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

Eugene District Office
2890 Chad Drive, P.O. Box 10226
Eugene, Oregon 97440

DRAFT

August 1992

Eugene District Resource Management Plan and 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.

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE
P.O. BOX 10226
EUGENE, OREGON 97440

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

August 1992

Dear Reader:

You are cordially invited to assist the Bureau of Land Management (BLM) in a planning process that is important to you and your interests.

We ask for your participation in evaluating this draft of the Eugene District's Resource Management Plan/Environmental Impact Statement (RMP/EIS) that has been prepared in conformance with land use planning procedures established by the Federal Land Policy and Management Act of 1976.

The planning area encompassed by this document is BLM's Eugene District. The planning area includes 316,592 acres of Federal land administered by BLM, primarily in Lane, Linn and Douglas Counties. Minor acreages of Benton County are also covered.

There are seven management alternatives, each with a different emphasis and each addressing the planning issues in a different way. Public comment played an important role in shaping both the issues and the alternatives, which have been analyzed in this RMP/EIS. Before the preferred alternative was developed, suggestions received from individuals, interest groups and other governmental entities were thoroughly considered. These suggestions were used to strike a reasonable balance, considering relevant legal mandates, between the expressed desires of some to emphasize the production of commodity resources; the desires to maintain the current flow of resources from the public lands; and the desires to protect, restore and enhance natural values.

Through this Draft RMP/EIS, the BLM has tentatively established: resource management goals (as expressed by each alternative); resource management objectives and specific management actions that would determine the potential land uses; levels of resource production; areas in which use restrictions would apply; and lands that could be transferred, sold or exchanged.

The end product of this planning process will be a Resource Management Plan (RMP) that will integrate the natural resources and their subsequent uses into a balanced, sustainable approach to multiple use management of the Eugene District for the next 10 years. Your participation in guiding the future management of these lands is encouraged. This RMP will replace and supersede the Eugene District Management Framework Plan (MFP), which was completed in 1983. When completed, this RMP will establish specific land use allocations and

management direction for commercial forest harvest, biological diversity, special status species, wildlife habitat, recreation, areas of critical environmental concern, visual resources, cultural resources, energy and minerals management, land tenure adjustment, and rights-of-way for BLM administered lands in the entire planning area, and identify rivers suitable for national wild, scenic or recreational river status.

We would appreciate you reviewing this document and providing us with your written comments by December 21, 1992. Comments are most useful when they address one or more of the following: 1) errors in the analysis that has been performed; 2) new information that would have a bearing on the analysis; 3) misinformation that may have been utilized and could affect the outcome of the analysis; 4) requests for clarification; and 5) support of an existing alternative or definition of a substantive new alternative with the range of alternatives considered (an alternative that would provide a different mix of allocations than any existing alternative). Although we have identified and quantified primary economic effects of the alternatives, we recognize that there are other effects on social values that are important, even though they are very difficult to describe or measure. Your comments may help us to better address these and other effects in the proposed RMP/final EIS. To assist you in this, you are invited to contact Jon Strandjord, planning team leader, at any time during the comment period.

The major plant group map referenced in the RMP/EIS is currently not available. The map will be available in about two weeks and will be mailed to those receiving this document.

BLM employees will be available at informal public meetings to be held during the comment period. An open house is scheduled for September 30, 1992 from 2:00 p.m. to 4:00 p.m. and from 6:00 p.m. to 8:00 p.m. at our office. Other public meetings will be scheduled as needed.

If you are interested in an overview of all six of BLM's western Oregon draft Resource Management Plans, our Oregon State Office has published an executive summary of them. A copy may be obtained in our office or by writing them at P.O. Box 2965, Portland, Oregon 97208.

Thank you for your interest in the multiple use management of BLM administered lands.

Sincerely,

Ron Kaufman

District Manager
Eugene District

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

Draft
Eugene District
Resource Management Plan

Environmental Impact Statement

Prepared by
Eugene District Office

D. Dean Bibles
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Abstract

Draft (X) Final ( ) RMP/EIS

Department of the Interior

Bureau of Land Management

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

2. Abstract: This Draft Resource Management Plan/Environmental Impact Statement 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 its Eugene District. Seven alternatives including No Action (no change in the existing plan) are analyzed. These alternatives range 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 Preferred Alternative would provide for a planned annual timber sale level of 19.9 mmcf (119 mmbf, Scribner Short Log), while maintaining water quality in all watersheds. Old growth forest acreage would be reduced by about 2,700 acres (7 percent) in the short-term, five additional Areas of Critical Environmental Concern (ACECs) would be designated, and three segments of river would be found suitable for designation under the Wild and Scenic Rivers Act.

3. The comment period will end on December 21, 1992.

4. For further information contact:

   Jon Strandjord

   RMP/EIS Team Leader

   Bureau of Land Management

   Eugene District Office

   2890 Chad Drive

   P. O. Box 10226

   Eugene, Oregon 97440

User's Guide

The **Summary** presents a synopsis of the Draft RMP/EIS. It summarizes all alternatives but presents more detail for the Preferred Alternative. It 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 is the Introduction to the Draft RMP/EIS. This chapter includes a description of the planning area and the purpose and need for preparing the RMP/EIS. It also includes a discussion of the RMP 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 RMP/EIS process.

Chapter 2 (Description of the Alternatives including the Preferred Alternative) has two major sections - management direction common to all alternatives, and alternatives and management direction by alternative. The first section is particularly important to understanding how lands would be managed under every plan alternative. This chapter describes seven different alternatives that respond to the 11 issues identified in Chapter 1. The alternatives provide a mix of uses and actions, which could resolve the issues. This chapter includes a tabular summary of the alternatives so they can be compared. It also includes maps displaying the major land use allocations for each alternative, except No Action. These maps are located in a map packet included with this document.

Chapter 3 (Affected Environment) describes the environment that could be affected or changed by implementing 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 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 describes agencies and organizations BLM has worked with during the preparation of the Draft RMP/EIS. It discusses relevant relationships with other agencies and summarizes public involvement.

RMP/EIS Summary

Introduction

The Eugene District's Resource Management Plan (RMP) will establish guidelines for the management of BLM administered land in the Eugene District for approximately ten years. It will supersede and replace the Eugene District's Management Framework Plans (MFPs) covering the same area, completed in 1983. The Draft RMP/EIS has been prepared in accordance with the BLM planning regulations issued under authority of the Federal Land Policy and Management Act and written in accordance with Council on Environmental Quality regulations issued under authority of the National Environmental Policy Act.

BLM administered lands in the planning area consist of 307,190 acres of O&C lands, 9,001 acres of Public Domain (PD) lands and 363 acres of acquired or other railroad grant lands, plus 1,299 acres of split estate (Federal minerals).

Two maps have been attached to this Summary for additional clarification and information. These maps are titled the "Preferred Alternative Map" and the "Preferred Alternative Strategy Map."

Alternatives

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

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

The land use or resource allocations of the alternatives are summarized in Table S-1 found at the end of this summary. Analysis of effects of each alternative except No Action has been facilitated by development of 10-year representative timber management scenarios. These reflect possible timber harvest units, road locations, and timber management practices during the life of the RMP. These scenarios include different levels of forest management practices (also shown in Table S-1). Anticipated environmental consequences of the alternatives are summarized in Table S-2, also located at the end of the summary.

Preferred Alternative

The Preferred Alternative is the BLM's suggested planning solution. It will be reconsidered after review of public comments on this draft RMP/EIS. The Preferred Alternative was formulated after initial analysis of the effects of the other alternatives. In formulating the Preferred Alternative, the District's managers considered public comments received in response to the District's January, 1991 Summary of the Analysis of the Management Situation and other comments received during the planning process.

BLM managers believe the Preferred Alternative best balances public demands and the capabilities and limitations of the resources within the constraints of a variety of legal mandates. It represents a sustainable balance between protection of natural resources and production of economic outputs.

Planning Issues and Major Concerns Addressed by the Preferred Alternative

General: Inherent in all management practices is a goal of maintaining long-term site productivity of soils. This goal would be accomplished by use of Best Management Practices (BMPs) and minimizing disturbance of fragile areas.

All BLM prescribed fire activities, which could effect air quality, would be conducted in accordance with the Oregon State Implementation Plan administered by the Department of Environmental Quality, and the Oregon Smoke Management Plan administered by the Department of Forestry.

Special management would be provided for the Pacific yew, the bark of which is the only currently approved (by the Food and Drug Administration) source of taxol, a promising agent for treatment of ovarian and breast cancer. The strategy for management and collection of Pacific yew bark on Federal lands is the subject of a separate Environmental Impact Statement (EIS) being prepared by the U.S. Forest Service, with BLM as a cooperating agency. BLM actions covered by this RMP will be consistent with the strategy under development. This strategy will include how to assure a sustainable

yew supply with full consideration of ecosystem relationships of the yew. Included will be regeneration of yew and possible extraction of taxol without harvesting individual trees.

The BLM would aid and support the 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.

Water Quality and Riparian Zones

To assure protection of water and water-dependent resources, the BLM would continue nonpoint source management in cooperation with the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality. Management activities would be consistent with Oregon's adopted Statewide water quality management plan for forest practices, and comply with Oregon's water quality standards and guidelines. Best Management Practices would be selected to protect the identified beneficial uses of the water. They would be based on site-specific conditions, feasibility, and the water quality standards for waters potentially affected. Since BLM administered lands are a minority in many watersheds, impact analysis acknowledges that BLM can only partly influence water quality. Factored into BLM timber sale scheduling decisions would be an assessment of compliance with the antidegradation policy of Oregon's water quality standards. This assessment would recognize the influence of actions by other parties.

In watersheds providing surface water to public water systems serving municipalities, the goal of management would be to provide treatable water at the point of intake to the system.

Riparian Management Areas (RMAs) would be established to provide stewardship of riparian zones along perennial streams and other streams that carry fish and to protect natural functions. Within these RMAs, no timber harvest would be planned as part of the sustained yield timber management program but some harvest activities could occur to achieve resource management objectives. These activities could include road construction and yarding corridors to facilitate timber harvest outside the RMA. RMA widths would be determined by on-the-ground riparian vegetation and stream characteristics. Average widths on each side of streams and other waters are expected to be as follows: 1st and 2nd order perennial streams 75 feet; 3rd order streams 105 feet (150 feet for any 1st through 3rd order stream that carries fish); 4th order 150 feet; 5th order 210 feet; 6th order 240 feet; lakes, ponds and other waters 150 feet. These widths for streams approximate one-and-a-half times the average riparian zone width of such streams as measured in two western Oregon BLM Districts.

Timber

In the inventory of the late 1970s, about 286,000 acres were identified as suitable for timber production. During the next ten years, forest acres were converted to nonforest uses such as roads while other areas originally classified as unsuitable for timber production were reclassified as suitable. As a result there were also about 286,000 acres of commercial forestlands identified as suitable for timber production in the most current inventory. These lands are considered capable of being reforested within five years after harvest and of being managed without irreversible resource damage. Among other objectives, approximately 259,000 acres of these lands would be managed for timber production.

The allocation of lands for timber production is shown graphically in Figure S-1 found at the end of this summary. See Table S-1 for comparison with other alternatives. The annual Allowable Timber Sale Quantity (ASQ) would be 19.9 million cubic feet (119 million board feet Scribner short log). This is 47 percent below the current ASQ and 48 percent below the average harvested in the 1984-1988 period.

Some aspects of timber management are described in the following discussion of Old Growth and Mature Forest. Timber would be harvested during density management in the Old Growth Emphasis Area (OGEAs) and connectivity areas. Commercial thinning would be applied in General Forest Management Areas (GFMAs). Regeneration harvests would occur in the trial harvest portions of the OGEAs, in the connectivity areas and in the GFMAs; but not in the deferred portion of the OGEAs during the life of the plan.

New timber harvest roads would be kept to the minimum necessary for management. To support timber sales sold during the life of the RMP, it is expected that about 220 miles of new roads would be constructed. This would expand the existing BLM timber management road network by about 11 percent.

Four types of site preparation treatment would be used to prepare newly harvested areas for planting of trees: prescribed burning, herbicide application, and mechanical and manual techniques. Selection of treatments for site preparation, as well as for later management of vegetation suppressing conifer seedlings, would use an integrated vegetation management approach, emphasizing techniques proven most effective at assuring seedling survival and growth. This is in conformance with BLM's 1992 Record of Decision, **Western Oregon Program - Management of Competing Vegetation**. Prevention of conditions that cause or favor the establishment of damaging levels of competing or unwanted vegetation is the preferred strategy. Broadcast burning would be avoided on highly sensitive soils. Burning would be conducted in accordance with Oregon Smoke Management Plan rules and directives administered by the Oregon Department of Forestry, so that air quality would be maintained.

Harvested areas would be planted with native commercial conifer tree species to promptly achieve adequate reforestation following regeneration harvest; this generally would occur within three years after completion of harvesting. Seedlings would be grown from genetically selected seed from a broad selection of parent trees to maintain genetic diversity.

Precommercial thinning would be applied in managed stands to meet both timber management and density management objectives. Fertilization would be applied to stands precommercially or commercially thinned, density managed, and other stands where suitable stocking exists. Conversion would be applied to some of the commercial forestland currently dominated by hardwoods. Precommercial thinning, fertilization and conversion would contribute about 13 MMBF (11 percent) of the Preferred Alternative ASQ.

Old Growth and Mature Forest

Old growth conifer stands inventoried by the BLM contain dominant trees at least 200 years old, generally a multilayered canopy of various tree species, and standing and fallen dead trees. Mature conifer stands are dominated by trees from 100 to 190 years old. As of 1990, about 41,000 acres (14 percent) of the BLM administered forestland in the planning area contained old growth stands and 28,000 acres (9 percent) contained mature stands. Preferred Alternative management would retain about 38,000 acres of old growth forest and 28,000 acres of mature forest at the end of the expected 10-year life of the RMP, and provide about 54,000 acres of old growth and 130,000 acres of mature forest if the plan were continued for 100 years. This would result in a long-term increase in biological diversity from the current condition.

Forestlands not subject to planned timber harvest, due to allocation for protection of special values or concern about sustainability of timber production, total about 41,000 acres. These areas currently contain a wide range of forest ages. Barring any unforseen catastrophic disturbances, these areas would ultimately become mature and then old growth forest.

About 142,000 acres would be managed to maintain and improve a system of Old Growth Emphasis Areas (OGEAs), to help maintain a diversity of species in western Oregon. Regeneration harvest of timber on about 72 percent of these areas is planned to be deferred for at least 80 years and until research has shown that such harvest can be designed to retain or quickly reestablish old growth characteristics. These areas would ultimately be subject to regeneration timber harvest on a cycle of 300 years with retention of an average of 6-8 green trees per acre. On the remaining 28 percent, a trial harvest program would be implemented to conduct the research on the reestablishment of old growth characteristics. These areas would be subject to regeneration harvest on a 200-year cycle with the same retention levels as above.

The Old Growth Emphasis Areas would be linked by connectivity areas totalling about 26,000 acres that would be managed on a regeneration harvest cycle of 150 years, with retention of an average of 12-16 green trees per acre. These areas would contribute to regional biological diversity and to recovery of the northern spotted owl by linking to areas in other Districts and protected National Forest lands.

The forests in the OGEAs and connectivity areas currently younger than 90 years old would be managed to control their density to accelerate the development of old growth structural characteristics.

There would be about 93,000 acres in General Forest Management Areas (GFMAs). This would include some lands managed under special restrictions to protect or enhance other resource values such as visual resources, suitable Wild and Scenic Rivers, recreation sites, and Rural Interface Areas (RIAs). Lands in GFMAs, not managed under special restrictions, would be managed on a regeneration harvest cycle of 60-80 years, depending on the age of culmination of mean annual increment for each prescription. An average of 6-8 green trees per acre would be retained for future forest diversity and sustainability of timber production. Most of the old growth and mature forest in these areas would be harvested during the next twenty years under the Preferred Alternative.

Special Status (including Threatened and Endangered Plant and Animal) Species Habitat

BLM management would be designed to protect Federal listed or proposed threatened and endangered plant and animal species. Proposed projects that may affect such species are reviewed with the Fish and Wildlife Service through consultation under the Endangered Species Act. Consistent with policy identified in BLM's nationwide **Fish and Wildlife 2000** and **Botany 2000** plans, and BLM Manual Section 6840, habitats would be managed to maintain populations of Federal Candidate Species at a level that would avoid listing the species under the Act. BLM actions would be designed to similarly protect State Listed and Bureau Sensitive species. Permitted and management actions would not be expected to lead to Federal listing of any species. Table S-3, found at the end of this summary, shows the numbers of plant and animal species in the above-mentioned categories that have been identified as inhabiting BLM administered lands in the planning area.

To support the Pacific Bald Eagle Recovery Plan, three existing nest sites would be protected as well as two winter roost complexes. Additional acres would be excluded from harvest to maintain the potential to support a total of ten nest sites in the short and long-term.

To protect the marbled murrelet all three known sites would be deferred from harvest. In addition, approximately 93 percent of existing potential habitat would be protected during the short-term.

The northern spotted owl recovery plan was not final when the BLM's Preferred Alternative was developed. To contribute to the owl's recovery the OGEAs would be managed to accelerate the development of old growth characteristics. The connectivity areas would be managed to provide spotted owl dispersal habitat. In addition, some 80 to 100 acres around each site occupied by an owl pair would be protected until the site is vacated and the habitat is no longer considered important to spotted owl recovery. None of these acres would be harvested in the first decade.

Analysis of the effects of this management in a spatial population model indicates that the habitat resulting from this management after ten years would support from 8 to 29 pairs of spotted owls. After 100 years the habitat would support from 26 to 73 pairs of owls. The ranges vary according to optimism of assumptions about the relationship between the amount of a suitable habitat at a location and pair formation and reproduction. In comparison, current inventories (through 1991) show 72 pairs of owls. The population model, however, indicates that current habitat can continue to support only 17 to 31 pairs. This is due to the substantial decline in owl habitat on all ownerships in recent years, which has left many remaining stands inadequate to support successful breeding and packed owls too tightly into many of the remaining areas of adequate habitat. Comparison to the effects of other alternatives is shown in Table S-2.

Other Wildlife (including Fish) Habitat

Management of other wildlife habitat would be consistent with policy established in BLM's **Wildlife 2000** plans. For example, the OGEAs and the connectivity areas linking them would provide biological connectivity corridors for a variety of mobile species. To contribute to biological diversity, nonmerchantable dead and down woody material would be retained on all areas from which timber is harvested. Sufficient green trees and snags would be identified for retention to contribute to long-term support of cavity nester populations on BLM administered lands at 40 percent of the optimum woodpecker population level under Alternative B and 60 percent under Alternatives C, D, E and the Preferred. This compares to a current condition estimate of 44 percent.

Special habitats such as cliffs, talus slopes, meadows and wetlands would be managed to protect their primary habitat values. To achieve this objective, they would be buffered from harvest of standing timber with widths ranging from 0 feet (Alternative A) to 200 feet (Alternatives D, E and the Preferred Alternative).

The habitat of elk and other wildlife species would be improved at varying levels in Alternatives C, D, E and the Preferred through access management of some public roads to reduce disturbance during critical time periods. Under Alternative E, permanent pastures of high quality forage, 10 acres per section, would be established following timber harvest activities in elk emphasis areas, where big game forage is considered deficient, and forage seeding is compatible with other resource objectives. Such seeding is expected to improve habitat conditions on BLM administered land.

Consistent with BLM's nationwide **Fish and Wildlife 2000** plan, the fisheries potential of anadromous fish streams would be enhanced. Large woody debris and snags in and adjacent to streams would be retained unless the debris obstructs fish passage, when there is

a threat to downstream structures such as bridges, or when the debris has the potential to degrade a stream channel. In combination with BLM riparian zone protection this management is expected to contribute to an overall long-term (200 year) 162 percent increase in potential production of salmon and steelhead in streams affected by habitat on BLM administered lands. To the extent of available funding, fish habitat improvement projects would be undertaken to correct factors limiting fish production. Included would be projects improving 302 miles of existing stream habitat for salmon, steelhead, trout and other native species.

Special Areas

All seven existing Areas of Critical Environmental Concern (ACECs), including ACEC/RNAs, would be retained. Two existing Environmental Education Areas would be retained. An additional five areas would be designated as ACECs. This would include one 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 five.

Recreation

Consistent with BLM's nationwide **Recreation 2000** plan, lands would be managed for a wide variety of recreation opportunities. There would be particular emphasis on enhancement of opportunities for accomplishing those goals and objectives of **Recreation 2000** as well as the Special and Extensive Recreation Management Area initiatives.

All fourteen existing recreation sites except Turner Creek would remain in this alternative. These recreation sites include Shotgun SRMA, R&PP leases and boat landings. Eighteen additional recreational sites and five SRMAs could be developed and managed. The emphasis of facility management and development would be to accommodate the increasing demand for recreation opportunities close to population centers and accessible by road.

Nine road systems (both BLM and County roads) would be included as components of the BLM Back Country Byway System.

As part of management of the use of off-road vehicles, 2,378 acres would be closed year round to vehicle uses, mainly to protect certain wildlife areas and Areas of Critical Environmental Concern. Use for administrative purposes and authorized removal of commercial commodities such as timber could be excepted within these areas. Off road use would be limited on 147 miles of road and closed on 84 miles. The rest of the District would be open to ORV use.

Use for all recreation categories (except winter sports and snowmobiling) would be expected to increase during the life of the RMP. Expected demand would be nearly met for the recreation categories of off-road, motorized and non-motorized travel as well as fishing, camping, other land based and other water-based activities. The remaining recreation categories would vary in their capability to meet projected demand.

Additional emphasis would be placed on interpretive and informational signing and maps to support State and local strategies for encouraging tourism.

Wild and Scenic Rivers

There are three river segments covering 70 miles that would be found suitable for designation by Congress under the Wild and Scenic Rivers System. These segments are identified in Table S-4 found at the end of this summary. If designated by Congress, these would be added to the National Wild and Scenic Rivers System. The other six river segments (consisting of 36 miles) found eligible for designation and studied by BLM have been found not suitable for such designation.

Visual Resources

For preservation of scenic quality, 1,390 acres would be managed as Class I. To retain scenic quality, 13,768 acres of other highly sensitive land for recreation facilities and river corridor, would be managed as Class II, so that landscape alterations caused by management would not attract attention. To partially retain scenic quality, 29,413 acres of visually sensitive lands would be managed as Class III so that landscape alterations would not dominate the view.

Cultural Resources

Prehistoric and historic sites would continue to be identified and managed for their public and scientific uses.

Land Tenure

Lands adjustments would emphasize exchanges to benefit multiple resource values. Only Public Domain (PD) lands, however, would be exchanged for the

specific purpose of supporting recovery of a threatened or endangered species. Lands would be categorized in the following zones: 78,095 acres where lands would be retained in BLM's administration; 238,463 acres where land ownership may be blocked up in exchanges for other lands, transferred to other public agencies or given some form of cooperative management; and 35 acres of lands scattered and isolated, with no known unique resource values. BLM administered lands in the last category would be exchanged for private inholdings in the other zones or could be considered for sale or for transfer to another agency or local government.

Energy and Minerals

Most BLM administered lands would remain available for mineral leasing, the location of mining claims, or the use of salable mineral resources. A variety of designations and allocations such as: special areas, recreation areas, wildlife areas, Riparian Management Areas, OGEAs and connectivity areas, and visual classifications, could restrict mineral exploration and development on certain lands under the Preferred Alternative.

These restriction levels represent some increase in restrictions compared to the current plan, primarily due to the use of controlled surface use stipulations for mineral leases on lands involved with forestry, riparian, and wildlife related land allocations. In addition, there would be some increase in the number of acres withdrawn from locatable mineral entry with the intent of protecting valuable surface resources.

Rural Interface Areas

VRM Class III management (and other special timber management practices) would be applied on approximately 6,800 acres of BLM administered lands within 1/4 mile of private lands where County zoning allows for development on 1 to 20-acre lots.

Socioeconomic Conditions

BLM timber management programs are expected to support 1,317 jobs and provide $26 million a year in personal income during the life of the plan. Recreation activities on BLM administered lands are expected to support 300 jobs, an increase of 60 from 1984-1988.

The net decline in jobs cited above combines with an expected decline in jobs supported by U.S. Forest Service, private and other timber supplies. This would lead to substantial job losses in some communities in the planning area with consequent adverse effects on community stability.

Jobs are also supported by downstream and offshore recreational and commercial fishing for fish supported by BLM habitat. However, fishing opportunities related to BLM management are expected to improve slightly in the next ten years.

Monitoring the RMP

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

- To be sure activities are occurring in conformance with the RMP.
- To determine if activities are producing the expected results.
- To determine if activities are causing the effects identified in the Environmental Impact Statement (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 Indian tribes, so long as the RMPs are also consistent with applicable Federal laws and regulations. The BLM has compared the Preferred Alternative of the draft RMP with a variety of such plans of other agencies. This alternative appears to be consistent with all such plans, policies and procedures, except as noted in the Consistency section of this Chapter.

Public Involvement

Public involvement has been an integral part of BLM's Resource Management Planning effort. Activities have included mailers or brochures, public meetings, open houses, field trips, distribution of planning documents and related comment periods, informal contacts, group meetings, written letters and responses to comments. 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 (AMS), which set the baseline for development of the Draft RMP/EIS. Suggestions for formulation of the Preferred Alternative were also requested.

The draft RMP/EIS has been released for public review and comment until December 21, 1992. After comments are received they will be evaluated. Substantive recommendations may lead to changes in the Analysis of Environmental Consequences (AEC) or one or more of the RMP alternatives. The proposed RMP/Final EIS is expected to be completed for public review next summer. Any protests on that document will be reviewed and addressed by the Director of BLM before a Record of Decision (ROD) on the RMP is completed.

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

Allocation/Action	NA[1]	A	B	C	D	E	PA[2]
1. Timber Management Allocations (thousand acres)							
Intensive Timber Production	260	274	249	0	0	100	89
Restricted Timber Production	12	0	1	207	151	38	30
Enhancement of Other Uses/Not available	30	28	52	95	151	164	183
2. Allowable Sale Quantity							
MMCF	35	53.8	49.8	14.8	17.2	17.2	19.9
MMBF	223	342	316	88	101	97	119
3. Timber Management Practices (assumed average annual acres unless noted, 1st decade)							
Regeneration harvest	3,750	4,410	3,890	1,120	1,570	1,670	1,670
Commercial thinning/density Management Harvest	4,840	1,410	1,480	2,640	800	790	2,210
Prescribed Burning	2,950	3,160	2,800	910	1,170	1,260	1,720
Planting Regular Stock	2,130	2,960	2,310	0	0	0	0
Planting Genetically Improved Stock	2,580	2,580	2,580	1,530	1,960	2,120	2,200
Vegetation Control	2,780	3,280	2,860	50	1,080	1,180	1,110
Animal Damage Control	3,050	3,590	3,180	880	1,320	1,420	2,360
Precommercial Thinning	3,640	2,530	2,310	2,170	1,580	960	2,760
Fertilization	13,010	9,040	7,880	4,160	3,030	2,650	5,240
Road Construction (miles)	269	291	261	227	145	178	220
4. Special Status Plant Species Habitat Where Federal, Candidate State Listed, and Bureau Sensitive Species Would be Protected	538	14	17	17	538	538	538
5. Areas of Critical Environmental Concern (ACECs):							
RNAs/ACECs - Numbers	4	0	5	5	5	5	5
RNAs/ACECs - 1,000 Acres	939	0	1,367	1,367	1,367	1,367	1,367
Other ACECs - Numbers	3	2	6	11	18	18	7
Other ACECs - 1,000 Acres	201	132	564	2,709	8,293	8,293	573

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

Allocation/Action	NA[1]	A	B	C	D	E	PA[2]
6. Visual Resource Management (acres)							
VRM Class I	400	1,120	1,120	1,120	1,120	5,703	1,390
VRM Class II	0	3,071	8,005	16,434	40,828	74,444	13,768
VRM Class III	300	6,705	19,256	31,798	72,658	234,905	29,413
VRM Class IV	314,352	304,156	286,671	265,700	200,446	0	270,481
7. Riparian Zones							
Riparian Management Areas excluded from planned timber harvest (acres)	8,675[3]	10,530	12,922	18,364	34,701	46,302	21,836
8. Recreation Resources							
Existing sites maintained (number)	10	10	12	13	13	13	13
Potential sites developed (number)	0	0	2	11	18	18	18
Access Management (miles)	0	0	0	67	84	250	84
ORV designations (acres)							
. Open	314,367	316,157	314,171	312,126	306,534	306,534	314,214
. Limited	566	358	25	25	25	25	0
. Closed	1,659	77	2,396	4,441	10,033	10,033	2,378
Wild & Scenic Rivers (river segments found suitable)							
. Wild	0	0	0	0	0	0	0
. Scenic	0	0	0	0	0	0	0
. Recreational	0	0	1	1	1	3	3
9. Mineral Resources							
Closed to Locatable Mineral Development	2,595	2,031	4,237	28,266	33,221	33,221	13,350
Open to Locatable Mineral Development	315,187	315,751	313,545	289,516	284,561	284,561	304,432
Closed to Leasable Mineral Development	98	52	52	52	52	52	52
Open to Leasable Mineral Development	317,684	317,730	317,730	317,730	317,730	317,730	317,730

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

Allocation/Action	NA[1]	A	B	C	D	E	PA[2]
10. Rural Interface Area Management (acres)							
Subject to VRM Class II							
management	0	0	0	0	6,800	19,650	6,800
Where clear cutting,							
herbicides and prescribed	0	0	0	0	6,800	19,650	6,800
fire excluded							

[1] NA - No Action Alternative
[2] PA - Preferred Alternative
[3] This number is low due to insufficient inventory data for the MFP

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

Effects	Baseline	Alternatives NA[1]	A	B	C	D	E	PA[2]
Air Quality (tons of fuel burned[3]								
annually in prescribed fires, 10 years -								
thousand acres)	142	72	85	76	59	66	69	77
Water Quality (10 years)[4]								
No. of watersheds probably improving[5]	N/A	2	2	2	4	5	5	5
No. of watersheds probably declining	N/A	8	10	8	5	7	6	7
No. of watersheds with no significant change	N/A	3	1	3	4	1	2	1
Biological Diversity								
After 10 years (acres)								
. mature forest	27,775	[6]	22,573	16,685	31,280	29,933	31,824	28,574
. old-growth forest	41,547	[6]	8,671	19,330	37,161	40,861	43,493	38,841
After 100 years (acres)								
. mature forest	27,775	[6]	15,825	24,690	169,202	94,797	134,429	132,441
. old-growth forest	47,547	[6]	11,256	26,820	56,258	57,851	69,319	54,675
Riparian Trend (200 years: +, -, 0)		0	-	0	0	+	+	0
Woodpecker Populations								
(% of potential, 10 years)	44	38	36	41	48	49	49	49

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

Effects	Baseline	Alternatives NA[1]	A	B	C	D	E	PA[2]
Elk Habitat (10 years)[6]								
No. of habitat areas improving	N/A	0	0	0	0	0	0	1
No. of habitat areas unchanged	N/A	0	0	0	0	2	5	4
No. of habitat areas declining	N/A	5	5	5	5	3	0	0
Fish Populations, 200 Years (+,-,0)		+	0	+	+	+	+	+
Threatened and Endangered Species								
Spotted owl carrying capacity,								
BLM land (100 years) (Range; Rule 1 - Rule 2)	N/A[18]	N/A[18]	N/A[16]	N/A[16]	NA[18]	17-47	N/A[18]	26-73
Acres, Suitable Habitat								
BLM land (100 years) (thousand acres)	N/A	35	21	48	274	143	151	173
Potential bald eagle breeding sites protected	10	10	10	10	10	10	10	10
Potential bald eagle winter roost sites protected	2	2	2	2	2	2	2	2
Known marbled murrelet sites protected	3	3	1	1	2	3	3	3
Visual Resources (10 years; +, -, 0)		-	-	-	+	+	+	+
Wild and Scenic Rivers								
(assessed river segments, 10 years)								
Number of outstandingly remarkable values								
(ORVs) beneficially affected		11	0	0	5	7	14	7
Number of ORVs unaffected		3	7	8	9	7	0	7
Number of ORVs adversely affected		0	7	6	0	0	0	0
Recreation Use (capability to meet 10-year demand[7])								
Off-road travel		5	5	5	4	4	3	4
Motorized travel		3	3	3	3	3	3	4
Nonmotorized travel		2	1	1	3	4	4	4
Camping		2	1	1	3	4	4	4
Hunting		2	2	2	3	3	4	3
Picnicking, studying nature, etc.		2	1	1	3	4	4	4
Fishing		3	2	2	4	4	4	4
Boating		2	1	1	3	3	3	3
Swimming, general waterplay		3	2	2	5	5	5	5

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

Effects	Baseline	Alternatives NA[1]	A	B	C	D	E	PA[2]
Winter sports		1	1	1	1	1	1	1
Snowmobiling		0	0	0	0	0	0	0
Socioeconomic Conditions (10 years)								
Planning area jobs dependent on BLM timber production[9]	N/A	2,330	3,487	3,218	925	1,071	1,080	1,317
Planning area jobs dependent on recreation on BLM administered lands	240	220	200	200	250	290	290	300
Planning area annual personal income dependent on BLM timber production ($ million)[9]	N/A	43,630	67,726	62,595	18,386	21,780	21,498	26,001
Planning area annual personal income dependent on recreation on BLM administered lands ($ million)	3,000	2,762	2,471	2,471	3,123	3,506	3,501	3,693
Average annual O&C receipts distributed to counties ($ million)	13,170	23,742	34,900	32,970	10,606	11,207	12,535	14,589

[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 13 analytical watersheds - 13 of those, where BLM administers substantial acreage, were analyzed.
[6] The planning area was divided into 5 elk habitat areas - 5 of those, where BLM administers substantial acreage, were analyzed.
[7] 0 = no opportunity to meet demand, 1 = least able to meet demand, 5 = best able to meet demand
[8] Values are approximately between Alternatives A and B.
[9] Includes timber management activities.
[10] Information not available at this time.

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		
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

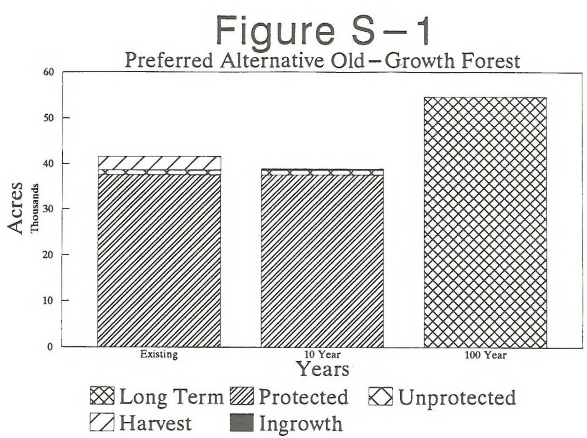

Figure S-1 Preferred Alternative Old-Growth Forest

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Chapter 1
Introduction

The Planning Area

This Resource Management Plan/Environmental Impact Statement (RMP/EIS) 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. 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 for the Action

The Resource Management Plan will establish guidelines for the management of BLM administered land in the Eugene District. It will provide a comprehensive framework for allocating and managing the BLM administered resources in the area for the next ten years, within the principles of multiple use and sustained resource yield. It will supersede and replace the Eugene District's Management Framework Plans (MFPs) covering the same area, which were completed in 1983.

The Preferred Alternative identified in this document was selected after consideration of 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, and the requirements of Bureau policy. The draft RMP 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 1-A.

Relationship of the RMP to BLM Policies, Programs and Other Plans

BLM in Oregon is developing five other RMPs concurrently with development of this one. The six RMPs 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 these Districts administer there is shared management of certain

Table 1-1 - BLM Administered Land Acreage

County	O&C	CBWR	PD	Acreage of 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	269,896	0	7,528	362	40	277,810	1,291
Linn	16,855	0	300	<1	0	17,155	8
Totals	**307,150**	**0**	**9,056**	**362**	**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

resource or administrative features (e.g., watersheds, road networks). Cooperation is occurring in the planning for management of these lands.

In 1987, the BLM completed a Record of Decision (ROD) for its Northwest Area Noxious Weed Control EIS. A copy of key elements of that ROD is included as Appendix 1-B of this document. This RMP/EIS is tiered to that EIS, and the decisions made in that ROD are not addressed again in the RMP/EIS alternatives.

This RMP/EIS is tiered similarly to the BLM 1989 EIS, Western Oregon - Management of Competing Vegetation, regarding analysis of impacts of vegetation management activities on human health, and regarding all other impacts from the use of herbicides in management programs other than noxious weed control. A copy of the key elements of the ROD for that EIS is included as Appendix 1-C of this document. The decisions made in that ROD are also not readdressed.

Pacific yew management and collection on Federal lands will be the subject of a separate EIS being prepared by the U.S. Forest Service with BLM as a cooperating agency. The draft EIS is expected to be released later this year.

Any recommendation made in the ROD for this RMP/EIS that certain river segments assessed herein are suitable for designation under the National Wild and Scenic Rivers Act, will be a preliminary administrative recommendation. This matter will receive further review and possible modification by the Director, BLM; Secretary of the Interior; or the President of the United States. After completion of this RMP and its Record of Decision, BLM plans to prepare a suitability study report to assist and review support recommendations to Congress for designation of those river segments considered appropriate for designation under the Wild and Scenic Rivers Act. Final decisions have been reserved by Congress.

The following rivers would be assessed for suitability by BLM: Bear Creek; Fish Creek; Greenleaf Creek; Marten Creek; McKenzie River, Seg. A; Siuslaw River, Seg. B; Siuslaw River, Seg. C; Whittaker Creek; and Sharps Creek.

Planning Process and Criteria

BLM's planning process involves nine 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 7. Public involvement has occurred at several steps in the process (See Appendix 1-D, Public Involvement).

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 RMP and the other five western Oregon RMPs being developed concurrently. The development of those planning criteria is discussed in Appendix 1-E, Planning Criteria. The criteria for formulation of alternatives are published in their entirety in Appendix 1-E.

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 forestlands 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 forestlands:

- precommercial thinning, commercial thinning, fertilization, brushfield 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 or 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 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 following issues were eliminated from consideration as primary factors in the formulation of alternatives, for the reasons cited:

- **Grazing/range management** - There are only a few seasonal grazing leases issued by BLM in the planning area. These few leases do not pose significant resource conflicts.
- **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 five 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 RMP.

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.

Western Oregon Digital Database

To support the RMP process BLM developed the Western Oregon Digital Data Base (WODDB), a geographic information systems (GIS) digital (computer) data base.

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 District 16 townships with 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 which 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 six 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, which 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.

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

The WODDB database has been used in three ways in the planning effort:

1. To compute and aggregate resource data for each planning area, and display maps of that data.
2. To help design alternatives in accordance with criteria established for alternative formulation and to display maps of those alternatives.
3. To facilitate analysis of some of the consequences of those alternatives.

Chapter 2
Description of the Alternatives Including the Preferred Alternative

Alternatives to be Analyzed and Alternatives Dropped from Detailed Study

There are seven alternatives, including the Preferred Alternative, for which impacts are analyzed in Chapter 4. These include:

- **No Action** - This alternative would entail no change from the management direction established in BLM's current Management Framework Plans (except where Congress has since enacted legislation prescribing different management direction for specific geographic areas or transferring specific lands to the administration or ownership of other parties). 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 four Research Natural Areas (RNAs) 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 for 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 would be designated. 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 important waters. All existing Areas of Critical Environmental Concern (ACECs) would be retained and four 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 which include lands zoned for one to five-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 nine 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 Rural Interface Areas which include lands zoned for one 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 and species of related concern would be protected. Timber harvest would not be planned in and 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 Rural Interface Areas, which include lands zoned for one 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. A sustained yield of timber would be produced consistent with the emphasis on these other values. All old growth forest stands would be retained. Species with a high potential for Federal listing as threatened or endangered and species of related concern would be protected. Timber harvest would not be planned in and 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 Rural Interface Areas.

- **Preferred Alternative** - This alternative would manage lands to contribute to community stability consistent with maintenance of ecosystems. It would manage biological diversity, provide regional and subregional connectivity, and contribute to long-term recovery of the spotted owl. Habitats of other threatened and endangered species would be protected. Species of related concern would be protected sufficiently to avoid endangering the species. Timber harvest would not be planned in or adjacent to riparian zones of important waters. All existing ACECs would be retained and five new ones would be designated. Three rivers 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 within all recreation sites, all ACEC's and along the McKenzie River Corridor. Recreation management would provide for a wide range of recreation opportunities. Special timber harvest and forest management practices would be applied in Rural Interface Areas.

Allocations and management by alternative are compared in Table 2-1. All tables in this chapter are located at the end of the chapter. Allocation acres shown in Table 2-1 overlap and partly duplicate. A different hierarchical perspective on allocations, displaying net acres without duplication, is shown in Table 4-T-1 in Chapter 4.

In the scoping of the plan a number of alternatives, or potential elements of alternatives, were considered but eliminated from detailed analysis. These alternatives are discussed in the Summary of Scoping in Appendix 1-D. Some are also addressed in the Sensitivity Analysis (see Appendix 4-L).

Management Direction Common to All Alternatives

The following management direction would apply fully to all alternatives analyzed with some exceptions for the No Action alternative and Alternative C. Significant exceptions to this direction are noted in the descriptions of those two alternatives.

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 (see Appendix 2-A) and minimizing disturbance of fragile areas, these losses would be kept to a minimum.

All BLM prescribed fire activities that could affect air quality, would be conducted in accordance with the Oregon State Implementation Plan, administered by the Department of Environmental Quality, and the Oregon Smoke Management Plan administered by the Department of Forestry.

Special management would be provided for the Pacific yew, the bark of which is the only source of taxol currently approved by the Food and Drug Administration. Taxol has been shown to be a promising agent for treatment of ovarian and breast cancer. The strategy for management and collection of Pacific yew bark on Federal lands is the subject of a separate Environmental Impact Statement (EIS) being prepared by the U.S. Forest Service with BLM as a cooperating agency. BLM actions covered by this RMP will be consistent with the strategy under development. This strategy will include how to assure a sustainable yew supply with full consideration of ecosystem relationships of the yew. Included will be regeneration of yew and possible extraction of taxol without harvesting individual trees.

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.

Water Quality and Riparian Zones

To assure protection of water and water-dependent resources, BLM would continue to implement a nonpoint 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 two goals for NPS prevention and control efforts: (1) the protection, in every waterbody, of water quality necessary for full support of the various designated beneficial uses of water, and (2) the maintenance of "high quality" waters wherever they are found. The Clean Water Act, as amended, directs Federal agencies to comply with State water quality requirements to restore and maintain water quality necessary to protect identified beneficial uses.

The Oregon NPS management plan requires the BLM to continue coordination with DEQ for implementation of Best Management Practices (BMPs), 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 2-A.

Timber management activities would be planned so as to be consistent with Oregon's adopted Statewide Water Quality Management Plan for forest practices, and comply 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, and off-road vehicle use would also be regulated to protect water quality. Management of the grazing program will be reliant on season-of-use controls and conservative amounts of use - averaging nineteen (19) acres for each Animal Unit Month (AUM) - in order to protect water quality. Grazing is expected to continue at current levels of 504 AUMs on 10,540 acres.

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.

Floodplains 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 (RMAs) would be established on each side of all streams, lakes, ponds and other waters that will meet Oregon Forest Practice Act requirements and Oregon water quality standards. (See Figure 2-R-1 in Riparian Management on page 2-80)

The exclusion of fragile non-suitable 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 2-A.

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 2-C.

The Allowable Sale Quantity (ASQ) 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 ASQ 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 ASQ calculation process for Alternative D, and the ten-year representative timber management scenarios are contained in Appendix 2-B.

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: Forestlands 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 ASQ 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 ASQ 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 2-C.

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 2-A) 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 2-D 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.

Forest Health: Forest practices would be designed to maintain long- term site productivity, promote ecosystem health and to assure the sustainability of timber production. Consistent with the design of each alternative, individual timber sale and silvicultural actions would contain design features that prevent site degradation and which protect the forest from increased levels of damage from pathogens and insects.

Management plans would be developed to treat specific tree diseases and insect outbreaks.

Special Forest Products: Sale of special forest products (firewood, burls, mushrooms, ferns, floral greens, etc.) would be accommodated consistent with other land use allocations. Sales would be designed as part of activity plans designed to assure resource sustainability and to prevent damage to other resource values, such as special status plants. The market value of such products would be based on their highest and best use. The Analysis of the Management Situation (AMS), Table T-17, identifies the special forest products that have previously been offered in the District.

Special management will be provided for the tree species Pacific yew, the bark of which is the only source of taxol currently approved by the Food and Drug Administration. Taxol has been shown to be a promising agent for treatment of ovarian and breast cancer. Special management will address harvest of the yew as well as its regeneration and the possible extraction of taxol without harvesting individual trees. Pacific yew management and collection on Federal lands will be the subject of a separate Environmental Impact Statement (EIS) being prepared by the U.S. Forest Service, with BLM as a cooperating agency. The draft EIS is expected to be released later this year.

Special Status Species (including Threatened and Endangered) Habitat

Plants: Federally Listed plant species, and proposed threatened or endangered plant species and associated habitats, would 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) would be conducted for special status plants. Consultation or conference with the U.S. Fish and Wildlife Service would 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 would be modified, relocated or abandoned in order to obtain a "no effect" determination. No discretionary activities will be undertaken or permitted that would 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 USFWS and the claimants.

