber (i.e., a regulated forest) on lands available for timber management. When a regulated forest is achieved, the maximum nondeclining even flow level would equal the Long-Term Sustained Yield (LTSY) capacity of the District's available forest lands under the selected management regime. Because of the silvicultural and forest management strategies used under the Alternative C and the PRMP, the classic concept of a regulated forest with a balanced age class distribution does not readily apply.

Under the PRMP, there is a provision for retention of late successional fragments in fifth field watersheds where Federal forest lands are currently composed of 15 percent or less of late successional forests. In the Eugene District, approximately 3,016 acres of matrix land would be deferred for one or more decades. This would cause a decrease in the PSQ by approximately 8 percent.

The TRIM-PLUS computer harvest scheduling model was used to estimate the PSQ for all alternatives except NA and D, and for the sensitivity analyses of intensive management practices. For Alternative D, the "50-11-40 Model" was used. Estimates for the NA were derived from the ASQ developed in the current (1980s) planning cycle, which utilized the SIMIX Model. See Appendix AA for a description of the TRIM-PLUS and other models used.

Empiric yield tables derived from the timber inventory provided the initial volume of existing stands. The Stand Projection System (SPS), a computerized stand growth and yield simulator, generated yields for future managed stands based on plot data from southwestern Oregon.

For the Matrix land 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 20 decades. Table 4-32 lists the TRIM-PLUS projected PSQ in cubic feet and Scribner board feet for each alternative.

If timber is harvested below Culmination of Mean Annual Increment (CMAI) as proposed in Alternatives NA, A, B, E and the PRMP, a maximum nondeclining PSQ could be obtained in the short-term. Harvesting below the age of CMAI, however, would delay the time needed for the stand to reach regulation and LTSY capacity. CMAI represents the harvest age for an individual timber stand at its highest average annual level of wood production for the complete rotation.

Under Alternative C, some timber harvest volume, in addition to the even flow quantity calculated for the PSQ, would be removed as partial cuttings from the blocks of land designated for restoration and retention (R&R) of mature and old growth forest. Such partial cuttings would be designed to accelerate development of old growth structural characteristics in younger stands located within the R&R blocks.

The prescriptions for Alternatives C and the PRMP call for retention of a portion of the stand at harvest, development of stands with multiple canopy layers,

Table 4-32 - Probable Sale Quantity (PSQ)

Alternative	MMCF[1]	MMBF by Decade					
		1st	2nd	3rd	5th	10th	20th
No Action	**35.2**	224	216	207	199	86	194
A	**53.8**	342	329	317	304	284	296
B	**49.8**	316	296	294	284	259	266
C	**14.8**	88	90	89	85	100	97
D	**17.2**	101	103	101	97	98	100
E	**17.2**	97	98	96	94	93	97
PRMP	**6.1**	36	35	37	37	38	39

Volumes are average annual MMCF and MMBF for each decade.

[1] Note: MMCF is the same through all decades due to even flow management based on cubic feet.

maintenance of wider tree spacing through a series of density management cuttings, and management on longer rotations. These practices are intended to permit portions of the forest to develop old growth structural characteristics at an accelerated rate. There is currently little available research that quantifies the expected timber yields from such stand management regimes for this area of western Oregon. Management of the Adaptive Management Areas (AMA) is, however, expected to provide information that could be utilized in computing the PSQ for the next planning cycle. Modeling of the PSQ is more difficult for these two alternatives than it is for the other alternatives that rely on traditional forest management techniques; therefore, the level of confidence in the resulting PSQ is lower for the PRMP and Alternative C than for Alternatives NA, A, B, D, and E.

The PRMP would rely on a modification of traditional silvicultural practices, such as green tree retention and a larger down log and snag component, within the General Forest Management Area. The Connectivity-Diversity Blocks would employ prescriptions similar to those described for the low retention portion of Alternative C. Although the Late-Successional Reserves under the PRMP would use nontraditional silvicultural techniques and objectives, modeling is not an issue in these areas because the reserves are not part of the PSQ computation. Appendix AA briefly describes the PSQ computation process.

Tables 4-37 and 4-38 in Appendix FF display harvest volumes and acres for the first, second, third, fifth, and tenth decades of the plan for each of the 7 alternatives. Regeneration harvest refers to a harvest where most of the standing trees are removed and a new stand is established. Thinning or density management refers to a silvicultural practice that typically removes about 30 to 40 percent of the volume during any one entry.

Some additional volume, in the form of density management, would be derived from the Late-Successional Reserves and Riparian Reserves 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. This volume would not contribute to the computation of the PSQ. Management of the LSRs and RRs would be addressed in Watershed Analysis.

Sensitivity Analysis

A test for the Allowable Cut Effect (ACE) was done by using several scenarios where a number of silvicultural practices were removed from a full use scenario and compared against the full use one. If no genetic stock were used, the PSQ would not decrease. If no genetic stock were used and fertilization was not done, the PSQ would not decrease. If no genetic stock were used, no precommercial thinnings were conducted, and fertilization was not done, the PSQ would not decrease. If none of the intensive practices described above were used, the PSQ would not decrease. There was no change in PSQ because of the many constraints (the minimum harvest age, the best 25 percent of Connectivity/Diversity Blocks, the 15 percent FEMAT rules, and the AMA constraints) that limited the amount of available acres above minimum harvest age. Even though these intensive would not directly affect the PSQ, they would help build volume inventories and increase the PSQ potential for future decades and would enhance (increase) growth and structure of stands. See Appendix AA for further discussion of the Allowable Cut Effect (ACE). Also see Appendix MM for discussion of yields, economic value, and wood quality effects from doing intensive silvicultural practices.

If the current critical northern spotted owl habitat areas, designated by Oregon Department of Fish and Wildlife, outside the LSRs were not available for timber harvest, the PSQ would be reduced by 28 percent.

Acres Harvested per Decade

In general, the number of acres that receive regeneration harvest treatments each year is related to the planned rotation length. With a 60-year rotation on a regulated forest, annual regeneration harvest acreages should equal approximately 1/60 of the total regulated acres. Under Alternatives C, D, and the Connectivity/Diversity Blocks of the PRMP, which specify rotations ranging between 150 to 300 years on some areas, the annual acreage receiving regeneration harvest would be much smaller than for the shorter rotations of intensively managed lands of the other alternatives.

The acres and volumes for regeneration harvest and thinning/density management are displayed separately in Table 4-57 in Appendix DD.

Acres of Forest Land Converted to Roads

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 administered lands under the terms of reciprocal right-of-way agreements or permits. The reduction in forest land acreage resulting from road construction would continue for several decades until all roads necessary to manage lands allocated for timber production were constructed. This length of time would vary by alternative.

A greater amount of land would eventually be occupied by permanent roads under Alternatives NA, A, and B, which have the largest allocations of land to timber production. Table 4-33 displays the total mileage of existing plus additional permanent roads and acres planned for the road system for the first and fifth decades of the plan for each alternative. The acreage includes areas such as the road surface, ditches, turnouts, landings, cut slopes, and fill slopes, which would be taken out of production. Allocation of land to permanent roads has the unavoidable adverse effect of removing land from production of timber products. On the other hand, roads are necessary to provide access for management purposes such as reforestation, stand maintenance, fire protection, and monitoring.

The loss of timber production acres would, however, be minimized by (1) careful advance planning in making effective use of available logging systems to minimize the total length of road system needed; (2) building roads only to the minimum width required for the expected use of each road; and (3) avoiding unnecessarily wide clearing limits in road design and construction.

Age Class Distribution of the Future Managed Forest

The rotation age at which timber stands are harvested helps to determine the age and size characteristics of the future forest. Under all alternatives, the average age and diameter of harvested trees on the intensively managed lands would decline significantly over the first few decades but slowly increase (except Alternative C and the PRMP, which rise at a faster rate than the other alternatives due to restrictions on cutting older stands in the short term) as the forest approaches regulation.

Under Alternative C, where a large number of acres would be managed on rotations of 150 to 300 years, and under the PRMP, where a large number of acres would be managed as Late-Successional Reserves, Riparian Reserves, or Connectivity-Diversity Blocks, the future forest would contain more acres of mature

Table 4-33 - Estimated Total Miles[1] and Acres[1] of Roads (existing and proposed) on BLM Ownership.

Alternative	End of 1st Decade Miles	End of 1st Decade Acres	End of 5th Decade Miles	End of 5th Decade Acres
No Action	2,190	11,940	2,420	13,220
A	2,210	12,060	2,470	13,450
B	2,180	11,900	2,410	13,140
C	2,150	11,710	2,350	12,790
D	2,070	11,260	2,190	11,960
E	2,100	11,440	2,250	12,290
PRMP	2,020	10,990	2,090	11,370

[1] All milage and acreage values are rounded to the nearest 10.

and old growth seral stages than under Alternatives A and B, which have shorter rotations.

Table 4-36 in Appendix FF compares the average age at regeneration harvest by decade for each alternative. In the managed areas under Alternatives NA, A, B, E, and the PRMP, most stands would be harvested at or near the minimum harvest age during the first few decades. Under Alternative C and the PRMP, the average age of harvested trees would eventually start to increase, equaling or exceeding CMAI. Management under alternatives A and B would allow harvest to continue at the minimum harvest age beyond the tenth decade. Such delays in reaching CMAI would significantly postpone the time for the managed forest to reach its maximum productive capacity.

Other Effects of the Alternatives

Some effects that are not easily quantifiable between alternatives are listed and discussed below:

- Management of Adaptive Management Areas
- Retention of green trees and dead and down material
- Wood quality of harvested trees
- Reforestation
- Genetic selection
- Stand management practices
- Land exchanges
- Adjustment of Riparian Reserves
- Protection buffers, survey and manage requirements, and protection of bat roost sites
- Long-term site productivity

Management of Adaptive Management Areas (AMA)

Adaptive Management Areas are unique to the PRMP; therefore, no comparison can be made to the other alternatives. Management activities in these areas would be conducted to achieve the objectives as described in Chapter 2. The Central Cascades 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 PSQ associated with the Central Cascades Adaptive Management Area is particularly uncertain. Each Adaptive Management Area would ultimately have a plan that would include timber sale plans and long-term yield projections.

Retention of Green Trees and Dead and Down Material

Under Alternatives C, D, E, and the PRMP, some live trees and/or snags would be retained within the harvested area. In most cases, these trees would never be harvested, but would provide a source of snags and/or elements of structural diversity for the future forest. The number of trees retained varies by alternative and from one land use allocation to another within Alternative C and the PRMP.

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. The TRIM-PLUS model reduced yields in the PSQ to account for trees being retained on harvested units and for reduced growth due to competition of an overstory. In general, growth reductions due to overstory competition would depend on how the retained trees are distributed; the position of the individual trees or clumps within the unit; the size of retained trees; and the aspect, size, and shape of the harvest unit. Additional competition from adjacent unharvested stands would/could occur. Considering these various factors, the PSQ of Alternative C and the PRMP could be reduced due to growth reductions in future stands that compete with a retained overstory.

Retaining trees that display characteristics such as limbiness, excessive taper, and crooks or forks would have the potential for those traits that are genetically determined to be transmitted to subsequent stands.

Risks of Insects and disease: Silvicultural practices used to achieve management objectives could lead to increased incidence of insects and diseases and subsequent loss of yield. Risks include the following:

- Green tree retention regimes have a higher potential to spread diseases from existing infected trees to regenerated trees than clear cutting.

- Thinning or partial cutting can result in physical damage, especially on steep or broken terrain, to

remaining trees that predispose them to insect or disease attack leading to reduced yield and value. This is especially true of silvicultural systems that require more than one entry into stands.

- Thinning entries can spread black stain fungus, especially in stands with soil compaction that resulted from previous tractor logging.

- Spread of the laminated root rot fungus, *Phellinus weirii*, may be accelerated by intensive management regimes such as those proposed for Alternatives A, B, and the NA. Under all of the alternatives, identified infection sites would be replanted with tree species that are resistant or immune to the disease when this is consistent with watershed objectives. The disease may continue to spread from infected areas that are not detected prior to planting.

Wood Quality of Harvested Trees

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 lower densities to allow more rapid diameter growth.

Wood density is closely related to strength that, 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. 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.

Under Alternatives NA, A, B, E, and the GFMA 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). 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, some timber stands would be managed at wider spacings than under the other alternatives. Trees grown under such conditions are expected to have very large diameters, but are also likely to be limby and have low-to-medium density wood, large knots, and a large core of juvenile wood.