Where plants are protected under a given alternative, adequate buffers would 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 would be written and implemented for all Special Status Plant Species. Systematic inventories and studies would 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 would depend on a variety of criteria including the preference of a landowner and on the method of acquisition allowable under a given alternative.

See Appendix 2-E, Tables 2-5a and 2-5b for Special Status Plant Species Protection by Alternative.

Animals: All actions relative to the habitats of Federally listed or proposed threatened or endangered species would 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) would 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 would 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 would be initiated. No activities will be undertaken or permitted that would jeopardize populations of Federally listed threatened or endangered plants or animals, or species officially proposed for such listing. Special Status Species and Priority Species habitat protection by alternative are listed in Appendix 2-E, Tables 2-5c and 2-5d.

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 would be protected.

Habitat Management Plans (HMPs) would be written and implemented, incorporating the responsible BLM management actions identified in all Recovery Plans.

As funding permits, systematic inventories and studies would be conducted on special status species where baseline information is currently lacking.

Stream channel and pond integrity with associated riparian areas would be protected during all activities to conserve the Oregon Chub.

Wildlife (including Fish) Habitat

Nonmerchantable down, dead woody material would 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 would be constrained in accordance with alternative design features to maintain dead and down woody debris. Salvage of down, dead material from other lands would also be constrained to meet alternative design features for protection of dead & down woody debris.

Except where public safety is a concern, snags would be retained where they occur on lands not allocated to timber production. Unmerchantable snags would 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 would be girdled or topped to create snags. Timber sale contracts would 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 would include retention of soft snags except where unacceptable for safety, logging systems, or burning considerations.

Wherever practical, new roads would avoid areas with high wildlife values. Access on spur roads unneeded for continued timber management would be controlled upon completion of logging and replanting. Some alternatives provide for additional access management to protect species sensitive to human intrusion. All roads would remain open for administrative use, forest products removal, and access for mineral exploration and development (see Recreation direction for more detail).

Precommercial thinning projects would 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 would 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 would 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, eg., less than 20 percent of all forestlands within a drainage is in the early seral stage.

Any leasable or salable mineral exploration and development activities would be conducted to avoid degrading special habitats.

Fish: 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. Riparian areas within lands allocated will be managed to maintain and restore riparian communities, including large conifers. Stream crossing structures would be installed so that fish passage is not impeded, and with the least alteration possible of the channel. When practical, timber sale contracts would require removal of debris from the channel where the following conditions exist: when fish passage of a major anadromous fish migratory route is obstructed, when 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.

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. Elements of the fisheries portion of the FW 2000 Plan are summarized in Table 2-2.

See the previous Water Quality Protection discussion for riparian management direction, which relates to wildlife and fish habitat.

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 ACECs 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 ACECs without approved ACEC management plans). All designated ACECs

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. Ground base suppression equipment would not be allowed in RNAs. Fire suppression tactics will be determined in the site specific management plans. Prescribed fire could be used to achieve management objectives. Where substantial mineral potential has been identified, 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 ACECs. No new road construction would be allowed in ACECs. Off-road vehicle use would not be permitted in ACECs except on existing open roads. 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.

Some candidate ACECs 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 (see Appendix 2-F). For further explanation of Special Area Management by Alternatives, see Table 2-6 at the end of Chapter 2.

Recreation

Most BLM administered lands in the planning area would be designated as Extensive Recreation Management Areas. The lands would be available for dispersed recreation activities, including hunting, fishing, sightseeing, horseback riding, mountain biking, hiking, and rafting consistent with managed forest settings. Provision for opportunities accessible by car and close to population centers would be emphasized. All BLM administered lands would be open to recreational mineral collection (casual use) unless 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) would be maintained and managed through all alternatives:

- Recreation Sites - camping and day use
  - Whittaker Creek
  - Clay Creek
  - Sharps Creek
- Special Recreation Management Area
  - Shotgun Creek - 260 acres managed for day use only
- Recreation and Public Purpose leases
  - Greenway Tract (State)
  - McKercher Park (Linn County)
  - Marten Rapids Park (Lane County)
  - Whitewater Park (Lane County)
- Boat landings
  - Rennie
  - Silver Creek
  - Whittaker Creek
- Hiking trails
  - Eagles Rest (.7 mile)
  - Shotgun trail system (5.7 miles)
  - Forest Service trail #3462 (.2 miles of right-of-way on BLM)

The provision of other recreational opportunities would vary by alternative as shown on Table 2-7b.

The Eugene District currently does not have any established National Back Country Byways, but is actively exploring areas for opportunities in this program. Several routes have been proposed (see Chapter 3 for listings).

The use of off-road vehicles on BLM administered lands will be regulated in accordance with the authority and requirements of Executive Orders 11644 and 11989 and regulations contained in 43 CFR 8340. They require that off-road vehicle use not cause significant adverse impacts to resource values, that conflicts between visitors be minimized, and that public hazards are identified and public safety is promoted.

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's Recreation 2000 Implementation Plan, and the Oregon-Washington Special Recreation Management Area and Extensive Recreation Management Area initiatives.

Wild and Scenic Rivers

Currently, the Eugene District currently does not have any designated rivers. Management guidelines and standards for National Wild and Scenic Rivers are described in Appendix 2-G of this chapter.

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, is being done 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. Wild and Scenic Rivers eligibility and classification criteria are shown in Appendix 3-J and Table 3-WSR-3 of chapter three.

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 (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. Under interim management, no actions would be authorized on BLM administered lands within the half-mile corridor that would adversely impact the Outstandingly Remarkable Value(s), which resulted in rivers being found eligible/suitable. Interim management would be applied in all alternatives except the No Action alternative. Management guidelines and standards for designated National Wild and Scenic Rivers, which also apply to segments under interim management, are described in Appendix 2-G.

Interim management for potential recreational rivers would exclude timber harvest in the riparian management area, severely restrict development of leasable and salable minerals, and protect the segment's free flowing values and identified Outstandingly Remarkable Value(s). Interim management for potential scenic rivers would exclude timber harvest in the Riparian Management Area, provide Visual Resource Management Class II management in the half-mile corridor, and protect the segments' free flowing values and identified Outstandingly Remarkable Value(s). Interim management for potential wild rivers would exclude timber harvest and other disturbing activities within the half-mile corridor, except for exploration and development of locatable minerals, which would be restricted but not prohibited. The corridors of seven eligible rivers, which are not being studied for suitability, would receive interim management to protect their Outstandingly Remarkable Values, and their eligibility for designation as recreational rivers. They are: Fall Creek, North and South Gate Creeks, Nelson Creek, Lake Creek (Segment B), McKenzie River (Segment B), and Willamette River.

Wilderness Study Area Protection

The Eugene District does not have any wilderness areas. The District's Recreation Opportunity Spectrum (ROS) inventory found the District's lands in the following categories: Roaded Natural, Rural, and Urban with some small pockets of Semi-Primitive Motorized (not enough acres to qualify for wilderness).

Visual Resources

Visual Resource Management (VRM) classes and objectives as set forth below are all common to all alternatives:

Class I. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV. The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may domi-

nate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Cultural Resources

BLM would continue to identify localities with cultural resource values and manage them for their public and scientific uses. This objective would largely be accomplished through implementation of 36 CFR 800, which ensures that authorized land use actions do not inadvertently harm or destroy Federal or non-federal cultural resources, but would also include affirmative measures taken to protect and enhance cultural resources. The affirmative measures would be largely a result of the 1988 Archeological Resources Protection Act (ARPA) amendments and the Bureau initiative, Adventures in the Past. The ARPA amendments direct Federal agencies to identify and evaluate their cultural resources and to develop public awareness programs to explain the significance of those resources. "Adventures in the Past" helps attain those goals by enhancing public enjoyment and awareness of cultural resources. Implementation of these measures would depend upon adequate funding and would be susceptible to change based on the accumulation of new data. The measures would include:

- Systematic inventory of areas likely to contain cultural resources.
- Systematic testing and evaluation of archaeological sites to assess their potential for contributing to public and scientific uses.
- Development of inventory plans based on the geomorphic provinces of the Coast Range and the western Cascade Range.
- Development of Memoranda of Understanding with relevant Indian groups so that their heritage and religious concerns may be appropriately considered. These groups would include the Confederated Tribes of Siletz, the Confederated Tribes of Grand Ronde, and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians.
- Interpretation of cultural resources to increase public awareness and appreciation of the resource values.

All vertebrate fossils and scientifically significant invertebrate and plant specimens will be collectible only under a permit issued by the Authorized Officer. Common fossils will be collectable without a permit as long as mechanized equipment or explosives are not used. Paleontological clearances will be performed as a standard part of project clearance. Affected sites will be analyzed for their significance and mitigation measures will be applied, if appropriate. Efforts to increase our knowledge of sites and specimens will continue, using volunteers or contractors as appropriate.

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 2-I, 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-L-1. Zone 3 lands are identified in Appendix 2-J.

Lands will be acquired where directed by Congress, including lands to be purchased with funds appropriated from the Land and Water Conservation Fund.

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-L-1. 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 protection 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).

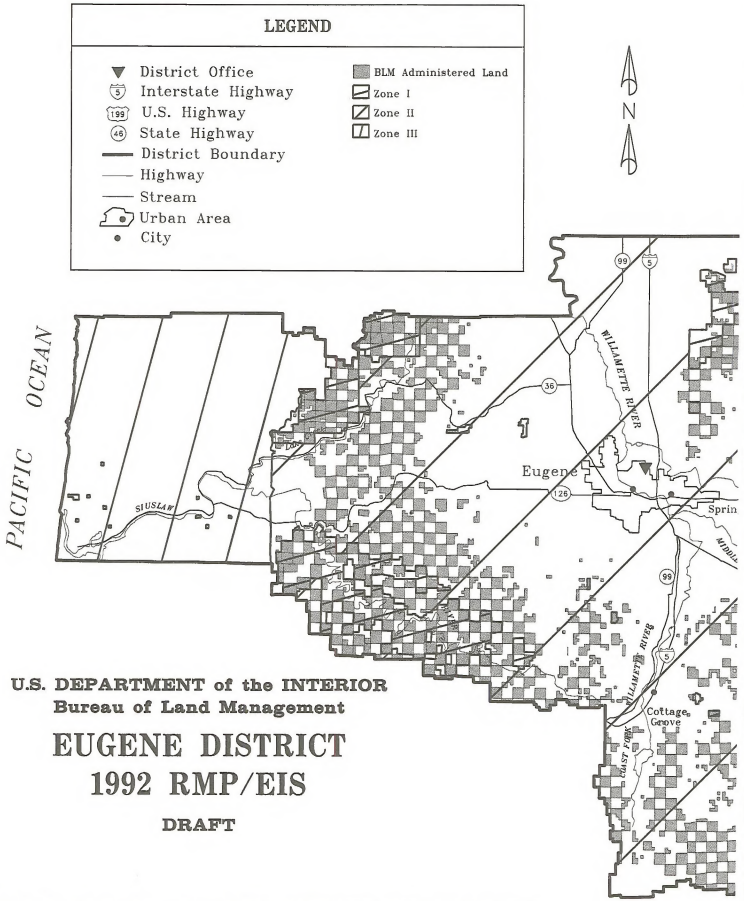
No sales under authorities other than those discussed above are anticipated.

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

Table 2-L-1 - Lands Recommended for Transfer To or From Other Public Agencies

Township	Agency Range	Agency Section	Public Subdivision	From	To	Acres
16S	2E	25	NEGNWG	USFS	BLM	40.00
16S	9W	35	SHNEGNEGSEG, NHSEGNEGSEG, SEGSEGNEGSEG, SHSWGSEG, SWGNEGSEGSEG, NEGNWGSEGSEG, SHNWGSEGSEG, SWGSEGSEG, WHSEGSEGSEG	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	SHSWG	BLM	USFS	80.00
18S	10W	14	SWGSWG	BLM	USFS	40.00
20S	1E	17	SEGNEG, NEGSEG	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



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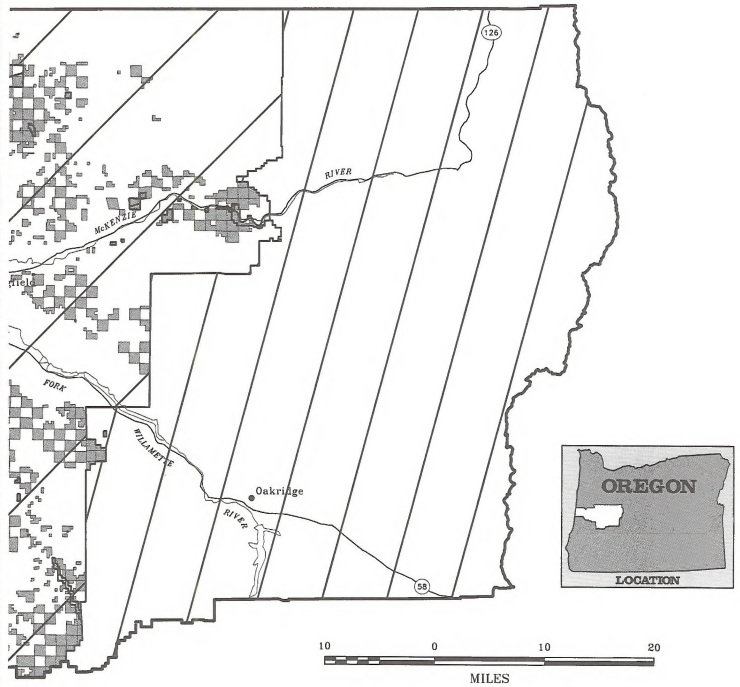
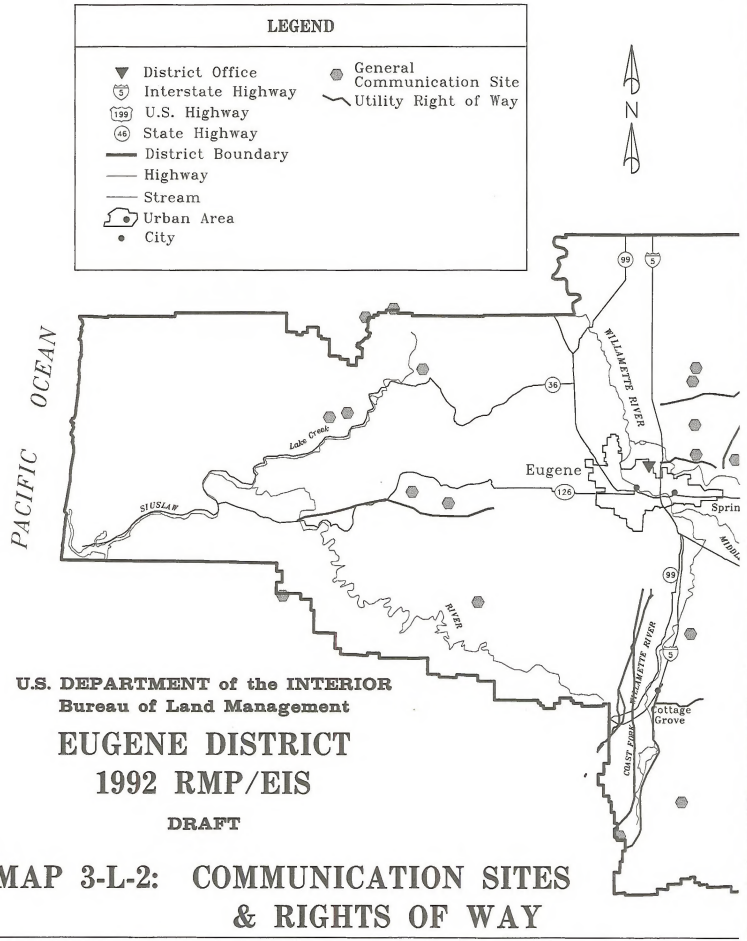
MAP 2-L-1: LAND TENURE ZONES


126
RIVER
McKENZIE
FORK
WILLAMETTE
RIVER
Oakridge
58
OREGON
LOCATION
10
0
10
20
MILES



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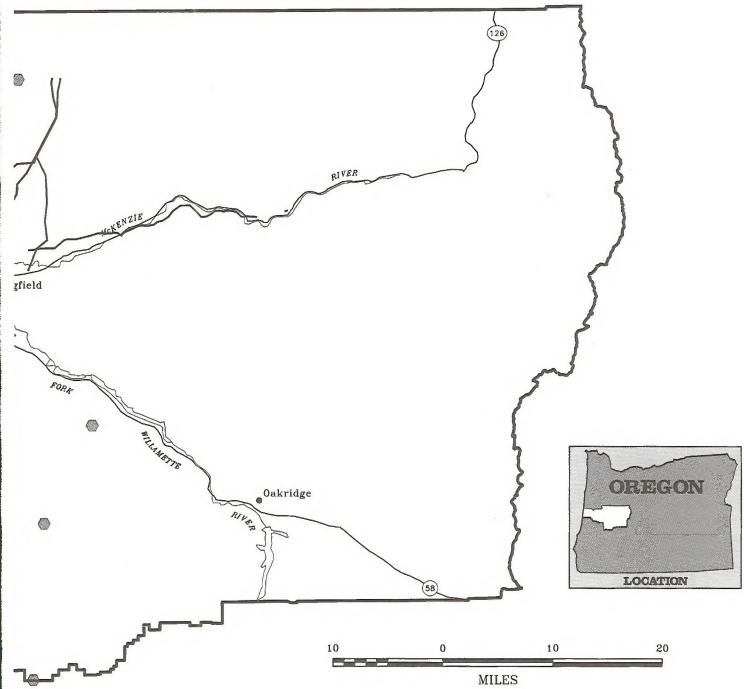
MAP 3-L-2: COMMUNICATION SITES & RIGHTS OF WAY


126
RIVER
McKENZIE
gfield
FORK
WILLAMETTE
RIVER
Oakridge
58
OREGON
LOCATION
10
0
10
20
MILES

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. Lands presently leased for industrial purposes at Culp Creek (OR 33636) would continue to be available for such lease. 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, 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-L-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.

Communications facilities would be allowed on existing and potential communication sites, also shown on Map 2-L-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-L-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 (RNAs), 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 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 hydro-

power 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. Non-exclusive Easements, when consistent with management objectives, will be negotiated. These types of easements do not provide access for the public. Temporary easements will only be utilized when no other options are available. Condemnation authority will be used when necessary.

Acquisition procedures will be completed as described in BLM Manual Handbook H-2101-1. There are currently numerous scattered tracts of timber located within the District boundaries. As specific tracts are identified as to type of access needed, acquisition actions will be started consistent with management objectives for the specific tract.

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, amendments, or assignment 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 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 swap or provide for the purchase of road ownership and control by the United States.

Acquisition for access for other programs such as recreation, water quality, or wildlife habitat will be completed as necessary. Access will be based on the program needs identified in the acquisition document.

Withdrawals

Table 2-3 (see Tables at end of Chapter 2) shows existing land classifications and withdrawals, 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 1 of Appendix 3-B 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 1 of Appendix 3-B (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.

Table 2 of Appendix 3-B 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.

Energy and Minerals

Leasable Minerals: Several lease notices would be in effect for all lands in the operating area under all alternatives. The notices pertaining to the 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; cultural resources; and special status fish species are shown in Appendix 2-K. Since BLM is conducting surface management activities on lands within the operating area withdrawn by the Corps of Engineers, the mineral leasing of these lands is discussed in this document. Standard oil and gas lease terms are listed in Section 6 of "Offer to Lease and Lease for Oil and Gas" Form 3100-11. The powersite stipulation would be used for any lands within a powersite designation, and the Corps of Engineers stipulation would be used for any lands withdrawn by that agency. The standard leasing terms are displayed in Appendix 2-K.

Special stipulations would be attached to oil and gas leases to provide additional protection for fragile areas or critical resource values. The criteria whereby these special stipulations can be waived, modified, or exempted are shown in Appendix 2-K with each stipulation. No surface occupancy would be allowed on land use authorizations, in developed 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 slopes or slopes over 60 percent, or on lands classified as VRM Class II. 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 those roads. Additional conditions may be added as site specific conditions of approval in order to protect surface resources found during field visits to proposed well site locations.

BLM will provide similar opportunities for geothermal exploration and development in the same areas open to oil and gas leasing. All geothermal activities are regulated under 43 CFR 3200, and leases would be issued subject to the leasing stipulations found in Appendix 2-K.

Across all alternatives, the withdrawals to the Army Corps of Engineers for Fern Ridge and Lookout Point Reservoirs would be modified to open 6.64 acres to mineral leasing. Lands within incorporated cities are by law closed to oil and gas leasing. Two tracts within the operating area are affected by this: the Danebo office site in west Eugene, and the Cannery Dunes tract in Florence, Oregon, together encompassing 52.36 acres. Land obtained under future land exchanges, donations or other means of acquisition would be managed with regard to leasable minerals in the same manner as those with comparable resource values. If Forest Management Research Sites are established in the future on BLM managed lands, those sites would be leased subject to a Controlled Surface Use special stipulation.

Locatable Minerals: Areas not specifically closed to mineral entry would continue to be open under the mining laws. Mineral exploration and development would continue to be regulated under regulations found in 43 CFR 3809 to prevent unnecessary or undue degradation. Activities exceeding casual use, but disturbing five acres or less, may proceed 15 days after a notice is filed in the District Office. A notice is screened for impacts that constitute unnecessary or undue degradation. Processing a notice is not a Federal action and there is no formal environmental analysis. Projects disturbing more than five acres require an approved plan of operations before work can begin. Once a plan of operations is filed with the BLM, the proposed action is analyzed and mitigating measures needed to prevent unnecessary or undue degradation are required for approval. Plans of operation are bonded to ensure that mitigating measures are followed and that reclamation of the disturbed lands is completed to the satisfaction of the Authorized Officer.

All surface disturbance from mining operations, whether conducted under a notice or an approved plan of operations, shall be reclaimed. For all alternatives, the operating standards shown in Appendix Attachment 2-K.1 will be implemented. Land obtained under future land exchanges, donations or other means of acquisition would be managed with regard to locatable minerals in the same manner as those with comparable resource values.

Under all alternatives, lands within R&PP leases, recreation sites, the Tyrrell and Dorena Seed orchards, office sites, and reconveyed land not opened to locatable mineral entry would be closed to mining claim location.

Under all alternatives, locatable mineral exploration and development would be subject to some additional restrictions on lands within community pits, progeny test sites, regional forest nutritional study installations,

powersite withdrawals (for placer mining only), Federal mineral estate only, and areas where threatened and endangered plant and animal species occur.

Salable Minerals: Salable minerals, including common varieties of sand, gravel, rock, cinders, pumice, pumicite, clay, and stone, would be made available for the general public and local governments, consistent with management direction for protection of other resources. Under all alternatives, the following lands are considered to be closed (discretionary) to salable mineral use: land use authorizations, developed recreation sites, regional forest nutritional research study installations, special areas, progeny test sites, the Tyrrell and Dorena seed orchards, lands reconveyed but not opened to locatable mineral development, and VRM Class I areas. On these lands, if the Authorized Officer decides that the impacts from a proposed salable development would be acceptable, then salable mineral uses may be allowed. Bald eagle nest and roost sites and associated habitat, and marbled murrelet nest sites are considered closed to salable mineral development as well. However, if the impacts of a proposed development can be mitigated so that it will not adversely affect the species, then use of existing or proposed salable mineral resource sites on these lands may be allowed.

Salable mineral development may be restricted on lands within powersite withdrawals, or where only the mineral estate is in Federal ownership. Special status fish species would be protected under all alternatives. Lands within VRM Class II areas are considered open for salable mineral development provided that the use of the site can meet visual quality objectives of the area. Likewise, in areas suspected of having fragile or potentially unstable slopes, salable minerals may be utilized if the impacts of such use are acceptable to the Authorized Officer or the impacts can be mitigated.

Salable mineral development would be prohibited if the proposed operation would adversely affect the northern spotted owl, American peregrine falcon, bald eagle, marbled murrelet or any other threatened or endangered animal species. Areas with threatened or endangered plants would be closed to salable mineral development unless excavation can be conducted in such a way as to avoid disturbing the plant species protected under the Endangered Species Act.

Most of the public and private demand in this area is for quarry rock, and these needs would be met from 12 existing designated community pits, or the other 63 quarries that have not yet been designated community pits. New common use areas or community pits would be designated if the level of localized activity warrants. BLM would issue sales contracts for mineral materials (including commercial use of petrified wood) pursuant to the 43 CFR 3604 or 3610 regulations where the disposal is deemed to be in the public interest. Material sale contracts are valued according to the current appraisal of the fair market value. Rock quarries would also continue to be used to provide rock for use in the construction and maintenance of BLM access roads.

Mineral material free use permits (FUPs) are considered on a case-by-case basis and issued at the discretion of the Area Manager to government agencies or subdivisions and to nonprofit organizations. Materials obtained by FUP may not be bartered or sold. Free use of petrified wood for noncommercial purposes is permitted pursuant to the regulations in 43 CFR 3622. As stated in these regulations, up to 250 pounds of petrified wood may be collected by individuals in one calendar year. If a collector certifies that pieces of petrified wood over 250 pounds in weight would be displayed to the public in a museum or similar institution, the Authorized Officer may issue a permit for the removal of such specimens using the procedures in 43 CFR 3621.

Reclamation of mineral material sites would be conducted by the operator at the conclusion of excavation work if deemed appropriate by the Authorized Officer at the time of contract or permit issuance, or by BLM crews when the site is completely depleted of all useable materials. In the latter case, reclamation work is financed with the reclamation fee payments made over the years by all the operators who used the site.

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

Recreational Mineral Collecting: Under all alternatives, most BLM administered lands in the planning area would remain open to hobby mineral collecting and rockhounding pursuant to the regulations in 43 CFR 8365.1-5(b)(2). Acres closed to these activities would be shown in Table 2-9(a).

Reserved Mineral Estate: The reserved Federal mineral estate (also referred to herein as Federal subsurface mineral estate) would continue to be open for mineral exploration and development. Conveyances of mineral interest owned by the United States where the surface is, or will be, in nonfederal ownership, may be made to the existing or proposed owner of the surface estate after a determination is made under Section 209(b) of 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.

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

Withdrawal Revocations: Under all alternatives, the following withdrawals are proposed for revocation: Horton Air Navigation Site (partial), Fall Creek Reservoir (partial) and Turner Creek Recreation Site, encompassing 113.50 acres. The partial revocation of the Horton Air Navigation Site withdrawal would open these lands to mineral leasing and location under the mining laws. The partial revocation of the Fall Creek Reservoir withdrawal, and total revocation of the Turner Creek Recreation Site withdrawal would open these lands to mining claim location. Both tracts are already open for mineral leasing.

Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by alternative.

Roads

Roads would be constructed and maintained to standards sufficient to serve their anticipated use. Road construction would be sited and scheduled in order to avoid mass movement of soil. Where appropriate to the anticipated intensity of use, roads would be paved or rocked to minimize sedimentation. Where feasible, cuts and fills would be revegetated to stabilize them prior to winter rains, where feasible. Roads built for temporary use would be rehabilitated when that use is completed. If required to alleviate significant resource damage, road closures would be implemented, using standard analysis, public involvement and notification procedures.

Because BLM administered and private lands generally are intermingled in the planning area, each party must cross the lands of the other in order to reach its timber. It is BLM policy to provide all prospective purchasers of BLM timber with an equal opportunity of access when timber is offered for sale. This is most often accomplished through reciprocal right-of-way agreements with private landowners or through Federal ownership and control of roads. Reciprocal right-of-way agreements 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 50 individual agreements and permits are subject to the regulations in effect when they were executed or assigned.

The provisions of these agreements allow the BLM only limited discretion to control the location of roads constructed under their terms by the private parties across BLM administered lands and vice versa. This limited discretion allows BLM to object for only one environmental reason - excessive erosion damage.

Noxious Weeds

Treatment of noxious weeds to control infestations on BLM administered lands would be designed using an integrated pest management approach. Chemical, mechanical and biological methods would be considered. Application and monitoring of the effects of herbicides would be done in accordance with BLM's multistate EIS, *Northwest Area Noxious Weed Control Program*, 1986, as supplemented in 1987, and the related Record of Decision (ROD). (See Appendix 1-B for relevant portions of the ROD.)

Hazardous Materials

The goals of the Hazardous Materials Program will be to protect public health and safety, protect National and environmental resources, comply with State and Federal regulations, and minimize future risks, costs, and liabilities. The program will be one of comprehensive environmental management by safeguarding the quality of groundwater, surface water, soils, air, fish and wildlife, recreational lands, timber lands and communities.

The control of the generation, transportation, storage, treatment, and disposal of hazardous wastes will be completed in accordance with the Resource Conservation and Recovery Act (RCRA) and other appropriate regulations. Waste minimization and recycling efforts will be maximized to the greatest extent possible.

There are ten known closed landfills in the District. A site review will be completed at each to determine if a site investigation or further action is required.

All existing underground storage tanks will be removed. All newly installed fuel storage facilities will be aboveground.

Identification, investigation, and cleanup of hazardous releases from BLM facilities will be completed as specified in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A release of a hazardous substance into the environ-

ment, including the abandonment or discarding of barrels, containers, or other closed receptacle containing any known or suspected hazardous substance, pollutant, or contaminant will invoke the appropriate response to the release.

Emergency response will be as specified in the District Hazardous Materials Contingency Plan. The response will include cleanup, proper notifications, investigation, risk assessment, and other actions consistent with the emergency.

The Emergency Planning and Community Right-to-Know Act (EPCRA) will be utilized to complete emergency planning with State and local jurisdictions with hazardous materials, and emergency planning responsibilities for BLM facilities. Emergency notifications, and routine reporting of substance inventories will be completed as specified in EPCRA.

Fire

Fire management is the management of both wildfire and prescribed fire, each of which is described in the following sections.

Wildfire: The management of wildfire on BLM administered lands in the planning area is accomplished through contract with the Oregon Department of Forestry (ODF). ODF has assigned the responsibility for protection of the Eugene BLM administered lands to the Douglas Forest Protective Association, Eastern Lane Forest Protective District, Linn Forest Protection District, Western Oregon Forest Protective District, and West Oregon Forest Protection District. In general, these five agencies conform respectively to the boundaries of Douglas, Lane, Linn and Benton counties. The contract covers all suppression activities in the planning area.

The suppression of wildfires under all alternatives would involve either an Intensive or Conditional response, depending upon the resource values at risk. Regardless of which of these two response levels is followed, a BLM Environmental Specialist with specific knowledge of resource values, locations and constraints would be assigned to all wildfire which escapes initial attack.

Intensive fire suppression - The objective in this scenario of fire suppression action is to make every reasonable effort to suppress a fire while considering potential resource loss and suppression costs. Intensive fire suppression is normally used in general timber management and Rural Interface Areas where the resource values are high. The main intent in selecting suppression tactics in such high value resource areas is to keep fires small and contained to the immediate area, and to prevent the fire from escaping into special fire concern areas, which could require different suppression tactics. Intensive fire suppression may include the use of tractors in fire line construction, air tankers, and limited snag falling. Even with intensive fire suppression initiatives, tractors or other heavy equipment use will only be utilized when considered essential for control.

Conditional fire suppression is employed in areas where the fire suppression actions may cause more harm to the resources than the wildfire. Fire suppression tactics are determined by various factors such as weather, fire behavior, aspect, topography and land management objectives. Emphasis is given to using tactics that minimize soil disturbance, including constructing fire lines by hand methods rather than with a tractor. For example, in many areas tractor use would generally be prohibited in fire line construction. However, in instances where such use may be permitted, it would be subject to specific controls. Air tanker use would be excluded in areas where the potential exists for adverse impacts to streams, ponds, or other waterways. The felling of snags would also be minimized.

Fire Use or Prescribed Fire is the tool used most to emulate the natural role of fire to achieve resource objectives for wildlife enhancement, plant species maintenance, forestland biodiversity, hazard reduction, and site preparation.

Prescribed Fire: Prescribed fire would be used to maintain and enhance biodiversity in more of a natural role whenever conditions require. Prescribed fire would be used in the historical role of general commercial timber management to prepare lands and enhance conditions for reforestation by removing logging slash through burning, and also retarding competitive brush growth through the intensity of the fire's heat. Prescribed fire also would be used to create and enhance wildlife production and help perpetuate varieties of plant species. Another benefit of burning logging slash is the reduction of fire hazards. If not removed or reduced in logging, slash can contribute to the ease of ignition of wildfire and perpetuate rapid spread rates of the wildfire resulting in severe damage to the site, or to the rapid expansion of the undesirable fire to catastrophic proportions.

Management of forest fuels is important for preventing and controlling wildfire. In managing forestlands 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.

In order to assure that resource objectives such as wildlife, and botanical species maintenance are met and that forestland 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.

To meet the resource objective there are approximately 200,000 acres of the District land base that lend themselves to fire entry under prescription. It is reasonable to assume that at least an annual average of 1,800 acres of understory related burning will be necessary to meet these needs. This would assume an approximate 30-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-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, 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. The requirement for the introduction of prescribed fire could vary annually from 1,400 to 2,200 acres per year under Alternatives C, D, E and the Preferred Alternative.

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 1,800 acre understory burn regime can be implemented so understory burning does not add or exceed established air quality standards.

Rationale for Estimated Understory Burn Acres: Of the approximate 200,000 acre land base available for potential prescribed fire entry, an estimated one-third would require prescribed fire to meet resource and hazard reduction goals. Forest age classes and plant communities vary widely throughout the District. Fire entry requirements will also vary. Old growth stands may need fire entry on cycles from 20 years to 40 years, while some plant community maintenance may require annual entry of fire, due to the complex variabilities.

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-F-1, 2-F-2 and 2-F-3 clearly show that the Eugene District can meet the emission standards established for the year 2000, treat available sites for reforestation, and carry out approximately 1,800 acres of prescribed burning to meet resource objectives for biodiversity, wildlife, and forest fuel hazard abatement.

For a more detailed discussion on Air Quality, see the Chapter 4 section that demonstrates emission factor comparisons in graphic form.

Rural Interface Areas

Specific management directions for Rural Interface Areas are described for each alternative in the Management Direction by Alternative section of this chapter. There are no management directions common to all alterantives in RIAs. For a more comprehensive discussion of RIAs see Chapter 3.

Table 2-F-1 - Average Emission Factors (lb. emission per ton of fuel consumed)

Type of Burn	PM	CO	VOC	SOx	NOx	Total
Broadcast	25.60	270.0	25.0	4.0	4.0	332.6
Tractor Pile	20.40	153.2	25.0	4.0	4.0	206.6

Table 2-F-2 - Average Consumption Rates (in tons per acre)

Broadcast Burning	
Baseline (1976-1979)	63.6
Current	33.0
Pile Burning	
Tractor Pile	33.0
Grappler/Hand Pile	25.0
Underburning	20.0

Table 2-F-3 - Acres by Treatment Method and Alternative

			Alternatives					
	Baseline	Current	A	B	C	D	E	PA
Method:								
Tractor Pile	65	0	0	0	0	0	0	0
Grappler	0	2,020	2,380	2,110	820	1,020	1,080	1,180
Broadcast	2,238	660	780	690	90	150	180	340
Underburn	0	0	0	1,000	1,800	1,800	1,800	1,800
Consumption:								
Total Tons	142,337	72,280	85,240	76,000	59,470	66,450	68,940	76,720
Emission:								
Total Tons	**23,889**	**8,838**	**10,426**	**9,235**	**2,612**	**3,457**	**3,777**	**4,913**

Management Direction by Alternative

Goals and objectives for the alternatives are defined in Appendices 1-E and 2-N. Table 2-1 summarizes the management actions for each alternative. Key allocations for each alternative, except the No Action alternative, are displayed on fold-out maps enclosed with this document. These maps are digital (from computerized data). This data was compiled from BLM's most recent inventories. The No Action alternative, based on earlier inventories that were not computerized, could not be digitally mapped.

The specific direction for each alternative follows.

No Action Alternative

Water Quality and Riparian Zones

Riparian Management Areas (RMAs) 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.

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 allowable 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: Forestlands in the TPCC category of Woodland would not be subject to planned harvest. Other forestlands 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 forestlands total about 21,000 acres.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and lands not available for timber management currently contain about 8,000 acres of old growth and 6,000 acres of mature forest.

Silvicultural Systems Utilized: All land available for timber management in this alternative would be managed with even-aged silvicultural systems. In addition to the features of these systems described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for intensive timber management, unmerchantable snags, green culls, and down logs would be retained where feasible. On lands available for restricted timber management, snags or green trees would be retained at the rate of one per acre.

2. Minimum regeneration harvest age for existing and future stands is set to age 40 and future stand rotation age is not restricted in this alternative.

Special Status Species (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 would be required for special status species.

Under the No Action Alternative, 538 acres of Special Status Plant Species would be protected.

Special Status Species Habitat (Animals)

All occupied bald eagle habitat, and previously identified suitable-but-unoccupied habitat would be protected from timber management practices that would degrade conditions essential for eagle nesting and roosting. Some habitat for other Federally listed threatened species, and species proposed for listing, and candidates, would be maintained in extended rotation areas located within the East-West Corridor. Other Special Status Species would be expected to occur in the same habitat. Snags retained within timber harvest areas would provide some habitat for cavity-using species. Some habitat for species dependent upon, or strongly oriented towards special habitat features would also be protected.

Wildlife Habitat

At least one snag or green wildlife tree would 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 would be retained following logging where safety and fire management activities permit. Also, at least one 25-acre patch of dense second growth conifers would be maintained within each BLM section as nesting habitat for Cooper's and sharp-shinned hawks. Mature and old growth stands retained in extended rotation areas would 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 would be implemented to benefit species sensitive to human intrusion and associated disturbances.

Special Areas

Current Management direction (BLM ORO Manual 1613) requires that priority be given to the designation and protection of special areas including ACECs, RNAs and ONAs (RNAs and ONAs are a sub-designation of ACECs). Areas on BLM administered lands that meet ACEC criteria would be designated as ACECs if special management needs were identified. Present Special Areas (1,572 acres) would be retained. In presently designated Special Areas, three acres are withdrawn from locatable mineral entry subject to no surface occupancy for mineral leasing, and are closed to salable mineral development.

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 MFP for trails and recreation sites could be constructed, and closed sites could be reopened.

Wild and Scenic Rivers

Continue current management direction. The Siuslaw River, identified in the Nationwide Rivers Inventory as a potential river addition to the Rivers System, would be analyzed in Environmental Assessments prior to any timber sale.

Visual Resources

Commercial forestland totalling about 300 acres will be managed to meet VRM Class III standards, i.e., changes caused by management activities may be evident, but should remain subordinate to the existing characteristic landscape. This land is located along the McKenzie River corridor. A timber harvest rotation of approximately 120 years will be used in these areas. Special areas of scenic resources will be managed as Class I. These are 400 acres of Upper Elk Meadows Area of Critical Environmental Concern/Research Natural Area (ACEC/RNA), and Horse Rock Ridge ACEC. The remaining BLM lands are managed as VRM Class IV.

Land Tenure

Exchanges would be made to benefit one or more of the resources managed. No Land Tenure Zones would be established. Sale of O&C lands not suitable for permanent forest management 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 O&C lands and of public domain lands could be made to accommodate other appropriate uses. Leases or conveyances under the Recreation and Public Purposes Act could be made to provide appropriate facilities or services.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species would be protected on all lands in the operating area under leasing notices. No Surface Occupancy stipulations would be used to protect great blue heron rookeries and osprey nest sites, affecting approximately 1,200 acres. Timing stipulations would be utilized on mineral leases to protect elk concentration areas and mineral springs utilized by the band-tailed pigeon, affecting approximately 240 acres.

Closures to locatable mineral exploration or development would remain in effect on 2,595 acres. No additional lands would be withdrawn from mineral entry under the mining laws. Lands within ACECs would be subject to the additional restrictions under the 43 CFR 3809 regulations, affecting 1,140 acres.

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. Salable mineral sources within Special Recreation Management Areas may be utilized, if the impacts from the proposed development are acceptable to the Authorized Officer. Special status plant and animal species would be protected at salable mineral sites. Seasonal restrictions would be utilized in elk concentration areas, and near mineral springs utilized by the band-tailed pigeon.

Rural Interface Areas

There is no land use allocation or management prescription for this alternative.

Alternative A

Water Quality and Riparian Zones

Riparian Management Areas (RMAs) 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.

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 allowable 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 planned 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 forestlands in the planning area. If all such forestlands 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: Forestlands in the TPCC category of Nonsuitable Woodland would not be subject to planned harvest. Other forestlands 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.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and lands not available for timber management currently contain about 7,000 acres of old growth and 5,000 acres of mature forest.

Silvicultural Systems Utilized: All land available for timber management in this alternative would be managed with even-aged silvicultural systems. In addition to the features of these systems described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for timber management, unmerchantable snags, green culls, and down logs would be retained.

2. Minimum harvest age for existing stands and future stand rotation age are not restricted in this alternative.

Special Status Species (Plants)

Special status plant species would be managed for their conservation, and actions would be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive plant species where such actions would not diminish commercial use such as timber production. Under Alternative A, 14 acres of special status plant species would be protected.

Special Status Species Habitat (Animals)

BLM management and permitting actions would be designed to protect habitat of Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species where such actions would not diminish commercial use such as timber production. See Table 2-5c and 2-5d in Appendix 2-E for a list of special status species known to exist on BLM administered lands in the planning area, and their protection by alternative.

Wildlife Habitat

Emphasis would 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 Areas

Potential ACECs 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 ACECs and potential ACECs that meet the preceding standard, including RNAs and proposed RNAs, would be retained or designated on nonforest lands or nonsuitable woodlands of low to moderate mineral potential. 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 ACECs and RNAs would be revoked.

Recreation

Two currently closed recreation sites, Haight Creek and Lake Creek, would remain undeveloped use areas while retaining their natural settings, leaving a total of 11 existing recreation sites (including Recreation and Public Purpose leases, Shotgun SRMA, and boat landings), and three trails (totalling 6 miles) in this alternative. See Table 2-7b for comparison of sites and trails. Vehicle use other than for administrative purposes and commercial commodity extraction would be closed year-round on 77 acres. ORV use would be limited on 358 acres, and open on the remaining District land. No roads would be limited or closed. See Table 2-1 for comparisons of off-road vehicle and road closures.

Wild and Scenic Rivers

No rivers would be found suitable for Federal designation as Wild, Scenic or Recreational (see State Director's Guidance, Apendix 1-E). See Table 2-4 for comparisons of proposed Wild and Scenic River designations.

Visual Resources

Lands within existing boundaries designated by Congress for exclusive management would be managed as VRM Class I (Eugene District currently has none). Available (for planned timber harvest) forestlands would be managed as VRM Class IV, and the remaining other lands would be managed as inventoried. See Visual Resource Management within the Management Direction Common to All Alternatives for VRM objectives and class standards by class. See Table 2-1 for acres of each class by alternative.

Land Tenure

Exchanges would be made to acquire lands that would enhance the nondeclining harvest level of the commercial forestland managed by BLM, by improving age class distribution or other harvest level determination factors. Factors to be considered include site quality, access to public forestland, logical logging units, and management of public forestland 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, a Controlled Surface Use stipulation would be utilized within Riparian Management Areas.

Closures to locatable mineral exploration or development would be in effect on 2,031 acres, including designated special areas and recreation sites.

Riparian Management Areas 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.

Rural Interface Areas

No special management would be provided in Rural Interface Areas (RIAs).

Alternative B

Water Quality and Riparian Zones

Riparian Management Areas (RMAs) 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.

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 allowable 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 forestland 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: Forestlands in the TPCC categories of Nonsuitable Woodland and Suitable Woodland-Low Site would not be subject to planned harvest. Other forestlands 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 forestlands total about 22,000 acres.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and the lands not available for timber management currently contain about 8,000 acres of old growth and 5,000 acres of mature forest.

Silvicultural Systems Utilized: All land available for timber management in this alternative would be managed with even-aged silvicultural systems. In addition to the features of these systems described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for timber management, snags and unmerchantable cull trees, and green merchantable trees would be retained to provide nest sites for 40 percent of optimum woodpecker populations, both for the present

needs and over the long-term. Unmerchantable down logs would be retained where available.

2. Within identified sensitive Rural Interface Areas, customary forest management practices would be altered, where realistically feasible, to mitigate adjacent neighbors concerns. Modification of practices would not result in significant yield loss.

3. Minimum harvest age for existing stands and future stand rotation age is not restricted in this alternative.

Special Status Species (Plants)

Special status plant species would be managed for their conservation, and actions would be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive species where such actions would not diminish commercial use such as timber production. Habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive Species would 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, would be protected to the extent considered necessary to prevent their Federal listing. Under Alternative B, 17 acres of special status plant species would be protected.

Special Status Species Habitat (Animals)

BLM and BLM permitted activities would 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 would 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 would 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 would focus on those species. See Tables 2-5c and 2-5d in Appendix 2-E for a list of special status species and their protection by alternative.

Wildlife Habitat

During timber sale planning, suitable wildlife trees would be identified for retention in numbers adequate to retain at least three snags and green culls (nonmerchantable) per acre.

Special Areas

All existing Special Areas would be retained (1,572 acres). Potential ACECs 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 RNAs 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 used would be designated. Special Areas would be withdrawn from locatable mineral entry; mineral leasing would be subject to no surface occupancy and closed to salable mineral development on 2,363 acres.

Recreation

Thirteen existing recreation sites (including R&PP leases, Shotgun SRMA, and boat landings), and three trails (totaling 6 miles) would be maintained and managed. Haight Creek and Lake Creek sites could be reopened. See Table 2-7b for comparison of sites and trails. Options would be retained for development of two additional recreation areas on Public Domain lands: Heceta Sand Dunes (217 acres), and Cannery Dunes (40 acres), both north of Florence and nominated as ACEC/ONAs. This would bring the total of available recreation sites to 15.

Vehicle use other than for administrative purposes and commercial commodity extraction would be closed year-round on 2,396 acres. ORV use would be limited on 25 acres and open on the remaining District lands. No roads would be closed or limited.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Forest Service 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.

Visual Resources

Available forestland 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. Interim management of the McKenzie River, Segment A, found suitable in this alternative, would be managed as VRM II within a quarter-mile of State Highway 126 (which parallels the river). Interface Areas, (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 other available forestland 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. See Table 2-1 for acres of each class by alternative.

Land Tenure

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 forestlands, 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species would be protected on public domain lands with leasing notices. Controlled Surface Use stipulations would be utilized within designated mature and old growth forest blocks and Riparian Management Areas.

Closures to locatable mineral exploration or development would be in effect on 4,237 acres, including designated special areas and recreation sites.

Riparian Management Areas 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. Use of existing salable mineral sites within designated mature and old growth forest blocks would be allowed; however, site expansion could be restricted if the removal of mature or old growth trees would be necessary. Special status plant and animal species would be protected at salable mineral sites on public domain lands.

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.

Alternative C

Water Quality and Riparian Zones

Riparian Management Areas (RMAs), which would be one and a 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.

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 allowable 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 forestland would be allocated to restricted timber management.

On about 139,000 acres of forestland, 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 forestland, 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 forestland, 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 forestland 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: Forestlands 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 forestlands 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 forestlands total about 29,000 acres.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and the lands not available for timber management currently contain a total of about 22,000 acres of old growth and 19,000 acres of mature forest.

Silvicultural Systems Utilized: All land available for timber management in this alternative would be managed under structural retention prescriptions (see Appendix 2-C). Silvicultural prescriptions would be designed to achieve the highest level of timber production possible consistent with the protection of ecosystem health, the long-term retention and restoration of biological diversity, and conformance with management objectives. Such prescriptions would include the principles of ecological forestry that strive to maintain complex ecosystem structure, function, and species

across the landscape. Prescriptions would be designed to assure the regeneration of all indigenous tree species. They would vary dependent on plant community, site characteristics, stand condition, and management objectives and would include both density management and/or regeneration harvests.

In addition to the features of these systems described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for timber management, snags, unmerchantable cull trees, green merchantable trees, and down logs would be retained to provide nest sites for 60 percent of optimum woodpecker populations and to meet Old Growth Definition Task Group standards.

2. Conversion would only occur on grass, brush or hardwood stands that resulted from past management activities and that are located on lands available for timber management. Hardwoods would be retained or restored in the reestablished stand at a level consistent with identified target stand objectives. All other shrub and hardwood stands would be assumed to represent desired or natural conditions and would not be converted.

3. In conifer stand management, native hardwoods would be retained or restored at a level consistent with identified target stand objectives.

4. Prescribed fire would be used to the extent possible for site preparation and fuel reduction. It would also be used where necessary to encourage natural regeneration and to restore or retain natural ecological processes through site disturbance.

5. Fertilization would be used where relevant to supplement natural nitrogen fixation, enhance growth, and hasten development of vertical structure and large trees. Fertilization would not be assumed to contribute to the allowable sale quantity in multiple canopy silvicultural regimes because of the lack of tree response data in stands with multiple canopies.

6. Lands available for timber management and lands in old growth restoration and retention areas which do not currently possess old growth structural characteristics would receive precommercial thinnings followed by density management. The objective would be to maintain open stand conditions, diversify stand structure, promote retention of mixed species, and accelerate development of old growth structure conditions. To the extent that stand conditions permit, density management would be designed to leave enough snags and dead and down material to meet Old Growth Definition Task Group standards.

7. To minimize the regeneration period, artificial regeneration would occur at the first opportunity following site preparation and would be supplemented by natural reforestation. Planting would occur at minimum needed densities and a mix of native species (generally based on the percentage of species existing in the stand) would be planted to help assure species diversity.

8. A maximum of 50 percent of Douglas-fir planting stock within a reforestation unit would be grown from "genetically improved" tree seed. This seed would be collected from either selected trees growing in natural stands or from seed orchards developed from selected trees.

9. Manual and chemical methods would be used only as part of spot suppression of specific species for site preparation, maintenance, or release treatments.

10. Minimum harvest age for existing stands is set at age 60 and future rotation length is set at 150 years.

Special Status Species (Plants)

Special status plant species would be managed for their conservation, and actions would be mitigated to protect habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive plant species where such actions would not diminish commercial use such as timber production. Habitats of Federal Candidate 1 and 2, State Listed and Bureau Sensitive plant species would 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 would be protected to the extent considered necessary to prevent their Federal listing. In addition varying sized blocks of mature and old growth forests would 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 would be protected.

Special Status Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, management of areas maintained to conserve biological diversity would focus on protection of Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species. BLM and BLM permitted activities would 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 would 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 would 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 would focus on those species. If their presence is identified on public domain lands, their habitat would be protected. See Table 2-5c and 2-5d in Appendix 2-E for a list of special status species and their protection by alternative.

Wildlife Habitat

Timber harvests would 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 would be buffered from surface disturbance and harvest of timber. Table 2-5 shows buffering of special habitats by alternative.

Special Areas

All existing Special Areas would be retained (1,572 acres). Potential ACECs 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, and closed to salable mineral development.

Recreation

The following five proposed Special Recreation Management Areas would be identified, and managed: McKenzie River, Sharps Creek, Siuslaw River, Gilkey Creek and Upper Lake Creek. See Map 2-REC-1 detailing the proposed Sharps Creek Special Recreation Management Area (SMRA).

A total of 14 existing recreation sites and three trails (totaling 6 miles) would be maintained and managed. Options would be retained for future development of nine additional recreational sites than those in Alternative B, and nine trails (totaling 22.5 miles). See Table 2-7a and 2-7b for comparison of sites and trails. This would bring the total of available recreational sites to 30.

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.

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. ORV use would be limited on 147 miles and closed on 67 miles of BLM roads due in part to wildlife concerns.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Forest Service 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.

Visual Resources

Available forestland where Federal ownership consists of more than half of a viewshed and available forestland adjacent to (within a quarter-mile) developed

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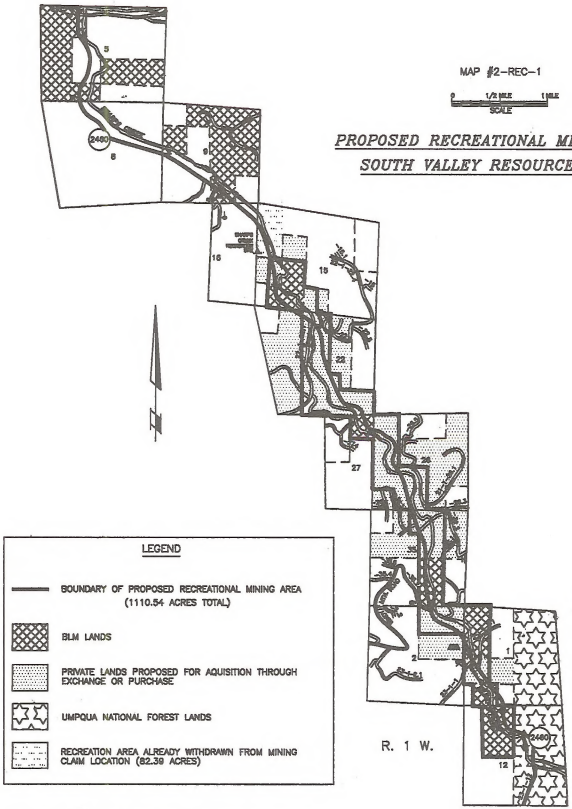


Note: District generated map through non-cartographic methods.

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. Interim management of the McKenzie River, Segment A, found suitable in this alternative, would be managed as VRM II within a quarter-mile of State Highway 126 (paralleling the river). BLM lands within a quarter-mile of 1 to 20-acre private lots would be managed as VRM III (see Rural Interface Area Management). Remaining available forestland would be managed as VRM Class IV. Remaining other lands would be managed as inventoried. Acres that would be managed for each VRM Class are shown in Table 2-1.

Land Tenure

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 forestlands 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species would be protected on all BLM administered lands under lease notices. No Surface Occupancy stipulations would be used to protect great blue heron rookeries and osprey nest sites, affecting approximately 1,200 acres. A Timing stipulation would be utilized to protect mineral springs utilized by the band-tailed pigeon affecting approximately 80 acres. Controlled Surface Use stipulations would be utilized to protect Riparian Management Areas, Special Recreation Management Areas, and old growth restoration and retention blocks.

Closures to locatable mineral exploration or development would be in effect on 28,266 acres, including designated special areas and recreation sites. Also included in this acreage is the proposal for the establishment of a recreational mining area along Sharps Creek. Map 2-REC-1 illustrates which lands are within the corridor for the proposed recreational mining area. This proposal calls for withdrawing 403.54 acres of BLM land from future entry under the mining laws. All of these acres are currently under mining claim and would not be available to the general public for recreational mining until those mining claims are relinquished or abandoned by the mining claimants. Blocking ownership along the creek would minimize trespass onto private lands by the public users as well as facilitate management of the recreation area. There are 700.71 acres of private lands within the boundary that BLM would be interested in acquiring through land exchange or purchase. If these parcels were acquired, they would immediately be withdrawn from entry under the mining laws.

If the McKenzie A river segment were to be designated as a recreational river, locatable mineral operations on these lands (1,194 acres) would be required to be conducted to minimize surface disturbance, sedimentation, pollution, and visual impairment.

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. Riparian Management Areas and the McKenzie A river segment (if designated as a recreational river) would be closed to salable mineral development unless the Authorized Officer determines that impacts from a proposed operation are acceptable or can be adequately mitigated. Salable mineral sources within Special Recreation Management Areas may be utilized, if the impacts from the proposed development are acceptable to the Authorized Officer. Special status plant and animal species would be protected at salable mineral sites. Seasonal restrictions would be utilized near mineral springs utilized by the band-tailed pigeon. Use of existing salable mineral sites within old growth restoration and retention blocks would be allowed; however, site expansion could be restricted, if the removal of old growth trees would be necessary.

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.

Alternative D

Water Quality and Riparian Zones

Riparian Management Areas (RMAs), 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.

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 planned 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: Forestlands in the TPCC categories of Nonsuitable Woodland and Suitable Woodland would not be subject to planned harvest. Other forestlands 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 forestlands total about 34,000 acres.

About 95,000 acres of forestland 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 (HCAs):

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.

Old Growth and Mature Forest

The lands managed for enhancement of non-timber resources and the lands not available for timber management currently contain a total of about 36,000 acres of old growth and 20,000 acres of mature forest.

Silvicultural Systems Utilized: Forestlands allocated to timber management in this alternative would be managed under an even-aged system designed to produce the highest level of timber management consistent with retention of 50 percent of each quarter township in stands suitable to spotted owl dispersal.

In addition to the features of this system described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for timber management, snags, unmerchantable cull trees, and green merchantable trees would be retained to provide nest sites for 60 percent of optimum woodpecker populations, both for the present needs and over the long-term.
2. To retain wildlife habitat diversity and maintain long-term soil productivity, adequate existing and future sources for down logs and coarse woody debris would be reserved.
3. BLM administered lands within one quarter mile of private land in identified Rural Interface Areas (zoned for 1 to 20 acre lots) would be managed under VRM Class II objectives. Herbicide spraying, clear cutting, and prescribed burning would be prohibited.
4. Minimum harvest age for existing stands is set at age 40 and future rotation lengths set at age 80.

Special Status Species (Plants)

All BLM administered lands would 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 would be under management discretion. Under Alternative D, 538 acres of special status plant species would be protected.

Special Status Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, BLM management and permitting actions would 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 would focus on those species. If their presence is identified, their habitat would be protected. See Table 2-5c and 2-5d in Appendix 2-E for a list of special status species and their protection by alternative.

Spotted owl Habitat Conservation Areas (HCAs) would be established as shown on the Alternative D map. Timber harvest would not be planned in these areas, and logging and other silvicultural activities (except stand regeneration) would not be conducted. Road construction in HCAs would take place only where no feasible alternative exists. 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. Reforestation activities on cutover lands in HCAs would encourage a mix of species in the regenerating forest. In each quarter township, lands would be managed so that 50 percent of the forest matrix on BLM administered lands outside HCAs would have stands averaging 11 inches or more dbh with at least 40 percent canopy closure.

Wildlife Habitat

During timber sale planning, suitable wildlife trees would be identified for retention. The target would 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 would be retained in final harvest timber sale units. These would include all Class 1 logs if hollow or rotten and Class 2 and 3 lots greater than 20 inches in diameter. Smaller material would be left on site unless removal is needed for tree planting.

Special habitats would be buffered from surface disturbance and harvest of timber. Table 2-5 shows buffering of special habitats by alternative.

Special Areas

All existing special areas would be retained and all potential ACECs 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.

Recreation

The following five proposed Special Recreation Management Areas (SRMAs) would be identified, and managed: McKenzie River, Sharps Creek, Siuslaw River, Gilkey Creek and Upper Lake Creek.

A total of 14 existing recreation sites and three trails (totaling 6 miles) would be maintained and managed. Options would be retained for future development of 16 additional recreational sites than those in Alternative C, and 19 trails (totaling 71.5 miles). See Table 2-7a and 2-7b for comparisons of sites and trails. This would bring the total of available recreation sites to 37.

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.

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. ORV use would be limited on 147 miles and closed on 84 miles of BLM roads due in part to wildlife and riparian concerns.

Wild and Scenic Rivers

Eleven river miles of the McKenzie River (Segment A) from the Forest Service 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.

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 including the McKenzie River, Segment A, found suitable in this alternative. Acres that would be managed for each VRM Class are shown in Table 2-1.

Land Tenure

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 forestlands 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species on all BLM administered lands in the planning area would be protected under lease notices. No Surface Occupancy stipulations would be used to protect great blue heron rookeries and osprey nest sites, affecting approximately 1,200 acres. A Timing stipulation would be utilized to protect mineral springs utilized by the band-tailed pigeon affecting approximately 80 acres. Controlled Surface Use stipulations would be utilized to protect Riparian

Management Areas, Special Recreation Management Areas, and habitat conservation areas for the northern spotted owl.

Closures to locatable mineral exploration or development would be in effect on 33,221 acres, including designated special areas and recreation sites. Also included in this acreage is the proposal for the establishment of a recreational mining area along Sharps Creek. Map 2-REC-1 illustrates which lands are within the corridor for the proposed recreational mining area. This proposal calls for withdrawing 403.54 acres of BLM land from future entry under the mining laws. All of these acres are currently under mining claim and would not be available to the general public for recreational mining until those mining claims are relinquished or abandoned by the mining claimants. Blocking ownership along the creek would minimize trespass onto private lands by the public users as well as facilitate management of the recreation area. There are 700.71 acres of private lands within the boundary that BLM would be interested in acquiring through land exchange or purchase. If these parcels were acquired, they would immediately be withdrawn from entry under the mining laws.

If the McKenzie A river segment were to be designated as a recreational river, locatable mineral operations on these lands (1,194 acres) would be required to be conducted to minimize surface disturbance, sedimentation, pollution, and visual impairment.

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. Riparian Management Areas and the McKenzie A river segment (if designated as a recreational river) 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 sources within Special Recreation Management Areas may be utilized, if the impacts from the proposed development are acceptable to the Authorized Officer. Special status plant and animal species would be protected at salable mineral sites. Seasonal restrictions would be utilized near mineral springs utilized by the band-tailed pigeon. Use of existing salable mineral sites within habitat conservation areas for the northern spotted owl would be allowed; however, site expansion could be restricted if the removal of the habitat protected in these areas would be necessary.

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.

Alternative E

Water Quality and Riparian Zones

Riparian Management Areas (RMAs), 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.

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 planned 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 forestland 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 forestland 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 forestland 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: Forestlands 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 forestlands 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 forestlands total about 44,000 acres.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and the lands not available for timber management currently contain a total of about 41,000 acres of old growth and 15,000 acres of mature forest.

Silvicultural Systems Utilized: Lands allocated to timber management in this alternative would be managed with even-aged or shelterwood retention systems. In addition to the features of these systems described in Appendix 2-C, the following design features are used in this alternative:

1. On lands available for timber management, snags, unmerchantable cull trees, and green merchantable trees would be retained to provide nest sites for 60 percent of optimum woodpecker populations. In addition, 20 percent of the land in each harvest unit would be retained for woodpecker habitat. This habitat would be reserved in two-acre patches scattered throughout the harvest unit.

2. To retain wildlife habitat diversity and maintain long-term soil productivity, existing and future sources for down logs and coarse woody debris would be reserved to meet target stand conditions.

3. On BLM administered lands within one-half mile of private land in Rural Interface Areas zoned for 1 to 20-acre lots, there would be no herbicide spraying, no clear cutting, and no prescribed burning. A modified shelterwood system would be used to provide a continuous canopy following regeneration harvest. The overstory would be removed after about 40 years.

4. Minimum harvest age for existing stands and future rotation ages on intensive timber management lands are not constrained for this alternative. Regeneration harvest on Visual Resource Management Class II lands and Rural Interface Areas would be constrained by a 150-year area control.

Special Status Species (Plants)

Same as Alternative D

Special Status Species Habitat (Animals)

In addition to protection of Federally listed or proposed threatened or endangered species, BLM management and permitting actions would 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 would focus on those species. If their presence is identified, their habitat would be protected. See Tables 2-5c and 2-5d of Appendix 2-E for a list of special status species and their protection by alternative.

Wildlife Habitat

During timber sale planning, suitable wildlife trees would be identified for retention. The target would 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 would be retained for cavity nester habitat in two-acre patches.

Where available, a total of 350 linear feet per acre of down logs would be retained in final harvest timber sale units. These would include all Class 1 logs if hollow or rotten and Class 2 and 3 logs greater than 20 inches in diameter. Smaller material would be left on site unless removal is needed for tree planting.

Special habitats would be buffered from surface disturbance and harvest of timber as shown in Table 2-5.

Special Areas

Same as Alternative D

Recreation

Alternative E is the same as Alternative D except 250 miles of roads would be closed to ORV use due to fish, wildlife, and riparian concerns. See Effects on Wildlife (roads) for details.

Wild and Scenic Rivers

Sixty-six river miles would be found suitable for designation as Recreational. River segments 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.

Visual Resources

VRM Class I management would be provided for all lands so inventoried 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. VRM Class II management would be provided for lands inventoried as Class II (this would include the McKenzie River, Segment A, found suitable in this alternative) and for lands within a half-mile of Rural Interface Areas of 1 to 20-acre private lots (see Rural Interface Area section). 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 that would be managed for each VRM Class are shown in Table 2-1.

Land Tenure

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 forestlands 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species on all BLM administered lands in the planning area would be protected under lease notices. No Surface Occupancy stipulations would be used to protect great blue heron rookeries and osprey nest sites affecting approximately 1,200 acres. A Timing stipulation would be utilized to protect mineral springs utilized by the band-tailed pigeon, affecting approximately 80 acres. Controlled Surface Use stipulations would be utilized to protect Riparian Management Areas, Special Recreation Management Areas, and forest stands older than 150 years.

Closures to locatable mineral exploration or development would be in effect on 33,221 acres, including designated special areas and recreation sites. Also

included in this acreage is the proposal for the establishment of a recreational mining area along Sharps Creek. Map 2-REC-1 illustrates which lands are within the corridor for the proposed recreational mining area. This proposal calls for withdrawing 403.54 acres of BLM land from future entry under the mining laws. All of these acres are currently under mining claim and would not be available to the general public for recreational mining until those mining claims are relinquished or abandoned by the mining claimants. Blocking ownership along the creek would minimize trespass onto private lands by the public users as well as facilitate management of the recreation area. There are 700.71 acres of private lands within the boundary that BLM would be interested in acquiring through land exchange or purchase. If these parcels were acquired, they would immediately be withdrawn from entry under the mining laws.

If the McKenzie A, Siuslaw B, and Siuslaw C river segments were to be designated as recreational rivers, locatable mineral operations on these lands (6,735 acres) would be required to be conducted to minimize surface disturbance, sedimentation, pollution, and visual impairment.

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. 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 Authorized Officer determines that impacts from a proposed development are acceptable or can be adequately mitigated. Salable mineral sources within Special Recreation Management Areas may be utilized if the impacts from the proposed development are acceptable to the Authorized Officer. Special status plant and animal species would be protected at salable mineral sites. Seasonal restrictions would be utilized near mineral springs utilized by the band-tailed pigeon. Use of existing salable mineral sites within forest stands older than 150 years would be allowed; however, site expansion could be restricted, if the removal of the forest stand protected in these areas would be necessary.

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.

Preferred Alternative

Water Quality and Riparian Zones

Riparian Management Areas (RMAs) would be established on each side of all perennial streams and other waters. The RMA will include the total riparian zone on 2nd order streams, twice the width of riparian zones on 3rd order streams and one and a half times the width of riparian zones on 4th order and larger streams. The following are expected average widths: 1st and 2nd order perennial, 75 feet; 3rd order, 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 vegetation and stream characteristics. All fish bearing streams would have a minimum of 150-foot protection on each side of the stream.

Timber

This alternative emphasizes maintenance and enhancement of biological diversity, improving the balance of forest seral stages, management of wildlife habitat through a system of mature and old growth forest blocks that are distributed in a broad geographical band that connects the Cascade and Coast Ranges, retention of old growth structural characteristics, enhancement of younger forest structural characteristics, and coordination with endangered species recovery that is balanced with timber production. Projected 10-year acres for timber harvest and other timber management activities are shown in Table 2-1. The allowable annual sale quantity for the expected 10-year life of the plan would be 19.9 mmcf (119 MMBF Scribner short log).

Since this alternative includes many elements recognized to be substantially untested, modeling its sustainable timber yield is more difficult than the other alternatives. The level of confidence in yield and harvest values is lower than other alternatives with more traditional management practices.

Silvicultural prescriptions would be designed to achieve the highest level of timber production possible consistent with the protection of ecosystem health, the long-term retention and restoration of biological diversity, and conformance with management objectives. Such prescriptions would include the principles of ecological

forestry that strive to maintain complex ecosystem structure, function, and species across the landscape. Aerial application of herbicides would cease.

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 sales preparation. Access management, including closure, would be applied to reflect biodiversity and multiple use needs.

The forestland available for timber management is categorized into the following land use allocations:

General Forest Management Areas

Rural Interface Areas

Visual Resource Management Class II Areas

Connectivity Areas

Old Growth Emphasis Areas

Spotted Owl Pair Sites

Intensive Timber Management Lands: About 89,000 acres of forestland would be managed for intensive timber production in the General Forest Management Areas. Timber production would be emphasized subject to a low level of retention of green trees.

Restricted Timber Management Lands: About 3,000 acres of forestland would be restricted for timber management to reduce impacts to rural residents in the Rural Interface Areas. Timber management would be subject to a high level of retention of green trees.

About 1,000 acres of forestland would be restricted for timber management to reduce visual impacts in the Visual Resource Management Class II areas. Timber management would be subject to a high level of retention of green trees.

About 26,000 acres of forestland would be restricted for timber management in connectivity areas. This management is intended to provide dispersal habitat for highly mobile species between Old Growth Emphasis Areas (OGEAs - see description below), provide limited old growth structural characteristics needed by old growth related species and produce a moderate timber output. This land use is located to provide connectivity between BLM and U.S. Forest Service old growth habitat where logical. Regeneration harvest would be planned subject to the following constraints:

1. At least one-half of the area would be maintained in a well distributed pattern of late, mature and old growth seral stages.
2. Suitable spotted owl habitat would be maintained, augmented by the best substitute habitat, at a level equal to 40 percent of the home range acreage for selected spotted owl pairs that supplement those in the OGEAs.

Lands Managed for Enhancement of Nontimber Resources: About 18,000 acres of forestland in Riparian Management Areas would be managed to maintain and improve riparian habitat for fish, wildlife and plants and maintain or improve water quality. There is no harvest planned within Riparian Management Areas along perennial streams (generally orders 3 and larger). Riparian Management Areas would have a minimum horizontal width of 50 feet on each side for all stream orders. Riparian Management Areas would be designed on a case-by-case basis to site specific conditions. No harvest would be planned within 150 feet of lakes. Trees retained along perennial streams and around lakes would not be counted as part of harvest unit retention targets. Tree cutting could occur within the Riparian Management Areas to allow road construction, yarding corridors for timber harvest, or habitat improvement projects. Along intermittent streams (generally orders 1 and 2), riparian management would be based on site specific resource values. Trees retained in harvest units could be concentrated adjacent to intermittent streams. Trees retained along these streams would be counted as part of the harvest unit retention target. Brush, hardwoods and noncommercial conifers would not be cut within 25 feet of intermittent streams other than for road construction or habitat improvement projects.

About 142,000 acres of forestland would be managed for enhancement of mature and old growth habitat in the Old Growth Emphasis Areas. Two subcategories have been identified: areas where regeneration harvest would be deferred and areas where regeneration harvest would not be deferred.

In the nondeferred areas, stand diversification and development of structural characteristics needed by old growth related species would be promoted while producing a limited output of timber. Since this is a nontraditional and untested management strategy, a trial harvest program would be designed to test various harvesting and silvicultural systems. The results would be monitored for subsequent structural development and the number of old growth related species that could use this habitat. Regeneration harvest would be limited by a 200-year area regulation. Harvests would be modeled to not exceed a quarter of the existing stand acreage using small patch cuts (1/2 to 5 acres) once every 50 years in a given stand. Since this is a trial program, a range of harvest patterns and methods would be compared to determine the best methods.

The deferred regeneration harvest areas would produce and retain a high proportion of mature and old growth stands located where they would support a regional biodiversity design while producing a limited timber output. Regeneration harvest would be deferred in these areas for eight decades. Regeneration harvest would be limited by a 300-year area control. The harvesting and silviculture regeneration systems used for long-term management would be based on the results of the trials in the nondeferred areas.

About 1,000 acres of forestland would be managed to help maintain options to provide for spotted owls throughout the landscape in the future. Regeneration harvest would be deferred for eight decades. After eight decades, this land would be managed the same as the surrounding land use allocation.

About 3,000 acres of forestland would be managed for visual resource enhancement (VRM II) along the McKenzie River.

Lands Not Available for Timber Management: Forestlands in all TPCC Woodland categories would not be subject to planned harvest. Other forestlands allocated for recreation sites, for threatened and endangered species recovery areas where timber harvest is prohibited, and for ACECs would not be subject to planned harvest. These forestlands total about 19,000 acres.

Old Growth and Mature Forest

The lands managed for enhancement of nontimber resources and the lands not available for timber management currently contain a total of about 41,000 of old growth and 28,000 acres of mature forest.

Silvicultural Systems Utilized: Prescriptions would be designed to assure the regeneration of all indigenous tree species at levels that reflect natural successional processes. They would vary dependent on plant community, site characteristics, stand condition, and management objectives and would include both density management and/or regeneration harvests.

The silviculture systems in this alternative include even aged systems (6-8 green tree per acre retention) and Structural Retention Systems (6-8 and 12-16 green tree per acre retention) described in Appendix 2-C. The following design features are used in this alternative:

1. On lands available for timber management, snags, unmerchantable cull trees, green merchantable trees, and down logs would be retained to provide nest sites for 60 percent of optimum woodpecker populations and to meet Old Growth Definition Task Group standards. Where sufficient mortality occurs to allow a salvage harvest, only the material in excess of the retention requirements could be removed.

2. Sites dominated by grass, shrubs or hardwoods that occur on suitable, available forestland and which resulted from human activity would be reconverted to conifers. Hardwoods would be retained in the reestablished stand at a level consistent with identified target stand objectives. All other shrub and hardwood stands would be assumed to represent desired or natural conditions and would not be converted. No conversion would be conducted in the deferred OGEAs.

3. Prescribed fire would be used to the extent possible for site preparation and fuel reduction. Where prescribed fire is not an option due to air quality restriction, mechanical and manual treatments will be used to encourage natural regeneration and to restore or retain natural ecological processes through site disturbance.

4. To minimize the regeneration period, artificial regeneration would occur at the first opportunity following site preparation and would be supplemented by natural reforestation. Planting would occur at minimum needed densities and a mix of native species (generally based on the percentage of species existing in the stand) would be planted to help assure species diversity.

5. All of the Douglas-fir planting stock would be grown from genetically improved tree seed. This seed would be collected from either selected trees growing in natural stands or from seed orchards developed from selected trees.

6. Lands in the general forest management, rural interface and visual resource management areas would receive precommercial and commercial thinnings for the purpose of increasing the merchantable yield of wood. Lands in the connectivity and old growth emphasis areas would receive precommercial and commercial density management to accelerate development of old growth structural characteristics and diversify stand structure by maintaining open canopy conditions, leaving islands of unthinned areas and promoting retention of mixed species. With density management, these characteristics are expected to occur in an average of 120 years. To the extent that stand conditions permit, density management would leave dead and

down material and leave or create snags to meet Old Growth Definition Task Group standards. Entire stands will not be thinned in situations where access or stand conditions prevent an economically feasible harvest operation.

7. In conifer stand management, native hardwoods would be retained or restored at a level consistent with the natural process of stand development.

8. Manual and chemical methods would be used only for spot suppression of specific species for site preparation, stand maintenance, or release.

9. Fertilization would be used where relevant to supplement natural nitrogen fixation, enhance growth, and hasten development of vertical structure and large trees. Fertilization would not be assumed to contribute to the allowable sale quantity in multiple canopy silvicultural regimes because of the lack of tree response data in stands with multiple canopies.

10. Minimum harvest ages are set at age 50 in the connectivity and nondeferred OGEA, age 60 in the Visual Resource Management Class II, Rural Interface Areas, and general forest management areas and age 80 in the deferred OGEA and owl pair sites. The future rotation lengths vary from the culmination of mean annual increment (60 to 90 years) where timber production is the primary objective to 150 to 300 years where the primary objectives involve nontimber resources.

11. 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 under VRM Class II objectives. Herbicide spraying, clear cutting, and prescribed burning would be prohibited.

Special Status Species (Plants)

Management direction for special status plant species would be consistent with BLM Oregon State Office Manual 6840 and Instruction 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 would be managed for the conservation and protection of known sites for all Federal Candidate 1 and 2 plant species, State Listed and Bureau Sensitive plant species and their habitats. The protection of BLM Assessment and BLM Tracking plant species would be under management discretion. Forty-six acres of special habitat (ponds, wetland, meadow/forest edge, riparian) would be managed for *Lomatium bradshawii* (Federally Listed), *Montia howellii* (Federal Candidate 2), *Frasera umpquaensis* (Federal Candidate 2), *Horkelia congesta* ssp. *congesta* (Bureau Sensitive), *Lycopodium inundatum* (BLM Assessment), *Utricularia gibba* (BLM Assessment), *Poa laxiflora* (BLM Assessment), and *Microcala quadrangularis* (BLM Assessment). *Aster vialis* (Federal Candidate 2), *Cimicifuga elata* (Bureau Sensitive), and *Poa laxiflora* (BLM Assessment) would be protected on 492 acres of forested habitat.

Special Status Species Habitat (Animals)

Special status species, and their habitats, would be protected, managed and conserved so that no management action would contribute to the need to list any species as threatened or endangered under the Endangered Species Act.

All proposed project areas would be surveyed for occupancy by species listed as Federally threatened or endangered, candidates for Federal listing, species proposed for Federal listing, and other special status species recognized by the Bureau (see Table 3-SSW-1) where habitat conditions indicate possible use. If Federally listed species, candidates for listing, or species proposed for listing are found in, or adjacent to the project area, the project may be altered so as to not affect the species or its habitat. Should the Bureau consider going forward with a project that may affect a listed species, or a species proposed for listing, it will consult with the U.S. Fish and Wildlife Service as required by the Act and implementing regulations. Should the Bureau consider going forward with a project that may affect a candidate for Federal listing, it will conference with the U.S. Fish and Wildlife as required by Bureau Policy. If other special status species are found, all potential site specific mitigation measures will be identified and evaluated for incorporation into the project design.

The level of protection given to identified special status species would depend on the proposed management action, the habitat requirements of the species and the projected impacts of the actions. Protection may include, but is not limited to, 1) relocating parts, or all, of a project area; 2) implementing seasonal or other

timing restrictions; 3) selecting reserved trees in the silvicultural system to meet special needs; 4) treating reserved trees to create snags or special structural conditions; 5) increasing buffer widths or leaving buffers where they normally are not required; 6) erecting artificial nesting structures; 7) altering silvicultural practices to protect or encourage growth of plant species having high wildlife habitat values; 8) implementing special measures to minimize stream siltation; and 9) use of prescribed fire as a habitat management tool, or avoidance of its use as a means of protecting habitat.

Wildlife Habitat

The District's biodiversity goals for the Preferred Alternative mirror the Bureau's No. 1 National Wildlife (2000) Habitat Management Goal 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." The District's emphasis under the Preferred Alternative is on habitats that are not normally produced, or otherwise provided for, under forest management practices on private lands. The goal, therefore, is to ensure a high level of biodiversity, on a landscape level, throughout the portion of the planning area where BLM lands are concentrated, i.e., the BLM operating area. District biodiversity goals are also consistent with the Bureau's National Goal 2 - to provide adequate habitat for big game and upland game; and with Goal No. 4, "Provide suitable habitat conditions for birds of prey on public lands through the conservation of and management of essential habitat components, including habitat for prey species . . . "

Special Areas

All existing ACECs and RNAs would be retained (1,140 acres). Row River Environmental Education Area would not be designated under the preferred alternative, but would be managed for the area's recreational opportunities (25 acres). Vik Road EEA (58 acres) and McGowan Creek EEA (79 acres) would both be reduced in acres to a total 137 acres. One existing ACEC that is proposed for RNA status would be designated, Horse Rock Ridge ACEC (proposed RNA). Five potential special areas would be designated under the preferred alternative (508 acres). The proposed Cougar Mountain Ancient Yew Grove ACEC would be adjusted to 10 acres. Additions to four Existing Special Areas would be designated, totalling 292 acres.

Proposed ACECs, Bald Eagle Habitat Areas, and Relict Forest Islands would not be designated under the preferred alternative but would be managed for their primary values under the Bald Eagle Recovery Plan and within Old Growth Emphasis Areas (see Timber section in this chapter.

Recreation

All existing sites, except Turner Creek, would be maintained and managed. Turner Creek, currently closed and not maintained, would be turned back to the timber base. All proposed SRMAs and proposed recreation sites, except Mohawk Wayside, would be retained for further development. An additional site, Row River, formerly an Environmental Education Area, would be converted to a recreational site. This would bring the total of available recreation sites to 37. All existing trails would be maintained and managed. All 19 proposed trails, totaling approximately 71.5 miles on BLM and private lands, would be retained for future development. All BLM administered lands would be open to ORV use except 2,378 acres (closed status). ORV use would be limited on 147 miles and closed on 84 miles of BLM roads due in part to fish, wildlife, and riparian concerns. The remaining roads would be open to ORV use. All nine proposed Byways (see Chapter 3 for list) would be included as components of the BLM Back Country Byway System.

Wild and Scenic Rivers

Three river segments comprising 66 river miles would be found suitable for potential designation as Recreational. These segments are: the Siuslaw River, Segments B and C; and the McKenzie River, Segment A. Appendix 2-H contains Wild and Scenic River suitability assessments for all river segments studied. Interim management to protect the identified Outstandingly Remarkable Values will continue on those rivers found eligible but not assessed. These rivers are: Fall Creek, North and South Fork Gate Creek, McKenzie River (Segment B), Nelson Creek, Lake Creek (Segment B) and the Willamette River.

Visual Resources

Class I will consist of all existing ACECs and Shotgun Special Recreation Management Area (SRMA), totalling 1,390 acres.

Class II, totalling 13,768 acres will consist of all of Sharps Creek and McKenzie River SRMAs, including the McKenzie River corridor (suitable for Wild and Scenic Rivers System), and recreation sites within their

viewshed. It will also include approximately 6,800 acres of BLM administered lands within a quarter of a mile of private lands (1-20 acre lots).

Class III will consist of Upper Lake Creek, Siuslaw River, and Gilkey Creek SRMAs, and lands previously inventoried as Class II for the South Valley Resource Area, totalling 29,481 acres.

Class IV will consist of the remaining BLM lands, totalling 270,481 acres.

Land Tenure

Exchanges would be made to benefit one or more of the resources managed, including nontimber values. As a matter of practice substantial areas of O&C forestlands allocated as available for timber management would not be exchanged for lands to be managed for single use management purposes. Any exchanges involving O&C lands would be done in close consultation with the O&C counties. Sale of lands not suitable for permanent forest management would be made to dispose of lands that meet any of the criteria of FLPMA Section 203(a). Leases of O&C lands other than available commercial forestlands and of public domain 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.

Energy and Minerals

In addition to the management of energy and minerals described as common to all alternatives, the following provisions would also be in effect for this alternative. Refer to Tables 2-8, 2-9(a), and 2-9(b) for a comparison of the anticipated mineral restrictions by each alternative.

With regard to leasable minerals, special status plant and animal species on all BLM administered lands in the planning area would be protected under lease notices. No Surface Occupancy stipulations would be used to protect great blue heron rookeries and osprey nest sites affecting approximately 1,200 acres. A Timing stipulation would be utilized to protect mineral springs utilized by the band-tailed pigeon affecting approximately 80 acres. Controlled Surface Use stipulations would be utilized to protect Riparian Management Areas, Special Recreation Management Areas, and old growth emphasis areas and connectivity areas.

Closures to locatable mineral exploration or development would be in effect on 13,350 acres, including designated special areas and recreation sites. Also included in this acreage is the proposal for the establishment of a recreational mining area along Sharps Creek. Map 2-REC-1 illustrates which lands are within the corridor for the proposed recreational mining area. This proposal calls for withdrawing 403.54 acres of BLM land from future entry under the mining laws. All of these acres are currently under mining claim and would not be available to the general public for recreational mining until those mining claims are relinquished or abandoned by the mining claimants. Blocking ownership along the creek would minimize trespass onto private lands by the public users as well as facilitate management of the recreation area. There are 700.71 acres of private lands within the boundary that BLM would be interested in acquiring through land exchange or purchase. If these parcels were acquired, they would immediately be withdrawn from entry under the mining laws.

If the McKenzie A, Siuslaw B, and Siuslaw C river segments were to be designated as recreational rivers, locatable mineral operations on these lands (6,735 acres) would be required to be conducted to minimize surface disturbance, sedimentation, pollution, and visual impairment.

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. 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 Authorized Officer determines that impacts from a proposed development are acceptable or can be adequately mitigated. Salable mineral sources within Special Recreation Management Areas may be utilized if the impacts from the proposed development are acceptable to the Authorized Officer. Special status plant and animal species would be protected at salable mineral sites. Seasonal restrictions would be utilized near mineral springs utilized by the band-tailed pigeon. Use of existing salable mineral sites within old growth emphasis areas and connectivity areas would be allowed; however, site expansion could be restricted, if the removal of the forest stand protected in these areas would be necessary.

Rural Interface Areas

Approximately 6,800 acres of BLM administered lands within a quarter mile of private lands (zoned for 1-20 acre lots) would be managed to lessen the impacts of forest management practices. VRM Class II guidelines would be followed. Forest management practices would be constrained within these Rural Interface Areas as follows:

- Harvest regimes would leave 12-16 trees per acre at final harvest
- Density management would occur
- Only hand piling and burning slash would be permitted
- Herbicides would not be used
- Fertilization may take place but would not be required
- Streams utilized for domestic water sources would be protected (see Riparian section)

Requirement for Further Environmental Analysis

Site-specific environmental analysis and documentation (including categorical exclusion or administrative determination, where appropriate, and RMP conformance determination) would be accomplished for each action or type of treatment under consideration. Where the action is to be accomplished by a contractor or timber sale purchaser, the environmental 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.

Interdisciplinary impact analysis will be tiered within the framework of this and other applicable environmental impact statements. Tiering is used to prepare more specific documents without duplicating relevant parts of previously prepared general documents. The more specific environmental analysis can not lead directly to a change in the decisions resulting from the more general environmental analysis to which it is tiered. It could, however, result in some interim management direction pending plan revision, or a proposal to amend the plan. If an environmental assessment indicates potential for significant impacts that are seriously different from those described in an existing EIS, an environmental impact statement or supplement to this or another EIS may be required.

Specific proposals for treatment to manage competing vegetation would be addressed in site-specific environmental analyses tiered to BLM's EIS, *Western Oregon Program: Management of Competing Vegetation*, 1989. Specific proposals for control of noxious weeds would be addressed in site-specific environmental assessments tiered to BLM's EIS, *Northwest Area Noxious Weed Control Program*, 1986, as supplemented in 1987.

Analysis of cumulative effects on water in the EIS for this RMP may guide overall activity scheduling during the life of the plan. Analysis of cumulative effects on water would be revisited when addressing project level activities, to incorporate the most current available information regarding recent and projected activities. Results would be compared to those identified in the EIS. If a proposed activity lies outside the analytical watersheds specifically addressed in this EIS, only a subdrainage analysis would normally be made.

Direct, indirect and cumulative effects on water for project level activities would be analyzed for the appropriate size watershed. The analysis would determine whether implementation of standard BMPs are sufficient to comply with Oregon water quality standards. Proposed activities that appear likely to result in violation of these standards would be modified to mitigate the effects on water quality or deferred until it appears that activities could be conducted in compliance with the standards.

Environmental assessments will be made available for public review.

Use of the Completed Plan

The BLM planning regulations (43 CFR 1610.4-9) call for monitoring and evaluating Resource Management Plans at appropriate intervals. The purposes of monitoring the RMP are to:

1. Be sure activities are occurring in conformance with the plan.
2. Determine if activities are producing the expected results.
3. Determine if activities are causing the effects identified in the EIS.

The proposed monitoring plan for the RMP is set forth in Appendix 2-M.

Figure 2-1 shows how monitoring could lead to a revision in design features or to other changes in the RMP.

After implementation of the selected plan, it is expected to be at least a year before substantial on-the-ground activity under its guidelines occur, due to the lag in time for BLM project implementation and for actual activity to start on timber sales sold under the plan. In addition to routine monitoring, formal evaluation of the Resource Management Plan will be conducted shortly after the end of both the third and the fifth year it is in effect, to determine whether there is significant cause to amend or revise it. Evaluation includes a cumulative

Process for Changing the RMP

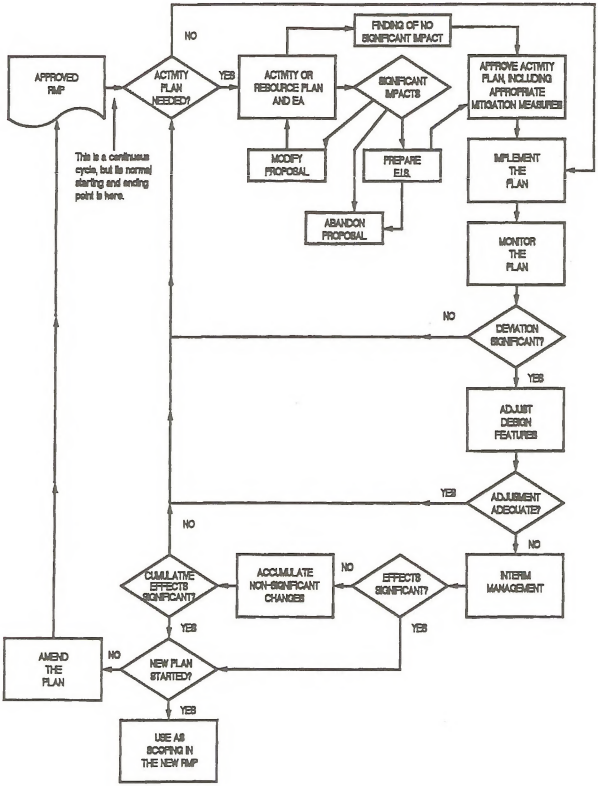


Figure 2-1 - Process for Changing the RMP

analysis of monitoring records, with the broader purpose of determining if the plan's goal and objectives are being met, and whether the goal and objectives were correct and achievable in the first place. Among the specific criteria to be considered in these evaluations are the following:

- Have average annual acres of intensive management practices or average annual timber sale volume deviated from that expected in the plan to such a degree that a deviation of more than ten percent in programmed sale volume for any sustained yield unit (SYU) for the expected ten-year life of the plan is anticipated? (Ten percent is defined as the threshold for revision because it represents the approximate accuracy of the timber inventory data used in the allowable sale quantity calculation.)
- Is reforestation occurring approximately as planned, or is a backlog developing of such magnitude that an allowable sale quantity change of more than ten percent would be appropriate if the trend were expected to continue for the balance of the ten-year period?
- Have TPCC acreage shifts made during timber sale planning led to a net change that would modify the allowable sale quantity for any SYU by more than ten percent?
- Do the combined effects of any changes identified above indicate that the allowable sale quantity (ASQ) should be modified by more than ten percent?
- Have changed circumstances (including new information) shown that some of the plan's goal and objectives are unlikely to be met?
- Have changed circumstances (including new information or changes in the plans of other government agencies or Indian tribes) so altered the amount or method of timber harvest or the expected impacts (on water, wildlife, etc.) of harvest or other activities, that the environmental consequences of the selected alternative may paint a seriously different picture than those anticipated in the RMP EIS?