In some areas, wood quality may be improved by pruning of young stands. By removing the limbs from the lower portion of the stem of crop trees, a greater proportion of clear wood and a lower proportion of juvenile wood can be produced.

Reforestation

Under all alternatives, it is assumed that harvested areas would usually be reforested within one growing season after site preparation, with an adequate number of seedlings of desired tree species. Reforestation estimates do not project full stocking to target levels on all harvested acres, but assume that high levels of reforestation success would continue.

Under Alternatives NA, A, B, D, E, and the General Forest Management Area in the PRMP, most regeneration would consist of planted tree seedlings and seedling protection measures (see Appendix BB). Under Alternative C and the Connectivity/ Diversity blocks in the PRMP, a greater amount of natural regeneration would be expected. Retained trees left in the harvested units would provide a close seed source for natural regeneration.

Genetic Selection

Under all alternatives except C, genetically selected seedlings would be planted following regeneration

harvest, to the extent that selected seed is available. Under Alternative C, genetically selected seedlings would comprise not more than half of the trees planted following regeneration harvest.

Reforestation efforts have the potential to change the genetic makeup of forest stands, whether seedlings were produced through a genetic selection program, obtained from general seed collection, or established naturally from sources such as seed trees. Use of carefully selected and tested sources of parent material can ensure that key gene combinations are not lost. By controlling the parental makeup of seed lots and planting of seedlings well adapted to local conditions, the natural adaptability to site and disease can reasonably be ensured. The numbers of trees being retained under Alternative C and the PRMP would add to the genetic diversity of the regenerated stands.

All alternatives would provide a network of trees throughout the landscape in the form of RMAs or Riparian Reserves, TPCC woodland blocks, and administrative withdrawals that would also add to the genetic makeup of the stand. Although this addition of untested reproductive material could add both desirable and undesirable traits, its basic contribution to the genetic diversity of the regenerated stand in the long-term would add some assurance that the locally adapted genetic pool is not lost. The design of tree selection and breeding programs should prevent excessive narrowing of gene pools or the complete loss of genetic traits. Moreover, genetic selection may provide the only viable method of protecting genetic material in species such as western white pine or sugar pine, whose existence is threatened by plant diseases.

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, future PSQs 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 long-term contribution of the genetically-selected trees.

See Appendix CC for a more complete discussion of the tree improvement program.

Stand Management Practices

A variety of intensive stand management practices would be implemented under every alternative. Tables 2-1 and 4-39 of Appendix FF display the projected annual acres of each practice 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 would vary by year in the course of implementing the plan.

See Appendix MM for discussion of yields, economic value, and wood quality effects from doing intensive silvicultural practices.

The anticipated effects of the stand management practices that would be implemented are described below:

Precommercial Thinning (PCT): PCT would be applied to overstocked young stands under all alternatives on sites allocated to timber production. PCT under Alternative C and the Connectivity/Diversity blocks of the PRMP would promote density management objectives. Alternative E and the PRMP would treat considerably fewer acres than the other alternatives during the first two decades.

PCT would help maintain stand vigor by increasing growing space, eliminating poorly formed or undesirable trees, reducing root competition, and delaying crown closure. Thinned stands produce larger diameter trees than stands that are overstocked.

There may be some negative effects of PCT. For instance, PCT can assist in the spread of black stain fungus, especially in stands where soil compaction has occurred. Slash resulting from PCT places a stand at increased risk of a stand replacement fire for several years.

Overall, PCT usually results in a small increase in the PSQ, allows earlier development of a merchantable stand and some of the characteristics of late-successional forests, provides an opportunity to control density and species composition, and eliminates poorly formed and diseased trees early in the life of the stand. The General Forest Management Area (GFMA) of the PRMP does not show PSQ gains for the first decade because of management constraints but PCT is contributing to future volume and faster growth of stands.

Commercial Thinning: Density management and other types of commercial thinnings are planned under all of the alternatives. Under Alternatives NA, A, B, D, E, and the GFMA portion of the PRMP, commercial thinning would be applied to young, well-stocked stands. An estimated 50 to 60 percent of young stands would be suitable for thinning based on inventory data, topography, location, density of trees, road locations, and other site specific information.

Commercial thinnings can produce an increase in total net yield and result in a higher PSQ. The yield increase results from early harvest of merchantable trees that otherwise would have died and become unusable before final harvest of the stand. The increased PSQ is a result of a combination of proper timing of intermediate harvests and a higher total yield over a rotation. Depending on spacing of residual trees, thinning can also result in production of larger trees with higher stumpage values and lower logging costs at regeneration harvest. The General Forest Management Area (GFMA) of the PRMP does not show PSQ gains for the first decade because of management constraints but thinning would contribute to future volume and faster growth of stands.
In the Connectivity/Diversity blocks (C/DB) of the PRMP and under Alternative C, density management harvest in young stands would increase the rate at which large trees, multiple canopy layers, and structural diversity are produced in these stands.

Thinning, if not carefully implemented, can damage the tops, crowns, bark, and roots of residual trees. Such damage would reduce wood quality and increase the risk of insect and disease attacks. Commercially thinned stands, particularly those not subjected to prior spacing management through precommercial thinning, may be more susceptible to windthrow, depending on their locations.

Forest Fertilization: Fertilization of some managed stands would take place under all of the alternatives. Effects would include higher growth rates, earlier production of merchantable trees, and increased resistance to insects and disease. Also, under Alternatives NA, A, B, D, and E, the PSQ would reflect expected future gains resulting from fertilization. No gains in PSQ would be projected under Alternative C, or in the C/DB of the PRMP, where stands are managed on long rotations. The General Forest Management Area (GFMA) of the PRMP does not show PSQ gains for the first decade because of management constraints, but fertilization would contribute to future volume and faster growth of stands.

Vegetation Control: Under all alternatives, competing vegetation would be controlled as provided by the ROD for Western Oregon Program-Management of Competing Vegetation (see Appendix 1-C) of the Draft RMP, to permit the survival and growth of an adequate number of commercial species tree seedlings in each regenerated area. The effect of such vegetation control would be more rapid reestablishment of forest conditions, a greater total yield of timber from each acre, and a correspondingly higher PSQ level.

For purposes of growth and yield projections, it was assumed that effective methods of vegetation control would be available and would be implemented as needed. These methods could include prescribed fire, herbicides, and manual or mechanical methods, as appropriate.

The timber yields that have been projected are dependent upon successful control of competing vegetation, whatever method is employed. If herbicides are not available or cannot be applied, necessary vegetation management would be accomplished by other methods. In the case of Alternative C and the PRMP, where the distribution of retention trees may prohibit aerial application of herbicides, costs of alternative methods of vegetation control may be higher.

Pruning: 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 10 years after PCT 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 the pruned limbs have decayed.

Land Exchanges

Under all alternatives, efforts to negotiate land exchanges should result in improved and more efficient management of BLM administered lands.

When land exchanges result in acquisition of lands that would be allocated to timber production, the projected PSQ may change, depending on site conditions, acreages, change in timber inventory, and changes in age class distribution. Any exchanges of commercial timberland for tracts that would be allocated to nontimber uses would result in a decrease in the PSQ. The types of land that would be considered for exchanges would vary by alternative.

Adjustment of Riparian Reserves

Under the PRMP, the prescribed widths of Riparian Reserves are intended to be interim until the completion of watershed analysis that would enable managers and interdisciplinary teams to determine the appropriate width to meet the objectives of the Riparian Reserves. Post watershed analysis of Riparian Reserves for permanently-flowing streams should approximate the boundaries prescribed in the PRMP. However, the boundaries of Post watershed analysis of Riparian Reserves 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. This variability of Riparian Reserves on intermittent streams contributes an element of uncertainty to the PSQ calculation.

It is also possible that watershed analysis could indicate the need to defer harvest in some watersheds for one or more decades. The number, size, and location of watersheds that may need to have harvest deferral are 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 fewer 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 PSQ calculation.

Protection Buffers, Survey and Manage Requirements, and Protection of Bat Roost Sites

The Management Action/Direction for the PRMP as described in Chapter 2, identified species for which protective buffers are to be provided (see SEIS Special Attention Species Appendix O) requiring additional survey strategies; and additional protection for caves, mines, and abandoned wooden bridges and buildings that are used as roost sites for bats. As surveys are conducted, the number of identified species and/or populations of species could result in an increase of additional protective buffers and management of additional managed sites. The total extent of species and sites is unknown.

Long-Term Productivity

Some researchers suggest that long-term site productivity may not be sustainable under intensive management such as those proposed for Alternatives NA, A, and B. Soil fertility may be diminished over time by repeated cycles of intensive harvest, site preparation, and control of competing vegetation (Perry and Maghembe, 1989).

The FORCYTE-11 model (see Appendix I) was used to predict long-term site productivity. It shows decreasing site productivity for areas harvested on short rotations (40 years) followed by light or moderate intensity broadcast burns. Most of the broadcast burns for all alternatives are expected to be of light-to-moderate intensity. Site productivity can be maintained when rotation lengths of 60 years or longer are practiced if burning intensities are light and all other factors are the same. When moderate burning along with 60-year rotations are examined using the FORCYTE-11 model, the results are mixed and indicate that long-term site productivity is either being maintained or is decreasing very slightly. One of the assumptions of such a scenario, however, is that after each harvest, the site would receive a moderate burn. Such a scenario is unlikely especially if remaining harvests are in young stands that would have light fuel loading. Under Alternatives C and the PRMP, rotation ages vary from 60 years to 300 years and, in almost all cases, would not reduce long-term site productivity. For additional information on long-term site productivity, see Effects on Soils.

Other potential impacts to long-term site productivity are being studied by the scientific community. Specific and conclusive results are not yet available, but some important observations appearing in scientific literature are listed below:

- Use of shorter rotations appears to lead to more rapid depletion of organic matter and nitrogen in forest soils. Nitrogen depletion would result in a reduction of long-term site productivity unless mitigated by periodic application of nitrogen

fertilizer to the site. However, nitrogen fertilization may not maintain organic matter in the soil. Soil organic matter influences many beneficial soil properties, such as nitrogen amounts, bulk density, soil water holding capacity, cation exchange capacity, and soil biological activity.

- Use of silvicultural prescriptions that increase temperature at the soil surface have a potential adverse impact on long-term site productivity. This reduced productivity is due to a loss of soil nitrogen (Borchers et al., 1990) and also a loss of important soil micorrhizae (Parke and Trappe, 1983) related to increased temperatures.

- Silvicultural prescriptions that do not retain species diversity may also have an adverse impact on long-term site productivity. Studies indicate that the growth of beneficial mycorrhizal fungi and other nitrogen-fixing soil organisms is associated with the presence of certain hardwood species (Borchers and Perry, 1990; Amaranthus and Perry, 1990).

Timber Supply

An analysis of the timber supply for the Eugene 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 Eugene 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 4-34. 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 Eugene District would decrease under all alternatives. The change in timber harvest would range from a 44 percent decrease in Alternative A to a 62 percent decrease in the PRMP. The decline in overall timber harvest in Alternatives A and B 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 from the first decade but would remain below the 1984-88 baseline.

Because a portion of the raw logs harvested in the District is 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, which include overseas log exports, are also shown in Table 4-34. The wood processing sector would consume less wood under Alternatives C, D, E, and PRMP than during the reference 1984-88 period. Differences between the amounts processed under different alternatives may be attributed to their PSQ levels.

The cumulative effects of the alternatives are shown in Table 4-35. 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 26 percent increase in Alternative A 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 attributable to the SEIS. 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 also would decrease under all alternatives. Logs exported overseas are included in this total.

For additional updated information on the Timber Supply Analysis for BLM Planning, see Appendix E.

Table 4-34 - Eugene 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]	38	35	55	50	14	16	17	6
USFS[3]	113	18	18	18	18	18	18	18
Private (industrial & non-industrial)	107	71	70	71	73	73	73	74
Other Public	1	1	1	1	1	1	1	1
Total	259	125	144	140	106	108	109	99

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Eugene District Timber Harvest (2001 -2010) - Millions of Cubic Feet (MMCF) per Year

Total	259	153	172	168	134	136	136	126

Data source: Non-BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA-USFS, PNW Research Station, Portland, OR, 1992. (revised 1994)

Eugene District Timber Processed (1993-2000) - Millions of Cubic Feet (MMCF) per Year

Total	286	150	176	162	130	132	131	123

Note: (1) Timber Processed from all sources was partitioned on county boundaries to approximate the BLM 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 on county boundaries to approximate BLM District.
[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.