Determination of where parameters of expected environmental consequences seriously differ will be linked to thresholds related both to the reliability of relevant predictions and to the significance of the particular environmental consequences.

If the answer to any of the preceding questions is affirmative, a plan amendment or revision may be considered. An analysis will be prepared and, if 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, it may still be necessary to supplement the EIS.

No additional evaluations of this type would be done unless some changed circumstance or unusual event called the continuing validity of the plan into question. Evaluations would not be conducted after the start (publication of a Notice of Intent to revise the Plan/EIS) of the next scheduled plan revision (on a 10-year cycle). Following completion of each plan evaluation, a summary of its findings will be included in the District's annual program summary.

If, too late for consideration in the fifth-year evaluation of the plan, some changed circumstance or unusual event calls the continuing validity of some aspect of the plan into question, interim management adjustments may be made without a plan amendment, to meet the plan's goal and objectives. The kind of circumstance that could lead to such an adjustment might be an announcement of research findings which clearly establish that some of the plan's goal 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 during the first five years of the plan, pending evaluation and possible plan amendment.

This approach to evaluation and interim adjustment will provide a process of adaptive management, permitting effective response to changing knowledge. 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. It could equally entail modification of rather localized management practices to respond to the results of monitoring. Although applicable to all alternatives, adaptive management would be particularly pertinent to the Preferred Alternative and Alternative C, which include many elements that are substantially untested.

Potential new management actions, which are identified after RMP/ROD approval, would be reviewed before BLM takes any actions. For example, if a new ACEC proposal meets BLM criteria for consideration, the District Manager may prescribe interim management measures for the balance of the life of the plan. Such interim management must meet the objectives of the RMP, except where they are inconsistent with the regulations regarding potential ACECs, and would become subject to analysis in the next RMP process.

The result of cumulative effects analysis by subdrainage in timber sale environmental analyses would influence final decisions both on timber sale scheduling and on application of design features and mitigating measures, including Best Management Practices (BMPs) 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 unanticipated impacts, the information gained from that monitoring will be used in subsequent development of mitigating measures, including BMPs, and considered in analyses of cumulative effects.

Factored into these timber sale scheduling decisions, 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 propagation of fish, shellfish, and wildlife, and recreation on the water.

Proposed timber sales and other land disturbing activities will incorporate the iterative (adaptive management) process for developing, implementing and evaluating nonpoint control (Best Management Practices) 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 effects on water quality will be taken to protect designated beneficial uses.

The ASQ identified in the plan represents the maximum annual average timber sale volume that would be offered from lands allocated to planned timber harvest. This 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 improvement, forest fertilization, timber sale planning, and related forest resource protection.

Timber sale volumes 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 timber sale volume would be reduced by half of the portion of the ASQ attributable to that activity. If, in subsequent years, budget levels permit BLM to eliminate the backlog of unfunded investments that have accumulated, the timber sale volume will be adjusted upward to the extent that the work can be accomplished.

This principle will apply similarly to management of roads and recreation sites. 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.

Costs of Management: The costs of implementing the alternatives would vary, primarily according to the complexity of management proposed and the amount of timber that would be offered for sale.

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 available for timber harvest mostly those lands requiring the least costly mitigation in design of timber harvest prescriptions.

In contrast, the costs of nontraditional timber management as proposed in the Preferred Alternative and Alternative C would be much higher per unit of timber sold than for the other alternatives. Preliminary cost estimates based on research at Oregon State University (OSU) indicate management costs associated with the Preferred Alternative could increase two to five times over traditional management. These additional costs include practices that provide noneconomic benefits such as management of biological diversity and special status species habitat.

For most other programs, the costs of management would not vary substantially among the alternatives (No Action excepted). The programs for which substantial variation is expected are:

Recreation: Development of new sites in Alternatives C, D, E and the Preferred Alternative, if funded through the budget process, would entail large initial investments plus increased maintenance costs.

Roads: The costs of construction and maintenance of roads in support of timber management were addressed earlier. Some alternatives, in addition, involve substantial costs for closure of roads. These costs

would be greatest under Alternatives D and E but also substantial under Alternatives C and the Preferred Alternative.

Wildlife: In those alternatives with nontraditional management and/or relatively low timber harvests, opportunities for elk forage seeding would be less. Thus, less would be invested in such seeding in Alternatives C, D, E and the Preferred Alternative than in the other alternatives. Alternative C and the Preferred Alternative would require the creation of snags to enhance biodiversity.

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 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. Exchanges of lands resulting in net adjustments in the commercial forest land base may be made without adjusting the allowable sale quantity or amending the RMP, unless the cumulative effects of all changes identified since approval of the RMP/ROD indicate that the decadal allowable sale quantity for any SYU should be modified by more than 10 percent.

Monitoring the Resource Management Plan

The implementation of the RMP will be monitored during the life of the plan to ensure that management actions are being implemented and are meeting their intended purposes. Specific management actions arising from proposed activity plan decisions will be compared with RMP objectives to ensure consistency with the intent of the plan. The draft monitoring plan for the Preferred Alternative is set forth in Appendix 2-M.

Research

One of the identified purposes of monitoring - to determine if activities are causing the effects expected - can only be answered by structured research. Over the past decade, the Forestry Intensified Research program and other work funded by the National Science Foundation and other organizations have developed significant new knowledge about the ecosystems of western Oregon, the habitat requirements of wildlife species, and the effectiveness of practices used to manage those ecosystems for a variety of objectives.

Additional research is underway. Research includes a BLM funded project to improve knowledge about spotted owl habitats and the development of silvicultural systems for management of such habitat; a study aimed at prediction of mortality levels in young stands subject to various levels of competition; cooperation with the Stand Management Cooperative of the University of Washington; and continued cooperation with the Wildlife Ecology Team of the Pacific Northwest Research Station in performing wildlife habitat relationship studies.

BLM staff is involved in continuing the plant association classification and correlation work begun under the FIR program. In that effort, emphasis will be placed on development of studies that permit better understanding of ecosystem processes and relationships within the major plant communities of western Oregon.

An overall strategy for forest management over the next decade would allow operational treatments to be carried out within a research design, which could in turn result in modification to operations during the next planning cycle, or earlier if appropriate. This strategy of adaptive management could consist of an ongoing interplay between modeling, experimentation, and management actions and could create new models for biological diversity based management.

In addition to adaptive management, BLM has identified a number of specific information needs that can only be addressed by specifically designed new research projects. Appendix 2-O contains a list of such research topics for which BLM proposes to seek funding. The research would be intended to develop new information to assist future decisions, particularly those to be made in the planning cycle. The list of possible research topics is considered dynamic, and it

is anticipated the list will be modified after completion of this RMP to reflect evolving knowledge and priorities.

Summary of Impacts

A summary of impacts of the alternatives has been set forth in Table S-2, incorporated into the Summary at the front of this document.

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Water Quality and Riparian Zones							
Protection of Riparian Management Areas (Average width in feet each side of stream)[2]							
Stream Order: 1						50	
2					60	60	
3	60-90	75	75	105	140	200	105
4	90-140	75	100	150	200	200	150
5	120-200	75	140	210	280	280	210
6+	140-270	75	160	240	320	320	240
Lakes, ponds, and other waters		75	100	150	200	400	150
Acres in RMAs	8,675[4]	10,530	12,922	18,364	34,701	46,302	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	14,300	14,300	14,300	14,300	47,700	14,300

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Old Growth and Mature Forest Habitat							
Management Direction			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.	Manage as recommended by the 1990 Conservation Strategy for the northern spotted owl.	Contribute to habitat diversity by 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.	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.	30,000	28,000	52,000	95,000	151,000	164,000	183,000
Acres managed for maintenance of older forest characteristics	0	0	0	207,000	0	28,000	30,000
Older Forest Retained	33,000	31,000	35,000	68,000	70,000	75,000	67,000

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Timber							
Forest Management Allocations (acres):							
Intensive	260,000	274,000	249,000	0	0	100,000	89,000
Restricted	12,000	0	1,000	207,000	151,000	38,000	30,000
Enhancement of Other Uses or Not Available	30,000	28,000	5,000	95,000	151,000	164,000	183,000
Practices (assumed average annual acres for 1st decade):							
Regeneration Harvest	3,750	4,410	3,890	1,120	1,570	1,690	1,670
Commercial Thinning/ Density Management	4,840,	1,410	1,480	2,640	800	790	2,210
Conversion	0	95	91	76	55	20	49
Site Preparation							
Prescribed Fire	730	780	690	90	150	180	540
Other	2,220	2,380	2,110	820	1,020	1,080	1,180
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	2,200
Stand Maintenance	1,390	1,640	1,430	600	550	600	690
Stand Protection	3,050	3,590	3,180	880	1,320	1,420	2,360
Stand Release	1,390	1,640	1,430	260	530	580	420
Precommercial Thinning	3,640	2,530	2,310	2,170	1,580	960	2,760
Fertilization	13,010	9,040	7,880	4,160	3,030	2,650	5,240
Miles of New Road Construction	247	291	261	227	145	178	220
Harvest (MMCF)	35.2	53.8	49.8	14.8	17.2	17.2	19.9
Harvest (MMBF)	223	342	316	88	101	97	119

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Special Status Species Including Threatened and Endangered Species Habitat							
Management Direction		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 of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.	Same as D.	Manage habitats of Federal Candidate, State Listed and Bureau Sensitive species on all BLM administered lands.
Acres managed for all Category 1 and 2 Federal Candidate, State Listed and Bureau Sensitive species plants and animals	316,600	42,600	73,800	115,600	316,600	316,600	316,600
Wildlife (Including Fisheries) Habitat							
Buffer with, special habitats (feet)	100	0	0	100-200	100-300	100-300	100-200
Fish habitat improvement (miles)	143	143	143	143	143	143	143

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Special Areas							
Existing RNA/ACECs retained (#/acres)	4/939	0	4/939	4/939	4/939	4/939	4/939
Other Existing ACECs retained (#/acres)	3/201	1/3	3/201	3/201	3/201	3/201	3/201
New RNA/ACECs designated (#/acres)	0	0	378	378	378	378	378
Other new ACECs designated (#/acres)	0	1/74	4/499	9/2,644	16/8,228	16/8,228	5/508
Environmental Education Areas (#/acres)	3/432	0	3/432	3/432	3/432	3/432	2/139
Recreation Resources							
Recreation sites							
Existing (# sites/acres)	10/67	10/67	12/91	13/92	13/92	13/92	13/92
New (# sites/acres)	0/0	0/0	2/258	11/845	18/1,151	18/1,151	18/1,160
Trails maintained							
Existing (# trails/miles)	3/6	3/6	3/6	3/6	3/6	3/6	3/6
New (# trails/miles)				9/22.5	19/71.5	19/71.5	19/71.5
Special Recreation Management Areas							
Existing (#/acres)	1/277	1/277	1/277	1/277	1/277	1/277	1/277
New (#/acres)				5/22,297	5/22,297	5/22,297	5/22,297
Backcountry Byways (#/miles)	0	0	0	0	0	0	9/186
Acres open to ORV use	314,367	316,157	314,171	312,126	306,534	306,534	314,214
Acres limited to ORV use	566	358	25	25	25	25	0
Acres closed to ORV use	1,659	77	2,396	4,441	10,033	10,033	2,378
Wild and Scenic Rivers							
River segments found suitable for designation:							
As Recreational (#/miles)	0	0	1/11	1/11	1/11	3/70	3/70
As Scenic (#/miles)	0	0	0	0	0	0	0
As Wild (#/miles)	0	0	0	0	0	0	0

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Visual Resources	Manage lands as VRM IV except for McKenzie Corridor (300 acres managed 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 miles of recreation sites, 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 III all lands inventoried as Class IV, and manage as Class I all lands within 1/4 mile of recreation sites, State and Federal highways and designated rivers.	Manage all existing ACECs and Shotgun SRMA as Class I. Manage Sharps, McKenzie SRMAs and recreation sites within view shed as Class II. Manage rest of SRMAs as Class III. Remaining lands manage as class IV.
Acres managed VRM Class I	400[3]	1,120	1,120	1,120	1,120	5,703	1,390
Acres managed VRM Class II	0[3]	3,071	8005,	16,434	40,828	74,444	13,768
Acres managed VRM Class III	300[3]	6,705	19,256	31,798	72,658	234,905	29,413
Acres managed VRM Class IV	314,352[3]	304,156	286,671	265,700	200,446	0	270,481

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Land Tenure	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.	Make exchanges to benefit one or more of resources managed. Only public domain lands to be exchanged to support recovery of the 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 (Zone1).	0	78,095	78,095	78,095	78,095	78,095	78,,095
Acres potentially eligible for exchange only (Zone 2)	316,576	238,462	238,462	238,462	238,462	238,462	238,462
Acres potentially eligible for sale or exchange (Zone3)	16	35	35	35	35	35	35

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

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Energy and Mineral Management							
Acres available for oil and gas and geothermal leasing.	317,684	317,730	317,730	317,730	317,730	317,730	317,730
Acres closed to oil, gas and geothermal lease.	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)	52 (oil/gas only)
Acres open to mining claim location and operation.	315,187	315,751	313,545	289,516	284,561	284,561	304,432
Acres closed to mining location.	2,595	2,031	4,237	28,266	33,221	33,221	13,350
Rural Interface Area Management							
Acres considered for alternative management practices	0	0	4,500	6,800	6,800	19,650	6,800
Acres where clear cutting, herbicide spraying and prescribed burning excluded	0	0	0	0	6,800	19,650	6,800
Acres managed for VRM Class II objectives	0	0	0	0	6,800	19,650	6,800
Acres managed for VRM Class III objectives	0	0	4,500	6,800	0	0	0

[1]See narrative for management direction common to all alternatives.
[2]Order 1 and 2 perennial stream would have a 75-foot 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.
[3]Acres for the NA Alternative are from the 1983 MFP.
4This is low due to insufficient inventory data for the MFP.

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

Stream	Potential[1] Rating	Anad[2] CO	CH	ST	Resident[3] CT	RB	Other	Current[4] Projects	Proposed Projects[5] Struct	Riparian	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		
Anthony	2			X	X				X		
Middle	2			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
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
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] CO	CH	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	
Bear	2	X			X				X	X	
Haight	1		X		X				X	X	
Dogwood	1		X	X	X				X	X	
Jean	2	X			X				X	X	X
Bottle	3		X		X				X	X	X

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

Stream	Potential[1] Rating	Anad[2] CO	CH	ST	Resident[3] CT	RB	Other	Current[4] Projects	Proposed Projects[5] Struct	Ripar	Other
Buck	1	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
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	
Wolf	1	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	Surface Segregative Effect[3]	Management Agency[4]	Recommendation to Continue or Revoke and Rationale
ANS 58-1[5]	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.

Table 2-3 - Land Withdrawals and Recommendations to Continue or Revoke Withdrawals[1]

Authority[2]	Location	Acreage	Purpose/ Name	Surface Segregative Effect[3]	Management Agency[4]	Recommendation to Continue or Revoke and Rationale
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 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.
PLO 5229	T.15S., R.1W. Sec. 29-32	260.00	Recreation Site/ Shotgun Creek	B	BLM	Continue - Lands are still being used for purpose for which they were withdrawn.
PLO 5490[6]	5	9055.90	Reserved for Multiple Use Management	D	BLM	Continue - Reservation is still needed to assure Public Domain lands 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 withdrawn.
PSC 287	T.18S., R.6W. Sec. 5	120.00	Protect Electric Transmission Line	C	BLM/FERC	Revoke - Powerline has been removed. Land notneeded 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 1 of Appendix 3-B 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 2-4 - Wild and Scenic River Suitability.

River Name		Segment Length Mi	BLM Admin. Ac. within 1/4 Mi.	Suitability by Alternative						
				NA	A	B	C	D	E	PA*
McKenzie	Seg A	11	1,194			R	R	R	R	R
Siuslaw	Seg B	46	4,390						R	R
Siuslaw	Seg C	13	1,151						R	R

*NA = no action alternative
*PA = preferred alternative
R = recreational

Table 2-5 - Buffering of Special Habitats

Special Habitat	Buffer by Alternative (feet)						
	NA	A	B	C	D	E	PA
Wet Habitats	100	0	0	100-200	100-300	100-300	100-200
ponds							
swamps							
marshes							
wet meadows							
Dry Habitats	100	0	0	100-200	100-300	100-300	100-200
grassy balds							
dry meadows							
Rocky Habitats	100	0	0	100-200	100-300	100-300	100-200
caves							
talus slopes							
moist or dry rocky outcrops (with/without soil development)							
Mineral Deposits	100	0	0	100-200	100-300	100-300	100-200
salt licks							
mineral springs							

Table 2-6 - Special Areas Management by Alternative

Existing Special Areas	Acres	No Action	A	B	C	D	E	Preferred
Lake Creek Falls ACEC	3	Retain as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry or maintain existing mineral withdrawals. Mineral leasing subject to no surface occupancy.	Same as No Action, and closed to timber harvest.	Same as A.	Same as A.	Same as A.	Same as A.	Same as A.
Long Tom ACEC	7	Retain as special area. Closed to public ORV use. Administrative access permitted.	No retention as special area. Core areas are protected under other existing authorities, i.e., Endangered Species Act.	Same as NA and withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as B.	Same as B.	Same as B.	Same as B.
Horse Rock Ridge ACEC Mohawk ACEC/RNA Camas Swale ACEC/RNA Fox Hollow ACEC/RNA Upper Elk Meadows ACEC/RNA McGowan Creek EEA Vik Road EEA	191* 292* 260* 160* 207* 229 178	Retain as special area. Closed to public ORV use. Administrative access permitted.	No retention as special area.	Retain as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as B.	Same as B.	Same as B.	Same as B.
Row River EEA	25	Retain as special area. Closed to public ORV use. Administrative access permitted.	No retention as special area.	Retain as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as B.	Same as B.	Same as B.	No retention as Special Area; designate as a recreation site.

Table 2-6 - Special Areas Management by Alternative (cont.)

Potential Special Areas	Acres	No Action	A	B	C	D	E	Preferred
Cannery Dunes	40*	No designation	Same as No Action. as special area.	Designate as special area. Open to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy.	Designate as special area. Closed to public ORV use. Administrative access permitted. Mineral leasing subject to no surface occupancy.	Same as C.	Same as C.	Same as C.
Heceta Sand Dunes	218*	No designation as special area.	Same as No Action.	Designate as special area. Open to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Designate as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy.	Same as C.	Same as C.	Same as C.
Horse Rock Ridge RNA Addition	187	No designation as special area addition.	Same as No Action.	Designate as special area. Closed to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as B.	Same as B.	Same as B.	Same as B.
Camas Swale ACEC/RNA Addition	34							
Upper Elk Meadows ACEC/ RNA Addition	16							
Lake Creek Falls ACEC/ ONA Addition	55	No designation as special area addition.	Designate as special area. Closed to public ORV use. Maintain existing mineral withdrawals. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as A.	Same as A.	Same as A.	Same as	Same as A.

Table 2-6 - Special Areas Management by Alternative (cont.)

Potential Special Areas	Acres	No Action	A	B	C	D	E	Preferred
Cougar Mountain Ancient Yew Grove	40*	No designation as special area.	Same as No Action.	Same as No Action.	Designate as special area. Closed to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as C.	Same as C.	Same as C. Adjust acres to 10.
Hult Marsh	167	No designation as special area.	Same as NA.	Designate as special area. Closed to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as B.	Same as B.	Same as B.	Same as B.
Grassy Mountain	74	No designation as special area.	Designate as special area. Closed to public ORV use. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as A.	Same as A.	Same as A.	Same as A.	Same as A.
[1] Coburg Hills BEHA	1,204	No designation as special area. Core areas protected under other existing authorities, i.e., Endangered Species Act.	Same as NA.	Same as NA.	Same as NA.	Designate as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Limited timber harvest where determined compatible with bald eagle recovery goals.	Same as D.	No designation as special area. Protected under other existing authorities.

Table 2-6 - Special Areas Management by Alternative (cont.)

Potential Special Areas	Acres	No Action	A	B	C	D	E	Preferred
[1] Fall Creek Reservoir BEHA	746	No designation as special area. Core areas protected under other existing authorities, i.e., Endangered Species Act.	Same as NA.	Same as NA.	Same as NA.	Designate as special area. Closed to public to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as D.	No designation as special area. Protected under other existing authorities.
[1] McKenzie River BEHA	2,037							
[1] Dorena Reservoir BEHA	611							
[1] Siuslaw River BEHA	282							
[1] Fern Ridge BEHA	166							
[1] Triangle Lake BEHA	538							
Triangle Lake RFI	810	No designation as special area.	Same as NA.	Same as NA.	Designate as special area. Closed to public ORV use. Administrative access permitted. Withdraw from mineral entry. Mineral leasing subject to no surface occupancy. Closed to timber harvest.	Same as C.	Same as C.	No designation as special area.
Coburg Hills RFI	854							
Cottage Grove Reservoir RFI	232							
Dorena Reservoir RFI	209							

RFI = Relict Forest
BEHA = Bald Eagle Habitat Area
EEA = Environmental Education Area
* Title Plat Acres
1 Mineral leasing, mineral entry and ORV restrictions for Alternatives A, B and C are restricted in mature and old growth forests that represent the minimum legal requirements for bald eagle protection under the Bald Eagle Recovery Plan.

Table 2-7a - Potential Recreation Sites and Trails

Potential Trail Name	Length of Trail	Alternatives NA	A	B	C	D&E	PA
Big Canyon Trail	1 miles*	-	-	-	X	X	X
Clay Creek	1 miles	-	-	-	-	X	X
Coburg Crest	23 miles	-	-	-	-	X	X
Coburg Crest Connector	6 miles	-	-	-	-	X	X
Deadwood-Windy Peak	6 miles	-	-	-	-	X	X
Fish Creek	3 miles	-	-	-	X	X	X
FS Trail (no number) (portion on BLM)	.5 miles	-	-	-	-	X	X
Greenleaf Creek	3 miles	-	-	-	-	X	X
Haskins Creek	4 miles	-	-	-	-	X	X
Hult Equestrian Loop	3 miles	-	-	-	-	X	X
Lake Creek	1 mile	-	-	-	-	X	X
Marten Creek	4 miles	-	-	-	X	X	X
McKenzie River	6 miles	-	-	-	X	X	X
Row River Overlook	1 mile	-	-	-	-	X	X
Sharps Creek	1 mile	-	-	-	X	X	X
Shotgun additions (2 trails)	1.5 miles	-	-	-	X	X	X
Siuslaw River	2 miles	-	-	-	X	X	X
Whittaker Creek Falls	3 miles	-	-	-	X	X	X
Whittaker Creek Ridge	1 mile	-	-	-	X	X	X
	Totals:	**0**	**0**	**0**	**9**	**19**	**19**
				(22.5 mi)			(71.5 mi)

* Miles are rounded from GIS calculations, and reflect total trail miles on BLM and private land. The type of trail, hiking, non mechanical, etc. would be deterimined when preparing the trail plan.

Trails Summary (existing and potential) by Alternative

ALT		Miles	No. of Trails
NA	=	6.0 mi	3 trails (3 + 0) (Shotgun system = 1 trail)
A	=	6.0 mi	3 trails (3 + 0)
B	=	6.0 mi	3 trails (3 + 0)
C	=	28.5 mi	12 trails (3 + 9)
D&E	=	77.5 mi	22 trails (3 + 19)
PA	=	77.5 mi	22 trails (3 + 19)

Table 2-7a - Potential Recreation Sites and Trails (cont.)

Potential Rec Sites/Areas	Type of Site	Alternatives NA	A	B	C	D&E	PA
Cannery Dunes	day use	-	-	X	X	X	X
(nominated ACEC/ONA)	(PD lands)						
Doe Creek	day use	-	-	-	X	X	X
Esmond Lake	camping	-	-	-	X	X	X
Edwards Creek	camping/day use	-	-	-	X	X	X
Fall Creek Reservoir	day use	-	-	-	-	X	X
Fall Creek	day use	-	-	-	-	X	X
Frying Pan	camping	-	-	-	X	X	X
Gilkey Creek (SRMA)	day use	-	-	-	X	X	X
Heceta Sand Dunes	day use	-	-	X	X	X	X
(nominated ACEC/ONA)	(PD lands)						
Homestead	camping	-	-	-	X	X	X
Hult Pond	camping/day use	-	-	-	X	X	X
(within nominated ACEC)							
McKenzie River (SRMA)	camping/day use	-	-	-	X	X	X
	(some PD lands)						
Mohawk Wayside	day use	-	-	-	-	X	-
N. Fork Gate Creek	camping/day use	-	-	-	-	X	X
Oxbow	camping	-	-	-	X	X	X
Row River	day use	-	-	-	-	-	X
(previously Environmental Education Area)							
Saleratus	day use	-	-	-	-	X	X
Sharps Creek Expansion	camping/day use	-	-	-	X	X	X
Sharps Creek (SRMA)	camping/day use	-	-	-	X	X	X
Sidog	camping/day use	-	-	-	-	X	X
Siuslaw Bend	camping/day use	-	-	-	X	X	X
Siuslaw River (SRMA)	camping/day use	-	-	-	X	X	X
Upper Lake Creek (SRMA)	camping/day use	-	-	-	X	X	X
Wolf Creek Falls	day use	-	-	-	-	X	X
	Totals:	**0**	**0**	**2**	**16**	**23**	**23**

Recreation Sites/Areas Summary (existing and potential) by Alternative

ALT	No. of Sites	ALT	No. of Sites
NA =	11 (11 + 0)	C =	30 (14 + 16)
A =	11 (11 + 0)	D&E =	37 (14 + 23)
B =	15 (13 + 2)	PA =	37 (14 + 23)

Table 2-7b - Existing Recreation Sites and Trails

		Alternatives					
Existing Sites/Areas	**Type of Site**	**NA**	**A**	**B**	**C**	**D&E**	**PA**
Clay Creek	camp/day use	X	X	X	X	X	X
Greenway Tract	Greenway use	X	X	X	X	X	X
(lease to State)	(R&PP lease)						
Haight Creek	camp/day	-	-	X	X	X	X
	(closed)						
Lake Creek	camp/day	-	-	X	X	X	X
	(closed)						
McKercher Park	day use	X	X	X	X	X	X
(County Park)	(R&PP lease)						
Marten Rapids	day use	X	X	X	X	X	X
(County Park)	(R&PP lease)						
Rennie Landing	boat landing	X	X	X	X	X	X
Sharps Creek RS	camp/day use	X	X	X	X	X	X
Shotgun Rec Site (SRMA)	day use	X	X	X	X	X	X
Silver Creek Landing	boat landing	X	X	X	X	X	X
Taylor Landing	boat landing	-	-	-	X	X	X
Turner Creek	day use	-	-	-	-	-	-
	(closed)						
Whitewater Park	day use	X	X	X	X	X	X
(County Park)	(R&PP lease)						
Whittaker Creek	camp/day use	X	X	X	X	X	X
Whittaker Creek Landing	boat landing	X	X	X	X	X	X
(next to Whittaker Cr RS)							
	Totals:	11	11	13	14	14	14
Existing Trails	**Type of Trail**	**NA**	**A**	**B**	**C**	**D&E**	**PA**
Eagle's Rest	Hiking (.7 mi*)	X	X	X	X	X	X
FS Trail #3462	Hiking (.2 mi)	X	X	X	X	X	X
(portion on BLM)							
Shotgun Trail System	Hiking (5.1 mi)	X	X	X	X	X	X
	Totals:	3	3	3	3	3	3
			(6.0 mi)				

* Miles are rounded from GIS calculations, and reflect total trail miles on BLM and private land

Table 2-8 - Oil and Gas and Geothermal Lease Restrictions (1000 Acres)

Restriction	NA	A	B	C	D	E	PA
Closed - Nondiscretionary[1]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Closed - Discretionary	0	0	0	0	0	0	0
Open - No Surface Occupancy[2]	7	4	6	10	16	20	8
Open - With Standard Lease Terms	236	266	222	19	98	30	96
Open - With Additional Restrictions[3]	75	48	90	289	204	268	214

1 Horton Air Navigation Site, Fern Ridge Reservoir, Lookout Point Reservoir, Lands within city limits (oil and gas only).
2 Fall Creek Reservoir, Oregon Islands NWR, Tyrrell and Dorena Seed Orchards, Walton Maintenance Site, Progeny Test Sites, Regional Forest Nutritional Study Installations, Land Use Authorizations, Recreation Sites, Special Areas, Reconveyed Land not opened to locatable mineral entry, VRM Class I lands, bald eagle and marbled murrelet nest sites, great blue heron rookeries, osprey nest sites.
3 Special Recreation Management Areas, Suitable Recreational Rivers, Powersite Withdrawals, Corps of Engineers Withdrawals, VRM Class II lands, Fragile Slopes, Riparian Management Areas, mineral springs utilized by band-tailed pigeons, Federal Mineral Estate Only (add 47 acres across all alternatives for oil and gas), 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), and Old Growth Emphasis Areas and Connectivity Areas (Preferred Alternative)

Table 2-9(a) - Locatable Mineral Restrictions (1000 Acres)

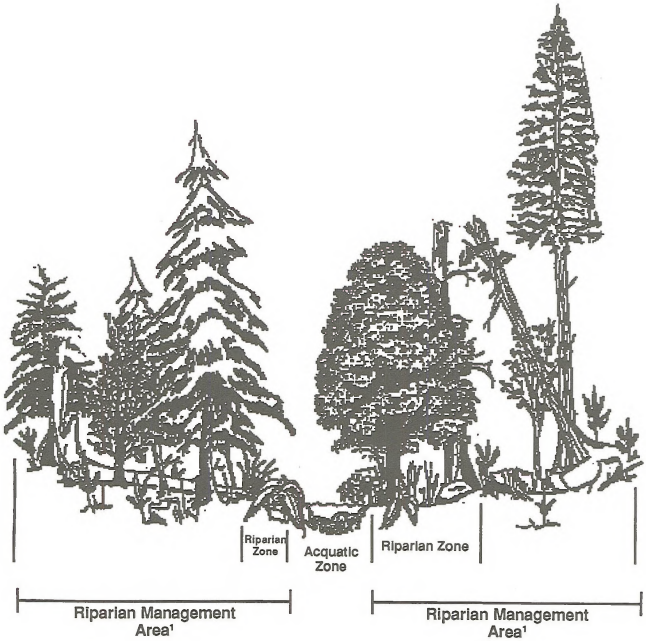
Restriction	NA	A	B	C	D	E	PA
Closed - Nondiscretionary[1]	2	2	4	28	33	33	13
Closed - Discretionary[2]	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Open - Standard Requirements	301	302	300	281	276	276	296
Open - With Additional Restrictions[3]	15	13	14	8	8	8	9

1 Horton Air Navigation Site, Fall Creek Reservoir, Fern Ridge Reservoir, Lookout Point Reservoir, Oregon Islands NWR, Danebo Office Site, Tyrrell and Dorena Seed Orchards, Walton Maintenance Site, Other Acquired Lands, Recreation Sites, Special Areas (Alternatives A, B, C, D, E and the Preferred Alternative).
2 Pending BLM applications for withdrawal, R&PP classifications or leases, land reconveyed by exchange under FLPMA.
3 Progeny Test Sites, Regional Forest Nutritional Study Installations, Community Pits, Designated Recreational River Segments, Threatened and Endangered Plant and Animal Species, Special Areas (No Action Alternative), Federal Mineral Estate Only, Powersite Classifications (placer operations only).

Table 2-9(b) - Salable Mineral Restrictions (1000 Acres)

Restriction	NA	A	B	C	D	E	PA
Closed - Nondiscretionary[1]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Closed - Discretionary[2]	8	14	17	25	44	62	31
Open - Standard Requirements	233	271	227	13	107	44	84
Open - With Additional Restrictions[3]	77	33	74	280	167	210	203

1 Horton Air Navigation Site, Fern Ridge Reservoir, Lookout Point Reservoir, Oregon Islands NWR.
2 Danebo Office Site, Tyrrell and Dorena Seed Orchards, Walton Maintenance Site, Progeny Test Sites, Regional Forest Nutritional Study Installations, R&PP Leases, Recreation Sites, VRM Class I Lands, Suitable Recreational Rivers, Threatened and Endangered Plant and Animal Species, Special Areas (Alternatives A, B, C, D and the Preferred Alternative), Riparian Management Areas, bald eagle and marbled murrelet nest sites, 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 Plant and Animal Species, Elk Concentration Areas (No Action Alternative), 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), Forest Stands Older than 150 years (Alternative E), Old Growth Emphasis Areas and Connectivity Areas (Preferred Alternative).



[1]Varies by Alternative.

Chapter 3
Affected Environment

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 Western Cascades. Each Province is characterized by a more or less unique suite of rocks 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 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 Western 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 Western 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 Western 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 included 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 Western Cascade Range in the drainage basin of the Middle Fork of the Willamette River. In the northern and central parts of the Western Cascades, the structure is dominated by several major folds that trend northeasterly. Folding in the Western 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

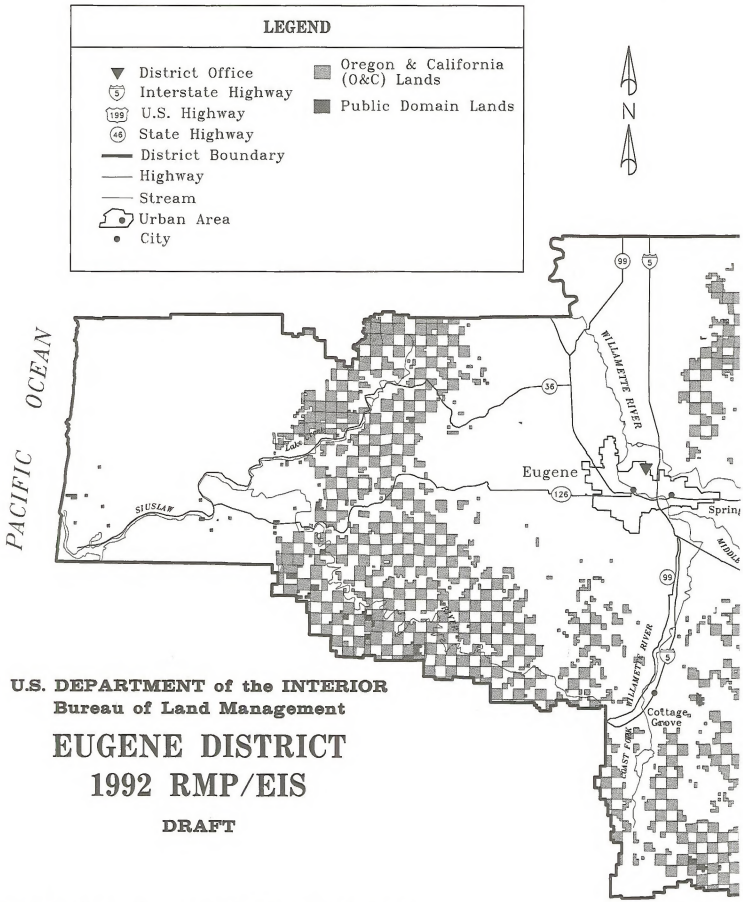
Land Status

As shown on Map 3-L-1, BLM administered lands are primarily in a checkerboard ownership pattern. Table 3-L-1 displays the ownership by county within the planning area. The BLM ownership is ten percent of the planning area.

Land Tenure

The District has had twenty-five 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 one documented sale proposal that, if implemented, would result in the sale of one acre of O&C land.

The District currently has one documented exchange proposal where the offered and selected lands have been defined that, if implemented, could result in the exchange of 240 acres of BLM administered land for 1,686 acres of non-federal land. A listing of the specific lands involved can be found in case file OR45978 (Champion International). In addition to this proposal, several other possible exchanges are presently being discussed with 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.



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MAP 3-L-1: LAND STATUS

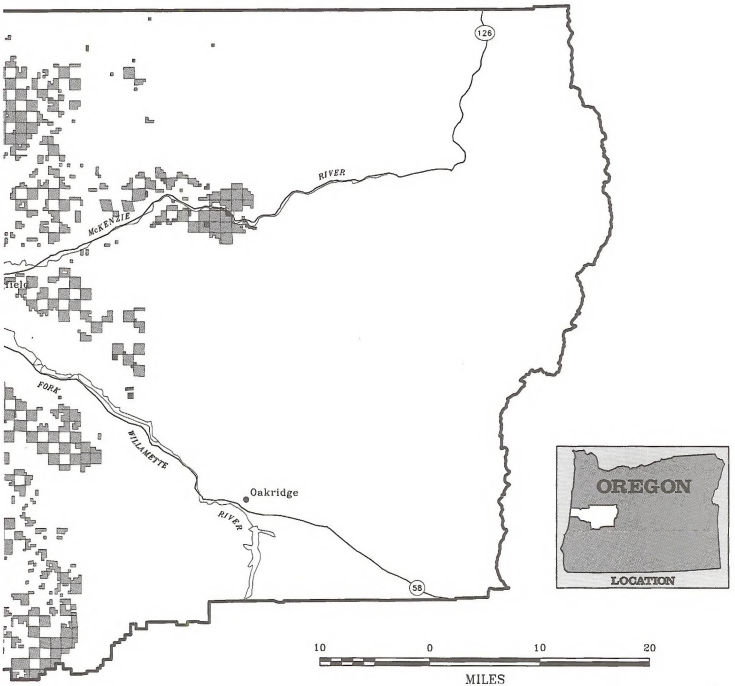

126
RIVER
McKENZIE
99
FORK
WILLAMETTE
RIVER
Oakridge
58
OREGON
LOCATION
10
0
10
20
MILES

Table 3-L-1 - BLM Administered Lands Within Planning Area by County and Land Status

County	Acreage[1] of 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**

[1]Acreage based on most recent surveys taken from Master Title Plats.

Non-federal lands that BLM has specifically considered for acquisition in previous years are located at Hult Reservoir; 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.

Trespass

Realty trespass is not a significant problem within the planning area. At present, two encroachments of residential improvements totalling less than one acre are identified. Where the land occupied is non-timberland 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 thirteen acres are presently identified. Where the land is non-timberland 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 43CFR 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 3-A, Table 3-L-3. 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	8,606	Withdrawn from operation of the general land laws only.

Withdrawals generally segregate land from operations under the non-discretionary 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, that 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 Appendix3-B, Table 3-L-4. 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 3-L-2. The Western Regional Corridor Study (Dec. 1986) 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.

The Bohemia Inc. lease of 9.94 acres at Culp Creek (OR 33636) expires in 1992. This lease can be renewed, if the lessee continues to need the land, terminated, or the lands could be disposed of by sale or exchange.

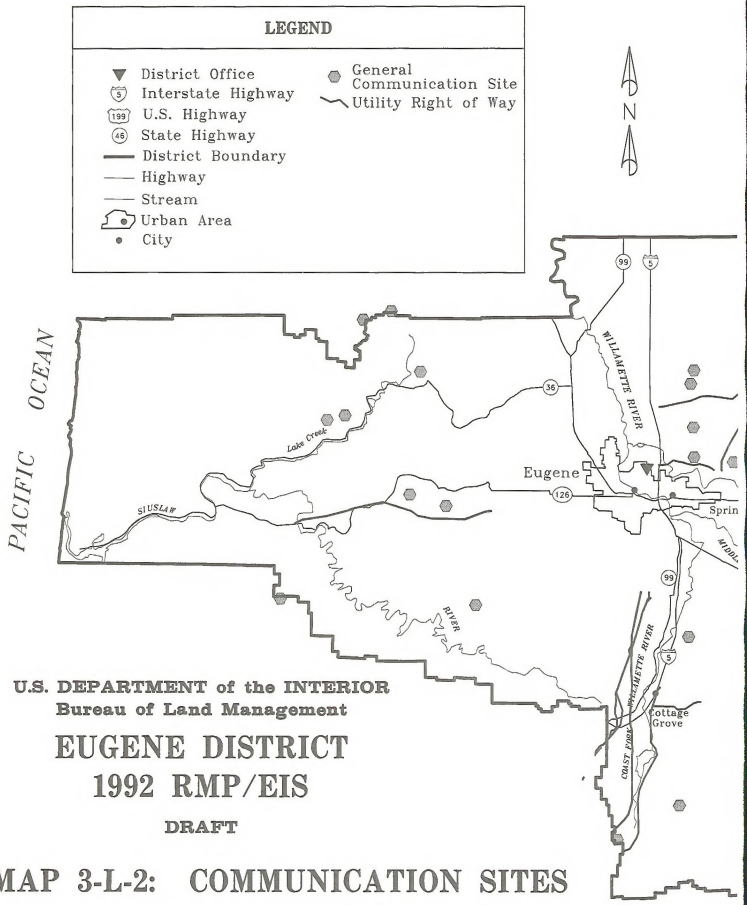
Those lands presently leased to Lane County for Whitewater and Martin Rapids County Parks are only minimally developed and managed by the County. Upon expiration in 2007, these leases might not be renewed unless the County proposes substantial new development. When and if the leases terminate, the R&PP 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



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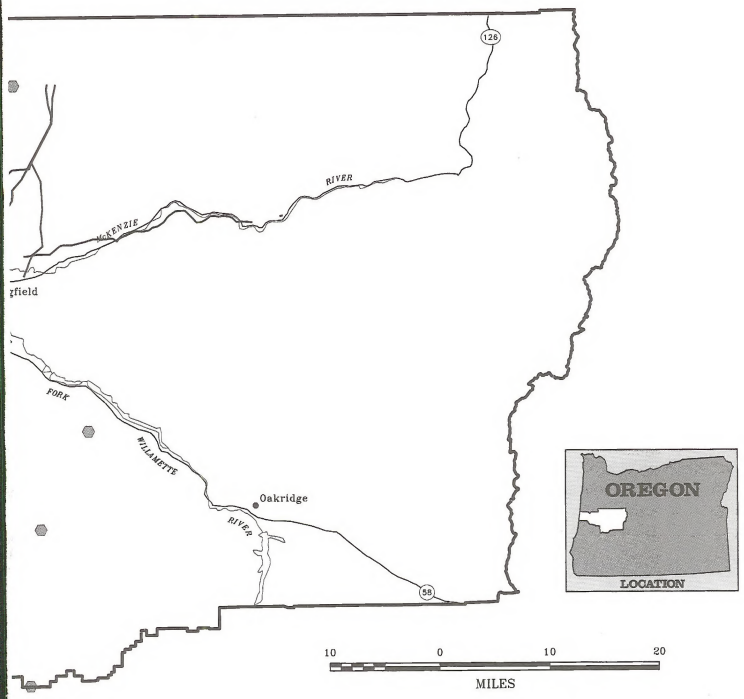
MAP 3-L-2: COMMUNICATION SITES & RIGHTS OF WAY


126
RIVER
MCKENZIE
zfield
FORK
WILLAMETTE
Oakridge
RIVER
98
OREGON
LOCATION
10
0
10
20
MILES

Mountain and Huckleberry Mountain. Eleven potential new communication sites have also been identified. Locations are shown on Map 3-L-2. (Same map as R/W corridors). 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 3-L-2, may be needed for specific electronic communication applications.

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

Table 3-L-2 - 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.

exclusive and 100 nonexclusive easements would be required to provide administrative access to these scattered tracts.

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-L-2 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 timber management. The District has also developed ten 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 as amended directs the State of Oregon to meet or exceed National ambient air quality standards by December, 1992. The Oregon Smoke Management Plan (OSMP), a part of the required State implementation plan, identifies strategies for minimizing the impacts of smoke from prescribed burning on the densely-populated, designated, non-attainment and smoke sensitive areas within western Oregon and the Bend area in central Oregon (see Map 3-A-1). Particulate matter (PM) with a nominal size of 10 microns or less (PM 10) is the specific pollutant addressed in the State implementation plans.

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-A-1 along with wilderness areas that are now designated Class II but may be designated Class I in the future.

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 non-attainment areas for this pollutant.

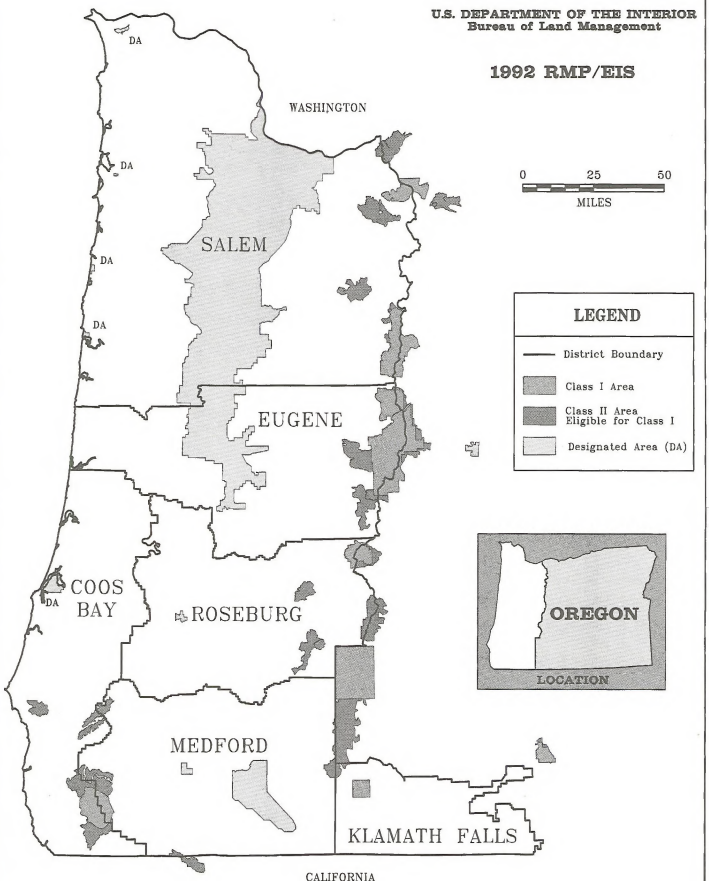
The non-attainment status of these communities is not attributable primarily to prescribed burning. Major sources of particulate matter within the Eugene/Springfield non-attainment area is smoke from wood stoves. Dust and industrial sources are other contributors. The contribution to the non-attainment status of particulate matter from prescribed fire is less than four 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 (see Appendix 1-C).