Table 4-35 - Western Oregon Timber Harvest (1993-2000) - Millions of Cubic Feet (MMCF) per Year[1]

Supplier[1]	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	987	1049	1019	886	892	876	858

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.

Effects on Energy and Mineral Resources

Exploration or Development of Energy and Mineral Resources

The allocations and management prescriptions of other resource programs affect the availability of land for exploration and development of energy and mineral resources differently throughout the alternatives. To assess these effects, constraints have been divided into 4 categories: closures (including withdrawals); no surface occupancy (for leasable minerals); standard requirements or lease terms; and additional restrictions, such as seasonal operating and visual resource management constraints. Closures are further divided into discretionary (under the control of BLM) and nondiscretionary (imposed by law, regulation, or Secretarial or Executive order).

The projected future exploration and development of mineral resources on the Eugene District is portrayed in the Ten-Year Mineral Development Scenarios in Appendix II. The most favorable condition for exploration and development of mineral resources would be where there are as few restrictions as possible. Individuals and companies involved in mineral exploration and development face numerous environmental obligations in order to comply with applicable laws and regulations that apply under all alternatives. Any additional measures for the

Table 4-40 - Oil and Gas Availability by Alternative (1,000 Acres) - GIS Acres

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Nondiscretionary[1]	Moderate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Low/Unknown	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/Unknown	0	0	0	0	0	0	0
Open:	High	0	0	0	0	0	0	0
No Surface	Moderate	5	3	4	7	11	14	121
Occupancy[2]	Low/Unknown	2	1	2	3	5	6	56
Open:	High	0	0	0	0	0	0	0
Standard	Moderate	158	180	148	2	58	8	0
Lease Terms	Low/Unknown	78	86	74	19	40	22	0
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	55	35	66	209	149	196	95
Restrictions[3]	Low/Unknown	20	13	24	78	55	72	43

[1] Lands within city limits.
[2] Fall Creek Reservoir; Fern Ridge Reservoir; Lookout Point Reservoir; Oregon Islands National Wildlife Refuge; Tyrrell and Dorena Seed Orchards; Walton and Whites Creek Maintenance sites, Progeny Test sites (Alt. NA - E); Regional Forest Nutritional Study Installations (Alt. NA - E); Land Use Authorizations; Recreation sites; Special Areas; Reconveyed Land not opened to locatable mineral entry (Alt. NA - E); VRM Class I lands (Alt. NA - E); bald eagle and marbled murrelet nest sites (Alt. NA - E); great blue heron rookeries; osprey nest sites; Riparian Reserves (PRMP).
[3] Special Recreation Management Areas; Suitable and Eligible Recreational Rivers; Powersite Withdrawals; Corps of Engineers' Withdrawals; VRM Class II lands; Fragile Slopes; Riparian Management Areas (Alt. NA - E); mineral springs used by band-tailed pigeons; Federal Mineral Estate only; elk concentration areas (NA Alternative); Designated Mature Old Growth Forest Blocks (Alternative B); Old Growth Restoration and Retention Blocks (Alternative C); Habitat Conservation Areas for the northern spotted owl (Alternative D); Forest stands older than 150 years (Alternative E); Late Successional Reserves (PRMP); Special Status Species (PRMP).

mitigation of disturbance to lands and nonmineral resources bring about even greater impacts to mineral exploration and development.

Tables 4-40 through 4-43 show by alternative, the acres of mineral estate considered to have high, moderate, low or unknown mineral potential that are available for mineral exploration and development, as well as an estimate of the acreage where such exploration and development would be restricted. On these tables, overlapping restrictions from different land-use allocations have been considered and, where this occurs, the highest restriction was used. Generally, Alternatives A and B and the No Action (NA) alternative provide more land with high and moderate potential for mineral exploration and development, as compared to the other alternatives. In contrast, Alternatives D, E, and the PRMP provide more protection for surface resources and could restrict some mineral exploration and development.

The irreversible and irretrievable commitment of resources would include the amounts of mineral commodities actually removed from the public lands.

Leasable Minerals

Under all alternatives, many of the lands in Land Tenure Zones 2 and 3, where land disposals or acquisitions could occur, have been classified as having moderate potential for the occurrence of oil and gas. If the mineral estate is retained by BLM in any disposal by exchange or sale, creating split estate situations; a minor negative impact would result from additional administrative requirements in permitting leasable mineral activity on the reserved mineral estate.

Under all alternatives, less than 0.05 percent of the lands in the operating area would be closed (nondiscretionary) to mineral leasing. As a result, over 99.95 percent of the lands would be open to mineral leasing under all alternatives. The partial revocation of the Horton Air Navigation Site withdrawal and modification of the Fern Ridge and Lookout Point Reservoir withdrawals would open those lands to mineral leasing under all alternatives.

Table 4-41 - Geothermal Availability by Alternative (1,000 Acres) - GIS Acres

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Nondiscretionary	Moderate	0	0	0	0	0	0	0
	Low/Unknown	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/Unknown	0	0	0	0	0	0	0
Open:	High	0	0	0	0	0	0	0
No Surface	Moderate	0	0	0	0	0	0	0
Occupancy[1]	Low/Unknown	7	4	6	10	16	20	177
Open:	High	0	0	0	0	0	0	0
Standard	Moderate	0	0	0	0	0	0	0
Lease Terms	Low/Unknown	236	266	222	19	98	30	0
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	0	0	0	0	0	0	0
Restrictions[2]	Low/Unknown	75	48	90	289	204	268	139

[1] Fall Creek Reservoir; Fern Ridge Reservoir; Lookout Point Reservoir; Oregon Islands National Wildlife Refuge; Tyrrell and Dorena Seed Orchards; Walton and Whites Creek Maintenance Sites, Progeny Test Sites (Alt. NA - E); Regional Forest Nutritional Study Installations (Alt. NA - E); Land Use Authorizations; Recreation Sites; Special Areas; Reconveyed Land not opened to locatable mineral entry (Alt. NA - E); VRM Class I lands (Alt. NA - E); bald eagle and marbled murrelet nest sites (Alt. NA - E); great blue heron rookeries; osprey nest sites; Riparian Reserves (PRMP).

[2] Special Recreation Management Areas; Suitable and Eligible Recreational Rivers; Powersite Withdrawals; Corps of Engineers Withdrawals; VRM Class II lands; Fragile Slopes; Riparian Management Areas (Alt. NA - E); mineral springs used by band-tailed pigeons; Federal Mineral Estate only; elk concentration areas (NA Alternative); Designated Mature Old Growth Forest Blocks (Alternative B); Old Growth Restoration and Retention Blocks (Alternative C); Habitat Conservation Areas for the northern spotted owl (Alternative D); Forest stands older than 150 years (Alternative E); Late Successional Reserves (PRMP); Special Status Species (PRMP).

Table 4-42 - Locatable Mineral Availability by Alternative (1,000 Acres) - GIS Acres

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Nondiscretionary[1]	Moderate	0	0	0	0	0	0	0
	Low/Unknown	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Closed:	High	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Discretionary[2]	Moderate	<0.1	<0.1	<0.5	1	1	1	6
	Low/Unknown	1.5	1.5	3	24	31	31	9
Open:	High	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Standard	Moderate	13	13	12	12	13	13	7
Requirements	Low/Unknown	285	285	283	262	255	255	281
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Restrictions[3]	Low/Unknown	13	13	14	13	13	13	9.5

[1] Fall Creek Reservoir; Fern Ridge Revervoir; Lookout Point Reservoir; Oregon Islands NWR; Dorena Seed Orchard; Walton Maintenance site; Other Lands with Acquired Land Status.
[2] Pending BLM applications for withdrawal; R&PP classifications; Danebo office site; Tyrrell Seed Orchard; Recreation Sites; Special Areas (Alt. A - PRMP); Whites Creek Maintenance Site.
[3] Progeny Test Sites; Regional Forest Nutritional Study Installations; Community Pits; Designated Recreational River segments; Threatened and Endangered Species; Special Areas (NA Alternative); Federal Mineral Estate only; Powersite Classifications (placer operations only).

Table 4-43 - Salable Mineral Availability by Alternative (1,000 Acres) - GIS Acres

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PRMP
Closed:	High	0	0	0	0	0	0	0
Nondiscretionary[1]	Moderate0	0	0	0	0	0	0	
	Low/Unknown	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Closed:	High	<1	0	0	0	0	0	<0.7
Discretionary[2]	Moderate	1	0	1	1	1	1	0.4
	Low/Unknown	7	14	16	24	43	61	8
Open:	High	3	3	2	2	2	2	<0.1
Standard	Moderate	9	10	9	7	9	8	<0.1
Requirements	Low/Unknown	226	253	221	9	101	41	0
Open:	High	0	0	1	1	1	1	3
With Additional	Moderate	2	2	2	4	2	3	12
Restrictions[3]	Low/Unknown	67	34	64	268	157	199	292

[1] Fall Creek Reservoir; Fern Ridge Reservoir; Lookout Point Reservoir; Oregon Islands National Wildlife Refuge.
[2] Danebo Office site; Tyrrell and Dorena Seed Orchards; Walton and Whites Creek Maintenance Sites; Progeny Test sites; Regional Forest Nutritional Study installations; R&PP Classifications; Recreation sites; Special Areas Except Low Elevation Headwaters of the McKenzie River (PRMP); great blue heron rookeries; osprey nest sites; VRM Class I lands (Alt. NA - E); Suitable and Eligible Recreational Rivers; All Special Areas (Alt. A - E); Riparian Management Areas (Alt. NA - E); bald eagle and marbled murrelet nest sites (Alt. NA - E).
[3] Federal Mineral Estate Only; Special Recreation Management Areas; VRM Class II lands; mineral springs used by band-tailed pigeons; Special Status Species; Suitable and Eligible Rivers; elk concentration areas (NA Alternative); Designated Mature Old Growth Forest Blocks (Alternative B); Old Growth Restoration and Retention Blocks (Alternative C); Habitat Conservation Areas for the northern spotted owl (Alternative D); Forest stands older than 150 years (Alternative E); Riparian Reserves (PRMP); Late Successional Reserves (PRMP).

In Chapter 2, many special leasing stipulations were described that would be used under the various alternatives. The No Surface Occupancy and Controlled Surface Use stipulations would be used in order to protect fragile surface resources. Compliance with the No Surface Occupancy stipulation on certain mineral leases, could result in additional expenses for the lessee to conduct exploration and/or development of the leasable minerals. Considering the road density on most lands in this District, it is not anticipated that the required use of existing roads on a lease with the Controlled Surface Use stipulation would present a significant negative impact to a lessee. Use of existing roads would actually result in a savings to the lessee, provided those roads accessed the necessary drill site. In the PRMP, large areas allocated as Late-Successional Reserves would be leased subject to a Controlled Surface Use (CSU) special stipulation. No lands on this District would be leased subject only to the standard lease terms under the PRMP, because the Special Status Species special stipulation would be attached to all leases. Timing stipulations used for some tracts of land under Alternatives NA, C, D, E, and the PRMP could add additional costs for the lessee in conducting operations on the leasehold.

For each stipulation in Appendix GG, there could be situations where those stipulations could be excepted, modified, or waived, so it is possible that the restrictive nature of some of them could be considerably reduced depending on the type of operation proposed. It is predicted that the oil and gas geophysical operations, drilling, and small field development could occur under all alternatives and that no exploration or development opportunities would be foregone by the industry under any of the alternatives. A lessee might incur additional costs under the more restrictive Alternatives C, D, E, and the PRMP where the CSU stipulations would be used on large tracts of land protected for biodiversity or habitat of the northern spotted owl. Under Alternatives A, B, C, D, E, the CSU stipulation would be used on leases containing Riparian Management Areas (RMA). This stipulation could restrict drill site construction and access to established roadways. Under the PRMP, oil and gas or geothermal activities would be highly restricted on large acres allocated for Riparian Reserves, due to the use of a No Surface Occupancy stipulation for those areas, as required in the SEIS/ROD.

With regard to geothermal resources, it is anticipated that drilling 2 temperature gradient holes and one geothermal well drilling operation would occur under all alternatives. It is anticipated that no exploration opportunities would be abandoned under any of the alternatives.

Locatable Minerals

Under all alternatives, the proposed revocation of the Fall Creek Reservoir (partial), Turner Creek Recreation Site, and Horton Air Navigation Site (partial) withdrawals would make 113 additional acres available for mineral exploration and possible development. Under all alternatives, lands within recreation sites, the Tyrrell and Dorena Seed Orchards, and office sites would be closed to mining claim location. Because most of these areas are believed to be within areas considered to have low potential for locatable mineral resources, it is not expected that these withdrawals would have a significant effect on forecasted mineral development.

Under Alternatives NA, A, and B, over 95 percent of the lands in the operating area would be open for locatable mineral operations. By comparison, over 89 percent of the lands are open under Alternatives C, D, and E. Alternatives C, D, and E provide for the closure of more lands with fragile surface resources by withdrawing those acres from mining claim location. Under the PRMP, approximately 95 percent of the lands in the operating area would be open for locatable mineral operations. Table 4-42 shows that approximately 15,000 acres of land would be closed to locatable mineral entry under the PRMP and of these, about 6,000 acres are considered to have moderate mineral potential, and about 300 acres are considered to have high mineral potential.

As described in Appendix II, the development of a silica sand deposit is forecasted under all alternatives. Under all alternatives, the existing Florence Sand Dunes withdrawal which affects the Cannery Dunes and the Heceta Sand Dunes ACEC parcels, precludes mineral exploration or development on 258 acres considered to have high potential for uncommonly pure silica sand. Exploration and mining operations for silica sand could occur on other lands with similar mineral potential under Alternatives NA, A, B, C, D, and E. These other lands would be proposed for withdrawal under the PRMP; however, if valid existing rights were established prior to the withdrawal, mineral exploration and development would not be prohibited.

Under Alternatives C, D, and E, the establishment the Sharps Creek Special Recreation Management Area, and under the PRMP, the establishment of the Row River Special Recreation Management Area (SRMA)

could limit future exploration opportunities for locatable minerals on certain acres of land located along Sharps Creek. The withdrawal of those acres from entry under the mining laws would prohibit the location of future mining claims. The withdrawal would have little effect on existing valid mining claims, with the exception that if the claimant did not file the required annual documents with the Oregon State BLM Office, the mining claim could not be relocated on those lands. A withdrawal would not prevent a mining operation on a valid claim. Because of this, and because placer gold exploration has been conducted on lands not proposed for withdrawal under these alternatives, mining a prospective bench placer deposit is not anticipated to be abandoned under any of the alternatives. Under Alternative C, D, E, and the PRMP, it is anticipated that there could be increased recreational mining activities along Sharps Creek, if existing mining claims were abandoned or if private landowners along the creek were willing to sell or exchange land to the BLM. The acquisition of approximately 700 acres along this part of Sharps Creek would probably reduce inadvertent trespassing by the public and simplify management of the recreation area.

With the establishment of other SRMAs under Alternatives C, D, E, and the PRMP, there would be an increase in the number of acres closed to locatable mineral entry as compared to the current situation. These discretionary closures are reflected in Table 4-42.

Under Alternatives B, C, D, E, and the PRMP, if suitable recreational rivers are designated by Congress, any mining claims eventually patented could only pertain to the mineral estate, and the surface estate would remain in public ownership. Two of the suitable river corridors (Siuslaw A, Siuslaw B) are in areas considered to have low potential for locatable mineral resources, and it is anticipated that there would be little effect on locatable mineral exploration and development by the recreational river designation under these alternatives. A portion of the McKenzie A river segment is considered to have moderate potential for locatable mineral resources, but there has been little or no interest in the area by the mining industry. For this reason, it is anticipated that there would be little effect on locatable mineral activities in this area by the recreational river designation under these alternatives. Also, under these alternatives, the Mohawk Research Natural Area/Area of Critical Environmental Concern (RNA/ACEC) and the McGowan Creek Environmental Education Area (EEA) would be withdrawn from locatable mineral entry. These withdrawals would prohibit exploration or development of 371 acres considered to have moderate potential for zeolites. Zeolites have been reported to occur as small (1 to 2 inch) specimens in the volcanic rock in this area, but mining claims have never been filed there in the past.

Under the PRMP, withdrawal of the Proposed Low-Elevation Headwaters of the McKenzie River Special Area would prohibit exploration or development of approximately 5,200 acres considered to have moderate potential for gold and silver. Hand samples collected from the area have indicated metallic minerals could occur in small veins in the volcanic rock there, but mining claims have never been filed in this area in the past.

Salable Minerals

Under all alternatives, salable mineral activities may be impacted by the occurrence of threatened and endangered plants or animal species at developed or prospective quarry sites. Under all alternatives, there could be seasonal restrictions to salable mineral extraction from any quarry located near protected wildlife nest sites.

There are currently no sand and gravel operations on any of the lands in the operating area. For this reason, the protection of Riparian Management Areas under Alternatives A, B, C, D, and E is not anticipated to have any effect on the salable minerals of sand and gravel. At several locations there are existing rock quarries within RMAs, but these quarries could probably be used without impairing the existing riparian values. Salable mineral development can occur within Riparian Reserves under the PRMP only if Aquatic Conservation Strategy (ACS) objectives can be met. Because existing salable mineral sites within Riparian Reserves on this District are rock quarries, rather than sand and gravel sources, the restriction would probably have little effect on quarrying operations in those areas.

The restriction to timber harvesting in certain areas under many of the alternatives could have a significant impact on the availability of some rock quarries for site expansion. New quarry site development or the expansion of existing quarry sites would not be allowed where the vegetation is to be protected in the following areas: designated mature and old growth forest blocks (Alternative B), old growth restoration and retention blocks (Alternative C), habitat conservation areas for the northern spotted owl (Alternative D), and forest stands older than 150 years (Alternative E). In the PRMP, salable

mineral sources could be developed in Late Successional Reserves if detrimental effects to the late successional habitat could be minimized. Salable minerals could be removed from within the boundaries of existing sites in these areas.

Under Alternatives NA, C, D, E, and the PRMP, the designation of SRMAs could effect the availability of existing and potential salable mineral resources in those areas. The use of salable mineral resources from sites within the boundaries of an SRMA would be reviewed on a case-by-case basis by the Authorized Officer, and if the impacts were acceptable, then the salable mineral site could be utilized.

It is anticipated that the development of two new quarry sites would be foregone under Alternatives D and E, primarily due to the decreased demand for salable minerals under these alternatives.

Effects on Socioeconomic Conditions

Introduction

Each alternative analyzed in this PRMP/FEIS proposes varying management prescriptions that would alter the production of commodity outputs and other natural resource values associated with BLM administered lands. Alternatives NA and A, B, C, D, and E have been carried forward from the Draft RMP/EIS and reanalyzed within the context of changed U.S. Forest Service (USFS) management direction specified in the *Final Supplemental Environmental Impact Statement (SEIS) 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 (ROD)*. While the alternatives only represent actions that 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. To estimate what future actions are likely to occur on USFS lands, and 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 (FEMAT) and the SEIS and decisions in the SEIS/ROD.

No estimates have been made of the economic contributions to local personal income and employment by 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.

Resource Uses

The availability of commodities, natural resources, and opportunities would be altered by each alternative. Commodity uses generate measurable economic activity, within and beyond the District. These activities include timber production and harvest, mining, recreation, special forest products, and fish production.

Natural resources also have values that do not generate measurable economic activity within markets. These nonmarket values include: scenic areas, water quality, and quantity, recreational use, nature study, cultural and subsistence hunting and gathering, and cultural resources. These values are held by people who want certain resources or opportunities to remain available on BLM administered lands. 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.

Timber

Timber markets within the Pacific 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 USFS 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 USFS's Forest Plans and BLM's 1992 Draft RMP/EIS 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 PRMP.

Future timber price projections were required in this PRMP to conduct portions of the analysis relating to employment, income, and county revenues. This 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 E, *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 USFS 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 Pacific 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 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, USFS, 1994). Many of these forestry services jobs, however, are low paying and cannot replace the wages associated with higher paying jobs in logging and millwork (Richardson, 1993).

Recreation

Each alternative in the PRMP identifies management actions that would favor certain types of recreation, or constrain development of recreation sites and facilities. Of all BLM Districts in western Oregon, the Eugene District is expected to experience some unmet demands for recreation on its lands (See Recreation, Chapter 4). All alternatives would meet demands for nonmotorized travel, camping, other land-base uses, fishing, boating, and water-based uses. These constraints would change the amount of recreation-dependent personal income and employment attributable to BLM administered lands in the Eugene 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

Assuming sustainable resource production can be maintained, demand for all Special Forest Products (SFP) would be met under Alternatives NA, A, and B (see SFP section, Chapter 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 SFPs may or may not be met under these alternatives, depending upon management objectives for other resources and sustainability of resource production.

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 explicitly to collect SFPs. Anecdotal evidence suggests that unemployed wood products workers are also participating in commercial collection.

Permitted collection of SFPs would be encouraged under all alternatives and may enhance local economies.

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 Eugene District. Table 4-51 provides a summary of measurable outputs under each alternative in the Eugene District. These quantities represent values associated with BLM management actions under each alternative and were used to estimate dependent personal income and employment. Table 4-52 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 Eugene District 1.1 million cubic feet per year of timber might be removed from various reserves, providing additional wood supply income and employment.

TABLE 4-51 - Summary of Measurable Annual Outputs by Alternative in the Eugene District

	BASE	NA	A	B	C	D	E	PRMP
Timber Harvest (MMCF)	38.37	34.98	54.50	50.34	14.14	16.38	16.55	6.22
Non-Resident Recreational Use[1]								
Fishing (Angler Days)	15,900	13,450	8,970	8,970	15,690	17,930	17,390	19,060
Hunting (Hunter Days)	4,800	6,040	6,040	6,040	6,040	6,040	6,040	6,040
Non-Consumptive (User Days)	239,100	218,490	197,250	197,250	247,880	279,110	279,110	294,290
Tmber Management Activity ($MM)	N/A	3.318	4.499	3.087	1.098	1.281	1.254	0.623

[1] Hospodarsky, 1989. Pacific Northwest Outdoor Recreation Consumption Projection Study: Oregon Project Final Report. Elxenburger, 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.

Table 4-52 - Estimated Dependent Personal Income And Employment By Alternative

Personal Income, Millions (1989 Dollars)	1984-1988	Alternatives NA		A		B		C		D		E		Prmp	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Total	21.533	48.935	20.690	47.521	31.000	71.624	28.358	65.417	9.140	21.005	10.840	24.228	10.917	24.403	5.428	11.560
Farm	0.003	0.042	0.003	0.051	0.002	0.071	0.002	0.063	0.003	0.026	0.003	0.030	0.003	0.030	0.003	0.019
Nonfarm	21.530	48.555	20.688	47.123	30.997	71.041	28.356	64.892	9.137	20.818	10.837	24.013	10.913	24.187	5.425	11.443
Ag. Serv., For., Fish., & Other	0.002	1.043	1.048	2.010	1.419	2.912	0.974	2.349	0.348	0.741	0.406	0.861	0.397	0.857	0.199	0.375
Mining	0.000	0.006	0.000	0.006	0.000	0.008	0.000	0.007	0.000	0.003	0.000	0.004	0.000	0.004	0.000	0.003
Construction	0.000	1.095	0.000	1.020	0.000	1.556	0.000	1.433	0.000	0.442	0.000	0.511	0.000	0.515	0.000	0.229
Manufacturing	19.954	32.541	18.191	29.741	28.280	46.200	26.081	42.663	7.241	12.149	8.593	14.067	8.680	14.209	3.290	5.417
Nondurable Goods	0.101	0.732	0.092	0.725	0.081	1.006	0.081	0.922	0.104	0.412	0.117	0.470	0.117	0.472	0.124	0.324
Paper & Allied Products	0.000	0.018	0.000	0.018	0.000	0.026	0.000	0.023	0.000	0.009	0.000	0.010	0.000	0.010	0.000	0.006
Durable Goods	19.853	31.809	18.099	29.016	28.199	45.195	26.000	41.741	7.136	11.738	8.475	13.597	8.563	13.738	3.167	5.093
Lumber & Wood Products	19.853	31.569	18.099	28.785	28.199	44.844	26.000	41.420	7.136	11.638	8.475	13.481	8.563	13.621	3.167	5.040
Transportation & Pub. Utilities	0.206	2.574	0.190	2.546	0.169	3.693	0.200	3.372	0.124	1.271	0.240	1.458	0.240	1.466	0.253	0.857
Wholesale Trade	0.032	0.132	0.029	0.129	0.026	0.171	0.000	0.158	0.033	0.083	0.037	0.094	0.037	0.095	0.039	0.073
Retail Trade	0.412	2.219	0.381	2.319	0.342	3.198	0.300	2.897	0.430	1.307	0.482	1.492	0.481	1.496	0.507	1.034
Finance, Insurance & Real Estate	0.000	1.625	0.000	1.713	0.000	2.528	0.000	2.270	0.000	0.780	0.000	0.898	0.000	0.903	0.000	0.470
Services	0.925	7.318	0.849	7.638	0.761	10.776	0.800	9.741	0.961	4.041	1.080	4.627	1.078	4.643	1.137	2.986
Government	0.000	0.338	0.000	0.347	0.000	0.512	0.000	0.462	0.000	0.161	0.000	0.185	0.000	0.186	0.000	0.098
Federal, Civilian	0.000	0.222	0.000	0.228	0.000	0.335	0.000	0.303	0.000	0.107	0.000	0.123	0.000	0.124	0.000	0.067
State And Local	0.000	0.116	0.000	0.119	0.000	0.177	0.000	0.160	0.000	0.054	0.000	0.062	0.000	0.062	0.000	0.031