Table 3-A-1 - Average Biomass Consumption Estimates

Category	Calculated Baseline (1976-79) Average Consumption (tons per acre)			Calculated (1984) Average Consumption (tons per acre)			Adjusted Planning Area (1989) Average Consumption (tons per acre)		
	High	Mid	Low	High	Mid	Low	High	Mid	Low
Duff [1]	18.2	16.6	14.9	18.2	12.9	9.1	9.1	2.7	1.9
Woody <3"	25.1	22.0	18.3	20.1	17.6	15.0	15.1	13.3	11.0
Woody >3"	7.0	6.1	5.1	5.6	4.9	4.1	2.4	2.4	2.0
Rotten	1.0	1.0	1.0	1.0	1.0	1.0	.8	.8	.8
Total	**51.3**	**45.7**	**39.3**	**44.7**	**33.2**	**29.0**	**27.4**	**19.3**	**15.6**

[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).



MAP 3-A-1: SENSITIVE AIR QUALITY AREAS

The pollutant most associated with the Eugene District resource management activities is PM 10 found in smoke produced by forestland 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.

The goal is to reduce particulate matter emissions from forestland prescribed burning 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 PM 10 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-A-1). For the planning area the average annual prescribed fire fuels consumption rate per acre during the baseline period was approximately 38.3 tons per acre from approximately 2,304 acres. There were prescribed fires prior to 1980 in the planning areas. During 1980 to 1984, the consumption rate was 60.2 tons per acre from an average of 1,080 acres. The present consumption rate, as represented by the period 1985 to 1988, is 33.0 tons per acre over an average of 1,900 acres. This reduction in total tons consumed has a direct proportional effect on the amount of particulate matter produced.

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 this 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. Smaller fuels that wildfires normally start and spread in are eliminated or reduced to safe loading levels.

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.

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) (see Table 3-A-2).

Table 3-A-2 - Smoke Intrusions in the Lane County Designated Area From All Landowners

	Number of Smoke Intrusions		Number
	Total	BLM	of Days
1984	5	0	5
1985	6	0	6
1986	5	0	5
1987	0	0	0
1988	0	0	0
Total	**16**	**0**	**16**

SOURCE: Southwest District of the Oregon Department of Forestry

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 burning (see Table 3-A-3).

Table 3-A-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 burning. 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 burning of logging slash. Most of the wood that is burned as firewood comes from the surrounding forestland. 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. Firewood, burned during the winter when colder air and temperature inversions occur, 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 burning 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 as well as providing a medium for plant growth. The concept of soil productivity is a measure of a soil's ability to produce vegetation. Vegetation growth requires that the soil provide adequate moisture, aeration, nutrients, and anchorage. A number of soil properties (organic matter content, nutrients, texture, structure, porosity, and depth) are recognized as important for vegetation growth. These properties are influenced by soil displacement, compaction, erosion, and organic matter removal.

Soils information (distribution and characteristics) has been collected by 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 five 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 soil information are available at the District office.

For descriptive purposes, soils occurring in the operating area can be divided into three physiographic areas, which encompass six soils groups (see Map 3-S-1). Descriptions of the three physiographic areas and six 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.

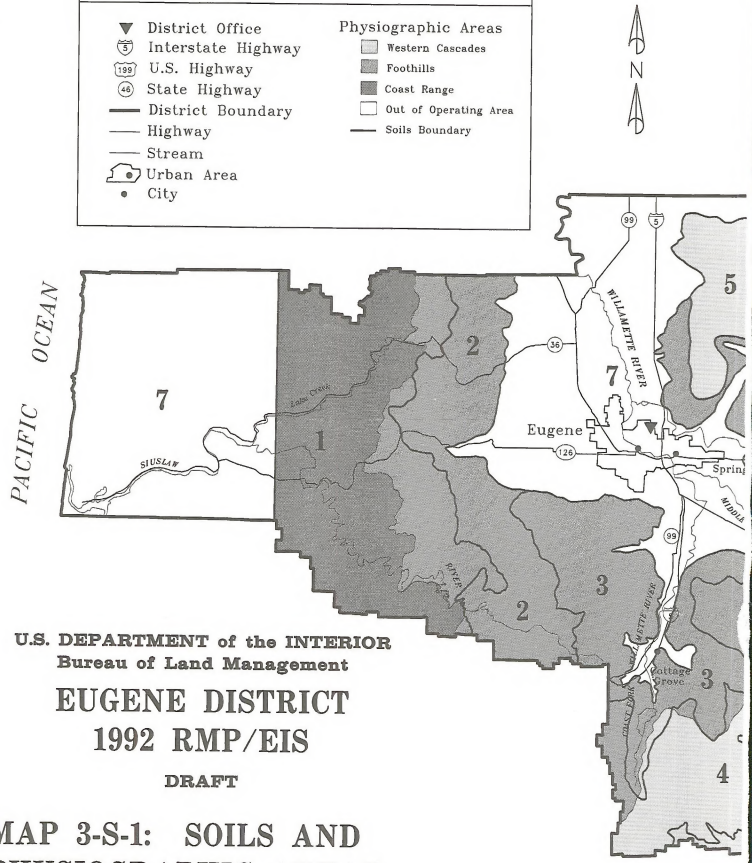
The Bohannon soils group, which has a udic moisture regime and mesic temperature regime, occurs in this physiographic area. Colluvial soils (e.g., Bohannon, Digger, Preacher) ranging from 20-60 inches deep occur on landforms with slope gradients ranging from 40-100 percent. These colluvial soils are brown, well-drained, gravelly (20-60 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 avalanches) 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)



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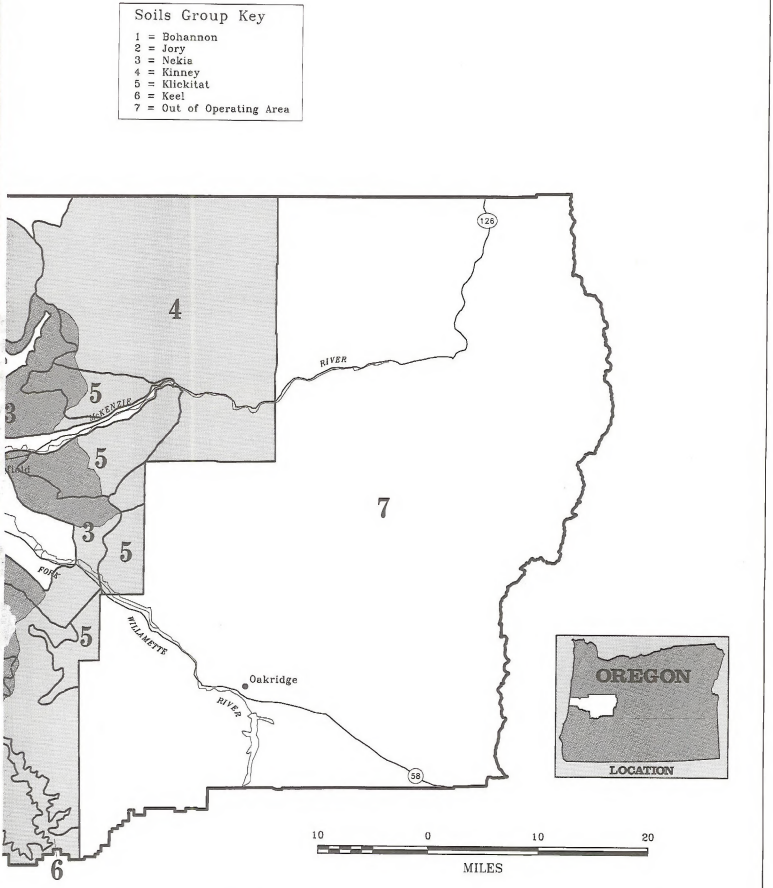
MAP 3-S-1: SOILS AND PHYSIOGRAPHIC AREAS


Soils Group Key
1 = Bohannon
2 = Jory
3 = Nekia
4 = Kinney
5 = Klickitat
6 = Keel
7 = Out of Operating Area
126
RIVER
4
5
3
5
7
3
5
FORK
WILLAMETTE
RIVER
5
Oakridge
58
6
OREGON
LOCATION
10
0
10
20
MILES

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 is 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 1,000-4,700 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-S-1 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 forestland. 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-S-2 displays acreage of forest sites less fragile than the nonsuitable woodland acres displayed in Table 3-S-1). 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 2-A) are used to protect them.

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 productivity by influencing disturbances such as displacement, compaction, erosion, and alteration of organic matter and soil organisms levels (see Appendix 4-C, Soil Compaction, Erosion, and Nutrient Status). 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 (by 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 salmonoids, domestic water supply, fishing, and water contact

Table 3-S-1 - 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

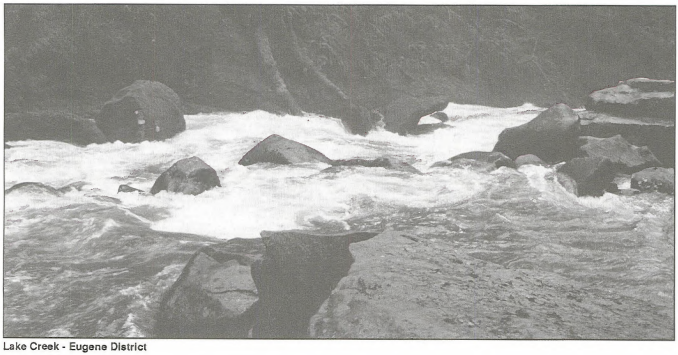
[1]Lands where the timber growing potential **will be** reduced even if special harvest and/or restrictive measures are applied due to inherent site factors such as soils having critical moisture supplying capacities, severe nutrient problems, critical slope gradients, mass movement potential, severe 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.

Table 3-S-2 - 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.



Lake Creek - Eugene District

recreation. Maintenance of water quality is important for all of these uses. See Tables 3-W-12 and 3-W-13, Appendix 3-D 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 3-C 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-W-1).

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.

Table 3-W-1 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-W-2 gives flow information, and Table 3-W-3 lists the larger lakes and reservoirs within each watershed. The location of the analytical watersheds is shown on the analytical watershed map.

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 four 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. There have not been any major land disturbing activities on this area.

Table 3-W-4 lists only 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-W-2). None of these community water systems have known water quality problems. In addition numerous domestic and irrigation water rights are held on BLM administered lands as well as downstream from these lands. Local watermasters maintain records of these water rights.

Table 3-W-1 - 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

Table 3-W-1 - Eugene District Analytical Watersheds (cont.)

Watershed Name	Analytical Watershed Acres	Percent BLM	Stream Order	Total Stream Miles	BLM Stream Miles
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
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
Alsea River	140,000	[1]See Salem District EIS			
Smith River	225,000	[2]See Roseburg District EIS			
Umpqua River	2,357,120	<1See Roseburg District EIS			

Table 3-W-2 - 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 R.	65	56.91	547	15,260	24.0
Willamette R.	55	32.67	2,008	[1]	[1]

[1] regulated flow[2] above Dorena Reservoir

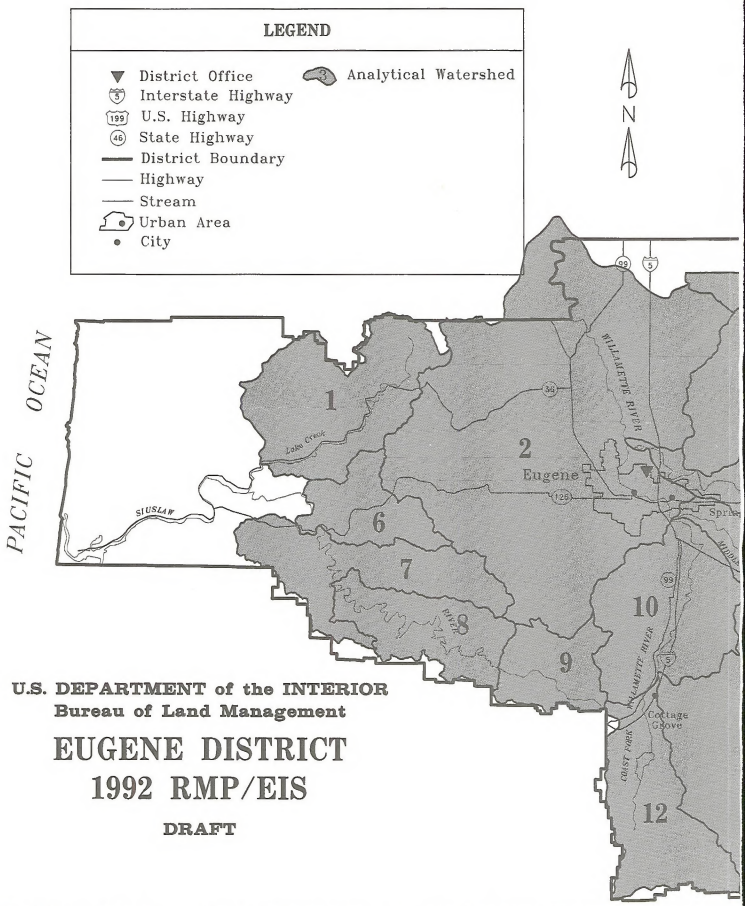
Table 3-W-3 - Lakes and Reservoirs

Watershed Name	Lakes/Reservoirs	Size (acres)	Use*
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	

*Use Key: R = Recreation F = Flood control P = Power generation I = Irrigation D = Domestic water supply

Table 3-W-4 - 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



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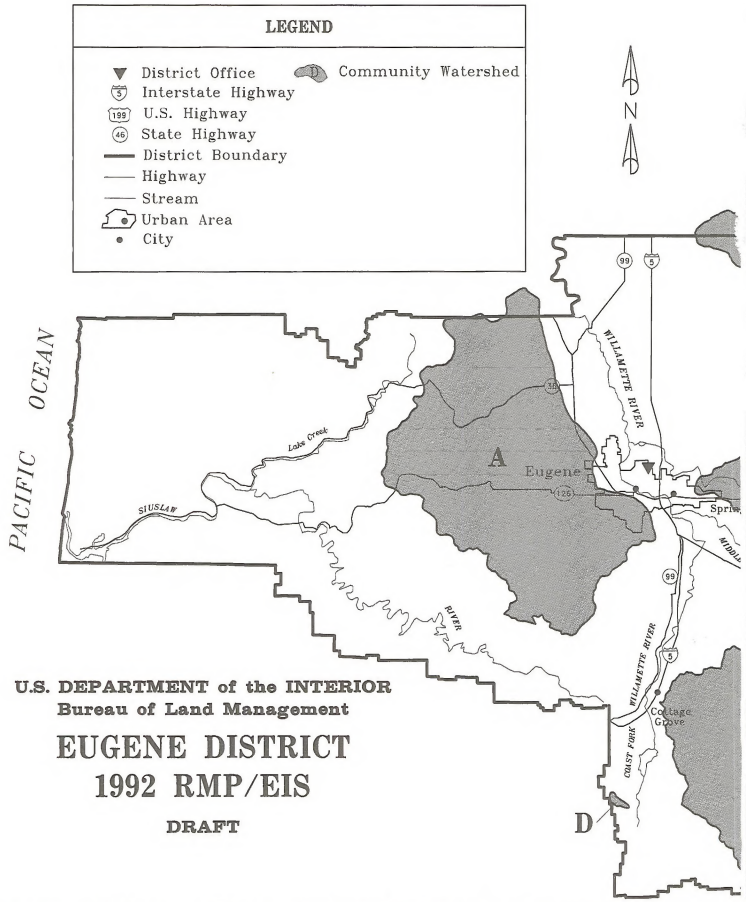
MAP 3-W-1: ANALYTICAL WATERSHEDS

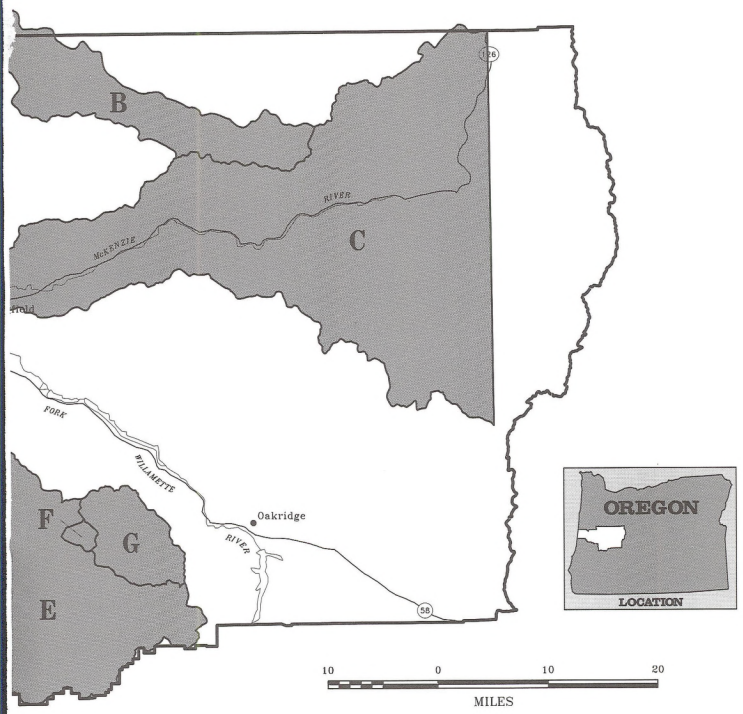

Analytical Watershed Key
1 = Lake Creek
2 = Willamette River
3 = Calapooia River
4 = Mohawk River
5 = McKenzie River
6 = Wildcat Creek
7 = Wolf Creek
8 = Middle Siuslaw
9 = Upper Siuslaw
10 = Coast Fork Willamette
11 = Middle Fork Willamette
12 = Big River
13 = Row River
126
3
4
5
RIVER
McKENZIE
11
FORK
WILLAMETTE
Oakridge
RIVER
13
58
OREGON
LOCATION
10
0
10
20
MILES



MAP 3-W-2: COMMUNITY WATERSHEDS

Community Watershed Key

A = Monroe (Long Tom River)
B = Brownsville (Calapooya River)
C = Eugene Water and Electric Board (McKenzie River)
D = London Water Coop (Beaver Creek)
E = Cottage Grove (Row River)
F = Cottage Grove (Prather Creek)
G = Cottage Grove (Laying Creek)



Existing Stream Channel Condition

The condition of the stream channel has a significant effect on downstream water quality parameters, and various beneficial uses. Because of the variety of beneficial uses within each analytical watershed, shown in Tables 3-W-12 and 3-W-13, Appendix 3-D, there is no one 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.

The effects of the Riparian Ecosystem on water resources are described in the riparian section of this chapter and in Appendix 3-C. 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-W-5 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 can significantly affect stream channels. There is 1 mining notice issued on the Calapooia River and 5 notices on Sharps Creek.

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 3-C). 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-W-6 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 ORVs, can cause compaction and sedimentation. Increases in sedimentation have occurred from heavy ORV 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 Assessment Report. Table 3-W-14 (Appendix 3-D) 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, were designated as A1. A2 streams are those where conflicting reports on water quality and beneficial use impairment have yet to be

Table 3-W-5 - Scoured Streams

Stream Name	Stream Order	Analytical Watershed	Date	Miles
		Debris Torrent		
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
		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 R.Tribs.	2-4	Upper Siuslaw River		
Row River Tribs.	3-5	Row River		

Table 3-W-6 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

Table 3-W-7 - 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 R.	M1	M1	M1				M1			M1	M2	M1	M1			A1
151 Mohawk River	S2									M2	S2					A1
164 Will., C. Fk		M2					M1	S1		M2		M2			S1	A1
181 Amazon Creek			S2	M1		S2	M1		S2	M1			S2	M1	S2	A1

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		
Solids	Objectionable Discoloration, Scum, Oily Slick or Film, Floating Solids		

S1 = Severe problem, data	M1 = Moderate problem, data
S2 = Severe problem, observation	M2 = Moderate problem, observation
S3 = Severe problem, perception	M3 = Moderate problem, perception

Table 3-W-8 - Temperature Monitoring Results

Creek Name	Analytical Watershed	Maximum Temperature	Predicted* Temperature
Wolf Creek	Wolf Creek	68	
Shotgun Creek	Mohawk River	62	
Bear Creek	McKenzie River	60	
Bear Creek Trib.	McKenzie River	57	57
Little Fall Cr.	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 R.	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

*Predicted temperatures were either measured above a timber sale or the temperature was calculated as if no shade had been removed.

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 (Trail Creek, Calapooia River, Mohawk River, Coast Fork Willamette River and Amazon Creek). Table 3-W-7 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 TMDLs 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. TMDLs and other limits on water pollution are essentially limits on human activities in a watershed. This means that setting TMDLs 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. Water quality limited streams are reported in the Draft 1990 Water Quality Status Assessment Report. As of 1990 no streams in the operating area have been designated as water quality limited.

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-W-8. 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 eight 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 2/100ml to 1000/100ml 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-W-9 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-W-10 shows the average sediment rate before, immediately after and one year after a slide. These averages are for a one week period 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, 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-W-11 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 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. Figure 3-W-1 show the watershed condition indexes for each of the

Table 3-W-9 - Sediment Rates

Stream	AWS	Turbidity (NTU) MAX	Turbidity (NTU) 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 & 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

Districts analytical watersheds. These indexes were derived by rating each of the parameters that are known to affect watershed conditions in Western Oregon. The method and rationale for deriving the Watershed Condition Index (WCI) is documented in Appendix 3-E.

These indices were calculated for areas that are primarily forest lands. In watersheds that have large areas of nonforest lands, the nonforest lands were not included in the calculations. These watersheds and the percent of nonforest lands are: Willamette River 69 percent, Coast Fork Willamette River 34 percent, McKenzie River 8 percent, and Middle Fork Willamette River 18 percent. In addition, all watersheds have some agricultural and developed lands mixed in with the forestlands. The watersheds surrounding the Willamette Valley have the most nonforest lands included in the analysis.

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 summers, higher stream temperatures, and more sediment and more toxic pollution than on forestlands. 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 forestlands) is even greater on nonforestlands where vegetation removal, and the disturbance of stream channels can cause high erosion rates (see Table 3-W-9). Toxic substances and sewerage is seldom found on forestlands; however, nutrients, heavy

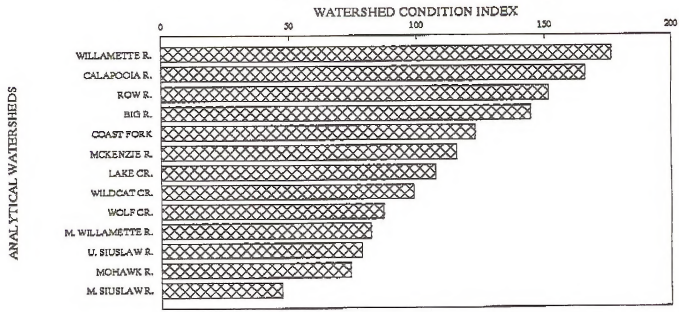
Table 3-W-10 - Sediment Rates from Mass Wasting Events

	Preslide Avg. Sediment (Mg/L)	Immediately Postslide Average Sediment (Mg/L)	One Year Postslide Average Sediment (Mg/L)
Bear Creek	18	128	29
Marten Creek	35	216	26

Table 3-W-11 - Walker Creek Slide Monitoring Results

DATE	Walker Cr. Above Sed(MG/L)	Walker Cr. Above Turb(NTU)	Walker Cr. Below Sed(MG/L)	Walker Cr. Below Turb(NTU)	Wildcat Cr. Above Sed(MG/L)	Wildcat Cr. Above Turb(NTU)	Wildcat Cr. Below SED(MG/L)	Wildcat Cr. Below TURB(NTU)
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	N/A	N/A	N/A
11/02/88	36	7.0	38	7.0	N/A	N/A	N/A	N/A

FIGURE 3–W–1



metals, toxins, oil and grease, high sediments, and trash have all been a problem in the Eugene/Springfield area.

Watershed condition indexes are highest for those analytical watersheds with a high proportion of nonforest lands. Another common factor in the watersheds with a high WCI 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 forestlands, 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 has the highest WCI 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 has the lowest WCI 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 conditlon 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 recently been cut. The topography and soils are not highly prone to landslides, and flooding is less likely due to relatively low flows. The DEQ Non-Point Source Pollution Assessment Report designated the Mohawk River as A1 because of high observed turbidities and low summer flows.

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 about 18 percent of the land in the watersheds, and because BLM management practices are among the less disruptive.

Biological Diversity

Introduction

Biological diversity is the variety of life and its processes. This discussion focuses on the concepts and components of biological diversity and their interrelationships. It covers the following focal components: species diversity, genetic diversity, ecosystem diversity, and landscape diversity.

Human activity has always had an affect on the natural environment of the planning area and, in the past 150 years, the effect has been greatly accelerated. The forestlands have been particularly affected by fire suppression and logging. The history of logging, beginning in the early 1900s, has varied. In the planning area, approximately 67 percent of the suitable commercial forestland on BLM administered land consists of young even-aged stands less than 55 years old, which resulted from clear cutting. 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. Therefore, the discussion of biological diversity emphasizes forestland and, specifically, old growth (for a brief historical perspective of Western Oregon forests see Appendix 3-L).

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 minimum 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-BD-1 displays tree species composition by age strata by sustalned 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. 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. The acres of various major

Table 3-BD-1 - 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%

forest plant groupings occurring on BLM administered lands in the District are shown in Table 3-V-2 (see Vegetation section). Their distribution is shown on Map 3-V-1.

Native American cultures affected the distribution of plant and animal species through hunting and the use of fire. White 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, diseases and insects that have significantly affected the range and distribution of some species.

Animal species diversity varied in patterns similar to plant diversity. Many animal species were associated with specific plant communities; therefore, they varied 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 have led to changes in animal communities.

Genetic Diversity

Genetic diversity in forest trees is defined as the variation within and among populations of a species. All differences among trees are the result of three things: the genetic differences, the differing environments where the trees grow, and the interactions between these two (Zobel, 1984). A population of trees is a dynamic system because gene frequencies and likewise the environment change over time. 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 tree.

Genetic diversity is maintained by having members of a species living in a broad geographical area under a variety of conditions. Adaption to localized conditions aids in gene selection. By maintaining connectivity among populations and individuals, the species is able to keep a diversity of genes in the species gene pool and prevent isolation and loss of diversity.

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 genetic diversity. Planting any type of stock will change the genetic makeup of the local population from what would have been there if natural seeding had occurred. For example, planting genetically selected disease resistant stock will improve the diversity and the likelihood that the trees of that species will survive, but it may reduce the diversity of other species on that site. Planting nonlocal stock may increase diversity but likely reduce the ability of the trees to survive. 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 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 with 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 2-D for further discussion.

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, riparian areas, or upland meadows are examples of ecosystems. Ecosystems can be subdivided into local communities.

Classification of communities into plant associations is incomplete on BLM administered land but, for purposes of the RMP/EIS, plant communities with similar characteristics have been aggregated into major plant groupings, discussed previously.

Special and unique ecosystems provide another component of ecosystem diversity. These include wetlands as well as plant communities of rockland and talus slopes (see Vegetation, Special Areas, and Water sections).

Plant and animal species in natural ecosystems vary by seral stage (see Vegetation section). Early seral communities usually have the largest number of higher (vertebrate) animal species and high representations of sun-tolerant, pioneer plant species such as grass. As succession progresses, the number of species declines and the species present change. In forest communities, species diversity increases again as the old growth stage is approached, but the species mixture differs from the early and mid seral stages. The old growth stage supports shade-tolerant plant species and tends to be the richest in insect species, lichens, fungi, and micro-flora and fauna. The large trees support and shelter these organisms with favorable temperature and moisture regimes. There are greater amounts of nonliving organic material at the old growth stage.

Under natural conditions, a diversity of communities occurs over the landscape. Each plant community has its associated animal community. Both evolve over time as the forest community progresses through its seral stages. Animal communities change as species move into and out of plant communities. Proximity to the full range of seral stages facilitates such movements. Older communities serve as a genetic 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 forestland, which is at least 10 percent stocked with trees 200 years or older in stands that are 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 was developed by U.S. Forest Service (USFS) researchers (Old Growth Definition Task Group, 1986). Definitions for individual series currently are being prepared. BLM has no specific mature/old growth inventory showing what stands meet the USFS old growth definition; however, an inventory has been initiated.

Structure in an ecosystem or community is the relationship of physical size, height and vertical stratification of vegetation. It relates to ecological processes such as nutrient cycling, nitrogen fixing, forest succession, incorporation of organic matter into soils, and predator-prey relationships.

The most obvious differences between seral stages are differences in stand structure, e.g., trees, snags, fallen trees, which create habitat for a variety of organisms and influence nutrient cycling and other functional processes. Structures retained from later seral stages to the early seral stage serve as biological legacies. In unmanaged forests, such retention varies between stands.

Structural diversity is lower during the mid and late seral stages of natural stands than during other stages of successional development (Franklin and Dyrness, 1973; Long, 1977; Franklin et al., 1981). Younger managed stands have the lowest structural diversity due to timber harvest, which removed most dead trees and down logs. Harvesting in recent decades left these components, but at levels below that occurring after natural disturbance.

Table 3-BD-2 - Structural Characteristics

Seral Stage	Average Diameter[1] (Inches)	Average Diameter[2] (Inches)	Average TPA[4] Over 30 Inches[3]
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
[3] = all live trees
[4] = trees per acre

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 newer trees. As wood breaks down it forms a 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 turn, help process the organic matter releasing the nutrients and aiding in growth of the forest.

Vertical diversity is provided by tree heights and canopy layers as shown in Table 3-BD-2. 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 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 reproduction begins in the gaps. Disturbance frequency and severity is the primary determinant of gap formations in an ecotype (Spies, Franklin and Klopsch, 1990).

The death and fall of canopy trees determines the structure and dynamics of forest ecosystems. Snags provide habitat for cavity users (see Wildlife section). Dead and down woody material provides habitat for many species including decomposers that are considered critical to the overall health of the forest. Average dead and down material is summarized in Table 3-BD-3.

Of all the functional mechanisms responsible for shaping forest communities, disturbance events are particularly significant. These events reset plant succession in entire stands or in patches and prevent succession from continuing to a true climax on most sites. They include wildfire, windthrow, insect attack, and tree disease. 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.

Table 3-BD-3 - Dead and Down Material (Conifer Stands)

Seral Stage	Age Class (Years)	Per Acre Down Logs (Tons) by Diameter Class 7-17.9"	18-29.9"	30+"	Total
Early Seral	0 - 15	4.06	10.37	10.40	24.84
Mid Seral	16 - 45	5.62	11.78	12.48	29.88
Late Seral	46 - 95	4.71	11.18	9.71	25.65
Mature	96 - 195	4.05	7.73	11.44	23.22
Old Growth	196+	5.47	10.67	27.22	43.36

Fire suppression, starting in the 1920s, has progressively reduced the size of wildfire. Fire exclusion has led to development of dense underbrush and increased occurrence of shade-tolerant climax species (Stewart, 1986). It has also resulted in the encroachment of trees into grassy balds and meadows (Vale, 1981). In the last ten years there have not been any stand-replacing wildfires on BLM administered lands in the planning area.

Landscape Diversity

Landscape diversity is the geography of the size, shape, and connectivity of different ecosystems across a large area. For example, a landscape interspersed with grasslands, shrublands, meadows, ponds, streams, wetlands, and forests has greater biological diversity than one with a broad expanse of grassland. Forest diversity may be described in terms of the arrangements of stands within a watershed or larger area, or the arrangement of patches within a stand.

Prior to white settlement, older forest ecosystems were intermixed with younger and mid-age forest ecosystems in a continuous network of habitat in western Oregon forestland. It is estimated that old growth forests occupied at least 50 percent of the original landscape, perhaps less in the more fire prone interior valley and foothills forests (Andrews and Cowlin, 1940). The location of existing mature and old growth stands are shown on Map 3-V-1.

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. Clear cuts tend to be spread across the landscape and average 10 to 40 acres in size.

The size of old growth patches and the seral stage of adjacent stands have been shown to affect the quality of habitat, which exists within old growth patches. All smaller patches and those portions of old growth stands close to the edge of an early seral block are subject to a variety of external influences that substantially reduce their effectiveness as old growth habitat. These influences include wind, sunlight, temperature, and predation from species inhabiting adjacent lands. Thus, effective interior old growth habitat is substantially less than actual old growth acres (Harris, 1984). Most studies identifying the extent of such influences have occurred outside the Pacific Northwest. Harris concludes that edge effects extend approximately 600 feet into old growth stands from adjacent clear cuts due to changes in environmental parameters such as light, temperature, and relative humidity. 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-BD-4. 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-V-1 (Vegetation). Harris (1984) suggests that this habitat fragmentation has substantially reduced the population of forest interior animal species such as fishers, wolverines and lynx.

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

Table 3-BD-4 - Existing Older Forest Block

Block Size (acres)	Old Growth (Age 200+) No. of Blocks	Total Acres	Old Growth and Mature Combined No. of Blocks	Total Acres	Interior Old Growth Habitat No. of Blocks	Total 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

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.

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, such as fire, and windstorms and human caused, such as 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, which is dominant in most existing stands, western hemlock and western red cedar, which 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 associations within this zone have been classified into five major plant groupings. A major plant grouping is an aggregation of plant associations 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 have been described for each major upland 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 managed 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 four 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 (see Table 3-V-2). 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, the Eugene District will lose vegetative diversity.

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. Fires are at times intense enough to force succession back to the early seral stage. At other times, fires destroy only understory vegetation, leaving overstory tree species intact. Understory fires often burn in a mosaic fashion and contribute to the maintenance of a subclimax condition in the old growth seral stage. The degree to which succession is disrupted is generally proportional to the intensity of the fire.

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 NE 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 more often affect localized areas. These diseases and treatments are described in the Timber Resource section of the 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 that are more 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, reducing the time it takes to reach CMAI. Salvage removal can affect the biotic diversity of a stand by contributing to the simplification of habitat.

Table 3-V-1 - 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-V-2 - Acres of Plant Groups in Each Seral Stage

Plant Grouping (years)	Early Seral (0-15)	Mid Seral (16-45)	Late Seral (46-95)	Mature (96-195)	Old Growth (196+)	Total
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

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.

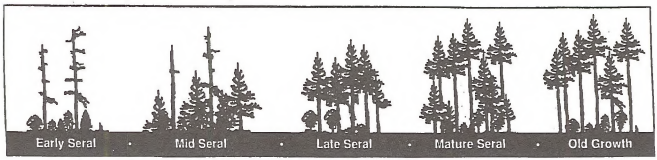
New Perspective of Seral Stages

Figure 3-V-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. 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. Therefore, we could also describe the seral stages as follows:

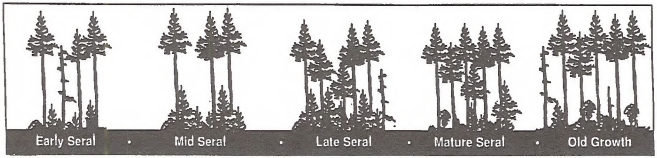
Succession Following Natural Catastrophic Stand Replacement: The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings

Natural, Catastrophic Stand Replacement



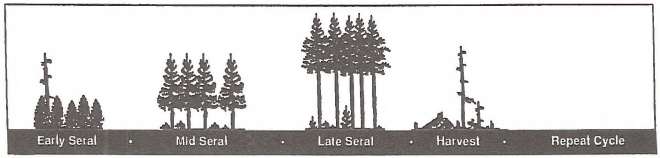
The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings (and very few living trees which serve as a seed source). Succession progresses in a more or less even-aged sequence, with vertical and fine grained diversity developing in the mature seral state and being fully expressed in the old growth stage.

Natural, Partial Stand Replacement

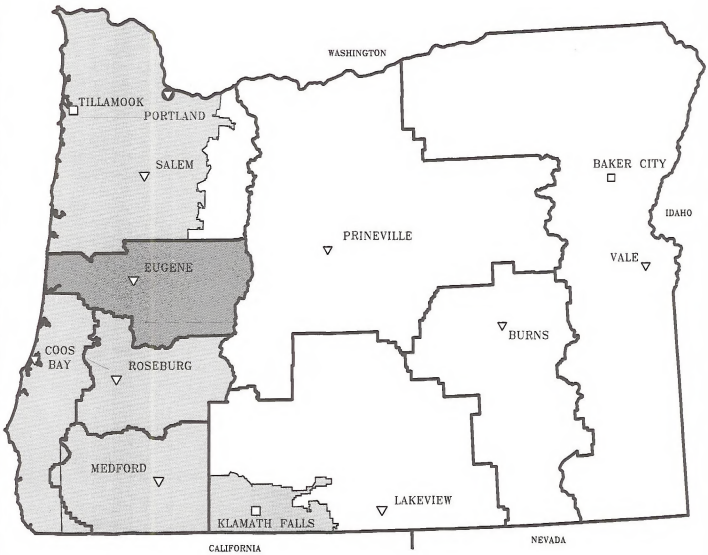


This succession path is very common in southwestern Oregon. The first seral stage consists of a patchwork of surviving green overstory trees, dead trees, and down trees. Patchescontain young conifers, forbs, and hardwoods. Development is uneven-aged and patchy with vegetation developing in the understory 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.



BLM State Office

BLM District Office

BLM Resource Area Office

District Boundary

Planning Area Boundary

Eugene Planning Area

Other Western Oregon Resource Management Planning Areas

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

EUGENE DISTRICT

MAP 1

GENERAL LOCATION EUGENE PLANNING AREA

(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 patch 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 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.

Dominant seral vegetation for each grouping is shown in Table 3-V-1. Acres of major plant groupings and seral stages are shown in Table 3-V-2. Map 3-V-1 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 locations, and may be considered unique ecosystems. The majority of the District's 11 special status plant species are found in these unique ecosystems.

Fire and other human activity have played a major role in plant succession. This role is described in the Biodiversity 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 floodplain. 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 (Boone, 1988). The plant diversity of the riparian zone is generally greater than that of dryer 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 establishment 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 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 be prevented from occurring.

Under common conditions, conifers (western red cedar, hemlock, and Douglas-fir) dominate riparian overstories in small V-shaped drainages, while deciduous trees (red alder, bigleaf maple, black cottonwood, and Oregon ash) gradually become more dominant in overstories as streams increase in size. Understory trees (vine maple), herbs and shrubs are generally more abundant in riparian areas than in upland communities. (See figure 3-R-1) Prior to settlement by nonnatives in the mid-1800s larger 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, which stabilize streams into a single, well defined channel, facilitate settling of streams and river bottoms. The broad riparian areas were nearly all converted to urban and agricultural use. Road building and logging, particularly hi-grading and splash damming, removed natural conifer riparian communities along larger streams and rivers, which 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 3-C.

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, and cover, and stabilize substrates, creating 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

Table 3-R-1 - Existing Conditions of Riparian Zones on BLM Administered Lands

	Acres of Each Condition Class I[1] by Stream Order				
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
L	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 3-F for explanation of the rating system.

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; provide streams with large woody debris that insures 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 and 532 miles of 3rd order and greater 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-W-1). Riparian zones associated with these 3rd order, and larger streams total 12,922 acres. 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 on 68 acres bordering ponds, lakes, and reservoirs and 4,568 acres of permanent wetlands. The riparian zones comprise 4.5 percent of the land base or 14,126 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).

The seral stage and species composition of riparian habitat profoundly influence the functions discussed above. All hydrological functions operate better in older seral stages. A higher percent of coniferous species provides large woody debris to streams for the function of dissipating energy, trapping sediments, and increasing water storage.

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.

The existing conditions of riparian zones associated with 3rd order and larger streams are displayed in Table 3-R-1. 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.

Grazing

Livestock grazing is a minor activity occurring on the Eugene District. A total of six grazing permits are issued annually (short-term permits) to six permittees for a total authorized use of 109 cows or 504 AUMs (Animal Unit Months[1]). This use encompasses 10,540 acres of BLM administered lands and occurs primarily in newly reforested areas where grass/forb plant communities exist until Douglas-fir trees dominate. Average use for the past five years (1987-1991) has been 364 AUMs per year.

[1] AUM = 1 cow + 1 calf <6 months old grazing for one month.

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-F-1). 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 invertebrate and amphibian species utilize the waters in the planning area, but very little is known of their distribution or habitat use at this time. The District is currently conducting an initial inventory of amphibians.

There are 533 miles of perennial water in the planning area. Two Hundred Seventy-five miles have resident trout and 187 miles are used by anadromous salmonids (See map 3-F-1 and Table 3-F-2). Sixty-seven miles of potential anadromous salmonid habitat 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 non-native fishes are found mainly in the larger streams and rivers.

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 percent in good condition (See Appendix 3-F). The term "wild fish" refers to naturally-spawning populations. 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.

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 non-native 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 ten years has allowed recovery of riparian communities and stream channels to begin. Full recovery is not expected for 200 years. As riparian and stream channels continue to improve, the productive potential of fish habitat will also improve.

Wildlife

About 212 vertebrate wildlife species (excluding fishes) are known, or are believed to regularly inhabit the forestlands, and intermingled non-forest lands, within the planning area. Of these, 28 are reptiles and amphibians, 120 are birds, and 64 are mammals.

Of the above wildlife species, 95 are considered priority species because they are game animals, or they occupy habitats vulnerable to intensive timber management activities as practiced over the last 50 years. These species are listed in Table 3-WL-1 along with information identifying their vulnerable habitats and species-related limiting factors.

Each of the priority species requires a specific set of habitat conditions that may be found within one or many of the plant communities and seral stages, which occur within the planning area. As explained in the Vegetation section of , 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

Table 3-F-1 - Fish Species in Eugene Planning Area Streams

Salmonids	
Coho salmon	*Oncorhynchus kisutch*
Kokanee (Sockeye salmon)	*Oncorhynchus nerka*
Chinook salmon	*Oncorhynchus tshawytscha*
Oregon chub	*Oregonichthys cramari*
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*
Oregon chub	*Oregonichthys crameri*
Peamouth	*Mylocheilus caurinus*
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.*

Table 3-F-2 - 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

Salmon in Fish Creek. Photo by Doug Huntington.

example, species richness within an area is a function of the number of seral stages present, the size of habitat islands that make up the habitat mosaic, and the spatial distribution of these habitat islands.

Also described in the Vegetation and Biodiversity sections in Chapter 3, seral stages are always changing and progressing toward their climax stage. Plant communities in western Oregon normally progress toward a climax seral stage dominated by a western hemlock forest. Under natural conditions, given enough time, every acre of forest habitat would be returned to the early seral stage as a result of wildfire. Human-related disturbances such as logging, and conversion of forestland to other uses, have seriously reduced the amount of remaining older seral stage habitat, and fragmented it into very small islands (see Biodiversity section).

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 & Stokes, 1980; Bruce et al., 1985; Brown, 1985, Appendix 8; Carey et al., 1991; Gilbert & Allwine, 1991 a & b; Corn & 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 varied thrush, chestnut-backed chickadee, and red-breasted nuthatch are examples of interior forest species; the red-tailed hawk, golden eagle, and Roosevelt elk are examples of species that use old and young seral stages to meet all life needs.

Currently, old growth represents less than 14 percent of the forest land base on BLM administered lands. Considering that the intermingled private forestlands are essentially devoid of old growth, dependent wildlife species are confined to less that 7 percent of the total acres within the forest landscape encompassing the area where BLM administered lands are concentrated. 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).

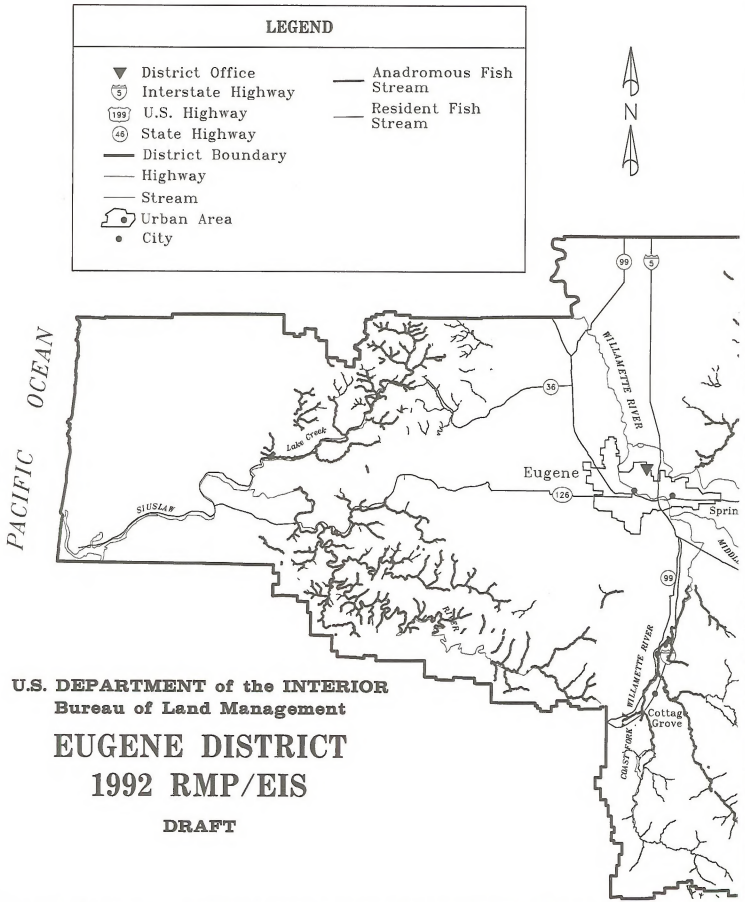
As a result of this conversion, wildlife species requiring older seral stage forests have been replaced by those species adapted to younger ones. For example, clear cutting mature and old growth coniferous forests has reduced the amount of optimum habitat for species such as the northern spotted owl, 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.