Employment (Jobs)	1984-1988	Alternatives NA		A		B		C		D		E		Prmp	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Total	1,053	2,457	1,264	2,677	1,812	3,934	1,586	3,509	594	1,214	683	1,398	684	1,403	393	735
Farm	1	9	1	11	1	16	1	14	1	6	1	7	1	7	1	4
Nonfarm	1,053	2,430	1,263	2,648	1,812	3,893	1,586	3,472	593	1,200	682	1,382	684	1,387	392	726
Ag.Serv., For., Fish., And Other	0	203	303	491	411	702	282	550	100	177	117	205	115	204	57	91
Mining	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	28	0	27	0	40	0	37	0	12	0	13	0	13	0	6
Manufacturing	901	1,219	822	1,115	1,277	1,730	1,180	1,598	336	458	389	530	393	534	150	207
Nondurable Goods	6	34	5	34	5	47	5	43	6	20	7	23	7	23	7	17
Paper & Allied Products	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Durable Goods	896	1,185	817	1,081	1,272	1,683	1,175	1,555	330	438	382	507	386	512	143	190
Lumber & Wood Products	896	1,172	817	1,069	1,272	1,665	1,175	1,538	330	432	382	501	386	506	143	187
Transportation & Pub. Utilities	8	97	7	96	6	140	6	127	8	48	9	55	9	55	9	32
Wholesale Trade	1	25	1	24	1	35	1	32	1	11	2	13	2	13	2	7
Retail Trade	34	183	32	192	28	265	28	240	36	108	40	124	40	124	42	86
Finance, Insurance & Real Estate	0	99	0	105	0	154	0	139	0	48	0	55	0	56	0	29
Services	108	577	99	599	89	826	89	749	112	339	126	387	126	388	133	269
Government	0	17	0	18	0	26	0	24	0	8	0	10	0	10	0	5
Federal, Civilian	0	8	0	8	0	12	0	11	0	4	0	5	0	5	0	3
State And Local	0	9	0	9	0	14	0	13	0	4	0	5	0	5	0	3

Source: USDI,BLM 1989b

Table 4-53 - Estimated Dependent Personal Income And Employment By Alternative, Western Oregon BLM

Personal Income, Millions (1989 Dollars)	1984-1988	Alternatives NA		A		B		C		D		E		Prmp	
	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)	1984-1988	Alternatives NA		A		B		C		D		E		Prmp	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
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., & 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

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. 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 4-53 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 10 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 9 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 projected to experience less than 10 percent reductions in timber industry employment from the 1990 level.

County Revenues

Future prices for timber stumpage in the Pacific 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. Pacific Northwest timber prices are expected to increase from the baseline period, as supplies from Federal lands decrease.

Table 4-54 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 decrease in 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 4-54 does not incorporate this legislation into the estimates displayed, as it is subject to revision by Congress.

Payments in Lieu of Taxes (PILT), 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

TABLE 4-54 - Projected O & C Payments to Counties Attributable to Timber Harvest in Western Oregon (millions 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	$0.724
Clackamas	$3.478	$7.213	$9.403	$8.558	$2.670	$3.005	$2.203	$1.430
Columbia	$1.302	$2.667	$3.490	$3.176	$0.991	$1.115	$0.818	$0.531
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	$0.941
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	$0.929	$0.603
Lane	$9.627	$19.845	$25.870	$23.545	$7.346	$8.268	$6.061	$3.935
Lincoln	$0.234	$0.468	$0.610	$0.555	$0.173	$0.195	$0.143	$0.930
Linn	$1.669	$3.431	$4.473	$4.071	$1.270	$1.429	$1.048	$0.680
Marion	$0.919	$1.897	$2.474	$2.251	$0.702	$0.791	$0.580	$0.376
Multnomah	$0.685	$1.417	$1.847	$1.681	$0.524	$0.590	$0.433	$0.281
Polk	$1.359	$2.807	$3.659	$3.331	$1.039	$1.170	$0.857	$0.557
Tillamook	$0.355	$0.728	$0.949	$0.863	$0.269	$0.303	$0.222	$0.441
Washington	$0.398	$0.819	$1.067	$0.971	$0.303	$0.341	$0.250	$0.162
Yamhill	$0.460	$0.936	$1.220	$1.110	$0.346	$0.390	$0.286	$0.186
Total	$63.414	$129.950	$169.420	$154.191	$48.105	$54.145	$39.694	$26.904
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.

exchanges or disposals are evaluated as they are proposed, and are not included in this document.

Approximately 5 percent of the revenues generated by Public Domain (PD) 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 PSQs, 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 PD 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.

After examining the impacts of reduced timber harvest on BLM and USFS 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 4-54, 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).

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, USFS, 1994). In the Pacific Northwest, timber or forest dependence has been identified as a destabilizing factor due to recent changes in forest management (BLM, USFS, 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/EIS 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 was designed to identify 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; Native American representatives; city, County and State officials; social service and development administrators; timber interests; and environmental professionals.

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.

Richardson's interviews produced differing stories about urban and rural Lane County. People most familiar with the Eugene/Springfield area cited its growing economic diversity as the main reason why recent job losses in the lumber and wood products sector would not have profound socioeconomic effects on the region in general. People most familiar with small towns in the County, however, felt the consequences from the 1990 recession and the proposed BLM reductions in timber harvest were much more serious. It should be noted that timber dependency is not perceived uniformally within small towns. One individual interviewed claimed that "timber has died," while other people thought some communities were still highly timber dependent (Richardson, 1993).

Those Interviewed felt that timber-related unemployment effects did ripple though the economies of small towns, causing property values to drop as mills closed (Richardson, 1993). They also anticipated many losses in community services associated with County revenue reductions. Cutbacks in County health clinics and law enforcement were specifically identified.

In general, local residents receive the greatest quantity of tangible and intangible benefits from BLM lands. Thus, local residents are most likely to be strongly affected, positively and negatively, by changes in BLM resource management activities. The direction and intensity of the effects would vary with individuals' personal uses and values for the lands. People are affected in many aspects of their lives - as workers, as members of families and communities, as consumers, and in their relationships with other people and the environment. The effects of BLM management on people occur in the context of existing socioeconomic processes. The BLM has little control over many of these processes, but these processes can both magnify and reduce the intensity of the BLM's socioeconomic effects.

A person's work can provide both income and an important source of identify; thus the loss of employment can bring economic and psychological hardship to individuals, their families, and their communities. Unemployment in the Oregon timber and wood products industries in the 1980s and 1990s has had these effects. The timber harvest levels proposed in the PRMP would support lower levels of employment in the wood products industry than were supported by harvests in the 1980s.

The causes of job losses in the wood products industry over the past decade are multiple, and include recessions in the early 1980s and 1990s, changes in worker productivity, and court injunctions on timber sales from Federal lands. Although workers in the industry have adapted to fluctuating employment caused by economic and business cycles, job losses caused by changing Federal policies appear to be permanent, rather than temporary in nature. For people who do not believe that reductions in Federal harvest levels are warranted, current and projected unemployment in the wood products industry is a source of great distress.

The interacting factors that are contributing to job losses in the wood products industry make it difficult to measure the specific effects of BLM management. However, the high visibility of changes in Federal forest management compared with these other factors lead many people to attribute unemployment in the wood products industry solely to BLM and Forest Service harvest levels.

Despite the common focus on timber in discussions of Federal forests, the BLM contributes to employment and income in the District in many ways. Environmental quality is vital to many aspects of

Oregon's economy, e.g., tourism, commercial fishing, and seafood processing, and the ability to attract new business and good workers. Retirees moving to Oregon also contribute to local economies. As the BLM contributes to improvements in environmental quality, it would be contributing to the growth of these economic sectors in the State and in local communities.

The BLM provides economically valuable infrastructure, e.g., roads, utility corridors, and communication sites, and water supplies for people throughout the District. Water quality is predicted to improve under the PRMPs.

Special forest products are rapidly increasing in economic importance. But much information about the scale, environmental effects, and economic value of collections remains anecdotal. The probable effects of the PRMP on special forest products collectors is unclear, but BLM managers anticipate increasing regulation in the coming year.

Many timber-producing areas in the District are actively seeking to diversity their economies, often focusing on tourism and retirement services. However, average wages in retail trade and services, which are the fastest growing economic sectors in the State, are much lower than wages in the timber industry. For Oregon, in 1990 the average annual wage in lumber and wood products manufacturing was $25,104; in services, it was $18,757; in retail trade it was $12,594.

Revenues from BLM timber sales have historically provided most payments to counties, but Congress has provided safety net payments during the 1990s as court injunctions have restricted the sale of timber from BLM lands. The effects of BLM management on County revenues would be mitigated if the Federal government chooses to continue safety net payments.

If County revenues drop, residents would suffer as services that they use are cut back or eliminated. County residents may be affected if law enforcement and emergency services, parks, and libraries, and maintenance of roads and other infrastructure are reduced. Reduction in services such as health clinics and food banks may occur - at the same time as demand for these services increase due to unemployment in the timber industry.

Unemployment has been linked with increases in drug and alcohol abuse, domestic violence, and stress-related physical and mental health problems, among other negative consequences. As wood products jobs have declined in many rural communities over the past 13+ years, many workers have left those communities, stretching or breaking ties with family and friends who remained. At the same time, many of these rural areas have been experiencing influxes of retirees and other new migrants, who have brought new ideas and expectations for forest management with them.

Many traditionally timber-producing families and communities feel that their way of life and many of their basic values are threatened by changes that have been occurring, and by their perceptions of negative stereotypes of loggers and millworkers in the media.

For many rural and urban residents of the District, the PRMP is a step in the right direction, but does not go far enough to protect the environment and to remedy perceived environmental damage from past management practices. This is especially true for those who have values tied to protecting all remaining old growth forests.

People on all sides of resource management issues in the District care deeply about forests and the natural environment, but they can have differing ideas about how that care is best expressed. The PRMP would benefit people whose aesthetic, cultural, and spiritual values are fulfilled by environmental preservation and some forms of recreation. For people who also express personal values and find meaning through working the land, the PRMP would provide less recognition of this way of appreciating the natural environment. Thus, some people would gain and others would lose in the quality of their relationships with the natural worlds, as the PRMP provides more opportunities for preservation and recreation uses and fewer opportunities for timber management.

Effects on Rural Interface Areas

Resource management activities such as road construction, timber harvest, and minerals development can adversely affect neighbors living in Rural Interface Areas (RIA). In turn, the reactions of neighbors to those activities can create opportunity costs (e.g., decisions to defer or not harvest timber) or additional administrative costs for BLM in managing resources. As explained in Chapter 3, RIAs have been defined for analytical purposes in

terms of acres of BLM administered lands within one-quarter and one-half mile of rural residential areas. It is understood that not all those living in the RIA would have or would express concerns about BLM's resource management practices, and that there are neighbors living outside these analytical RIA who may express concerns. In the discussions below, the potential number of expressed concerns and additional costs to BLM are treated as if they would be directly proportional to the number of acres affected by resource management activities.

Alternative A would provide the highest level of timber harvest and road construction. No special timber management actions or mitigation measures would be required under this alternative, and potential mineral development would be only minimally constrained. The potential for expressed concerns is expected to be relatively high compared to other alternatives, in proportion to the amount of activity and the number of acres affected.

Alternative B would provide a high level of timber harvest. Special timber harvest mitigation measures would be used within one-quarter mile of areas zoned for 1 to 5-acre lots. The potential for expressed concerns is expected to be somewhat lower than under Alternative A because of the special practices and because approximately 10 percent fewer acres would be affected.

Alternative C would provide the lowest level of timber harvest of all the alternatives. Special timber harvest mitigation measures would be used within one-quarter mile of areas zoned for 1 to 20-acre lots. The potential for expressed concerns is expected to be significantly lower than under Alternative B because of the special practices and because nearly one-third fewer acres would be affected by timber management actions.