Early, mid, and late seral stage conifer forests comprise the dominant habitat on BLM administered and private lands within the planning area. Wildlife problems associated with these habitats are directly related to structural and microclimate characteristics, landscape patterns, water quality, and extent of road construction. These are briefly described as follows:

Standing dead trees (snags) are of special concern because they provide primary habitat for many species of animals (Neitro et al., 1985; Schreiber, 1987; Brown, 1985, Appendix 18). Of the 95 priority wildlife species within the area occupied by BLM administered lands, at least 36 (38 percent) are dependent upon standing dead trees (or decadent green trees with cavities) for one, or more life needs (see Table 3-WL-1). 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).

Snag retention practices on BLM administered lands are currently less than sufficient to maintain viable populations of cavity users over the long-term (USDI, 1983; ODFW, 1990). 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, for example, show that BLM timber harvest areas 0 to 15 years in age have an average of .59 snag per acre greater than 11 inches dbh, and the 16 to 45 year age class have 1.08 snags per acre. The mature and old growth stands, however, have 10.13 and 6.12 snags per acre, respectively. The more relevant comparison, however, is with conditions that occur naturally following forest fires where large numbers of standing green trees are converted to snags.

The current BLM timber management plan requires retention of one snag, or green tree, at least 20 inches dbh by 50 feet tall on 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 in 1983 (USDI, 1983). When all ownerships are



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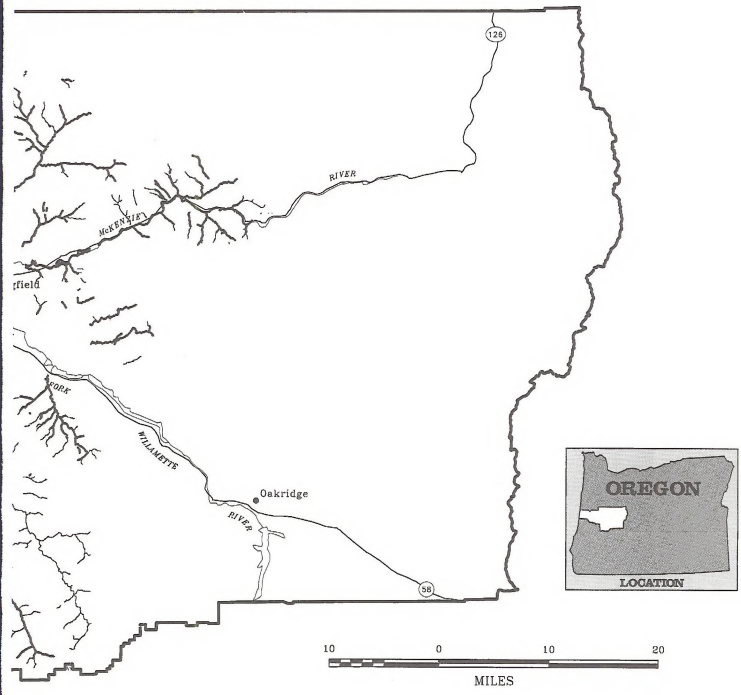
MAP 3-F-1: FISH-BEARING STREAMS


126
RIVER
McKENZIE
rfield
FORK
WILLAMETTE
RIVER
Oakridge
58
OREGON
LOCATION
10
0
10
20
MILES

Lake Creek Falls Fish Ladder - (low water level).
Photo by Doug Huntington

Lake Creek Falls Fish Ladder - (high water level).
Photo by Doug Huntington

Table 3-WL-1 - Priority species in the Planning Area[1]

Common Name	Scientific Name	Vulnerable Habitats & Limiting Factors[2]
amphibians		
Pacific giant salamander	*Dicamptodon ensatus*	DD,LM,CM,HD,RA,HW,OR
Olympic salamander	*Rhyacotriton olympicus*	LM,WQ,CM,SH,HW,OR
clouded salamander	*Aneides ferreus*	DD,LM,CM,HD
Oregon slender salamander	*Batrachoseps wrighti*	DD,CM,OF
Dunn's salamander	*Plethodon dunni*	DD,LM,CM,WQ,SH,OF
tailed frog	*Ascaphus truei*	WQ,LM,HW,OR
Northern red-legged frog	*Rana aurora*	LM,WQ,SH,RA,OR
heron/ducks		
great blue heron	*Ardea herodias*	LT,SE,OF,JX
wood duck	*Aix sponsa*	TC,DT,HD,OR,JX
harlequin duck	*Histrionicus histrionicus*	TC,DT,WQ,OR,JX
hooded merganser	*Lophodytes cucullatus*	TC,DT,JX
common merganser	*Mergus merganser*	TC,DT,OR,JX
marbled murrelet	*Brachyramphus marmoratus*	LT,OG
raptors		
osprey	*Pandion haliaetus*	DT,OR,JX
bald eagle	*Haliaeetus leucocephalus*	LT,OF,JX,SE
sharp-shinned hawk	*Accipiter striatus*	DS
Cooper's hawk	*Accipiter cooperii*	DS
northern goshawk	*Accipiter gentilis*	OF
red-tailed hawk	*Buteo jamaicensis*	LT,OF,JX
golden eagle	*Aquila chrysaetos*	LT,OF,JX
American kestrel	*Falco sparverius*	TC,DT,JX
peregrine falcon	*Falco peregrinus*	SH,SE,JX
western screech owl	*Otus kennicottii*	TC,DT,HD,OR
northern pygmy-owl	*Glaucidium gnoma*	TC,DT,OF
spotted owl	*Strix occidentalis*	TC,OF
barred owl	*Strix varia*	TC,OF
northern saw-whet owl	*Aegolius acadicus*	TC,OF
upland game birds		
ruffed grouse	*Bonasa umbellus*	HD,RA,OR
wild turkey	*Meleagris gallopavo*	HD,OF
California quail	*Callipepla californica*	HD
mountain quail	*Oreortyx pictus*	HD
band-tailed pigeon	*Columba fasciata*	HD,SH,OF,JX
mourning dove	*Zenaida macroura*	HD
swift/woodpeckers		
Vaux's swift	*Chaetura vauxi*	TC,DT,OF
red-breasted sapsucker	*Sphyrapicus ruber*	DT,OR
hairy woodpecker	*Picoides villosus*	DT,HD,OF
northern flicker	*Colaptes auratus*	DT,HD,OF
pileated woodpecker	*Dryocopus pileatus*	DT,OF
passerines		
olive-sided flycatcher	*Contopus borealis*	HD,OF
western wood-pewee	*Contopus sordidulus*	HD,OF
Hammond's flycatcher	*Empidonax hammondii*	HD,OF
western flycatcher	*Empidonax difficilis*	HD,RA,OF
purple martin	*Progne subis*	TC,DT
tree swallow	*Tachycineta bicolor*	TC,DT
violet green swallow	*Tachycineta thalassina*	TC,DT,SH
gray jay	*Perisoreus canadensis*	OF

Table 3-WL-1 - Priority species in the Planning Area[1] (cont.)

Common Name	Scientific Name	Vulnerable Habitats & Limiting Factors[2]
Steller's jay	*Cyanocitta stelleri*	OF
common raven	*Corvus corax*	HD,OF
chestnut-backed chickadee	*Parus rufescens*	TC,DT,OF
red-breasted nuthatch	*Sitta canadensis*	TC,DT,OF
brown creeper	*Certhia americana*	TC,DT,OF
winter wren	*Troglodytes troglodytes*	DD,OF
golden-crowned kinglet	*Regulus satrapa*	HD,RA,OF
ruby-crowned kinglet	*Regulus calendula*	OF
western bluebird	*Sialia mexicana*	TC,DT
Swainson's thrush	*Catharus ustulatus*	RA,OF
hermit thrush	*Catharus guttatus*	OF
varied thrush	*Ixoreus naevius*	OF
solitary vireo	*Vireo solitarius*	HD,OF
Townsend's warbler	*Dendroica townsendi*	OF
hermit warbler	*Dendroica occidentalis*	OF
western tanager	*Piranga ludoviciana*	HD,OF
purple finch	*Carpodacus purpureus*	HD,OF
red crossbill	*Loxia curvirostra*	OF
pine siskin	*Carduelis pinus*	RA,OF
evening grosbeak	*Coccothraustes vespertinus*	OF
bats		
big brown bat	*Eptesicus fuscus*	TC,DT,DD,HD,SH,OF
silver-haired bat	*Lasionycteris noctivagans*	TC,DT,HD,SH,OF
hoary bat	*Lasiurus cinereus*	HD,OF
California myotis	*Myotis californicus*	TC,DT,DD,HD,SH,OF
long-eared myotis	*Myotis evotis*	TC,DT,HD,OF
little brown myotis	*Myotis lucifugus*	TC,DT,SH,SH,OF
long-legged myotis	*Myotis volans*	TC,DT,DD,HD,SH,OF
Yuma myotis	*Myotis yumanensis*	TC,DT,DD,HD,SH,OF
carnivores/furbearers		
gray fox	*Urocyron cinereoargenteus*	DD,HD,RA
black bear	*Ursus americanus*	DD,SH,SE,OF
raccoon	*Procyon lotor*	TC,DD,HD,RA
marten	*Martes americana*	TC,DD,OF
fisher	*Martes pennanti*	TC,DD,SH,OF
mountain lion	*Felis concolor*	SH,OF
bobcat	*Lynx rufus*	DD,SH
Cervids		
elk	*Cervus elaphus*	HD,OF,SE,JX
black-tailed deer	*Odocoilesu hemionus*	JX
insectivores/rodents		
Pacific water shrew	*Sorex bendirii*	OR
dusky shrew	*Sorex montocolus*	RA,OF
Trowbridge's shrew	*Sorex trowbridgi*	RA,OR
shrew - mole	*Neurotrichus gibbsii*	RA,OF
northern flying squirrel	*Glaucomys sabrinus*	TC,DT,OF
western gray squirrel	*Sciurus carolinensis*	TC,DT,HD
Townsend's chipmunk	*Tamias townsendii*	DD,SH,HD
Douglas squirrel	*Tamiasciurus douglasi*	TC,DT
bushy-tailed woodrat	*Neotoma cinera*	TC,DD,RA,SH,OF
deer mouse	*Peromyscus maniculatus*	DD,HD,SH,OF

Table 3-WL-1 - Priority species in the Planning Area[1] (cont.)

Common Name	Scientific Name	Vulnerable Habitats & Limiting Factors[2]
red tree vole	*Arborimus longicaudus*	OF
western red-backed vole	*Clethrionomys californicus*	DD,OF

[1]Includes species known, or believed, to regularly occur on forestlands, and intermingled non-forest lands (within the area where BLM administered lands are concentrated) that are either game species, or high interest species. High interest species are those that are apparently dependent upon, or closely associated with, habitats that are vulnerable to intensive timber management practices. Species that are generally limited to the high Cascades, non-forest habitats of the Willamette Valley, and marine environments are not included.
[2]Information derived from Brown, 1985, Appendices 8, 19, & 20, with limited modifications based on more recent literature and local observations. Symbols identify (1) primary habitats vulnerable to intensive timber management, and (2) species-related limiting factors identified by District biologists:

TC = Cavity in tree (live or dead) required for reproduction.
DT = Dead tree (snag) primary habitat for foraging, or reproduction.
LT = Large (green) tree/limbs required for nest substrate.
DD = Dead and down trees primary habitat (essential for some species) for one, or more, life needs.
WQ = High water quality (cold and clear) essential life requirement.
CM = Cool, moist microclimate essential life requirement.
DS = Densely stocked stands of mid and late seral conifers required for 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 (Brown et al., 1985, Appendix 8) are primary habitat for one, or more life needs.
RA = Red alder forest (pole-size and older; Brown et al., 1985 Appendix 8) is primary habitat for one, or more, life needs.
SH = Special (unique) habitats essential for one, or more, life needs.
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).
JX = Juxtaposition of two, or more, habitats required as primary habitat for all life needs.
LM = Small creatures with low mobility and their habitats overlap potential timber harvest areas during critical periods of life cycle.
SE = Secretive species - highly sensitive to human intrusion - at least during critical periods of life cycle, or in crucial portions of home range.

considered, current snag retention levels for the entire BLM operating area are estimated to provide for less than 9 percent of woodpecker populations. The recently enacted revised State Forest Practices Act requires a minimum of 2 snags, or green trees, at least 11 inches dbh by 30 feet tall be left on all State and private lands following timber harvest. Eleven (11) inch dbh snags are, however, below recommended minimums for over 95 percent of all cavity-using species that occur within this area (Brown, 1985, Appendix 9).

The dearth of snags left in timber harvest areas may have established a trend where species capable of using early and mid seral stages, given the presence of snags, are becoming obligates of the remaining mature and old growth for one or more life needs, ie., these are the only habitats with sufficient numbers of usable snags. The northern flicker and raccoon are probable examples of this phenomenon. However, some species require snags within the early, or mid, seral stages. Since they are not adapted to the interior of older forests (including small islands), snags within such habitats are unavailable. Examples of these species include the western bluebird and purple martin (see Special Status Species section).

As discussed in the Biological Diversity section, large volumes of dead and down woody material play several important ecological roles in the forest ecosystem, and concerns have recently been expressed about the ecological effects of removing excessive amounts of it 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 & Trappe, 1984; Bartels et al., 1985; Brown et al., 1985 , Appendices 8 & 20; Maser et al., 1988; Corn & Bury, 1991 a & 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. 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.

Wildlife that decline with the loss of 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 & Trappe, 1984; Maser et al., 1988). Large, heavily decayed material that retains moisture through the dry period is important for animals such as the clouded salamander (see Special Status Species section). Also, the progressive loss of large fallen trees (dead and down material) may be decreasing 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 212 forest related species that occur in the portion of the planning area where BLM lands are concentrated, dead and down woody debris is primary habitat for 61 species (29 percent) (Brown, 1985, Appendix 20). Of the 95 priority wildlife species, dead and down woody material is primary habitat for 19 species (20 percent).

Unique or special habitats such as cliffs, rock outcrops, grassy balds and talus provide elements of diversity within the forest ecosystem (Scharpf & Dobler, 1985). These habitats are widely scattered over the planning area, are of infrequent occurrence, and represent a very small portion of the total land base. They provide essential habitat for some species and add to the diversity of available habitats for others. The cliff swallow, for example, 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.

Timber harvest activities including road construction and yarding, and other activities such as quarry development, off-road-vehicle (ORV) use, and communications site developments have removed cover and created disturbances in many special 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. Of the 212 forest-related species at least 38 (18 percent) are closely associated with unique habitats (see Table 3-WL-1).

The presence of hardwood stands, and conifer stands with abundant hardwood trees, adds diversity to wildlife habitat (Huff & 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 & 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 (Eugene District AMS). Of the 212 forest-related wildlife species that occur within the area where BLM lands are concentrated, hardwood, conifer-hardwood, or red alder forests are primary habitat for 141 species (67 percent). All three of these vegetative types are primary habitat for 51 species (24 percent). Of the 95 priority species in Table 3-WL-1, hardwoods are primary habitat for 34 species (36 percent). Hardwoods are primary habitat for all of the District's upland game species.

Big game 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. Clear cut harvesting of timber in large areas results in these habitats being poorly interspersed for optimum elk use, and exposes the animals to increased disturbance from roads that are open to public travel (Witmer & Wisdom et al., 1985; Wisdom & Bright et al., 1986). Throughout the planning area both BLM and the intermingled private land owners have harvested timber at rapid rates. This activity has produced forage areas in great abundance and severely reduced high quality cover in a relatively short period of time. This is a "boom & bust" situation (for deer as well as elk) since rapid removal of the older forest has left little opportunity to produce additional forage after closed canopy conditions are re-established.

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 seems to be the result of an Oregon Department of Fish & Wildlife reintroduction program and normal animal response to a population vacuum 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 crucial wildlife areas to human-caused disturbances. Reduction of elk habitat potential caused by high road densities has been well documented (Witmer & Wisdom et al., 1985; Wisdom & 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 area where BLM administered lands are located is believed to be below its potential (USDI, 1983).

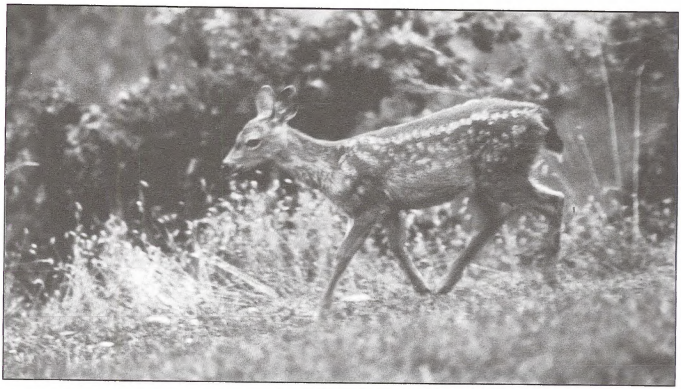
High road densities also present problems for other species. Noble, et al. (1990), recommended road closures for black bears, and the District has documented several instances of great blue herons abandoning their nests when timber sales, and associated roads, were located close to the rookeries (Eugene District AMS); high densities of roads open to public travel also subjects big game to poaching. For additional reference, see discussions of peregrine falcon and bald eagle in the Special Status Species section.

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, others appear to have lost these populations entirely (Applegarth, 1992). These species (see Special Status Species section) and the Olympic and Pacific giant salamanders are closely linked to small, headwater streams with high water quality (cold & clear) and cool, moist riparian zones (Applegarth, 1992; McComb, 1992). The District has estimated that less than 10 percent of all 1st & 2nd order streams on BLM administered lands remain in forest habitat 80 years old or older, and are undisturbed or minimally disturbed by upstream activities such as timber harvest or road condition. From a landscape perspective an even smaller proportion is undisturbed due to the generally larger proportion of other ownerships. Common characteristics of streams with low or non-existing populations of tailed and red-legged frogs include high stream siltation and the absence of forest cover over, and adjacent to, the streams and their riparian zones (Applegarth, 1992). Many streams on BLM administered lands cross lands of other ownerships upstream from BLM habitats and are, therefore, out of BLM's control relative to sedimentation.

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). The District is currently inventorying its lands for potential suitable habitat for these species.

Other species of raptors that inhabit forested areas within the planning area are associated with older forest habitats. Some, such as the goshawk and spotted owl, require relatively large tracts of older forest while others use a variety of vegetation types and forest seral stages; most, however, 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 described by Oakley et al. (1985) (also see the Riparian section), the diversity of habitat conditions provided by wetlands, including streamside riparian zones, makes them of paramount importance as



Blacktail Deer (fawn)

Roosevelt Elk -Photo by Aaron Reeves.

wildlife habitat. Because of this diversity these habitats are used by a large number of species. According to data presented by Brown et al. (1985, Appendix 8), the full range of wetland conditions are primary habitat for at least 150 of the 212 species of wildlife that occur within the portion of the Planning Area where BLM lands are concentrated. Also according to Brown et al. (1985), about 60 of these same species use stream-side riparian as primary habitat. As shown in Table 3-WL-1, older seral stage forest conditions are primary habitat for at least 13 of these priority species.

Special Status Species

BLM Special Status Species in Oregon include:

1. Federal threatened and endangered species
2. Federal proposed species
3. Federal candidate species (category 1 and 2)
4. State endangered, threatened, and sensitive species
5. Bureau sensitive
6. Bureau assessment

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 40,000 acres of the District have been surveyed for Special Status plants since 1980. Currently, Special Status species have been documented at 27 locations and approximately 500 acres are currently reserved for Special Status species. In some cases multiple resource values are protected within the plant reserve areas.

Special Status plant species occur in a variety of habitat types and plant associations within the Eugene District including high elevations meadows, lower elevation open forest ecosystems, Willamette Valley native prairie grasslands, rock outcrops, riparian areas, seeps, ponds and wetlands.

Special Status plant surveys occur prior to any planned ground disturbing activities, including timber sales, land exchanges, silvicultural projects, wildlife projects, quarry projects, proposed mining operations, etc. Inventory, research, and monitoring efforts have been implemented for Eugene's Federal Endangered plant species, Federal Candidate and Bureau Sensitive plants. Where Special Status species occur in planned project areas, sensitive 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 plant reserve. The Eugene District has worked closely with the U. S. Fish and Wildlife Service on a variety of projects concerning Special Status plant species.

During the reevaluation of Special Status plant species, several non-BLM parcels were identified as having Special Status plant species that could be looked at for possible acquisition or conservation easements, etc. Table 3-SSP-1 lists the Special Status plants that are known or suspected to occur in the planning area.

Grazing - There are no known threatened or endangered plant species in any of the grazing allotments, and there have been no surveys for plant species in these areas to date.

There is one Federally-listed Endangered species in the Eugene District, *Lomatium bradshawii*, Bradshaw's lomatium. Following is a brief overview of Federally Endangered, Federal Candidate and Bureau Sensitive Plant Species known to occur on the Eugene District.

Bradshaw's lomatium (*Lomatium bradshawii* (Rose) Math. & Const.)

Bradshaw's lomatium is presently listed by the U.S. Fish and Wildlife Service as an Endangered Species (1990 Federal Register Notice of Review). A draft recovery plan is presently being prepared by the U.S. Fish & Wildlife Service for this species. 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 Willamette Valley, Oregon, and is found in seasonally wet native grassland communities or along shallow streams. Lomatium populations within the Valley are restricted to less than 15 sites. Habitat for the species has declined due to urban and rural development and conversion of habitat into agricultural land. Natural successional development of grasslands to shrub and tree dominated sites has also probably 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 species.

The Eugene BLM manages one population of Bradshaw's lomatium. The importance of this site has been recognized by the District since 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, including the use of prescribed burning for habitat enhancement and maintenance of the Lomatium population, hydrological and soil characteristics within the native prairie and the population dynamics of Lomatium. Research and monitoring have been through cooperative agreements with State and private organizations interested in the recovery and long-term viability of this species. The BLM population at present appears to be stable.

Howell's Montia (Montia howellii Wats.)

Howell's montia is presently listed by the U.S. Fish & Wildlife Service as a Federal Candidate 2 Species (1990 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 and belongs to the *Portulacaceae* family. The historical range for the species extended from California to British Columbia. The species presently occurs at less than ten sites in the lower 48 States and 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.

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 also been identified such as possible limited seed bank, competition from native or introduced species, and alterations in habitat conditions limiting safe sites for seedling establishment.

Table 3-SSP-1 Special Status Plant Species - Known or Suspected

Botanical Name	Common Name	Status
Lomatium bradshawii	Bradshaw's Lomatium	FE; SE
Sidalcea nelsoniana	Nelson's checkermallow	PT; ST
Montia howellii	Howell's montia	FC
Frasera umpquaensis	Umpqua swertia	FC
Abronia umbellata spp. *breviflora*	pink sandverbena	FC; SE
Aster gormanii	Gorman's aster	FC
Aster vialis	wayside aster	FC
Castelleja levisecta	golden paintbrush	FC
Delphinium pavonaceum	peacock larkspur	FC
Erigeron decumbens var. *decumbens*	Willamette daisy	FC; SE
Howellia aquatilis	howellia	FC
Lupinus sulphureus ssp. *kincaidii*	Kincaid's lupine	FC
Aster curtus	white-topped aster	FC
Cimicifuga elata	tall bugbane	BS
Cypripedium fasciculatum	clustered lady's slipper	BS
Delphinium oreganum	Willamette Valley larkspur	BS
Horkelia congesta ssp. *congesta*	shaggy horkelia	BS
Limbella fryii	moss	BS
Nephroma occultum	lichen	BS
Oxyporus nobilissimus	giant polypore fungus	BS
Romanzoffia "thompsonii" sp. ined.	Thompson's mistmalden	BS
Agoseris elata	tall agoseris	AS
Astragalus umbraticus	woodland vetch	AS
Botrychium minganese	mingan grape fern	AS
Carex livida	pale sedge	AS
Erioderma sorediatum	lichen	AS
Hydrocotyle verticillata	pennywort	AS
Lophozia laxa	moss	AS
Lycopodium inundatum	bog club-moss	AS
Microcala quadrangularis	timwort	AS
Microseris bigelovii	coast microseris	AS
Mimulus tricolor	3-colored monkey flower	AS
Ophioglossum vulgatum	adder's tongue fern	AS
Pellaea andromedaefolia	coffee fern	AS
Poa laxiflora	loose-flower bluegrass	AS
Polystichum californicum	California sword-fern	AS
Utricularia gibba	humped bladder-wort	AS
Utricularia minor	lesser bladderwort	AS
Wolffia punctata	dotted water-meal	AS

FE = Federal Endangered species
PT = Proposed Threatened species
FC = Federal Candidate species
BS = Bureau Sensitive species
AS = Assessment Species species
SE = State Endangered species
ST = State Threatened species
Footnote: Special Status designations in Table 3-SSP-1 are dated through February 1, 1992.
Some status designations may change after this date.

Bradshaw's lomatium - Photo by Nancy Wogen.

The Eugene BLM manages one population of *Montia howellii*. Inventory, monitoring and research for this species started in 1989 and has continued in 1990 and 1991. A Special Area was established at this site in January, 1989. Approximately 4,000 additional acres have been inventoried specifically for *Montia howellii*. Several new populations were located during that effort. Research on this species has included studies on seed banking, disturbance ecology and data collection on the population dynamics of the species. Inventory, monitoring and research has been implemented through cooperative agreements with State and private organizations interested in the long-term viability of the species. The BLM population at present appears to be stable.

Wayside Aster (*Aster vialis* (Bradshaw) Blake)

The Wayside aster is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1990 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). *Aster vialis* is a perennial species and belongs to the *Asteraceae* family.

The species' historical and present range includes Lane and Douglas counties in Oregon. This species is most often found in low elevations in dry open woodland habitats. Historical fire suppression and the subsequent closure of forest stands probably reduced the habitat for this species as did 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, inbreeding depression, insect damage, and lack of flowering.

The Eugene BLM 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 all Eugene BLM Aster sites. Future management of these forest stands may be desirable for the long-term maintenance of this species and its habitat. Monitoring plots have been established at some of the 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 through cooperative agreements with various State and private organizations interested in the long-term viability of this species. At present, populations where monitoring plots have been installed appear to be stable.

Umpqua swertia (*Frasera umpquaensis* Peck and Appleg.)

Frasera umpquaensis is presently listed by the U.S. Fish and Wildlife Service as a Federal Candidate 2 species (1990 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). A draft BLM/U.S. Forest Service Interagency Habitat Management Plan/Species Management Guide for this species is presently being prepared to address the long-term management of this species throughout its range in Oregon. Frasera is a perennial species and belongs to the *Gentianaceae* family.

Wayside Aster - Photo by Nancy Wogen.

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 edges. The primary concentration for the species occurs in southern Oregon with several other populations being disjunct from this population center. Habitat has declined due to past forest management activities and probably the natural successional changes of meadow and meadow/forest edges to closed forest conditions. Other threats to the population have been identified such as low rates of seed germination, isolated populations, seed predation, and lack of seedling recruitment into some populations.

Umpqua Swertia - Photo by Nancy Wogen.

The Eugene BLM 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. Monitoring plots were established in 1991 as part of an interagency strategy to assess the species throughout its range in Oregon and to track the Frasera population at the BLM site.

Tall bugbane (*Cimicufuga elata* Nutt.)

Tall bugbane is presently listed by the BLM as a Bureau Sensitive species (Instruction Memo No. OR-91-57). The State of Oregon has listed this species as a candidate for listing as State Threatened or Endan-

gered (1991, OAR 603-73-080). *Cimicufuga elata* is a perennial species and belongs to the *Ranunculaceae* family. The species' historic range was from northern California to British Columbia.

Cimicufuga is a forest species and on the Eugene District is often found within bigleaf maple/sword fern/conifer communities. The species has not been recently reported with any frequency, and the present status of this plant species is unclear. Forest management activities may be the primary threat for this species because of its forest habitat it can be a rather inconspicuous component of the understory when not flowering. This lack of flowering may indicate possible long-term viability problems for the species.

The Eugene BLM manages several populations of *Cimicifuga elata*. Plant reserves have been established for BLM Cimicifuga populations. No specific inventory or research has been done for this species on the Eugene District. In 1992 a monitoring program has been established for this species. A cooperative research agreement within the State of Oregon will be implemented in 1992 to study the species' habitat, population biology, and disturbance ecology.

Shaggy horkelia (*Horkelia congesta* Dougl. ssp. *congesta*)

Shaggy horkelia is presently listed by the BLM as a Bureau Sensitive species. The State of Oregon has listed this species as a candidate for listing as State Threatened or Endangered. *Horkelia congesta* is a perennial species and belongs to the *Rosaceae* family. The species' historic range was from the Willamette Valley to south-southwest Oregon (Hitchcock et al., 1990). Hitchcock (1990) describes the habitat of this species as open sandy or rocky flats to open woods. The primary threats to the species have probably been urban, rural and agricultural development. Some observers have suggested that further taxonomic work is needed on this group.

Eugene BLM manages one population of *Horkelia congesta* ssp. *congesta*. The site was established as a Special Area in January, 1984. No specific research has occurred at the BLM site for this species, and minimum level monitoring was implemented in 1990. Several years of monitoring will be needed before an accurate assessment of the condition of this population can be determined.

Fish

Oregon chub: The Oregon chub was proposed in October, 1991, for listing as an endangered species. It was once common throughout the Willamette River Basin, living mostly in the main stem and larger tributaries. The chub preferred quiet, off-channel and backwater areas. As a result of removal of instream woody debris, channelization of river channels, and aquatic habitat changes resulting from timber harvesting and other development activities, much of the chub's habitat was lost. In addition, it is unable to compete against introduced species, particularly centrarchids, bullheads and mosquito fish. Known populations are restricted to a short area along the Middle Fork Willamette River.

At present, none of the known populations are on lands administered by BLM. An interagency task force has developed a recovery plan, which relies primarily on protecting existing populations and transplanting the chub into suitable habitat. BLM has agreed to assist in inventory and monitoring efforts, and efforts to locate suitable habitat for transplants. Current and proposed BLM management activities are not expected to impact the Oregon chub.

Wildlife (animals)

As shown in Table 3-SSW-1, several special status wildlife taxa are of known, suspected, or potential occurrence within the portion of the Planning Area where BLM administered lands are concentrated.

Brief descriptions of habitat needs, conditions and trends, extent of inventory efforts and actions recommended by Federal recovery plans are provided only for taxa that occupy habitat that is most vulnerable to timber management activities or habitat changes resulting from such activities.

Many other Federally listed species (i.e., Endangered, Threatened, Proposed, and Candidate) are not known to occur on BLM administered lands, but they may occur on non-forest lands within, or adjacent to, the planning area. Examples of these species include the Aleutian Canada goose, ferruginous hawk, long-billed curlew, and brown pelican. Federally listed marine turtles and mammals may occur within tidal areas of the Siuslaw River. BLM has no information relative to occurrences of listed invertebrate species within the planning area.

Peregrine Falcon

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).

Although there are several occupied eyries within the planning area, 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 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

Bald eagles require large, dominant nest trees that are close to lakes, reservoirs and rivers that contain abundant fish populations (Anthony and Isaacs, 1989; Stalmaster et al., 1985). Nest sites usually command a view of the forage area and must be relatively secure from human disturbances (Anthony and Isaacs, 1989; Stalmaster et al., 1985).

Table 3-SSW-1 - Special Status Species of Known, Suspected, or Potential Occurrence Within the BLM Planning Area[1]

Common Name	Scientific Name	Status
Federal listed, proposed, and candidates:		
northern red-legged frog	*Rana aurora aurora*	Candidate 2
foothill yellow-legged frog	*Rana boylei*	Candidate 2
spotted frog	*Rana pretiosa*	Candidate 2
northwestern pond turtle	*Clemmys marmorata marmorata*	Candidate 2
northern goshawk	*Accipiter gentilis*	Candidate 2
marbled murrelet	*Brachyramphus marmoratus*	Proposed threatened
American peregrine falcon	*Falco peregrinus anatum*	Endangered
bald eagle	*Haliaeetus leucocephalus*	Threatened
harlequin duck	*Histrionicus histrionicus*	Candidate 2
mountain quail	*Oreortyx pictus*	Candidate 2
northern spotted owl	*Strix occidentalis caurina*	Threatened
Pacific fisher	*Martes pennanti pacifica*	Candidate 2
Columbian white-tailed deer	*Odocoileus virginianus leucurus*	Endangered
white-footed vole	*Phenacomys albipes*	Candidate 2
Pacific western big-eared bat	*Plecotus townsendii townsendii*	Candidate 2
Oregon chub	*Oregonichthys cramari*	Proposed endangered
Bureau sensitive & assessment:		
clouded salamander	*Aneides ferreus*	Bureau assessment
tailed frog	*Ascaphus truei*	Bureau assessment
Oregon slender salamander	*Batrachoseps wrighti*	Bureau Sensitive
sharptail snake	*Contia tenuis*	Bureau assessment
northern saw-whet owl	*Aegolius acadicus*	Bureau assessment
black swift	*Cypseloides niger*	Bureau assessment
pileated woodpecker	*Dryocopus pileatus*	Bureau assessment
Lewis' woodpecker	*Melanerpes lewis*	Bureau assessment
purple martin	*Progne subis*	Bureau assessment
western bluebird	*Sialia mexicana*	Bureau assessment
great gray owl	*Strix nebulosa*	Bureau assessment
Pacific pallid bat	*Antrozous pallidus pacificus*	Bureau assessment
fringed myotis	*Myotis thysanoides*	Bureau Sensitive
marten	*Martes americana*	Bureau assessment

[1]Includes only those portions of the planning area where BLM administered lands are concentrated. Excluded areas are the high Cascades, marine environments, and nonforested habitats of the Willamette Valley floor.
Note: Species status designations in Table 3-SSW-1 are dated through February 1, 1992. Some status designations may change after this date.

There are three known bald eagle nest sites on BLM administered lands in the planning area and another on private land immediately adjacent to BLM lands. Although the four nests are less than 1/4 mile from a road, all of the roads are dead-end or spur roads that begin on private land. Public access to the sites is restricted in varying degrees. Three of the nests produced young in 1991. The other was located for the first time late in the summer of 1991 (after the normal period for eagle fledgling), so its productivity is unknown. These nest sites are associated with Dorena Reservoir, Cottage Grove Reservoir, Fern Ridge Reservoir and the McKenzie River.

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. A total of 52 birds were counted at the BLM roost sites on January 11, 1991 (Gawronski, 1991). Eagles that use these roosts forage on private lands on the nearby Willamette Valley floor. 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-nine bald eagles were counted within the Eugene District during the 1991 National Wildlife Federation mid-winter count (Gawronski, 1991). 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) lists ten (10) target nesting territories associated with foraging areas adjacent to BLM administered lands and the Coburg Hills winter roost area for protection/enhancement. The Bureau inventoried its lands located 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 2700 acres of occupied, and suitable-but-unoccupied habitat.

Northern Spotted Owl

The USFWS (USDI, 1991) has determined the physical and biological habitat features (referred to as primary constituent elements) that support nesting, foraging, roosting, and dispersal, which are essential to the conservation of the northern spotted owl. 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

Bald Eagle

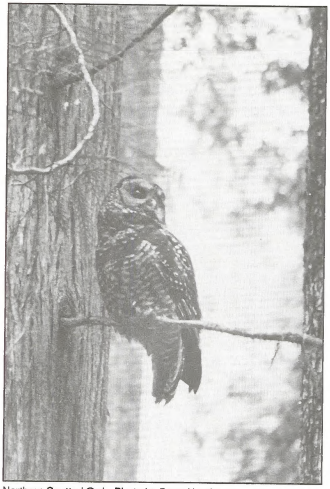
decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly."

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 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., 1990; USDI, 1991).

Since 1972, 120 spotted owl nest sites and activity centers have been identified within the BLM operating area on BLM administered lands (see Map 3-SSW-1). Another 14 have been identified on adjacent private lands. Pairs and single adult, or subadult, birds were found at 107 of these nest sites and activity centers within the last five years (1986 through 1991). In 1991, 71 of these site centers were occupied by pairs and 21 by single birds. The Eugene District has banded 287 owls, including 70 juveniles and 217 adults/subadults.



Northern Spotted Owl - Photo by Doug Huntington.

Although there are over 50,000 acres of mature and old growth forests present on BLM lands within the planning area, 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 two of the last five years). 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 area where BLM lands are concentrated.

Spotted owls are known to use younger forests (generally stands aged 40 to 80 years, i.e., the late seral stage) for foraging, and for nesting if suitable nest trees and adequate prey populations are available. Within the BLM operating area, there are approximately 30,000 acres of this habitat within 1.2 and 1.5 miles of occupied (since 1985) owl nest sites/activity centers in the Cascades and Coast Range, respectively. 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.

Lands cut within the last 40 years provide no significant habitat value for spotted owls.

BLM inventories began in the Eugene District in 1975. These low intensity inventories continued through 1985. After 1985, survey intensity increased considerably and generated more information and a significantly better understanding of the spotted owl's 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.

Marbled Murrelet

Marbled murrelets forage in saltwater on small fish and invertebrates and nest in old growth coniferous forests up to 50 miles inland; nests have been described as depressions in moss, or lichens, on the largest branches of old growth conifers (Nelson et al., 1987; Marshall, 1988; Varoujean et al., 1988).

Old growth trees 50 miles inland from the Pacific Ocean represent potential nesting habitat for this species. Inventories were first conducted for the species in 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.

Northern Goshawk

Goshawk nesting is believed to occur above the 1,900 foot elevation in the Cascades. Research 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 in one of the largest trees in the nest stand, and are usually situated on large limbs, against the bole of the tree, beneath or just above the lower branches of the 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; and Crocker-Bedford, 1990).

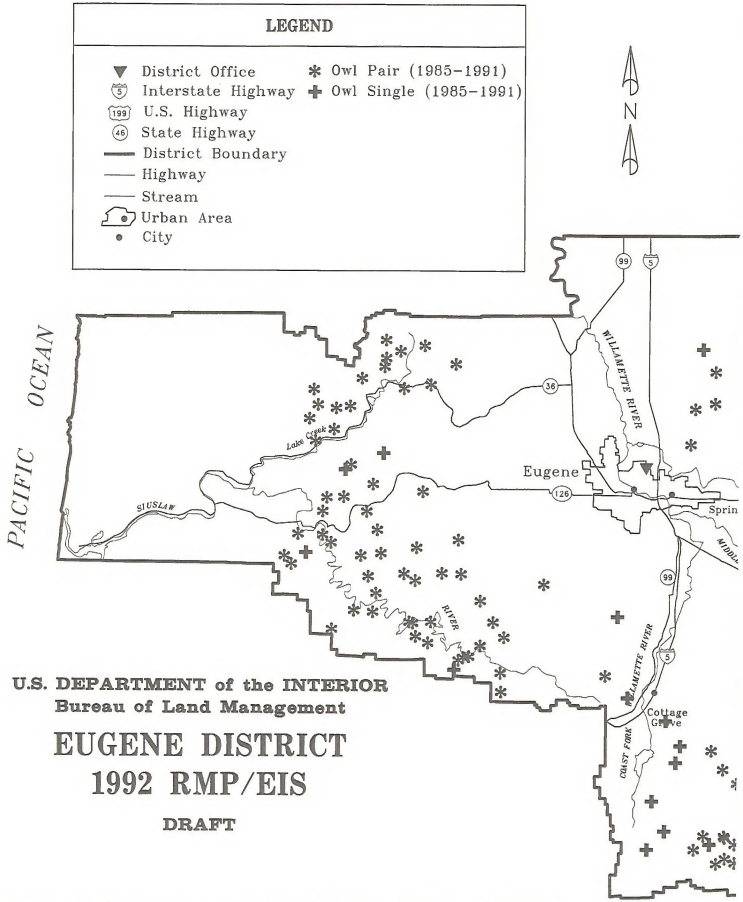
Goshawk nesting densities are approximately 4 pairs per township in suitable habitat (Reynolds, 1983). Nest stands approximate 400 acres and are associated with large tracts (nearly 5,000 acres) of mature and old growth forest for foraging (Crocker-Bedford, 1990). Goshawks appear to require large tracts of older forest for successful nesting, and extended rotations on a watershed basis, so as to maintain 2,500 to 5,000 acres of older forest around nest sites, would be required for (Crocker-Bedford, 1990).

Because of its habitat requirements, the species is currently believed to be scarce in the Eugene District. Goshawks have been observed occasionally within the District. One nest was located in 1979 but was subsequently destroyed in a timber sale.

Pileated Woodpecker

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). Cavity excavation in live trees is considered rare or uncommon. Unlike other regions, pileated woodpeckers in western Oregon nest extensively in Douglas-fir, and most nest trees (green or snags) have broken tops (Mellen, 1987). 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 five-acre patches. Mellen (1987) found the average home range size for pileated woodpeckers in the Oregon Coast Range was 1,170 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 avoided coniferous stands less than 40 years of age. According to Mellen (1987), 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.

Numerous observations of pileated woodpeckers have been recorded throughout the BLM operating area. However, no systematic inventories of pileated woodpeckers, or their habitat, have been done on the Eugene District. Habitat for the species is believed to be declining due to the very low rate of snag retention in timber harvest areas, and rapid decline of mature and old growth forests within the area where BLM lands are concentrated. (Although pileated woodpeckers did not select old growth in Mellen's study in the Oregon Coast Range, neither did they avoid it. Most pileated nest trees/snags are of old growth origin.)



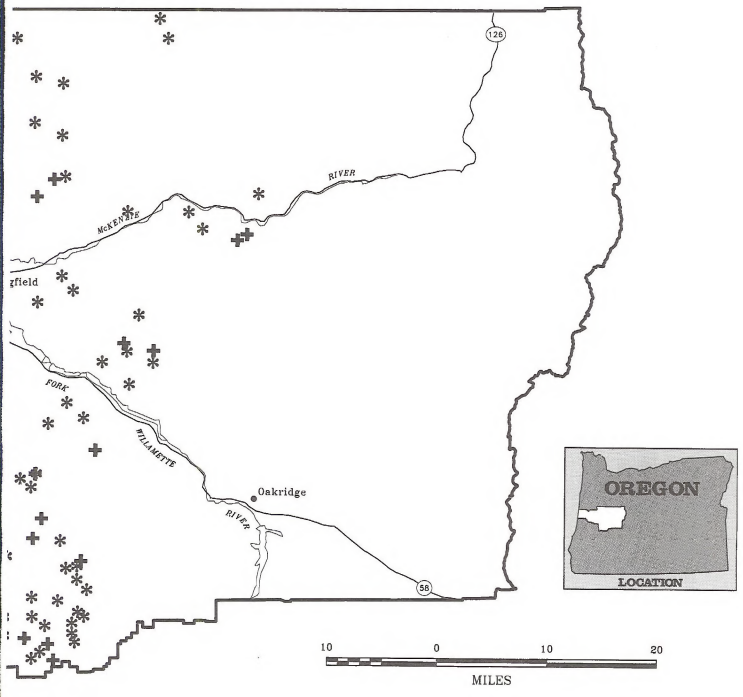
U.S. DEPARTMENT of the INTERIOR
Bureau of Land Management

EUGENE DISTRICT
1992 RMP/EIS

DRAFT

MAP 3-SSW-1: SPOTTED OWL SITES

Map represents any occupancy for years 1985 through 1991, not current occupancy. Presence of pairs of singles at sites may change each year.



Saw-whet Owl

According to Jones and Stokes (1980), "The saw-whet owl is a secondary cavity nester. It requires natural cavities or cavities excavated by woodpeckers in snags for nesting (Bent, 1961; Guenther and Kucera, 1978; Marcot, 1979; Thomas, 1979). Cavities are used for nesting, roosting, and for shelter during the overwintering period (Thomas, 1979)."

Also, according to Jones and Stokes (1980), 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.

No inventories have been conducted exclusively for this species but encounters during spotted owl inventory/monitoring have been recorded. No summaries of this data have been prepared.

Suitable habitat for this species is rapidly declining within the area where BLM lands are concentrated, and a similar trend in populations is assumed.

Purple Martin

Purple martins are cavity nesters and, under natural conditions, often nest in snags in forest openings (Jackman and Scott, 1975; Scott et al., 1977; USDI, 1985). "The problem confronting the species in mountainous areas appears to be a serious lack of nesting sites (snags). 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 species is beleived to occur in low numbers in the portion of the planning area where BLM lands are concentrated due to the small numbers of large snags being retained in openings created by timber harvest. Snags suitable for purple martins are at least 15 inches dbh and well over the 10 feet minimum nest height recommended by Brown, (1985, Appendix 19).

Western Bluebird

Western bluebirds are cavity nesters that primarily use natural cavities and old woodpecker holes in standing dead trees (Jackman, 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 - Appendix 19, 1985), are capable of providing suitable bluebird nest sites if they have cavities and are situated in early seral stage habitat. Dominance by herbaceous plant species and low occurrence of woody plants and debris is essential (Pinkowski, 1979).

Bird boxes placed in the District progeny (tree seedling) test sites in 1984 and 1985 have shown that the western bluebird nests in both the Cascades and Coast Range in the Eugene District. However, no inventories to estimate breeding populations have been done.

The decline of the western bluebird is a result of the changing patterns of human land use (Power, 1989). According to the USFWS (USDI, 1985), 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. This has led to the apparent serious decline of the species throughout western Oregon, western Washington and southwestern British Columbia (USDI, 1985). Snags suitable for western bluebird use are at least 15 inches dbh and well over the 10 feet minimum nest height recommended by Brown, (1985, Appendix 20).

Marten

According to Jones and Stokes (1980), ". . . martens utilize snags, logs, and windfalls for foraging and denning." Research indicates that a minimum of one square mile of mature and old growth forest (with a canopy closure greater than 50 percent, and normal snag/fallen tree components) provides optimum 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 (USDI, 1982).

Although the entire Eugene District lies within the historic range of the marten (Maser et al., 1981), few observations have been made in the planning area in recent years. In 1980, the District conducted a year-long inventory for marten (and fisher) in habitat judged to have the best potential. Although the inventory was conducted by two biologists with previous marten trapping experience (a variety of live trapping techniques were used) no martens were captured or their sign detected.

Fisher

The portion of the Eugene District located within the Cascade Range is within the historical range of the fisher (Maser et al., 1981). "Although it forages in a wide variety of forest types and in successional stages older than 10-15 years, its breeding habitat typically is restricted to mature and old growth forests. Large downed logs used as denning sites are more frequently found in older seral stages. In addition, canopy

cover of 80-100 percent may facilitate foraging behavior in winter by reducing snow accumulation on the ground. Use of younger successional stages for reproduction may be possible, provided that suitable denning sites and an adequate prey base are present" (Jones and Stokes, 1980). The District's one inventory for fisher is described for marten (above).

Tailed Frog

In North America, the tailed frog lives where other anurans (toads, tree frogs, and ranid frogs) cannot—in cold, high gradient, including torrential, mountain streams. This species has adapted to a situation where it is not in direct competition with the numerous advanced anurans.

Tailed frogs are generally absent from streams with elevated water temperatures and increased siltation (Nussbaum et al., (1983) p. 150). They may also be absent from streams in old growth forest where they are downstream from clear cuts or roads (Applegarth, 1991). Tailed frogs seem to require streams that are cold (generally well shaded) and clean (little mud and silt).

In addition to the coolness of the water, the coolness and dampness of air near streams may also be critical to these animals (Hawkins et al., 1988, p. 259). Adult tailed frogs are less tolerant of desiccation than many other anurans (Claussen, 1973). During warm nights of summer, tailed frogs are active (foraging and mating) on streamside rocks (Nussbaum et al., 1983, p. 148; Applegarth, 1991).

The Eugene District is fairly central to the total geographic range of the tailed frog, so the regional climate should be favorable. However, 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. A population was found in the Greenleaf Creek drainage in the Coast Range Resource Area during field work in 1991.

Red-legged Frog

The red-legged frog has been called the western wood frog (Slevin, 1928; Wright and Wright, 1949) because it roams far into humid, well-vegetated forests and forest meadows sometimes many hundreds of feet from the nearest pond or stream (Applegarth, 1991; Nussbaum et al., 1983). It is a diurnal predator on the forest floor to the extent that air moisture will allow. It probably eats mostly arthropods but may also consume small vertebrates (Hays, 1955).

Since the distribution of the red-legged frog extends from Baja California to British Columbia on the west (wet) side of the Sierra Nevada and Cascade Range, the climate of western Oregon should be favorable for this species. However, the species has recently become scarce in the Willamette Valley (St. John, 1987), and now seems to be absent from most streams and ponds in western Oregon (Applegarth, 1991).

Within the Eugene District, the red-legged frog has become scarce. BLM employees have related a few definite sightings. Herpetological surveys of timber sale areas in 1991 located red-legged frogs in two units of a sale near Mapleton. A fairly healthy population was discovered along Haight Creek where it passes through a quarter mile of old growth before entering the Siuslaw River. Red-legged frogs have been found in North Sister Creek, McGowan Creek, and the Siuslaw and McKenzie Rivers. In spite of apparently favorable conditions, red-legged frogs were not detected in 28 other sale units (Applegarth, 1991).

Oregon Slender Salamander

This is Oregon's only endemic amphibian. It is known from the west slope of the Cascade Range from the Columbia River south to Shadow Lake (near the Waldo Lake entrance road in southeastern Lane County). Although the species has not been documented in BLM land within the Eugene District, there is a possibility that it occurs within the McKenzie Resource Area (Applegarth, 1991). At present, the nearest known location is Hidden Lake (12 airline km south of Cougar Dam). The species is associated with mesic Douglas-fir and hemlock forest within an elevation range of 15 to 1,340 meters (50-4,400 feet) (Applegarth, 1991).

In the early spring just after snow melt, salamanders of this species can be found in damp situations, especially between pieces of bark that have fallen from dead trees. Smaller numbers are found in cracks and termite channels inside rotten logs. They do not seem to associate with cedar logs (Applegarth, 1991; Tanner, 1953).

Slender salamanders migrate vertically downward to avoid seasonally unfavorable conditions. They do not create their own tunnels and depend upon existing fissures, such as burrows or root channels. When moisture and temperature are again favorable, they move back up to the surface where they feed and reproduce. Slender salamanders are very conservative in the extent to which they wander about on the ground surface, and these movements probably take place "largely in the interspaces of the surface litter, not on top" (Hendrickson, 1955).

Clouded Salamander

The clouded salamander inhabits forests and woodlands. They are secretive and only active at night during and after rains. In the daytime these salamanders seek to escape desiccation and predation by hiding under surface objects such as rocks, bark, and wood. The clouded salamander has no lungs and relies on respiration through its wet skin. To keep its skin damp it must find damp situations at all times of the year. In late summer, when it can become dry under small objects, clouded salamanders estivate inside large rotten logs, deep in rock crevices, near clay layers, in root channels, or wherever they can find persistent dampness.

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). During wet weather, clouded salamanders often climb trees and can be found under the bark of dead trees, both fallen and standing. They have been found as high as 20 feet up in trees (Nussbaum et al., 1983).

The clouded salamander seems to be fairly widespread within 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, 1991). The elevational distribution of this species in western Oregon is from sea level to over 4,000 feet. It probably occurs within all three Resource Areas.

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).

ACECs 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.

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 ACECs, Appendix 3-G, Table 3-SA-3) 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 proposed or 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 ACECs will be part of the Distict's RMP decision, which will be made following completion of the RMP/EIS.

The Eugene District manages ten Special Areas, totalling 1,572 acres. Included in these Special Areas are four ACECs/RNAs, totalling 939 acres; three ACECs, totalling 201 acres; and three EEAs, totalling 432 acres. All existing Special Areas were reviewed and found to still meet relevance and importance criteria.

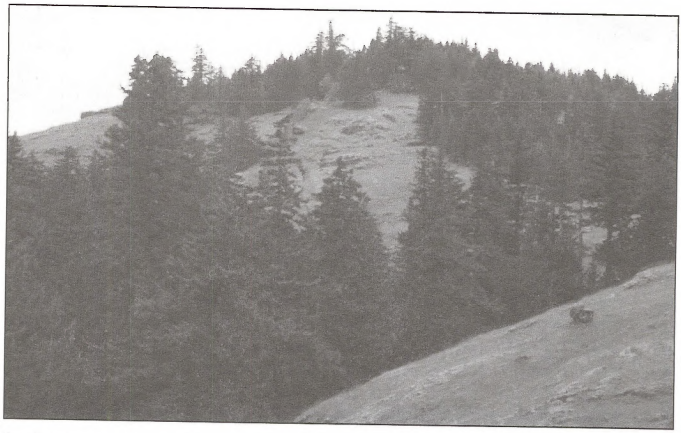
Existing and potential Special Areas are briefly described in Table 3-SA-1 and displayed on map 3-SA-1. EEAs were reviewed separately to determine the current and past use as well as the future potential for environmental educational purposes. The present condition of each existing and potential Special Area is described in Appendix 3-H, Table 3-SA-4.

Twenty new areas have been nominated for possible designation as ACECs, ACEC/RNAs or ACEC/ONAs. Potential adjustments to four ACECs or ACEC/RNAs have also been identified. An interdisciplinary team determined each of the areas eligibility for Special Area status. The team determined that four of the 20 proposed Special Areas did not meet the ACEC criteria of relevance and importance.

Potential Special Areas are briefly described in Table 3-SA-2 and displayed on Map 3-SA-1.

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



Horse Rock Ridge ACEC - Photo by Nancy Wogen.

Upper Elk Meadows ACEC/RNA - Photo by Nancy Wogen.

Table 3-SA-1 - Existing Special Areas

Special Area	Size (Acres)	Primary Resource Value/Description	Designation Current	Potential Proposed	Modification
Horse Rock Ridge ACEC	191*	Plant Community: Cascade foothills grass bald complex	ACEC	ACEC/RNA	Expand to 378 acres to include RNA values.
Long Tom ACEC	7	Plant Community: Relict, pre-settlement Willamette Valley wetland community	ACEC	ACEC	None
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.
Mohawk ACEC/RNA	292*	Plant Community: Old growth Douglas-fir and western hemlock forest in the Willamette foothills	ACEC/RNA	ACEC/RNA	None
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
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.
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.

Table 3-SA-1 - Existing Special Areas (cont.)

Vik Road EEA	178	Educational: Young Douglas-fir forest with Vik Creek and associated riparian community, including active beaver ponds	EEA	EEA	Adjust boundary to 60 acres to contain the riparian zone and a buffer.
Row River EEA	25	Recreational: riparian habitat is a key feature	EEA	Rec. Site	Site will be managed for recreational opportunities. This will not preclude environmental education programs/ projects.

*Title Plat Acres

Table 3-SA-2 - Potential Special Areas

Special Area	Potential Designation	Size (Acres)	Primary Resource Value/Description	ACEC Eligibility
Horse Rock Ridge Addition	ACEC/RNA	187	Plant Community: Additional acreage was nominated for RNA status to extend the undisturbed grassy bald outcrop. Includes important wildlife values.	Yes
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
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
Lake Creek Addition	ACEC/ONA	55	Recreation: Additional acres were nominated to include an area that has high recreation values.	Yes

Table 3-SA-2 - Potential Special Areas (cont.)

Cannery Dunes	ACEC/ONA	40*	Scenic Values & Plant Community: The area was nominated for its Oregon Coastal scenic qualities and recreational opportunities.	Yes
Heceta Sand Dunes	ACEC/ONA	218*	Scenic/Geological/ Recreational: The area was nominated for its diversity in wildlife, plant communities and ecological systems.	Yes
Hult Marsh	ACEC	167	Plant Community/ Wildlife/Fisheries/ Recreational: The area was nominated for its diversity in plant and wildlife values.	Yes
Cougar Mtn. Ancient Yew Grove	ACEC	40*	Plant Community: The area was nominated for the stand of large Pacific yew trees.	Yes
Grassy Mountain	ACEC	74*	Plant Community: The area was nominated as one of the last and finest examples of native grassy bald plant communities.	Yes
Triangle Lake RFI	ACEC	810	Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area.	Yes
Triangle Lake BEHA	ACEC	538	Plant Community/ Wildlife: The area was nominated for its potential bald eagle habitat.	Yes
Fern Ridge BEHA	ACEC	166	Plant Community/ Wildlife: The area was nominated for its bald eagle habitat.	Yes
Coburg Hills BEHA	ACEC	1,204	Wildlife: The area was nominated for its bald eagle habitat.	Yes

Table 3-SA-2 - Potential Special Areas (cont.)

Coburg Hills RFI	ACEC	854	Plant Community/ Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area; old growth forest.	Yes
Fall Creek Reservoir BEHA	ACEC	746	Wildlife: The area was nominated for its potential bald eagle habitat.	Yes
McKenzie River BEHA	ACEC	2,037	Wildlife: The area was nominated for its potential bald eagle habitat.	Yes
Dorena Reservoir BEHA	ACEC	611	Wildlife: The area was nominated for its bald eagle habitat and nest site.	Yes
Dorena Reservoir RFI	ACEC	209	Plant Community/ Wildlife: The area was nominated for important raptor habitat within identified Key Raptor Area; old growth forest.	Yes
Cottage Grove Reservoir RFI	ACEC	232	Plant Community/ Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area.	Yes
Siuslaw River BEHA	ACEC	282	Wildlife: The area was nominated for its potential bald eagle habitat.	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

Table 3-SA-2 - Potential Special Areas (cont.)

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
Bunker Hill	ACEC	36	Plant Community: The area was nominated for a remnant stand of old growth Douglas-fir.	No
McKenzie River RFI	ACEC	98	Plant Community/ Wildlife: The area was nominated for important raptor habitat within an identified Key Raptor Area; old growth forest	No

BEHA = Bald Eagle Habitat Area
RFI = Relict Forest Island
*Title Plat Acres

interior valley and the Cascade Range are within the Plateau cultural area. The cultural chronology and cultural prehistory of each of these areas differ. 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.

Eighty-nine prehistoric sites and one hundred seventy-one prehistoric isolated finds have been documented on BLM administered land. One site is 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.

Surveying Archaeological Site on the Eugene District - Photo by Doug Huntington.

There are seven inventoried historic sites located on BLM administered land. None are eligible for listing on the National Register of Historic Places.

Cultural resource inventory procedures are discussed in Appendix 3-I.

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. This 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-VR-1. The results of this inventory, shows 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 ACECs 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.

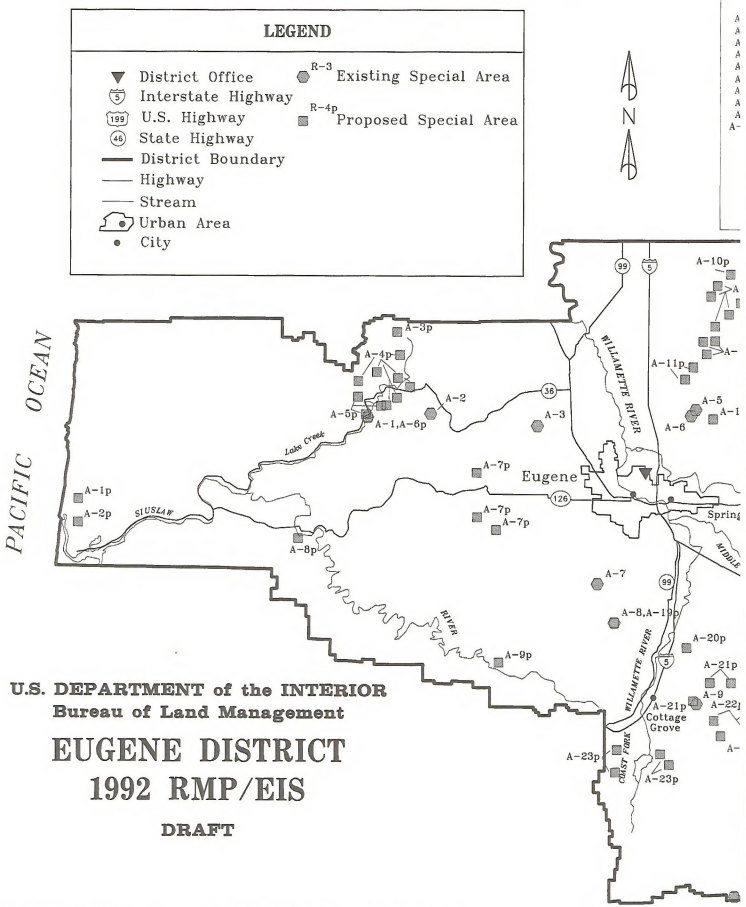
Recreation

The major recreation activities occurring on BLM administered land in the planning area are camping, picnicking, hiking, horseback riding, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing and driving recreation vehicles on and off roads. 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 ACECs or RNAs, are excluded from the 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 with approximately 93,000 acres. The majority of the 1990 recreation visits on BLM-administered lands in the District occurred as dispersed recreation within the ERMAs.

Within the planning area, Eugene BLM has four developed and managed recreation sites; four boat ramps; approximately six miles of developed hiking trails; 400 miles of stream supporting fishable populations of trout and salmon, and 300 miles of fishable streams; four R&PP (Recreation and Public Purposes) leases; three environmental education areas; 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 road vehicles (ORVs) are ACECs (areas of critical environmental concern). Areas currently limited to ORVs are existing recreation sites. The Eugene District lands fall within three ROS (recreational opportunity spectrum) classifications. These classifications are, Roaded Natural, Rural and Urban.



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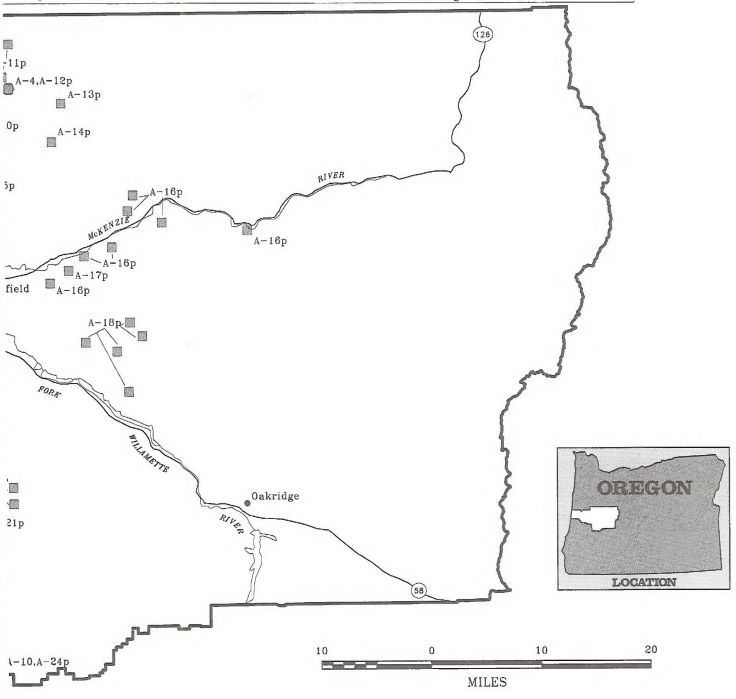
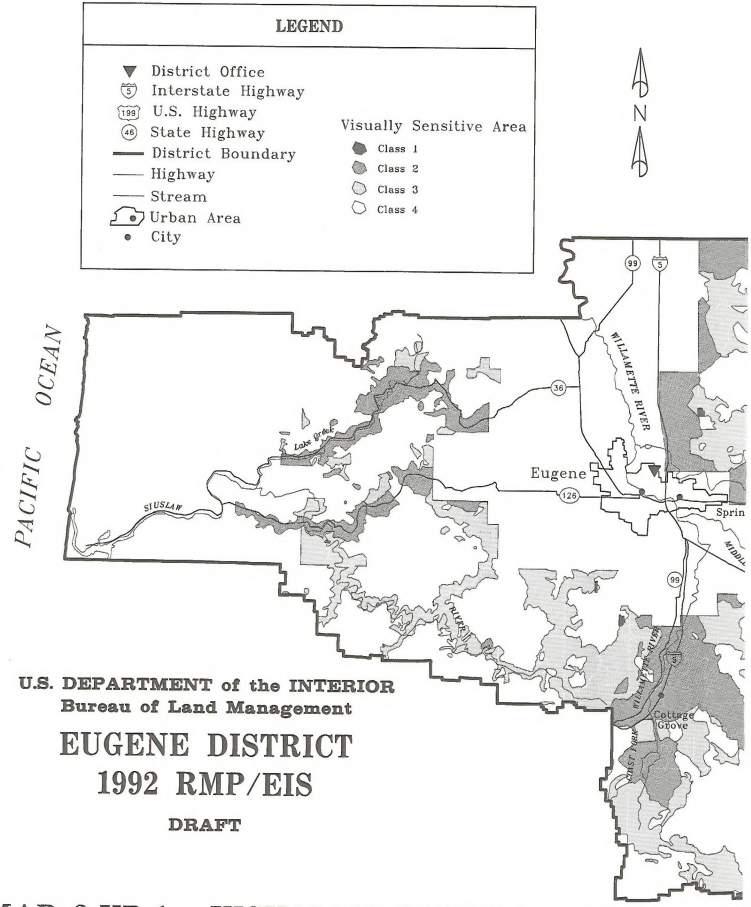
MAP 3-SA-1: SPECIAL AREAS

Special Area Key

-1 = Lake Creek Falls ACEC
-2 = Vik Road Environmental Education Area
-3 = Long Tom ACEC
-4 = Horse Rock Ridge ACEC
-5 = McGowan Creek Environmental Education Area
-6 = Mohawk ACEC/RNA
-7 = Fox Hollow ACEC/RNA
-8 = Camas Swale ACEC/RNA
-9 = Row River Environmental Education Area
10 = Upper Elk Meadows ACEC/RNA
A-1p = Heceta Sand Dunes ACEC/ONA
A-2p = Cannery Dunes ACEC/ONA
A-3p = Hult Marsh ACEC
A-4p = Triangle Lake ACEC (RFI)
A-5p = Triangle Lake ACEC (BEHA)
A-6p = Lake Creek Falls ACEC/ONA Addition
A-7p = Fern Ridge ACEC (BEHA)
A-8p = Siuslaw River ACEC (BEHA)
A-9p = Fawn Creek ACEC
A-10p = Coburg Hills ACEC (BEHA)
A-11p = Coburg Hills ACEC (RFI)
A-12p = Horse Rock Ridge ACEC/RNA Addition
A-13p = Grassy Mountain ACEC
A-14p = Bunker Hill ACEC
A-15p = Coburg Hills Scenic Area ACEC
A-16p = McKenzie River ACEC (BEHA)
A-17p = McKenzie River ACEC (RFI)
A-18p = Fall Creek Reservoir ACEC (BEHA)
A-19p = Camas Swale ACEC/RNA Addition
A-20p = Cougar Mountain Ancient Yew Grove ACEC
A-21p = Dorena Reservoir ACEC (RFI)
A-22p = Dorena Reservoir ACEC (BEHA)
A-23p = Cottage Grove Reservoir ACEC (RFI)
A-24p = Upper Elk Meadows ACEC/RNA Addition
RFI = Relict Forest Islands
BEHA = Bald Eagle Habitat Area





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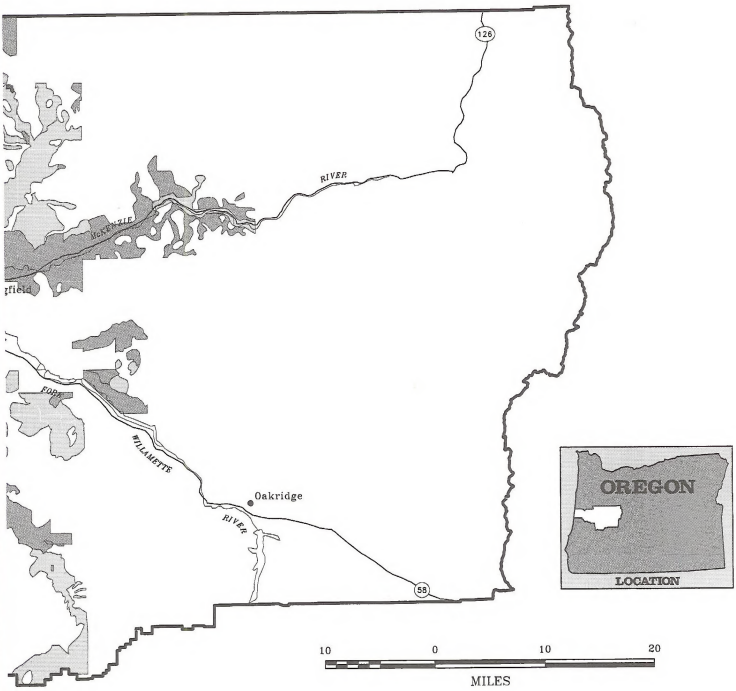
MAP 3-VR-1: VISUALLY SENSITIVE AREAS

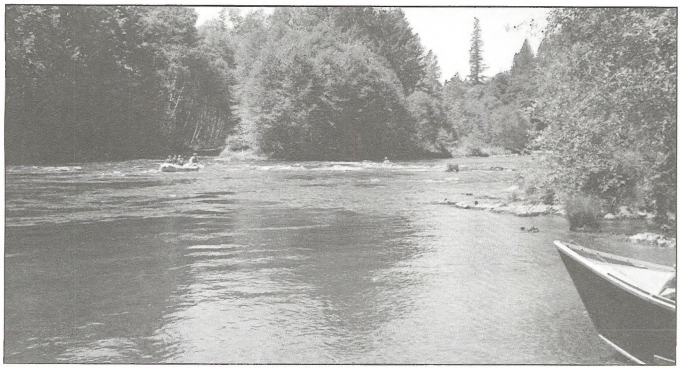

126
RIVER
McKENZIE
FORK
WILLAMETTE
RIVER
Oakridge
58
OREGON
LOCATION
10
0
10
20
MILES

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. Proposed Back Country Byways in the McKenzie Resource Area are Coburg Hills, Shotgun Creek, and Lost Creek; in the Coast Range Resource Area they are the Siuslaw River, Whittaker Creek, Alsea, and Oxbow; and in the South Valley Resource Area are Huckleberry-Silica Mountain and Blue Mountain. Proposed Watchable Wildlife sites are located along the McKenzie River (mainly for osprey), Fish Creek (mainly for anadromous fish), Whittaker Creek (anadromous fish), and Lake Creek (anadromous fish).

Existing and potential recreation sites are described in Tables 3-REC-1, and 3-REC-2, respectively. Existing and potential trails are described in Tables 3-REC-3, and 3-REC-4 respectively. Existing and potential SRMAs are described in Table 3-REC-5. All trails, recreational sites including ERMAs and SRMAs are displayed on Map 3-REC-1 and trails on Map 3-REC-2.

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 Oregon Parks and Recreation Department (OPRD 1988), which is the most recent

Trail construction on the Eugene District - Photo by Doug Huntington.



Rafting the McKenzie River - Photo by Doug Huntington.

Table 3-REC-1 - Existing Recreation Sites (within ERMAs)

Site	BLM Acres	1990 Visits[2]	Amenities
Clay Creek (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	3	-	BLM land along the Willamette River leased to the State (R&PP) for Greenway Management
Haight Creek (South Valley RA)	3	-	This is an existing site, but is currently closed. See Table 3-REC-2 for its potential
Lake Creek (Coast Range RA)	22	-	This is an existing site, but is currently closed. See Table 3-REC-2 for its potential
McKercher Park (Linn County Park)	2[1]	-	This is a County Park within the McKenzie RA. Two acres of BLM land are in a R&PP lease to complete the park's boundary
Sharps Creek (South Valley RA)	10	1,500	10 camping units, 2 picnic units, natural swimming area on Sharps Creek
Whittaker Creek (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 proposed hiking trail in the area
Turner Creek (Coast Range RA)	4	-	Existing site, but is currently closed
Marten Rapids (Lane County Park)	3	-	Existing site (R&PP lease), see Table 3-REC-2 for its potential
Whitewater Park (Lane County Park)	17	-	Existing site (R&PP lease), see Table 3-REC-2 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)

[1]Title Plat acres
[2]The most current recreation visitation estimates for BLM administered recreation sites are for 1990. Visitation estimates are derived from user fee envelopes collected at developed recreation sites, and observations by District employees.
Source: WODDB and District recreation inventory records including the 1990 Recreation Management Information System (RMIS).

Table 3-REC-2 - Potential Recreation Sites (Within ERMAs)

Site	BLM Acres	Resource Area Location	Amenities
Cannery Dunes	40[1]	Coast Range 18-12W-15	Located north of Florence, the area provides a scenic sand dune, 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 Rec Site. Included in the proposed Siuslaw River SRMA.
Heceta Sand Dunes	218[1]	Coast Range 18-12W-3	Located north of Florence, the site provides an area of 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 proposed ACEC (Hult Marsh) and proposed 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 proposed boundary of the Lake Creek ACEC/ONA.
Oxbow	61	Coast Range 20-7W-3	Potential walk in campsite along the Siuslaw River. Included in the proposed 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 growth, young conifers, western red cedar. Included in the proposed Siuslaw River SRMA.
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 proposed 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.

Table 3-REC-2 - Potential Recreation Sites (Within ERMAs) (cont.)

Marten Rapids (Lane County Park)	3	McKenzie 17-2E-1	Site leased to Lane County, but day use 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 proposed 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 (Lane County Park)	17	McKenzie 17-2E-34	Site leased to Lane County, but day use improvements have been removed. Included in the proposed McKenzie River SRMA. Potential for BLM or the county to reestablish improvements for day use.
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 proposed 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 proposed 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 proposed Siuslaw River SRMA.
Row River	14	S. Valley 20-2W-31	Potential day use area with interpretation trail overlooking the Dorena Reservoir.
Sharps Creek Expansion	20	S. Valley 22-1W-15	Expand current Sharps Creek Rec Site to accommodate this popular area.
Sidog	140	S. Valley 19-6W-29	Provide camping/day use area along the Siuslaw River. Included in the proposed Siuslaw River SRMA.

[1] Title Plat Acres
Source: WODDB and District recreation inventory records.

Table 3-REC-3 - Existing Recreation Trails

Trail	Miles	Resource Area Location	Other Descriptive Information
Eagles Rest Trail	.7	McKenzie RA 20-1W-12	Provides access to the top of Eagles Rest Mt. (elevation 3022); also connects to FS trail #3461.
Shotgun Rec. Area Trails	5.7	McKenzie RA 15-1W-29,30 31,32	Provides a variety of trails located in the Shotgun Rec. Site (SRMA). Trails included are: Shotgun Creek, Drury ridge, Meadow Loop, Lower, and Loop Trails A, B, C.
FS Trail #3462	.2	McKenzie RA 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.

Table 3-REC-4 - Potential Recreation Trails

Trail	Miles	Resource Area Location	Other Descriptive Information
Big Canyon Trail	1	Coast Range 18-8W-27	Potential area for interpretation of old growth forests, logging practices and spotted owl habitat information. The area is included in the proposed Siuslaw River SRMA.
Clay Creek Trail	1	Coast Range 19-7W-19	Potential trail along the Siuslaw River at the Clay Creek Rec. Site. The area is included in the proposed Siuslaw River SRMA.
Fish Creek Trail	3	Coast Range 16-7W-27,29,33	A potential trail along the banks of Fish Creek. Accesses watchable wildlife area along the creek.
Greenleaf Creek Trail	3	Coast Range 16-8W-22,15	Potential trail along the banks of Greenleaf Creek.
Hult Equestrian Loop Trail	2+	Coast Range 15-7W-13,14	Potential horse trail north of Hult Pond, and would be included in the proposed Upper Lake Creek SRMA.
Haskins Creek	4	Coast Range Trail Esmond Lake to Clay Cr.	Potential trail connecting Esmond Lake and Clay Creek Rec. sites in the Haskins Creek drainage area. The area is included in the proposed Siuslaw River SRMA.
Lake Creek Trail	1	Coast Range 16-7W-19	Potential trail within the BLM fish ladder area along Lake Creek.
Siuslaw River Trail	2	Coast Range 19-7W-19 20, 21	Potential trail connecting Clay Creek and Siuslaw Bend Rec. Sites along the Siuslaw River with an overlook of the river area. The area is included in the proposed Siuslaw River SRMA.

Table 3-REC-4 - Potential Recreat (cont.)

Whittaker Creek Falls Trail	3	Coast Range 18-8W-31 to 19-9W-12	Potential scenic trail along Whittaker Creek to several waterfalls 30-40' high.
Whittaker Creek Ridge Trail	1	Coast Range 18-8W-21	Potential forested trail in diverse habitats on a ridge above the Whittaker Creek Rec. Site. The area is included in the proposed Siuslaw River SRMA.
Deadwood-Windy Peak Trail	6	Coast Range 16-9W-36 to 16-8W-27	Potential forested trail from the Deadwood Community to Windy Peak Mt. (elevation 2502).
Coburg Crest Trail	23	McKenzie	Potential trail along the Coburg Hills.
Coburg Connector Trail	6	McKenzie	Potential trail to connect Shotgun to the Coburg Crest Trail.
FS Trail #____	.5	McKenzie 20-1E-17	A proposed FS trail near Hardesty Mountain, which would cross BLM lands.
Marten Creek Trail	4	McKenzie 17-2E-1,12 17-3E-7,18	Potential forested trail up Marten Creek, partially within the proposed McKenzie River (SRMA).
McKenzie River Trail	6	McKenzie on the South Bank of the River	Potential trail within the proposed McKenzie River SRMA, could connect from Eagle Rock to Little Bear along the South Bank.
Shotgun Additions	1.4	McKenzie within Shotgun SRMA	Two additional trails to loop existing paths within the Shotgun System.
Row River Overlook Trail	1	S. Valley 20-2W-31	Potential trail within the Row River Recreational Site. The trail would have a view of the Dorena Reservoir.
Sharps Creek Trail	1	S. Valley 20-1W-15	A Potential trail on the east bank of Sharps Creek, starting at the campsite area and keeping next to the bank for most of its length.
Mt. Bike Trails	-	on-going in all Resource Areas	Potential to work with adjacent landowners and Mt. Bike clubs to establish trails.

Source: WODDB and District recreation inventory records

Table 3-REC-5 - Existing and Potential Special Recreation Management Areas

SRMA	BLM Acres	Resource Area Location	Other Descriptive Information
Existing SRMAs			
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			
Siuslaw River	9,529[1]	Coast Range Siuslaw River from Smith River to Wildcat Creek	Potential recreation area along 55 miles of the Siuslaw River (confluence with Smith River and Wildcat creeks). This coincides with the proposed WSR river segments of B and C. Within the area, there are proposed trails, (Big Canyon, Clay Creek, Haskins Creek, Siuslaw River and 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.
Gilkey Cr.	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, mt. 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.
Sharps Creek Recreational Mining Area	495	S. Valley 22-1W-15 to 23-1W-12	Potential area for recreational mining, two additional campsites, and trails. Sharps Creek Recreation Site is located within the area. The area would include 1,111[1] acres, if all identified lands are acquired.
Upper Lake Creek	10,515	Coast Range 15-7W-most sec	Potential for various mountain bike and horse trails, campsites and byways. Area includes Hult Pond, Lake Creek and Congdon Creek headwaters. The area would be more unified with the acquisition of 15,072[1] identified private lands.

[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.
Source: WODDB and District recreation inventory

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-REC-6 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 were 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 non-motorized 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 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 and potential SRMAs to handle foreseeable recreation use will not be exceeded for many decades. Currently, at the District's high investment developed recreation site, Shotgun, use is at design capacity. Visitation at 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.

Wild and Scenic Rivers

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." The Eugene District has leased three acres to the State of Oregon for management under this program.

Shotgun Recreation Site - SRMA - Photo by Doug Huntington.

Table 3-REC-6 - Total 1990 Recreation Visits to BLM Administered Land

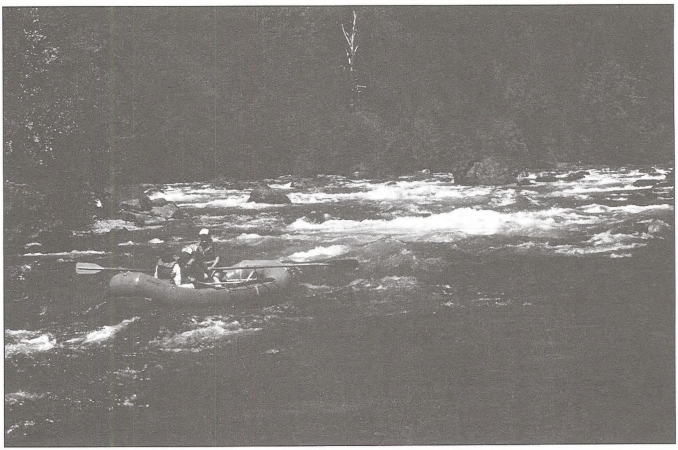
Recreation Use Category (with PNORCPS definitions)	% of Total Recreation Visits	Visitation
Off-road use visits (motor cycling off road, ATV 3 & 4 wheel, 4-wheel drive, dune buggy)	41,700	3
Motorized travel visits (sightseeing & exploring)	305,980	24
Non-motorized travel visits (hiking, backpacking, visiting the beach, beachcombing, trail bicycling, horseback riding)	378,030	30
Camping visits (all modes)	81,540	7
Hunting visits (big game, bow hunting, birds and small game)	29,670	2
Other land-based visits (nature study, wildlife observation photography, picnicking, visiting interpretive displays)	318,170	25
Fishing visits (fishing from boat or bank, fresh water)	61,280	5
Boating visits (river, non motorized as rowboat, canoe, raft, etc)	19,550	2
Other water-based visits (swimming or wading at beach/lake/river)	17,790	1
Winter sports visits (X-country, snowshoe, snowboarding, sledding, general snowplay)	9,550	1
Snowmobiling visits	0	0
Total	**1,263,260**	**100**

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 all 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. A corridor extending one quarter mile on each side of the river segment was included in the evaluation. See Appendix 3-J for a description of these guidelines. The status of eligibility determinations for these rivers is shown in Table 3-WSR-1 and Table 3-WSR-2 below.

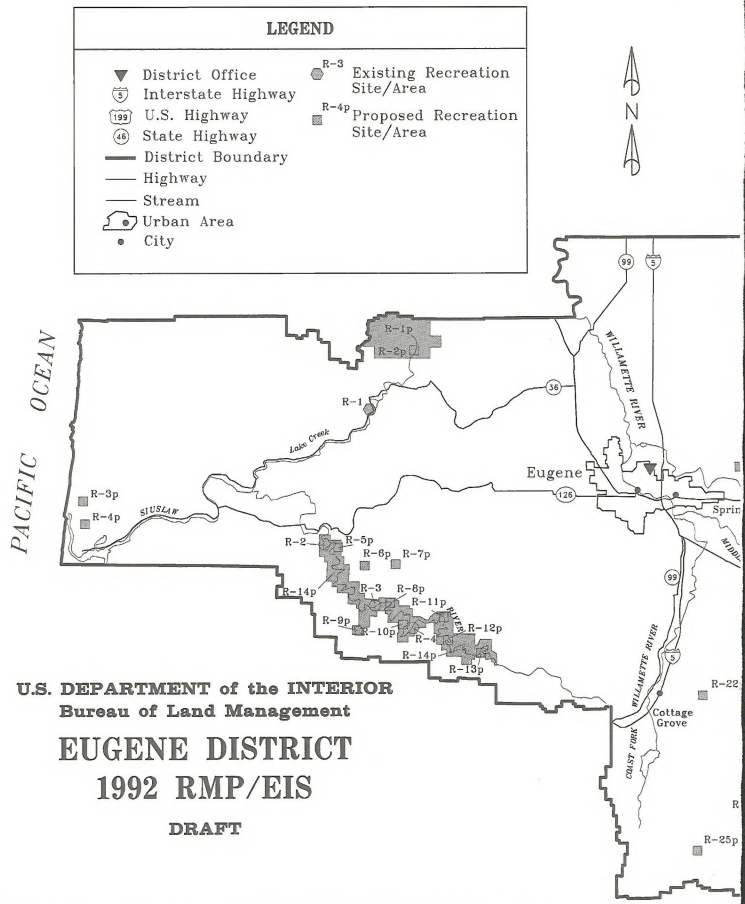
Sixteen river segments within the planning area meet the eligibility criteria for designation and thus would be eligible for suitability study based on their free flowing character and outstandingly remarkable values (see Map 3-WSR-1). Four of these river segments are located in areas where BLM administered lands provide substantial control of the river segment (40 percent or greater of adjacent land ownership). These four river segments plus five additional segments were selected for river assessments (see Appendix 2-H). They were selected 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 outstanding remarkable values. The South Fork Alsea also qualified for an assessment study and it is being handled by the BLM Salem District.

Timber Resource

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-T-1 displays the results of



Marten Rapids on the McKenzie River - Photo by Saundra Miles.