Alternative D would provide a fairly low level of timber harvest. Special timber harvest constraints would be used within one-quarter mile of areas zoned for 1 to 20-acre lots. The potential for expressed concerns is expected to be the lowest of all the alternatives because of the special practices and because this alternative proposes the least number of acres to be affected by timber management actions.

Alternative E would provide a level of timber harvest only slightly lower than Alternative D and provide timber management constraints within one-half mile of private lands zoned for 1 to 20-acre lots. The number of expressed concerns is expected to be roughly comparable to those expressed under Alternative D. More acres would receive special practices than under any other alternative; however, nearly 10 percent more acres would be affected under Alternative E than under Alternative D.

The "no burning" criteria under Alternatives D and E could lead to increased fire hazard situations in RIA. If significant amounts of logging slash and understory vegetation were left in harvest units, a wildfire could quickly burn through the units and make it difficult to protect nearby homes and other improvements from damage or destruction. Although mitigation measures are possible (e.g., mechanical removal or chipping of slash and cutting of understory vegetation), the fire hazard would remain higher than normal due to the quick regrowth of understory vegetation.

The PRMP proposes approximately 116 acres of timber available in the first decade to be regeneration harvest and 90 acres available for commerical thinning within one-half mile of 1-20 acre zoned areas. In General Forest Management Areas (GFMA), special timber harvest mitigation measures would be considered when operating within mapped RIAs. The amount of expressed concerns due to this potential activity and proposed mitigation is expected to be low-to-moderate compared to Alternative A.

Locatable mineral development, if it occurs in RIA, could have long term and unavoidable impacts.

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 Native American groups, as 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 these other agencies, the Proposed Resource Management Plan (PRMP) 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 forestwide land use plans for the adjacent National Forest(s)

- 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 & 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
  - Fish and Wildlife Service Determination of Critical Habitat for the Northern Spotted Owl
  - Proposed Critical Habitat for the Marbled Murrelet
  - Pacific Recovery Plan for the Peregrine Falcon
  - Lomatium bradshawii Recovery Plan

- 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 Commission rules and statutes
- Department of Human Resources, Health Division, standards for public water systems

- Department of Agriculture
  - Weed control plans
  - State-listed endangered plan species (see Effects on Special Status Species)

- Division of State Lands
  - Removal - Fill Law
  - Natural Heritage Program (See Chapter 4, 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 as follows:

Consistency with the Department of Environmental 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 perhaps, BLM can lessen the cumulative impacts by scheduling its timber sales to occur at different periods than most of the anticipated private timber harvest.

Consistency with the Department of Fish and Wildlife's many plans, policies, rules, and objectives is addressed in Appendix J.

Consistency with the Board of Forestry's Forestry Program for Oregon (FPFO) is complex, due to the diversity of goals of the FPFO. Specificity regarding consistency with the 5 FPFO objectives is provided in Appendix J.

The PRMP would designate one new potential Research Natural Area identified in the Natural Heritage Program, which is administered by the Division of State Lands, and would thus be consistent with that program (see Effects on Special Areas for further discussion).

The PRMP 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 (LCDC), through the Department of Land Conservation and Development, is variable among the 16 goals for which District BLM plan consistency is relevant. Oregon's land use program was enacted 21 years ago. Today a complex body of land use policy and goal interpretations exists due to the acknowledgment process, goal amendments, LCDC 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 J. That discussion also addresses consistency of BLM's Proposed RMP with the goals established for the Oregon Coastal Management Program (OCMP).

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 for affected Federal agencies making consistency determinations under the OCMP in accordance with the (Federal) Coastal Zone Management Act (CZMA). All applicable local government plans have been acknowledged by LCDC to be in conformance with the CZMA and all State agency programs and activities have been certified by LCDC to be in conformance with the CZMA. 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 CZMA 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 maximum 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 whenever the agency has discretion under Federal law to abide by State policies. The CZMA does not, however, impose a higher duty on Federal agencies than the State requires of its own agencies. The OCMP 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 OCMP. Although Federal lands are excluded from the boundaries of the coastal zone, the "directly affecting" provision requires Federal agencies to examine their activities for off-site 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 Lane, Linn, Benton, and Douglas Counties could be affected by BLM's Eugene District RMP.

The District has contributed data for development of Lane 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 Eugene 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

- Guidelines for the protest process
- Demographic summaries of comment responses on the Draft RMP/EIS

Introduction

The Eugene District Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) was prepared by an Interdisciplinary Team of specialists from the District Office with assistance from the Oregon State Office. Although the actual writing of the Draft RMP/EIS (published August, 1992) began in early 1990, an elaborate process that began in 1986 preceded the writing phase. The planning process involved many steps (see Chapter 1, Planning Process Overview), with public participation as well as consultation and coordination with many agencies and organizations.

This chapter has been revised since publication of the Draft RMP/EIS and includes a Summary of Major Changes from the Draft EIS; guidance for the protest process; consistency review; public involvement prior to and subsequent to publication of the Draft RMP/EIS; a tabular summary of comments received on the Draft; a list of agencies and organizations contacted during the planning stages and development of the Draft and this PRMP/Final EIS; a list of agencies and organizations to whom copies of the PRMP/FEIS have been sent; and a list of Preparers and Authors of this document.

Protest Process

The Resource Management Planning process includes an opportunity for administrative review of proposed decisions by a plan protest if you believe the approval of a proposed RMP would be in error (see 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 the planning process leading to this Eugene District RMP may protest. If records indicate that you have not had any involvement in any stage in the preparation of the proposed Eugene District RMP, your protest will be dismissed without further review.

A protesting party may raise only those issues that they submitted for the record during the planning process. New issues raised in the comment/protest period should be directed to the Eugene District Manager for consideration in plan implementation, as potential plan amendments, or as otherwise appropriate.

The period for filing a plan protest begins when the Environmental Protection Agency publishes its Notice of Availability for the Eugene District's PRMP/FEIS in the Federal Register. The protest period extends for 30 days. There is no provision for any extension of time. To be considered "timely," the protest must be postmarked no later than the last day of the comment/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)
Bureau of Land Management
1849 C Street, NW
Washington, D.C. 20240

In order to be considered complete, the 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 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 (i.e., meeting minutes or summaries, correspondence, etc.). A protest that merely expresses disagreement with the Oregon/ Washington State Director's proposed decision, without any data, will not provide BLM 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.

Consistency Review

Prior to approval of the PRMP/FEIS, the State Director will submit this plan to the Governor of the State of Oregon and request the Governor 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 this 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.

Public Involvement Prior to Publication of the Draft RMP/EIS

Public involvement has been an integral part of BLM's Resource Management Plan (RMP) process from the outset. To date public involvement activities have included a series of information mailers or brochures, public meetings, open houses, 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, which should be conducted in the planning process (see Appendix JJ, Summary of Scoping).

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 RMP process. 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.

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 suggested element of planning criteria by identifying a proposed timber harvest computer model, and an opportunity for public comment on the model.

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.

In January 1988 a mailer was distributed to inform the public of the upcoming availability of the State Director Guidance Document. Interested people 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. 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.

In January 1991 the Analysis of the Management Situation (AMS) was made available to the public at the District Office and copies of the Summary of the Analysis of the Management Situation were distributed to the public upon request. An open house was held in February 1991 to answer

questions and gather public comments. Thirty-three comments were received from the public by March 1991.

Public Involvement Following Publication of the Draft RMP/EIS

Statewide Public Involvement

There were a number of formal briefings of non-BLM groups and individuals, as well as informal meetings that covered all 6 western Oregon Draft RMPs. These meetings and briefings usually were coordinated by the Oregon State Office of BLM, although the formal briefings were led by past Eugene District Manager, Ron Kaufman. The following is a list of all Western Oregon briefings held by State Office personnel for all six western Oregon District RMPs.

District Public Involvement

The Eugene District Draft RMP/EIS was released for public review on August 28, 1992. The Federal Register Notice was printed on August 27, 1992 (Vol. 57 No. 167 pg. 38853).

As part of the planning process, the Eugene District solicited public comments on its Draft RMP/EIS. Based on comments received, the BLM made changes to its Draft RMP/EIS and issued the Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS).

During the 120-day comment period extending from August 21 to December 21, 1992, the District received 1,272 comment letters. The District continued to accept comment letters past the official closing date of the comment period and tried to consider these comments as much as possible. All of the original letters are on file at the Eugene District Office and are available for public review.

7/20/92	U.S. Fish and Wildlife Service, Portland
8/6-13/92	U.S. Forest Service, Washington D.C.
	Senator Bob Packwood
	Senator Mark Hatfield (staff)
	Senator Slade Gordon (staff)
	Congressman Les AuCoin (staff)
	Congressman Norm Dix
	Congressman Peter DeFazio (staff)
	Congressman Peter Kopetski
	Congressman Bob Smith
	Congressman Ron Wyden
	BLM Washington Office Staff
	Assistant Secretary of the Interior and Staff
	Professional/Conservation Groups, Washington D.C.
	House Interior Appropriations Staff
	Senate Interior Appropriations Staff
8/19/92	O&C Counties Executive Board
8/20/92	Environmental Groups (Oregon)
	Industry Associations (Oregon)
8/28/92	District Advisory Council
9/08/92	Governor's Forest Planning Team
9/16/92	Scientific Review Panel
9/17/92	Willamette Timbermen
9/22/92	Lane County Tax Equalization Group
10/06/92	U.S. Forest Service, Willamette National Forest
10/08/92	Oregon State University Faculty
10/09/92	Willamette Forestry Council
10/21/92	Society of American Foresters, Portland
10/26/92	Society of American Foresters, Eugene
10/27/92	University of Oregon Faculty
11/02/92	University of Washington Faculty
11/10/92	Society of American Foresters, Roseburg

The District comments were received through individual letters, personal contacts, petitions, and public meetings. They were analyzed so that meaningful changes could be made to the Preferred Alternative (PA) and in the development of the PRMP/FEIS. Substantive comments were the most useful to the BLM in development of the Proposed RMP, although all preferences and opinions were considered. Substantive comments were those indicating

- errors in analysis,
- new information that would have a bearing on the analysis,
- misinformation that may have been utilized and could have affected the outcome of the analysis,
- requests for clarification, and
- support of an existing alternative or definition of a substantive new alternative within the range of alternatives considered.

Each comment was considered valuable whether "substantive" or otherwise; opinions, feelings, suggestions, and observations were also considered. Each comment was weighed on its own merit against legal, technical information, resource capability, and public opinion. The use of public comments was not a vote-counting process.

The National Environmental Policy Act of 1976 (NEPA) requires BLM to respond to substantive comments received during a comment period. Responses to the substantive comments are in Appendix KK.

Public Meetings (District)

The Eugene District had 4 open houses to dispense information, answer questions, and solicit input regarding the Draft RMP/EIS. They were attended by 117 people who were asked to submit written comments. In addition, several other meetings were held with the Eugene District Advisory Council. Table A is a list of the dates, meetings, and open houses where BLM staffers met to discuss the Draft RMP/EIS.

Table A Public Meetings

Date	Number Attending	Meeting
08/28/92	8	Eugene Advisory Council
09/30/92	35	Open House, Eugene District Office
10/02/92	7	Eugene Advisory Council
10/07/92	11	Open House, Florence, Oregon
10/22/92	2	Open House, Cottage Grove, Oregon
10/28/92	47	Open House, Leaburg, Oregon
11/13/92	7	Eugene Advisory Council
Total	117	

Demographics

The District received 1,272 letters: 1,169 were individual letters, 3 were petitions, 4 were resolutions, and 946 were form letters with a total of 2,718 signatures. Most letters had more than one comment; there were 2,157 separate comments. Of the 2,157 comments, approximately 248 were substantive comments and 1,909 were preference/ opinion comments.

The District received letters from 4 States: California, 49; Indiana, 1; Oregon, 1,216; and Washington, 6. All 1,272 letters received were recorded into a dBase computer program.

Form letters made up 46 percent of the total letters received. The District received 4 different form letters. They included 113 from Environmental Groups and 896 from the Timber Industry.

Table B tabulates the response type, the number of comments received on Eugene's Draft RMP/EIS, and the number of signatures on the respective correspondence.

Table B - Summary by Type of Response

Response Type	Responses Number	Signatures Number
Comment Sheets	2	2
Form Letter	946	947
Letter	316	434
Petition	3	1,294
Resolution	4	40
Other	1	1
Total	1,272	2,718

Table C tabulates and summarize some of the demographic information about the comment letters received by the Eugene District on its Draft RMP/EIS.

Table C - Summary by Type of Respondent

Respondent Type	Responses Number	Signatures Number
Affiliated with Organization	84	1,478
Federal government	6	6
Individual	1,169	1,219
Local government	8	10
State government	5	5
Total	1,272	2,718

The following list tabulates the number of comments according to major topics or resource elements addressed in the comment letters. Preferred Alternative comments addressed resource topics and, therefore, were coded in the dBase to those resource programs contained in the following list.

Topic	Number of Comments
Access	1
Air Resources	15
Biological Diversity	34
Cultural Resources	3
Energy & Minerals	51
Fire	4
Fish	15
Hazardous Mat/Noxious Weeds	1
Lands, Rights-of-Way, Withdraw	18
Livestock Grazing	1
Recreation	28
Riparian Resources	35
Roads	14
Rural Interface Areas	19
Socioeconomic Conditions	115
Soil Resources	4
Special Areas	63
Special Status Species	98
Timber Resources	340
Vegetation	14
Visual Resources	16
Water Resources	44
Wild and Scenic Rivers	23
Wildlife	63
RMP/EIS (General)	59
Ecosystem Management	31
Withdrawals	1
Consistency w/ Agency Plans	8
Require Further EA	2
Use of Completed Plan	5
Mgt. New Acquired Lands	1
Monitoring	15
Research	1
Environmental Form Comments	113
Industry Form Comment—Yellow	285
Timber Industry Form Letter	43
Willamette Forest Council—Form Letter	568
Other	6
Total	2,157

Comment Analysis Process

The Eugene District began receiving public comment letters soon after release of the Draft RMP/EIS. Each letter received a date stamp and an identification number. Immediately following this process all letters were entered verbatim into a dBase.

The westside Oregon Districts were required to record demographics for all letters received. The demographics included the name, organizational title, address, type of respondent, type of response , and number of signatures on each letter. All letters were read by management and the RMP Team to identify substantive comments and preferences/opinions.

Following this process, each comment was coded and entered into the dBase. This process provided computer generated reports such as the number of comments by topic, a summary of types of responses, the number of signatures by type of response, and a list of respondents. These reports can be found in this chapter and in Appendix KK.

Summary of Draft SEIS Public Comment Analysis

The following is a brief summary of the public comments and analysis for the Draft 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. A detailed description of the public comments and analysis can be found in the Final Supplemental Environmental Impact Statement released in February 1994.

The Bureau of Land Management was invited to comment on the Draft Supplemental Environmental Impact Statement along with other State and Federal agencies, interest groups and the public. Public hearings were also held in Oregon, Washington, and California; these hearings received testimony or written comments from 359 individuals. The BLM participated in the coordination of these hearings.

During the 90-day comment period, 101,894 letters were received from all 50 States and several foreign countries. Approximately 40 percent of the letters came from east of the Mississippi River indicating that this issue extends beyond the three States affected.

The subjects that received the most substantive comments included allocations 17.7 percent; ecosystem 15.2 percent; silviculture 9.8 percent; and economic effects 7.7 percent. Comments related to BLM's Draft Resource Management Plans were 0.1 percent.

The comments indicate that feelings and issues surrounding the management of the National Forests and BLM administered lands in Oregon, Washington, and California remain intense and polarized.

Summary of Comments (Draft RMP/EIS)

Appendix KK contains the list of responders, the summary of comments with BLM responses, and a reproduction of letters from agencies and elected officials. Due to the volume of comments received, only letters from government agencies and elected officials were reproduced. This is in accordance with BLM and National Environmental Policy Act (NEPA) guidelines. This does not reduce the importance of letters received from nongovernmental individuals and groups. The substantive comments are paraphrased as provided for in NEPA (40 CFR 1503.4) to save space (see Appendix KK).

List of Agencies and Organizations Contacted and to Whom Copies of the Proposed RMP/Final EIS Have Been Sent

The RMP/EIS Team and supporting specialists in the Oregon State Office contacted or received input from the following agencies a nd organizations during development of the Draft and Final EIS and/or the planning steps preceding its development. Copies of the Proposed RMP/FEIS have been sent to these individual agencies, groups, and organizations and to a large number of others not listed here.

Federal Agencies

Environmental Protection Agency
Oregon Congressional Delegation:
- Honorable Peter DeFazio
- Honorable Ron Eachus
- Honorable Mark Hatfield
- Honorable Carl Hosticka
- Honorable Bob Packwood

U.S. Army Corps of Engineers
U.S. Department of Commerce - National Marine Fisheries
U.S. Department of Commerce - National Weather Service
U.S. Department of Energy - Bonneville Power Administration
U.S. Department of Transportation - Coast Guard
USDA, Forest Service
USDA, Soil Conservation Service
USDI, Bureau of Indian Affairs
USDI, Bureau of Mines
USDI, Fish and Wildlife Service
USDI, Geological Survey
USDI, Minerals Management Service
USDI, National Park Service

State of Oregon Agencies

Commission on Futures Research
Department of Agriculture
Department of Energy
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Geology and Mineral Industries
Department of Human Resources - Employment Division
Department of Land Conservation and Development
Department of Transportation - Parks and Recreation Division
Economic Development Department
Executive Department
Executive Department, State Economist
Office of the Governor (Governor's Forest Planning Team)
Oregon Water Resources Department

Local Government and Other Government Entities

Association of O&C Counties
City of Cottage Grove
City of Eugene
City of Florence
City of Springfield
City of Veneta
Douglas County Board of Commissioners
Lane County Board of Commissioners
Linn County Board of Commissioners

Organizations

1000 Friends of Oregon
American Fisheries Society, Oregon Chapter
American Forest Council
Associated Oregon Industries
Associated Oregon Loggers
Association of Oregon Archaeologists

Association of NW Steelheaders
Association of Oregon Counties
Bohemia Mine Owners Association
Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz
Confederated Tribes of the Warm Springs Reservation
Cottage Grove Chamber of Commerce
Defenders of Wildlife
District 4 Council of Governments
Douglas Timber Operators
East Lane Soil & Water District
Eastern Oregon Mining Association
Emerald People's Utility District
Emerald Road Runners
Emerald Valley Chapter of the Oregon Hunters Association
Environmental Education Association of Oregon
Eugene Chamber of Commerce
Eugene Water & Electric Board
Florence Area Chamber of Commerce
Forest Conservation Council
Friends of Greensprings
Greenpeace
Headwaters
Isaak Walton League of America
Junction City Chamber of Commerce
Keep Oregon Green
Lake Creek Valley Association
Lane Council of Governments
Lane County Audubon Society
Lane County Extension Service
Lane Education Service District
Lane Electric Cooperative, Inc.
Lane Regional Air Pollution Authority
League of Women Voters
Local Residents for Old Growth
Long Tom Conservation & Development Committee
Marcola Community Group
Mazamas
McKenzie Flyfishers
McKenzie Guardians
McKenzie Motorcycle Association
McKenzie River Guides
Motorcycle Riders Association
National Association of Conservation Districts
National Audubon Society
National Council of the Paper Industry for Air and Stream Improvement
National Forest Products Association
National Wildlife Federation
Native Plant Society of Oregon
Nature Conservancy
Northwest Coalition for Alternatives to Pesticides
Northwest Environmental Defense Center
Northwest Federation of Mineralogical Societies
Northwest Forest Resource Council
Northwest Forestry Association
Northwest Mining Association
Northwest Policy Center
Northwest Power Planning Council
Northwest Rivers Council
Northwest Steelheaders
Northwest Timber Association
Oregon Archaeological Society
Oregon Audubon Society
Oregon Environmental Council
Oregon Farm Bureau Federation
Oregon Forest Industries Council
Oregon Forest Protection Association
Oregon Historical Society
Oregon Natural Heritage Program
Oregon Natural Resources Council
Oregon Rivers Council
Oregon State Bar
Oregon State Federation of Garden Clubs
Oregon State University
Oregon Student Public Interest Research Group
Oregon Wildlife Federation
Oregon Women for Timber
Oregon 4-Wheel Drive Clubs
Organization of Walton Landowners
Pacific Logging Congress
Pacific Power and Light Company
Portland Chamber of Commerce
Public Lands Foundation
Save our Ecosystems
Sierra Club, Oregon Chapter
Siskiyou Audubon Society
Society of American Foresters
Southern Oregon Timber Industries Association
South Lane School District
Springfield Chamber of Commerce
Springfield Forest Products
State Board of Forestry
Trail Riders Association International
Umpqua Regional Council of Governments
Umpqua Valley Audubon Society
University of Oregon
Washington Environmental Council
Western Council - Lumber, Production & Industrial Workers
Western Forest Industries Association
Western Forestry Center
Western Forestry & Conservation Association
Western Lane Sportsman Association
Western Wood Products Association
The Wilderness Society
Wildlife Management Institute
Willamette Timberman Association
Yellow Ribbon Coalition

List of Preparers

Name	Position/Title	Discipline/Degree(s)
Neil B. Armantrout	District Fisheries Biologist	Fisheries, Ph.D.
Dale E. Bays	Economist. OSO	Forestry, BS
Raymond Bosch	Wildlife Biologist	Wildlife Mgmt., BS
Chris Cadwell	Natural Resource Database Specialist, OSO	Forest Management, BS
Duane Dippon	ARD/GIS Specialist, OSO	Forest Economics, Ph.D. Forest Management, MSF Forest Management, BSF
Arthur T. Emmons	Forest Inventory Specialist	Forest Management, BS
Leslie Frewing-Runyon	Economist, OSO	Economics, BA
Kathleen Friestad	Writer/Editor	Public Relations, BA
Glen Gard	District Environmental Protect. Spec.	
Paul Gnerer	District Silviculturist	Forestry, BS
Rebecca Gravenmier	GIS Coordinator, OSO	Range Management, BS
Phil Hamilton	Planning Process Coord. Oregon State Office	Forestry, BS
Doug Huntington	Public Affairs Specialist	Geography & Communications, BA Environmental Planning, MA
Jeane Hutcheson	Editorial Assistant	
Carol J. Jorgensen	Wildlife Biologist	Wildlife Biology, MS
Robin Kilgore	Illustrator	
C. Bradley Krueger	ADM-Operations	Forest Engineering, BS
Saundra Miles	Recreation Planner	Resource Management, BS
Jean Nelson-Dean	Policy Analyst	Journalism/English, BA Public Administration, MS
Jeffery S. Nighbert	Sr. Tech. Specialist for LIS, OSO	Geography, MA
Aaron Reeves	Tech. Writer/Editor	Communications, BS
Jerry Richeson	District Soil Scientist	Forestry, MS
Jay Ruegger	Natural Res. Spec. (ARD)	Soil Science, BS
Alan Schloss	District Hydrologist	Forestry, BS
Leo Sidebotham	Dist. Fire Mgmt. Officer	Natural Resources Mgmt. Forestry, BS
Michael D. Southard	District Archaeologist	Anthropology, Ph.D.
Robert P. Stein	Forester	Forest Res. Mgmt., BS Forest Ind. Mgmt., MBA
Kris Ward	District Geologist	Geology, BS
Jim Weir	Forester	Forestry, BS
Don Wilbur	Natural Resource Specialist RMP Team Leader, Eugene Dist.	Range Management, BS
Nancy Wogen	Natural Resource Specialist	Wildlife Mgmt., BS
Ron Wold	District Realty Specialist	Geology, MS

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Glossary

Activity Plan - A document that 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.

Administratively Withdrawn Areas - 1.7 million acres of Federal lands that have been withdrawn from timber harvest to create experimental areas, research areas, recreation areas, or scenic areas. They also include areas where regeneration is difficult and timber productivity is low, plus areas of special concern for individual species.

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Airshed - A geographical area that shares the same air mass due to topography, meteorology, and climate.

Allowable Cut Effect (ACE) - The expected contribution to the PSQ resulting from future management decisions.

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.

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 ACEC.)

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 Probable Sale Quantity (PSQ). 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 forest 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 ground water 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, BMPs 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.

BLM Operating Area - Portions of the Planning Area where BLM administered lands lie. (see definition for planning area).

Biological Legacies - Components of the forest stand (e.g., large trees, down logs, and snags) reserved from harvest to maintain site productivity and to provide structure and ecological functions in subsequent forest stands.

Board Foot (BF) - A unit of solid wood, one foot square and one inch thick.

Broadcast Burn - Allowing a prescribed fire to burn over a designated area within well defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both.

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 FWS 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 FWS has information to indicate that listing is possibly appropriate. Additional information is being collected.

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 Nesters - Wildlife species, most frequently birds, that require cavities (holes) in trees for nesting and reproduction.

Class I (air quality) Areas - Special areas (i.e., National parks, certain wilderness areas) protected for their air quality related values.

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.

Clear Cut 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.

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 PSQ. 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.

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 that is basic to maintaining viable populations of fish or wildlife during certain seasons of the year or specific reproduction periods.

Cubic Foot - A unit of solid wood, one foot square and one foot thick.

Cull - A tree or log that 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 that 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 that deviates from sustainable sale levels through a planned temporary increase or decrease in the PSQ. Must be economically and biologically justified.

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.

Designated Conservation Area (DCA) - 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.

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.

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.

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 PSQ.

Domestic Water Supply - Water used for human consumption.

Donation Land Claim - A tract of land originally surveyed and patented out of Federal ownership under authority of laws passed by Congress between 1850 and 1853 granting lands to early settlers of the Oregon Territory.

Economically Feasible - Having costs and revenues with a present net value greater than zero.

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 - An interacting natural system including living organisms and the nonliving environment. Ecosystems may vary in size. For example, the community of microorganisms in water; the lake that contains the water; the watershed where the lake is situated; and the mountain range where the watershed is located.

Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.

Ecosystem Management (EM) - 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. (Source: IB OR 93-339 to all employees from the State Director.)

Edge Effect - An ecologically biological effect that 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 NEPA when no EIS 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 Streams - Streams that contain running water only sporadically, such as during and following storm events.

Equivalent Clear Cut Acres - A hydrological term that describes the runoff from a watershed in terms of the number of acres of recent clear cut, which would be required to yield the same total amount of runoff. Following a clear cut harvest, runoff increases to a peak level, then gradually declines for 20 years. Stands of trees 20 years and older are considered to yield the same runoff as any fully forested site.

Established Stand - A reforestation unit of suitable trees that 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 that creates forest stands, which 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 (ERMAs) - All BLM administered lands outside Special Recreation Management Areas. These areas may include developed and primitive recreation sites with minimal facilities.

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 10 percent stocked with forest trees and that has not been developed for nontimber use.

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 TPCC 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 (GFMA) - 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 100-120 years after harvest entry, considering overstory mortality.

Gross Yarding - Removal of all woody material of specified size from a logging unit to a landing.

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 that 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 flood plain 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.

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. IPM 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.

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."

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.

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.

Inventory River - A potential wild, scenic, or recreational river identified in the 1982 National Rivers Inventory (NRI) published by the National Park Service.

Irreversible or Irretrievable Commitment of Resources - Effect of an action or inaction that 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.

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 Diversity - The size, shape and connectivity of different ecosystems across a large area.

Landscape Features - The land and water form, vegetation, and structures that compose the characteristic landscape.

Land Tenure Adjustments -

Zone 1 lands include areas currently identified as having high public resource values which merit long-term public ownership under BLM administration. They do not meet the criteria for sale under Section 203(a) of FLPMA and would be retained in public ownership.

Zone 2 lands include areas that meet criteria for exchange because they form discontinuous ownership patterns, are less efficient to manage, and may not be accessible to the general public. These BLM administered lands may be exchanged for other lands in Zones 1 or 2, transferred to other public agencies, or given some form of cooperative management. These lands do not meet the criteria for sale under Section 203(a) of FLPMA. Most lands in this zone would remain under BLM administration.

Zone 3 includes lands that are scattered and isolated with low resource values. They meet the criteria for sale under Section 203(a) of FLPMA, if important recreation, wildlife, watershed, threatened or endangered species habitat and/or cultural values are not identified during disposal clearance reviews. Oregon and California (O&C) lands assigned to Zone 3 are not suitable commercial forest land. Most lands in Zone 3 would be sold, exchanged, or transferred out of BLM administration over time. Zone 3 lands are specifically identified in Table 2-19.

Land Use Allocations - Allocations that 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.

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 Successional Forests - Forest seral stages that 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 that 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 l872 (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 l0 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 that includes logging contractors engaged in cutting timber and pulpwoods: 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.

Managed Pair Areas - In some portions of the northern spotted Owl's range it is necessary to provide additional protection in the matrix for pairs of owls and territorial singles. This consists of delineating a core habitat area, plus additional acreage of suitable habitat around the core. The acreage to be delineated around the core varies throughout the range, based on data for pairs in the area. The suitable acreage must be delineated in a area equal to the mean home range for that physiographic province. Appropriate silvicultural treatment is encouraged in suitable and unsuitable habitat in the acreage around the core.

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.

Management Objectives - Expressions of what BLM wants to accomplish with its management efforts.

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 map compiled for each township from the official government land surveys on which is shown Federal land ownership, acreages, and various land status information such as withdrawals, easements, rights-of-way, and leases.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Metes and Bounds - A description of the boundaries of a tract of land utilizing courses and distances between specific objects such as survey monuments.

MICRO*STORMS - A microcomputer database system providing background information and recommended treatment for each operations inventory unit.

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 that (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.

Multiaged Stand - A forest stand that has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multilayered structure.

Multilayered Canopy - Forest stands with two or more distinct tree layers in the canopy; also called multistoried 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; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; 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 and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

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 10 microns in size (PM_{10}), 50 micrograms per cubic meter annual average and 150 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 1966 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 Probable 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 that 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 PSQ. Some species may be managed and sold under a suitable woodland PSQ and, therefore, may be commercial as a woodland species.

Nonforest Land - Land developed for nontimber uses or land incapable of being 10 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.

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 track or wheeled vehicle designed for cross country travel over 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.

> **Open**: Designated areas and trails where Off-Highway Vehicles may be operated subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343.
>
> **Limited**: Designated areas and trails where Off-Highway Vehicles are subject to restrictions limiting the number or types of vehicles, date, and time of use; limited to existing or designated roads and trails.
>
> **Closed**: Areas and trails where the use of Off-Highway Vehicles is permanently or temporarily prohibited. Emergency use is allowed.

Old Growth Conifer Stand - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites that 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, multilayered 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 that 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.

Operations Inventory (OI) - 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 that 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 that may be considered include ecological, biological or botanical, paleontological, hydrological, scientific, or research.

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 that 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 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.

Plan Maintenance - Any documented minor change that 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 ACEC - An area of BLM administered land that meets the relevance and importance criteria for ACEC 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 that 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(ies) - 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.

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.

Recreation Opportunity Spectrum (ROS) - A fundamental Recreation planning tool that recognizes the critical link between the setting of an activity and the subsequent experience it provides. The ROS provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies that portion of the spectrum a given agency might be able to provide. The spectrum has seven categories ranging from Primitive to Urban.

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 (RIEC) 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 that 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.

Reserved Pair Areas - In those portions of the species' range where habitat and owl populations are inadequate to apply the criteria creating designated conservation areas, then individual pair areas were also reserved. These are areas of suitable habitat identified for pairs and territorial single owls. The acreage of these areas varies throughout the range, based on data for pairs in each physiographic province. All suitable habitat is reserved in an area equal to the mean home range for that province.

Residual Habitat Area - An area about 100 acres in size of nesting, roosting, and foraging habitat encompassing the known activity center for a pair of owls or a territorial single owl. The intended purpose is to protect the core areas in the short-term and to provide potential nest sites in the long-term. All habitat is reserved from harvest for an expected 80 years.

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(s) 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 (R&R) - 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.

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.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots of young tree seedlings.

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 River - See Wild and Scenic River System.

Scribner Short Log - A log measurement rule constructed from diagrams that shows the number of 1-inch boards, which 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 tradeoffs that 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 that 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 ages 15-40. 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.

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.

Short-Term - The period of time during which the RMP will be implemented; assumed to be 10 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 that 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 l0 inches in diameter at breast height (dbh) and at least 6 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 ACEC, RNA, ONA, 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 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 SRMAs.

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.

Splash Dam - A method of moving logs by rafting them downstream. A log dam would be built in front of the instream logs. When enough water and logs were collected behind the dam, the dam was broken releasing an avalanche of logs and water. This practice would scour the soil and vegetation from the streambed and banks for miles downstream. Splash damming has not been practiced in the planning area for over 40 years.

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 l985 through l988, 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 l985-l988 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 Replacing 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 that 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 that 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 that 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.

Stream Order - A hydrologic system of stream classification based on stream branching. Each small unbranched tributary is a 1st order stream. Two 1st order streams join to make a 2nd order stream. Two 2nd order streams join to form a 3rd order stream and so forth.

Stream Reach - An individual 1st 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 as 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 PSQ 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.

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.

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 5 inches in diameter with foliage that covers at least l0 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 that 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 5 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.

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 forest land into major classes indicating relative suitability to produce timber on a sustained yield basis.

Title Plat Acre - The official acreage of a tract of land as shown on the most current official BLM cadastral survey plat.

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.

Treatable Water - Water capable of being treated with commonly used filtration and chlorination systems.

Understocked - The condition when a plantation of trees fails to meet the minimum requirements for number of well spaced trees per acre.

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.

Watchable Wildlife - A Bureau of Land Management (BLM) program designed to increase opportunities to photograph, study, or simply watch the countless mammals, birds, fish, reptiles, amphibians, and invertebrates that live on the 270 million acres of Federal land that BLM administers.

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) database 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 living 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 that 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 PSQ.

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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MAP 2-13: EXISTING AND SUITABLE WILD, SCENIC, AND/OR RECREATIONAL RIVERS, WILDERNESS, WILDERNESS STUDY AREAS, AND INSTANT STUDY AREAS

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

1994 PRMP/FEIS

WASHINGTON

SALEM

EUGENE

DREC
DSCN
SANDY RIVER
CLACKAMAS RIVER
DSCN
SALMON
DREC
DREC
DWLD
RIVER
DREC
DSCN
PREC
NESTUCCA RIVER
PREC
MOLALLA
RIVER
TABLE ROCK FORK
RIVER
PREC
DREC
RIVER
DSCN
DSCN
DREC
Table Rock Wilderness
Little Sink ISA
DREC
Quartzville Creek
SOUTH SANTIAM
MIDDLE SANTIAM
RIVER
WILLAMETTE
PREC
McKENZIE
RIVER
PREC
SIUSLAW
RIVER
MIDDLE FORK
RIVER

MILES
0 10 25
0 10 25
KILOMETERS

N

OREGON
LOCATION

LEGEND

District or Resource Area Boundary

RIVER SEGMENTS

LOCATION

PREC

EUGENE

PREC

DREC

COOS BAY

Squaw Island Wilderness

Cherry Creek ISA

ROSEBURG

Wild Rogue Wilderness

DWLD

DREC

PWLD

North Sisters Rocks WSA

DREC

DREC

DSCN

PWLD

PWLD

DREC

DWLD

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DREC

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DWLD

Zwagg Island WSA

MEDFORD

Soda Mountain WSA

Mountain Lakes WSA

PSCN

KLAMATH FALLS

CALIFORNIA

LEGEND

- District or Resource Area Boundary

RIVER SEGMENTS

- Wild
- Scenic
- Recreational

DWLD = Designated Wild

PWLD = Potential Wild

DSCN = Designated Scenic

PSCN = Potential Scenic

DREC = Designated Recreational

PREC = Potential Recreational

SPECIAL MANAGEMENT AREAS

- Wilderness Area
- WSA = Wilderness Study Area
- ISA = Instant Study Area

01-10x-93

R12W R11W R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E

T14S T15S T16S T17S T18S T19S T20S T21S T22S T23S

PACIFIC OCEAN

Eugene

Springfield

Cottage Grove

Oakridge

WILLAMETTE RIVER

MIDDLE FORK WILLAMETTE RIVER

COAST FORK WILLAMETTE RIVER

WILLAMETTE RIVER

McKENZIE RIVER

SIUSLAW RIVER

Lake R.

99 5 36 126 58

10 0 10 20

MILES

N

Note:
This product was generated through digital or automated methods.

MAP 3-16: SERAL STAGE AND MAJOR PLANT GROUPS

EUGENE DISTRICT
1994 PRMP/FEIS

LOCATION

LEGEND

- District Office
- District Boundary
- Douglas Fir / Mixed Brush / Salal
- Douglas Fir / Ocean Spray / Herbs
- Douglas Fir / Red Alder / Salmonberry
- 100 - 199 Years Age Class
- City, Urban Area
- Interstate, State Highway
- Open Water
- Douglas Fir / Rhododendron - Ceanothus / Salal
- Douglas Fir / Red Alder / Vine Maple
- 200+ Years Age Class

AN EQUAL OPPORTUNITY EMPLOYER