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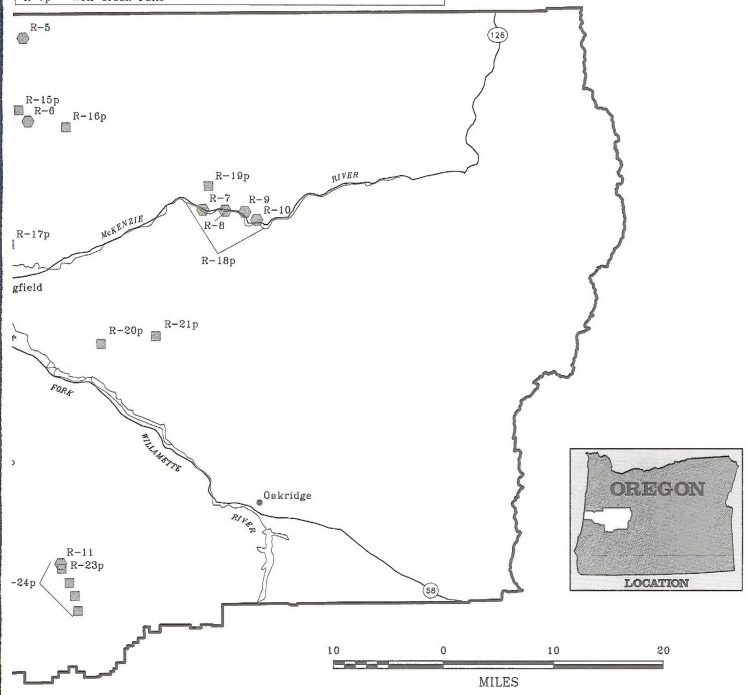
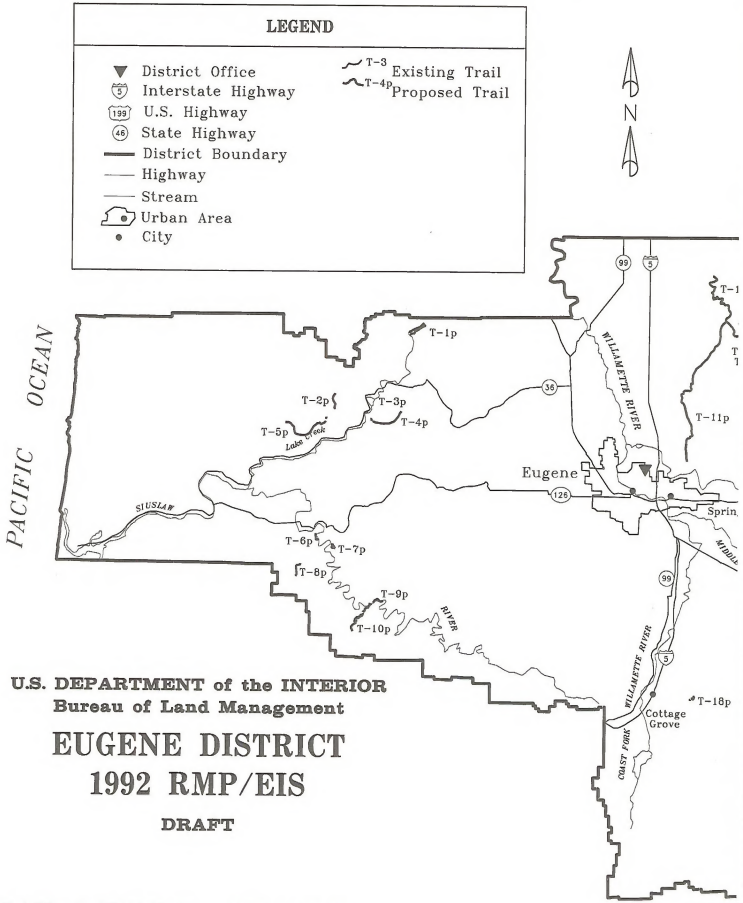
MAP 3-REC-1: RECREATION SITES

Recreation Site/Area Key

R-1 = Lake Creek
R-2 = Whittaker Creek
R-3 = Clay Creek
R-4 = Haight Creek
R-5 = McKercher Park
R-6 = Shotgun SRMA
R-7 = Whitewater
R-8 = Marten Rapids
R-9 = Rennie Landing
R-10 = Silver Creek Landing
R-11 = Sharps Creek

R-1p = Upper Lake Creek SRMA
R-2p = Hult Pond
R-3p = Heceta Sand Dunes
R-4p = Cannery Dunes
R-5p = Big Canyon Trail Area
R-6p = Saleratus
R-7p = Wolf Creek Falls
R-8p = Siuslaw Bend
R-9p = Esmond Lake
R-10p = Oxbow
R-11p = Sidog
R-12p = Frying Pan
R-13p = Doe Creek
R-14p = Siuslaw River SRMA
R-15p = Homestead
R-16p = Mohawk Wayside
R-17p = Gilkey Creek SRMA
R-18p = McKenzie River SRMA
R-19p = North Fork Gate Creek
R-20p = Fall Creek Reservoir
R-21p = Fall Creek
R-22p = Row River
R-23p = Sharps Creek Expansion
R-24p = Sharps Creek SRMA
R-25p = Edwards Creek





U.S. DEPARTMENT of the INTERIOR
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EUGENE DISTRICT
1992 RMP/EIS

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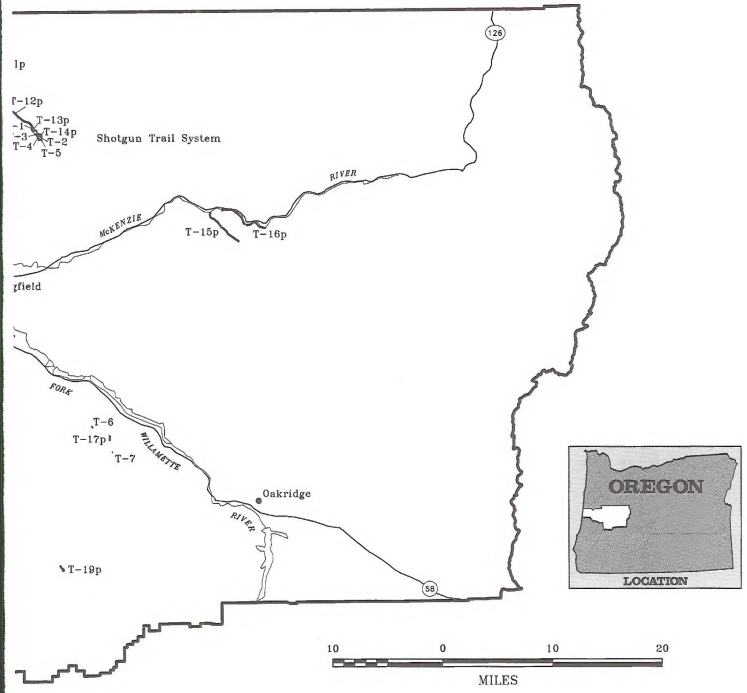
MAP 3-REC-2: TRAILS

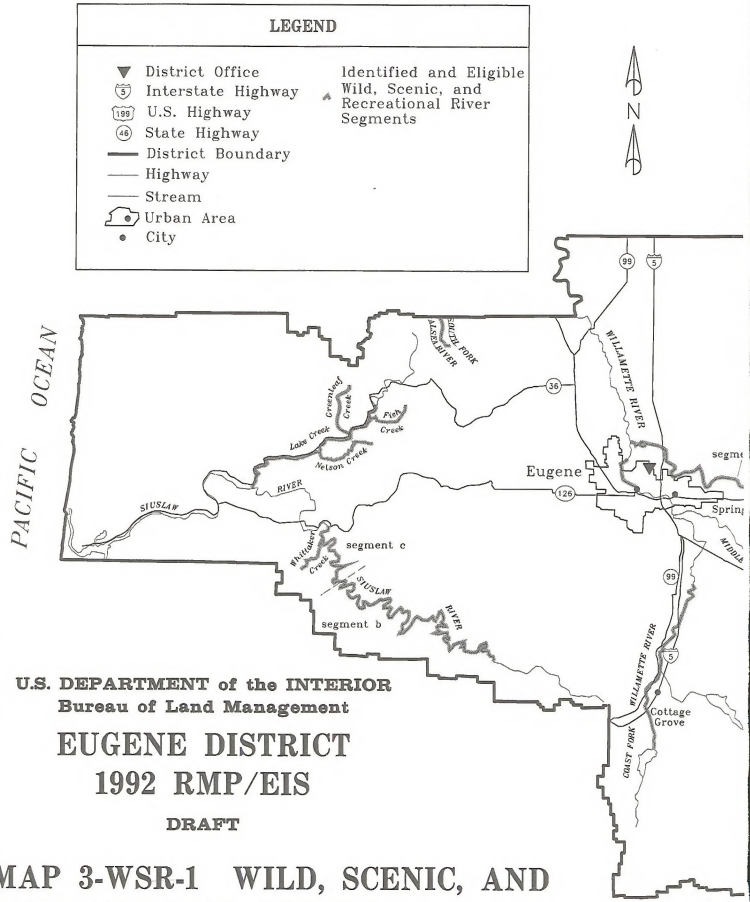
Trail Key

T-1 = Shotgun Creek
T-2 = Meadow Loop
T-3 = Loop Trails
T-4 = Lower Trail
T-5 = Drury Ridge
T-6 = Eagle's Rest
T-7 = Forest Service #3462

T-1p = Hult Pond Equestrian Loop
T-2p = Greenleaf Creek
T-3p = Lake Creek
T-4p = Fish Creek
T-5p = Deadwood - Windy Peak
T-6p = Whittaker Creek Ridge

T-7p = Big Canyon
T-8p = Whittaker Creek Falls
T-9p = Siuslaw River
T-10p = Haskins Creek
T-11p = Coburg Hills
T-12p = Coburg Hills Connector
T-13p = Shotgun Connector
T-14p = Boy Scout Trail
T-15p = Marten Creek
T-16p = South Bank McKenzie
T-17p = Forest Service
T-18p = Row River Overlook
T-19p = Sharps Creek





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1992 RMP/EIS

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MAP 3-WSR-1 WILD, SCENIC, AND RECREATIONAL RIVERS

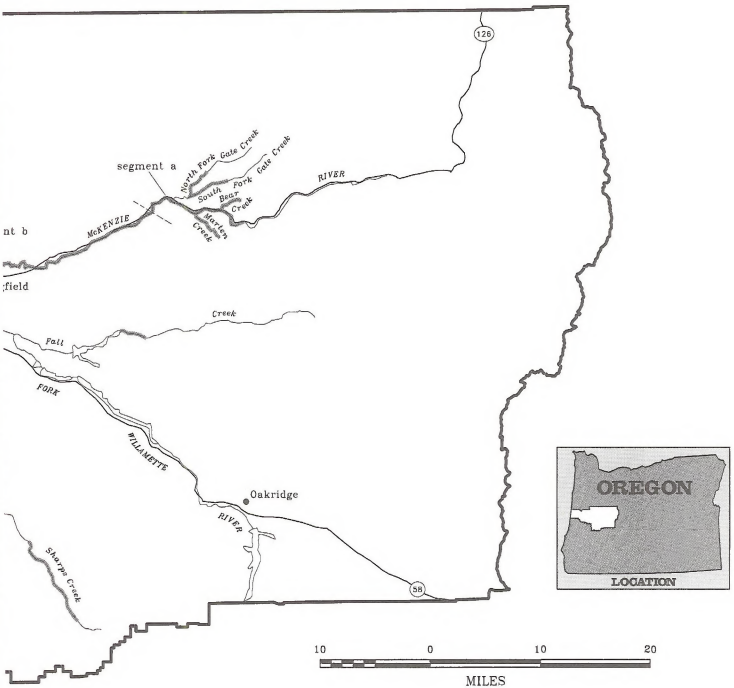

126
segment a
North Fork Gate Creek
South Fork Gate Creek
RIVER
McKENZIE
Martins Creek
nt b
:field
Creek
Fall
FORK
WILLAMETTE
Oakridge
RIVER
58
SHARPS Creek
OREGON
LOCATION
10
0
10
20
MILES

Table 3-WSR-1 - Potential Wild and Scenic Rivers - Found Eligible

River Name	Class	ORV*	Total River Seg. Miles	BLM River Miles	% BLM Corridor
South Fork Alsea	Recreation	Geology	The BLM Salem District is taking Riverthe lead on this river.		
Bear Creek	Wild	Fish	1.8	1.6	89
Fish Creek	Recreation	Fish	5.1	3.9	76
Greenleaf Creek	Recreation	Fish	7.4	4.3	58
Marten Creek	Recreation	Fish	3.9	3.3	85
Fall Creek	Recreation	Recreation	6.0	0.5	8
North Fork Gate Creek	Recreation	Fish	7.9	0.6	8
South Fork Gate Creek	Recreation	Fish	8.9	0.5	6
Lake Creek (Seg b)	Recreation	Recreation Fish	18.25	0.5	3
McKenzie River (Seg a)	Recreation	Fish Recreation Scenic	11.0	3.5	32
McKenzie River (Seg b)	Recreation	Fish Recreation Scenic Wildlife	40.0	0.5	1
Nelson Creek	Recreation	Fish	7.0	1.0	14
Sharps Creek	Recreation	Recreation	11.1	4.4	40
Siuslaw River (Seg b)	Recreation	Fish Wildlife	46.3	15.6	34
Siuslaw River (Seg c)	Recreation	Recreation Wildlife	13.4	3.5	26
Whittaker Creek	Recreation	Fish	6.5	2.4	37
Willamette River	—	State Greenway	30.0	0.001	<1

* ORV = Outstanding Remarkable Value

Table 3-WSR-2 - Potential Wild and Scenic Rivers - Found Ineligible

River Name	Class	ORV*	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

*ORV = Outstanding Remarkable Value

the TPCC as of October 1, 1988. Appendix 3-K 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.

Woodland - Woodland is forest land which is not included in the commercial forestland (CFL) allowable harvest base, and also includes all fragile nonsuitable land, noncommercial forestland, and nonsuitable commercial forestland.

Nonsuitable Woodland - Includes all fragile nonsuitable forestland 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.

Low Site - Sites that produce less than 20 cubic feet per acre per year of commercial species.

Noncommercial Species - Sites producing forest tree species (hardwoods) that are typically utilized as non-sawtimber products.

Nonsuitable CFL (Reforestation Problem) - Sites that cannot be reforested to meet or exceed minimum stocking levels of commercial species: 1) within 5 years of harvest using artificial regeneration and operational reforestation practices or 2) within 6-15 years of harvest using natural and/or artificial regeneration. These sites are classified as woodland.

Forest - Eugene district

Table 3-T-1 - TPCC Summary as of October 1, 1988

	Acres		
	O&C	PD*	Total
Nonforest			
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
Fragile nonsuitable	13,574	621	14,195
Low Site	83	0	83
Noncommercial Species	29	0	29
Nonsuitable CFL - Reforestation Problem	2,055	15	2,070
Subtotal	2,167	15	2,182
Nonproblem	4,947	187	5,135
Fragile Suitable	6,733	92	6,825
Cat. I - Reforestation Problem	212,746	3,803	216,549
Cat. II - Reforestation Problem	0	0	0
Combination Reforestation and Fragile Problem	54,153	3,541	57,694
Subtotal	278,580	7,623	286,203
Total	**306,023**	**8,692**	**314,715**

* Acquired Lands are included with Public Domain.

Suitable Commercial Forestland - Commercial forestland that is determined to be capable of sustaining long-term timber production.

Commercial Forestland (CFL) - All forestland that is capable of yielding at least 20 cubic feet of wood per acre per year of commercial tree species.

Nonproblem - Commercial forestland 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 five 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 forestland 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 five years of harvest for Category I lands. The regeneration period for Category II lands is 6-15 years.

District forestlands were inventoried in 1978 and 1988 to estimate the volume and age class distribution. Table 3-T-2 displays a comparison of the volume growing and age class distribution. Appendix 3-K provides additional information on inventories used.

The difference in inventoried acres displayed in Table 3-T-2 is a result of several factors including: 1978 acreage estimates were derived from the master title plats, 1988 estimates were derived by GIS; exchanges and acquisitions of land since 1978; construction of roads during the previous decade, etc.

As shown in Table 3-T-2, there is significantly more volume in the 1988 inventory than the 1978 inventory. The differences were analyzed by District and State Office personnel. Reasons for the difference include: inclusion of volume less than 30 years old in the 1988 data but not in the 1978 data; inclusion of hardwood volumes in the 1988 data but not in the 1978 data; differences in data analysis techniques between 1988 and 1978; and higher than expected growth. Refer to the Analysis of the Management Situation (AMS) and AMS appendices for a more detailed analysis.

The weighted average board foot/cubic foot ratio decreased during the decade as a result of harvesting timber in the larger size classes while ingrowth is primarily in the smaller diameter, younger age classes.

Table 3-T-3 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-T-2 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. 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-T-3 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-T-4 displays the volume of timber harvested by county and ownership. As in Table 3-T-3, 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-T-5 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-T-6 displays the number of acres by age class that have been subjected to intensive management practices through October 1, 1988.

Table 3-T-2 - Comparison of District Inventory Data 1978 and 1988

Age	Acres		Cubic Volume		Board Foot Volume	
Class	1978	1988	1978	1988	1978	1988
0	33,211	27,247	0	0	0	0
10	27,540	32,098	0	477,300	0	0
20	36,344	33,652	0	9,287,929	0	39,087,714
30	35,306	28,844	86,082,000	43,824,015	506,672,793	218,696,546
40	31,514	30,530	94,000,000	130,317,802	561,354,460	703,639,940
50	14,195	38,743	50,321,000	281,484,228	304,028,389	1,588,382,423
60	5,491	12,644	21,957,000	96,718,041	133,833,376	563,984,801
70	7,116	5,948	32,831,000	58,082,830	201,045,484	345,523,252
80	7,359	4,329	37,597,000	40,042,480	231,245,998	241,825,278
90	8,007	6,457	43,907,000	71,155,418	271,750,211	435,990,775
100	4,840	8,354	29,484,000	114,381,046	182,209,122	708,722,538
110	8,243	6,002	52,718,000	80,430,664	327,845,563	502,889,138
120	9,099	1,779	61,872,000	22,799,202	385,663,104	143,554,283
130	3,519	1,661	24,966,000	24,759,531	156,415,484	156,935,257
140	4,207	2,352	31,273,000	32,291,645	196,468,115	205,565,557
150	1,527	741	12,102,000	9,695,986	75,730,233	61,979,143
160	1,527	580	12,578,000	7,837,691	78,838,034	50,352,975
170	2,270	4,045	18,581,000	53,301,459	118,318,768	342,221,785
180	2,083	94	18,127,000	1,247,466	114,407,984	8,059,053
190	0	298	0	4,015,735	0	26,027,358
200+	42,851	39,507	405,401,000	463,851,558	2,568,198,473	3,014,974,451
Total	**286,249**	**285,903**	**1,033,797,000**	**1,546,002,026**	**6,414,025,591**	**9,359,412,267**

Note: 1978 acres are URA-4 acres, 1988 acres are suitable commercial forestland acres.
1978 volumes are net merchantable volume for commercial conifer species.
1988 volumes are net merchantable volume for commercial hardwood and conifer species.
1978 Avg. BF/CF ratio = 6.17
1988 Avg. BF/CF ratio = 6.05
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-T-3 - Forest Area and Growing Stock, by Owner and Timbershed (1989)

Owner	Forest Land		Available Growing Stock[1]
	Available	Not Available	(million cubic feet)
	(thousand acres)		
Eugene Timbershed*			
Public			
National Forest	721	544	3,682
Bureau of Land Mgmt.	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*			
Public			
National Forest	611	285	2,602
Bureau of Land Mgmt.	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*			
Public			
National Forest	713	547	3,743
Bureau of Land Mgmt.	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.

*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.

[1]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-T-4 - 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-T-5 - Timber Management and Forest Development Accomplishments

Practice	Average Annual Planned for 10 years	Average Annual Accomplished in 5 Years
Allowable Harvest Sold		
Million Cubic Feet	35.0	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:
FY 1988 is the last year in the base period for historical information in the RMP. In FY 1989-1991, additional funding was available for precommercial thinning and fertilization. During that period, 13,025 acres were precommercially thinned and 27,584 acres were fertilized.

Table 3-T-6 - Acres of Stand Treatment Accomplishments by Age Class (as of October 1, 1988)

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	27,247	313	0	0	0	0	0	0	0
10	32,098	8	758	0	23	0	0	0	0
20	33,652	0	9,484	0	2,408	0	0	0	0
30	28,844	0	13,094	0	881	0	0	0	
40	30,530	0	10,699	0	39	0	0	159	24
50	38,743	0	4,233	0	0	0	0	0	2,023
60	12,644	0	39	0	0	0	0	0	3,332
70	5,948	0	16	0	0	0	0	0	1,159
80+	76,197	0	12	0	0	0	0	0	1,212
Total	**285,903**	**321**	**38,335**	**0**	**3,351**	**0**	**0**	**159**	**7,750**

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.

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.

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. There are no Areas of Critical Mineral Potential (ACMP) nominated in the District.

It is BLM policy to encourage exploration and development of minerals using environmentally sound practices. Table 3-M-1 summarizes the potential for leasable, locatable, and salable minerals, and map 3-M-1 displays those areas of potential.

Leasable Minerals

The geologic setting in the Coast Range and portions of the McKenzie and South Valley Resource Areas is 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, 217,943 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 99,839 acres.

Table 3-M-1 - Mineral Potential (Acres)

Mineral Type	Low	Moderate	High	Total
Locatable	310,912	6,722	258	317,892
Salable	311,522	5,314	952	317,788
Leasable (Oil and Gas)	99,839	217,943	0	317,782
Leasable (Geothermal)	317,735	0	0	317,735

Master Title Plat (MTP) 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.

A total of 317,735 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.

Panning for Gold - Photo by Kris Ward.

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 250 acres of land are considered to have high potential, and approximately 6800 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 5300 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 a map kept by the District Geologist. Approximately 1,000 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 was 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

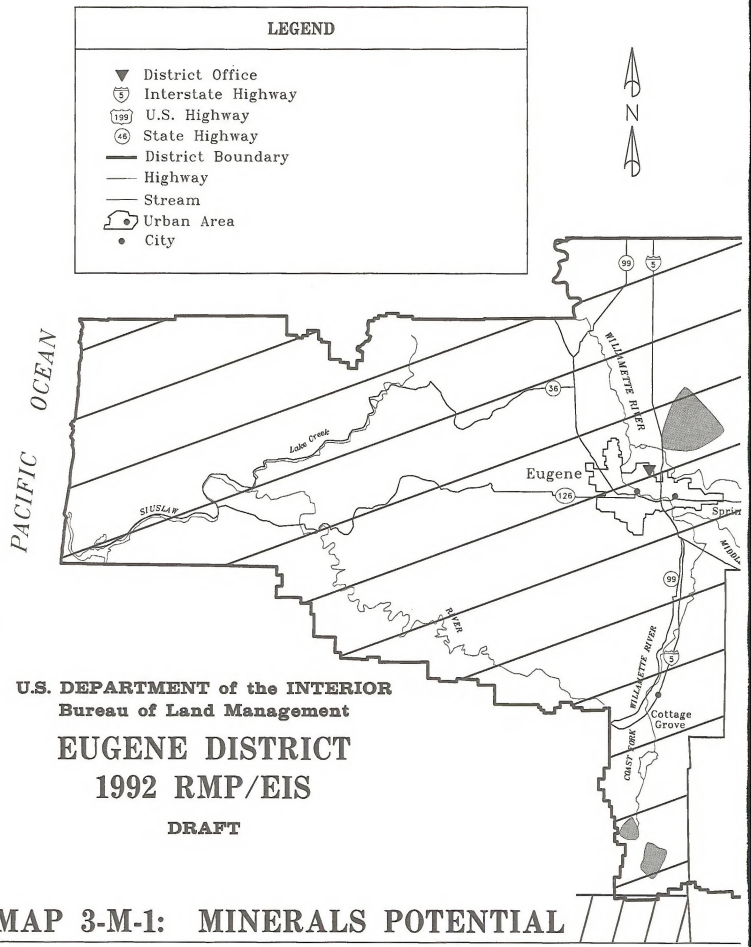
The Eugene District is located in the southern Willamette Valley and includes lands in Lane, Douglas, Benton and Linn counties. The District contains the cities of Eugene and Springfield, which combined make up Oregon's second largest metropolitan area. For purposes of socioeconomic description, the 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 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. 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 since 1980 remains at 10,515. Demographic information suggests that 13 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. The



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EUGENE DISTRICT
1992 RMP/EIS

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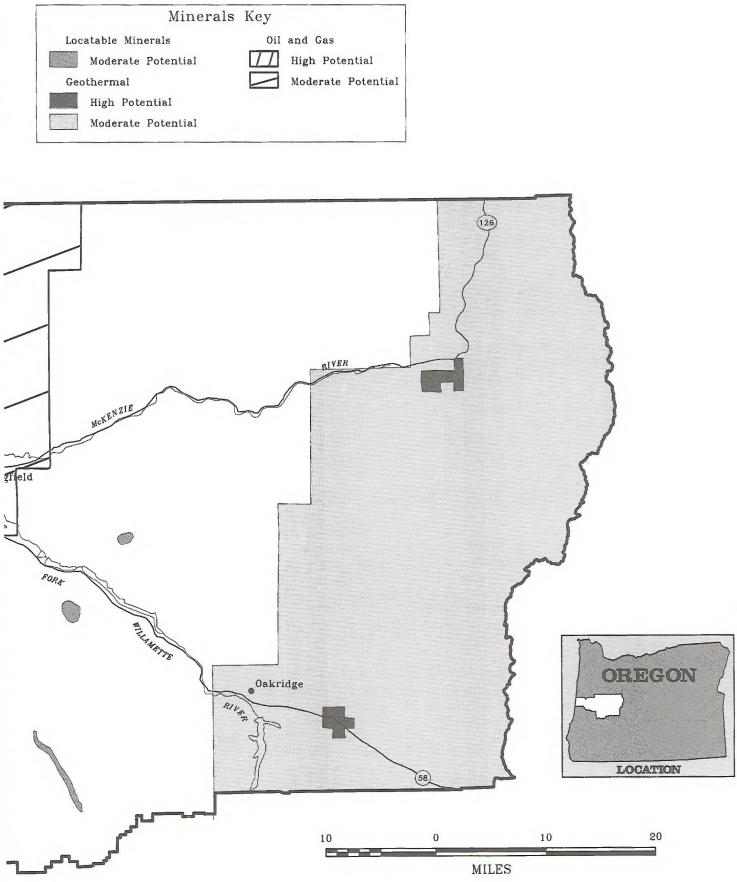
MAP 3-M-1: MINERALS POTENTIAL


Minerals Key
Locatable Minerals
Moderate Potential
Geothermal
High Potential
Moderate Potential
Oil and Gas
High Potential
Moderate Potential
126
RIVER
McKENZIE
field
FORK
WILLAMETTE
Oakridge
RIVER
58
OREGON
LOCATION
10
0
10
20
MILES

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. Between January 1989 and January 1991, the Oregon Employment Division recorded 22 cutbacks or closures in the wood products sector affecting 2,088 jobs. This was a 19 percent decrease from the 1984-1988 average wood products employment. 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 from the previous year.

Personal Income

Personal income statistics include both wage and non-wage income sources. Non-wage 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.

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 (Forest Products Committee, 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.

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 non-timber manufacturing jobs have been added to the Eugene/Springfield regional economy. These jobs have helped offset the loss of about 2,000 manufacturing jobs in the timber sector, 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 (non-durable 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 Committee (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 180-225 for an annual payroll of approximately $7 million. Another example, Blue Water Boats, located in Springfield, Oregon, 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 bachelors 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 months. At present, over 1,000 dislocated workers have enrolled in the program. The majority of these enrollees were previously employed by 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. Current statistics reflecting the program's success rate are unavailable at this time since students are enrolled for two years and the program is currently in the first year.

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

The BLM currently manages about 277,000 acres of forestland 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 non-industrial 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 dollars in local personal income. Respending effects added 1,210 jobs in other sectors and 17.1 million dollars in local personal income.

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, ORV use, camping, hiking, water sports, swimming and mountain biking. Community economic impacts occur when visitors from out of the region make purchases in the local economy. These "new" dollars create jobs and enhance personal income. The total level of 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 thousand annual visits were made to BLM

administered lands in the Eugene District by non-residents. Among these visitors, 4,800 were hunters and 15,900 were fishermen. Non-consumptive visitation by non-residents was estimated to be 239,100. Input-output analysis suggests that spending by these visitors generated 157 direct jobs and 1.68 million dollars in local personal income. Respending effects added 87 jobs and 1.32 million dollars in local personal income.

Fisheries

The BLM manages 533 miles of stream 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-ouput analysis estimates statewide employment of 7 direct jobs and 74,000 dollars of direct personal income is dependent upon the fisheries resource in the district. Statewide respending effects added 4 jobs and 75,000 dollars of personal income.

BLM Payments to County and State Governments

Activities on BLM administered lands generate income and employment throughout Oregon. In addition, State and local governments receive monies from timber harvest 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 9,627,226 million dollars. (USDI, BLMFacts) 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 seven 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). For Lane County, PILT payments averaged 133,816 dollars during the baseline period. These payments are not expected to change under any foreseeable BLM management strategies.

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-SE-1 displays the tax rate during the baseline period and to the present. The purchasers of BLM timber pay this tax.

Table 3-SE-1 - 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
7/1/91-6/30/93 $1.64	$0.39	$0.30	$0.50	$0.31	$0.14

Source: Oregon Department of Revenue. Personal Commmunication, Rick Schaek. July 1991.

Community Stability

The years after the baseline period of 1984 to 1988 included a National recession felt locally. These most recent years may indicate the types of social and economic impacts that could be expected if BLM management plans have an adverse impact to local economies. Employment losses during 1989, 1990 and 1991 occurred in all sectors of Oregon's economy including electronics, wholesale and retail trade, manufacturing, and lumber and wood products. Of these industries, BLM management is most likely to impact the lumber and wood products sector.

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	Elmira	Marcola
Cottage Grove	Harrisburg	Noti
Culp Creek	Lorane	Oakridge
Deadwood	Lowell	Saginaw
Dexter	Mapleton	Springfield
		Swisshome

Rural Interface Areas

County governments have zoned some private forest and non-forest lands that are intermingled with BLM administered forestlands 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 (RIAs). It should be noted that rural residents living in the areas identified in the table below are not the only residents with potential concerns, nor are they all necessarily affected by or concerned about BLM's management activities. The RIAs described below have been defined for analytical purposes, not as management areas.

The lands managed by the Eugene District are located in four counties. There are no RIAs in the Eugene District portions of Benton or Douglas counties. Table 3-RIA-1 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-RIA-1). The total amount of BLM administered land within RIAs 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 non-resource uses (e.g., no homes unless necessary for management of forest resources); they may allow non-resource 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 non-resource 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 RIAs are highly desirable for residential use. This use is a concern to BLM for several reasons:

Table 3-RIA-1 - 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

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 in forestlands may be vulnerable to wild forest fires and may cause problems for protecting resource lands as well as the private structures from wild fires.

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.

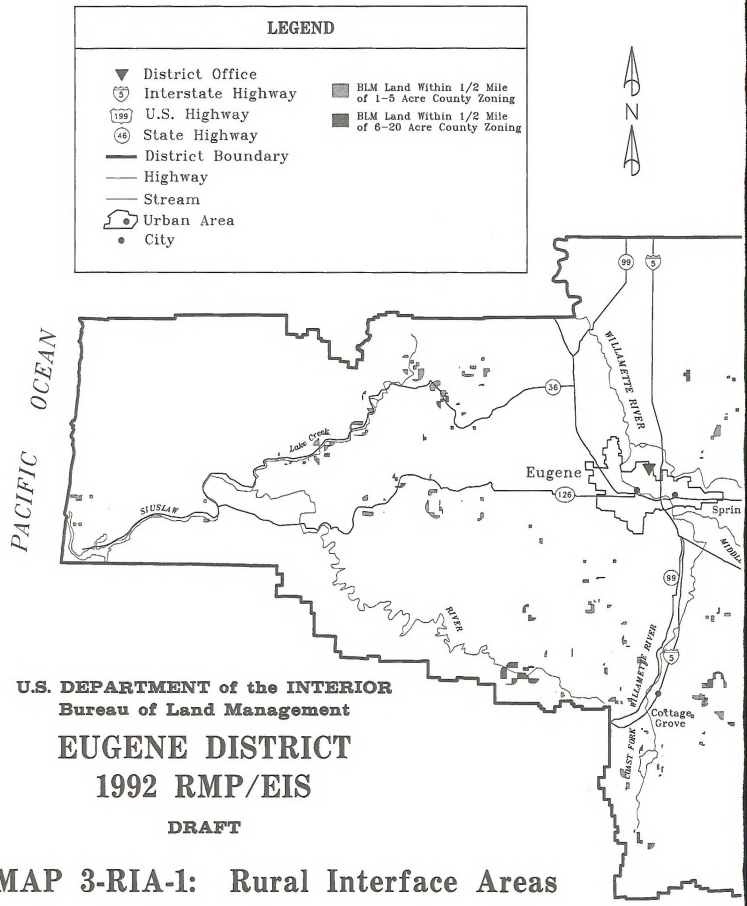
2. Residents taking domestic water from a stream that would be temporarily affected by road building or other forest management operations.

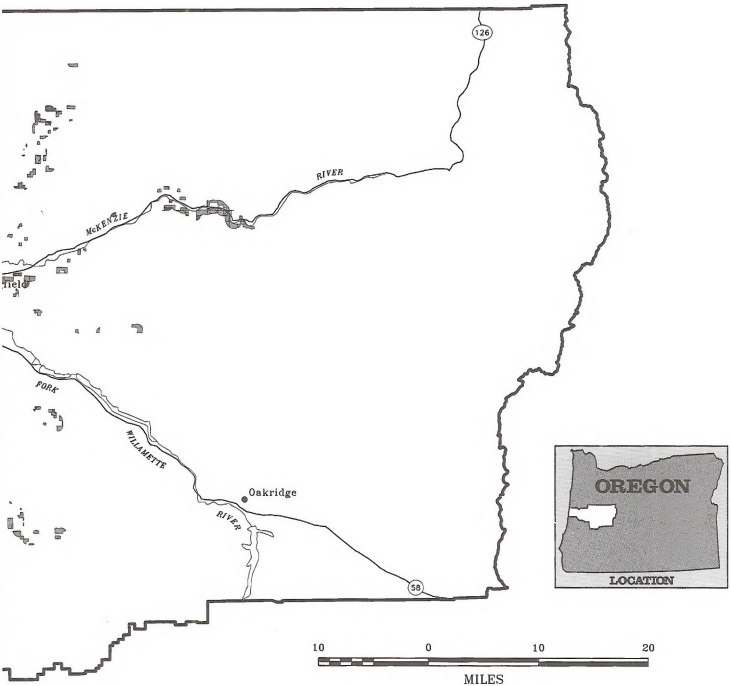
3. Residents objecting to clear cuts on slopes within immediate view of the home.

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 problems and similar ones are expected to increase with time because significant amounts of private land that are intermingled with or adjoin BLM administered lands are planned and zoned to allow rural residential development.


LEGEND
District Office
Interstate Highway
U.S. Highway
State Highway
District Boundary
Highway
Stream
Urban Area
City
BLM Land Within 1/2 Mile of 1-5 Acre County Zoning
BLM Land Within 1/2 Mile of 6-20 Acre County Zoning
N
PACIFIC OCEAN
WILLAMETTE RIVER
Lake Creek
Eugene
SIUSLAW
RIVER
Cottage Grove
COAST FORK
U.S. DEPARTMENT of the INTERIOR
Bureau of Land Management
EUGENE DISTRICT
1992 RMP/EIS
DRAFT
MAP 3-RIA-1: Rural Interface Areas


126
RIVER
McKENZIE
Tield
FORK
WILLAMETTE
RIVER
Oskridge
58
OREGON
LOCATION
10
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MILES

Chapter 4
Environmental Consequences

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 S-2).

Preliminary analysis, including scoping, indicates that the alternatives would not significantly impact the following: climate, 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 three 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 which cannot be avoided.

These topics are addressed, where relevant, as part of the discussion of environmental consequences for each component of the environment.

The baseline period to which predicted future effects are compared is normally 1984-1988, the period for which the existing plan has been in effect 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 ten-year period, even though such a harvest may occur two or three years after sale. Long-term is the period beyond 10 years. Long-term impacts were not analyzed in detail whenever meaningful analysis depended on specificity provided by the 10-year timber management scenario, nor for many cumulative effects that are primarily dependent on (forecasting) activities on private lands (e.g., effects on water and elk).

Knowledge about the physical, biological and socio-economic relationships discussed in this chapter is not complete. Much remains to be learned about the ecology and management of forests. Resource inventories are costly and those completed so far fall short of the ideal for every resource. The relationships between resource supply and the economy and communities are also imperfectly defined.

The Interdisciplinary Planning Team evaluated that information in light of Council of Environmental Quality Regulations on incomplete or unavailable information. The planning team sometimes concluded that missing information would improve their estimates. However, the basic data are sufficient and the relationships are well enough established to allow a reasoned choice among the alternatives.

A number of analytical models have been used to assess effects of the alternatives on various components of the environment. These models, like all models of complex biological-physical or economic systems necessarily simplify reality. They also are limited by current knowledge, but represent a synthesis of the knowledge of BLM staff and/or outside scientists familiar with the subjects of concern.

Model evaluation involves extensive validation through testing and comparison of predictions with actual outcomes. In that sense, most of the models used are too new to be validated. In fact, such validation of most of these models would take decades. Nonetheless they provide the most useful available methods, other than analyst intuition, for comparing probable differences in outcomes from implementation of the various plan alternatives. Model outputs are acknowledged not to be absolutes.

The application of the models to specify aspects of Alternative C and the Preferred Alternative, and other analyses of effects of that alternative, are attended by a lower level of confidence than the analyses of other alternatives. This circumstance is due to the substantially untested nature of many of these alternative

prescriptions. No models are absolute predictors of outputs or consequences that are quantified. 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.

In addition to analyses of the consequences of the seven land-use allocation alternatives fully analyzed, BLM has conducted some sensitivity analyses of the effects of varying management approaches. Sensitivity analysis is a process of identifying opportunity costs associated with differing approaches to sensitive land-use allocations and other decisions. It can assist selection of a Preferred Alternative by examining specific trade-offs that could result from making changes in single sensitive elements of an alternative.

Sensitivity analyses were conducted of potential allocations for riparian zone protection and old growth and mature forest protection or partial retention. In addition, sensitivity analyses were conducted of certain variations in the timber management prescriptions for the Preferred Alternative and Alternative A. These analyses are discussed in Appendix 4-L.

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.
- 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 ten-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 agreements.
- For analysis of cumulative effects, most private forestlands would be intensively managed with final harvest on commercial economic rotations averaging 40-60 years.

A 10-year representative timber management scenario has been 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 other alternative.

For each alternative, random spatial selection of timber harvest units was linked to the TRIM-PLUS allowable sale quantity calculation to determine the 10-year scenario that meets management selection criteria to provide the calculated allowable sale quantity identified for the alternative. The selected scenarios were evaluated for practicality by Resource Area timber sale planners. Estimates of logging practices and average annual levels of associated activities and intensive management practices for the decade of the plan are displayed in Table 4-I-1. In borderline cases, the estimates assume the practice which results in greatest impact.

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 of impacts of the alternatives. Actions (such as timber sales) implementing the planning decisions will be analyzed before implementation to determine if impacts addressed in the EIS (e.g., impacts to water quality in the analytical watersheds) might differ significantly from those predicted based on the 10-year scenarios. For analysis purposes, it was assumed that all harvest units in any watershed may be logged within any 5-year period.

Ten-year scenarios of expected mineral exploration and development activity have also been developed. They are set forth in Appendix 4-K.

Analysis of the alternatives is also based on their different levels of planned activities as shown in Table 2-1.

Table 4-I-1 - Estimated Annual First-Decade Levels of Timber Management Activity by Alternative

Activity (acres* except as noted)	Alternative NA	A	B	C	D	E	PA
Regeneration Harvest	3,750	4,410	3,890	1,120	1,570	1,690	1,670
Commercial Thinning/Density Management	4,840	1,410	1,480	2,640	800	790	2,210
Road Construction (miles)	269	291	261	227	145	178	220
Road Construction	1,470	1,590	1,420	1,240	790	970	1,200
Ground-based Yarding	80	98	78	80	79	75	123
Cable Yarding, No Suspension	710	680	691	737	464	534	611
Cable Yarding, Partial Suspension	2,791	3,052	2,716	1,278	861	931	1,118
Cable Yarding, Full Suspension	498	550	485	114	97	83	159
Broadcast Burn	730	780	690	90	150	180	540
Mechanical Pile and Burn	1,260	1,350	1,210	270	610	640	660
Hand Pile and Burn	960	1,030	900	550	410	440	520
Conversion	0	95	91	76	55	20	49
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	2,200
Vegetation Control	2,780	3,280	2,860	50	1,080	1,180	1,110
Damage Control	3,050	3,590	3,180	880	1,320	1,420	2,360
Precommercial Thinning	3,640	2,530	2,310	2,170	1,580	960	2,760
Fertilization	13,010	9,040	7,880	4,160	3,030	2,650	5,240

* All acreage values rounded to the nearest 10 acres.

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 plan/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.

- Exclusion of livestock grazing from riparian zones where such exclusion is considered important to maintenance or recovery of riparian vegetation.

Effects on Global Climate

A large body of 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 one degree centigrade or as high as five degrees centigrade 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 affect primarily 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.

A key factor in assessing the impact of timber harvest and forest regrowth on the amount of carbon in the atmosphere is the amount of carbon stored within the trees of the forest. One analysis shows that forests managed on rotations of less than 100 years would store less than half the amount of carbon stored in old growth stands (Harmon et al., 1990), leaving more carbon in the atmosphere. Analysis by Harmon et al. indicated that about 42 percent of timber harvested in the northwestern United States enters long-term storage in products, while paper production largely results in the loss of carbon dioxide to the atmosphere. 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 one-tenth of one percent to the total carbon currently in the atmosphere. The largest acreage of old growth (age class 200+) anticipated for harvest over a ten-year period in any plan alternative is 32,738 acres in Alternative A, while the Preferred Alternative would harvest 2,695 acres of old growth. Although they store less carbon in total, young, fast-growing trees 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. But 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 contributing 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 ten years in any alternative (Alternative A) is 850,000 tons (see Effects on Air Quality discussion), while under the Preferred Alternative, approximately 770,000 tons would be burned. These levels of burning would contribute a maximum of 1,275,000 tons and 1,155,000 tons of carbon dioxide to the atmosphere, respectively. (Burning a ton of slash can create up to 1_ tons 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, given that 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 Preferred Alternative could add .00027 percent to the carbon in the world's atmosphere, an unavoidable adverse impact.

The cumulative effects of BLM activities under the Preferred Alternative and similar activities proposed or anticipated on other forestlands in western Oregon and Washington for the expected ten-year life of the RMP, would add an estimated 180 million tons of carbon dioxide to the world's atmosphere, increasing carbon there by .02 percent. This includes 130 million tons from old growth timber harvest indicated by Preferred Alternatives in other BLM draft RMPs for western Oregon and by the U.S. Forest Service decision on

their Final EIS, **Management Direction on Northern Spotted Owls (1992)**, and 40 million tons from prescribed forest management burning by all landowners as controlled by the ceilings established in the Oregon Smoke Management Plan and the Washington State Smoke Management Plan. The effect on global climate would be slight. Total increases in atmospheric carbon dioxide from all worldwide sources, by comparison, are occurring at a rate of almost one-half percent annually (Trexler, 1991). For further discussion on Analytical Assumptions about Global Climate Change see Appendix 4-A.

Effects on Air Quality

The major sources of air pollutants associated with BLM resource management activities are smoke from prescribed burning and fugitive dust from use of unsurfaced roads, rock roads, road construction and maintenance.

Prescribed burning is the only resource management activity proposed under any alternative that could have a notable adverse impact on local or regional air quality. Smoke from prescribed burning adversely affects visibility at the point of ignition.

Under all alternatives, prescribed burning activities, regardless of resource management objectives, would follow guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. At times, it would be necessary to use methods other than prescribed burning to meet site management objectives because there is insufficient airshed capacity on a day-to-day basis for burning in and adjacent to designated areas to accommodate planned prescribed burns.

In order to comply with the OSMP, use of alternative treatment methods to broadcast burning would be part of all alternatives. Use of these techniques would be applied to areas directly adjacent to any designated nonattainment areas, and to sites where fire is not the best technique to meet resource management goals. Under all alternatives except Alternative A, biomass consumption is expected to be 50 percent less than baseline consumption levels. The restrictive allocation of burning authorizations under the OSMP has been sufficient to accommodate total prescribed burn planning proposed by timberland owners within the this planning area even though meteorological conditions sometimes prohibit burning on several days throughout the year. Burning by other landowners may or may not increase but emission reduction requirements mandated by the Visibility Protection Plan and supported by the Smoke Management Plan will determine the number of tons of emissions allowed. Cumulative prescribed burning on District lands under any alternative would be of relatively low risk in causing significant deterioration of ambient air quality. The Eugene District has achieved 50 percent reduction in total emissions from the emission baseline period.

Proposed burning as listed under Alternatives C, D, E and the Preferred would not be in excess of estimated emission levels targeted for the year 2000. Under these alternatives, all site preparation needs, wildlife and plant retention, and biodiversity requirements would be met without exceeding air quality emission requirements.

Current control strategies for Particulate Matter (PM) emissions have been very successful in reducing total emissions from prescribed burning in western Oregon. Visibility impacts on Class I areas and impacts on health in the Eugene-Springfield airshed and beyond have been reduced. It is anticipated that intrusions into the nonattainment areas from BLM management activities will only occur from unpredicted weather changes. These intrusions will be few in number, minor in concentration, and of short duration.

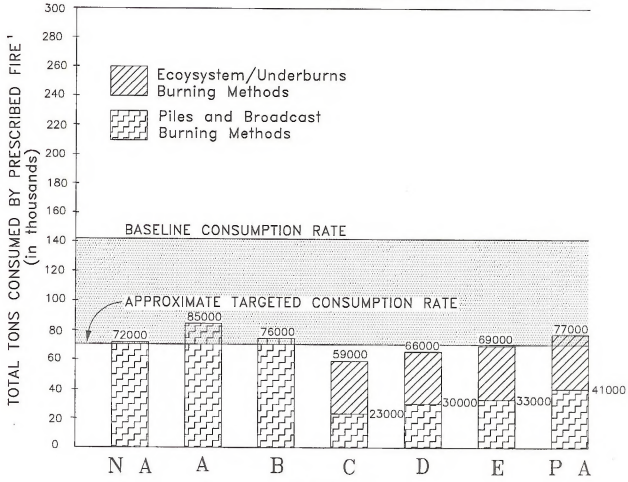
Biomass consumption from BLM prescribed burning would be the highest under Alternative A and lowest under Alternative E, with a slight increase for the Preferred Alternative but still under the year 2000 target. Alternatives C, D, E and the Preferred use prescribed fire to accomplish resource management objectives for wildlife habitat improvements, ecosystem health, and maintenance and increased biological diversity. Total biomass consumption for these alternatives, using underburning techniques, i.e., burning under standing trees, brush, and grass sites, could be 10 to 80 percent less than that associated with broadcast burning of clear cuts under Alternatives A and B. Table 4-A-1 graphically displays the effects of various alternatives on total tons of biomass consumed by prescribed burning for timber management and other resource management uses of prescribed fire.

Fugitive dust from new road construction and maintenance of older unpaved roads normally settles within a short distance from the point of origin. It has a negligible impact away from the construction and maintenance sites. Fugitive dust associated with road use also has negligible impact away from unpaved roads.

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

TABLE 4-A-1 PREDICTED ANNUAL CONSUMPTION BY ALTERNATIVE



	N A	A	B	C	D	E	P A
Piles[3]	2020/25	2380/25	2110/25	820/25[2]	1020/25	1080/25	1180/25
Broadcast	660/33	780/33	690/33	90/33	150/33	180/33	340/33
Underburns	N/A	N/A	N/A	1800/20	1800/20	1800/20	1800/20

[1] Approx. – Acres x Tons/Acre = Total Tons Consumed

[2] Acres/Tons per Acre

[3] Maximum Consumption, actural rate is approximately 50% less for portion handpiled

Table 4-A-1 Predicted Annual Consumption by Alternative

administered lands would be substantially less under Alternatives C, D, E and the Preferred compared to Alternatives A and B. Firewood availability will 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.

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.

The Eugene District's baseline emissions (1976-1979) of 23,885 tons have been reduced 50 percent as of 1991. The target date for 50 percent emissions is the year 2000. It is estimated that the Eugene District may be required to burn an average of 1,800 acres annually for ecosystem management and maintenance for biodiversity. The total emissions will be less than annual emission reduction targets by the year 2000.

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, Management Direction Common To All Alternatives section) and Best Management Practices (BMPs) in Appendix 2-A 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 soils related adverse impacts. This determination would be accomplished during the interdisciplinary team review of specific projects.

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 Preferred.

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 2-A) are used to protect them. These sites would be managed using BMPs (see Appendix 2-A) and other mitigating measures to minimize impacts from management activities. Unavoidable impacts may occur from unforseen 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-S-1 lists acres of fragile suitable, restricted classifications harvested by alternative.

Forest management practices (including road construction), recreation, mining, and Off-Road Vehicle (ORV) use may affect soil properties and productivity. Some kinds and degrees of disturbances created by forest

Table 4-S-1 - Approximate Acres[1] of TPC Fragile Suitable, Restricted Classifications Harvested by Alternative

Classification	Alternatives						
	NA	A	B	C	D	E	Preferred
Soil Moisture	689	407	376	260	166	174	272
Nutrient	10	6	5	4	2	2	4
Slope Gradient	1,082	640	591	408	261	0	427
Mass Movement	256	151	140	96	62	64	101
Groundwater	89	52	48	33	21	22	35
Total	**2,126**	**1,256**	**1,160**	**801**	**512**	**262**	**839**

[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.

management practices are considered acceptable while others are detrimental to long-term soil productivity. The extent of soil disturbance depends on numerous factors. Soil type and condition, equipment used, topography, degree and extent of implementation of planned practices and mitigation measures, and skills of individual equipment operators contribute to the degree of disturbance and resultant effects. 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 2-A), and practices in "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 regimes 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 4-C 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 two 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 three to five passes when soils are relatively dry (Froehlich and McNabb, 1983; Steinbrenner, 1955). Wert and Thomas (1981) reported Douglas-fir growth loss of 43 percent on ground-based yarding skid trails and 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. Dymess (1967) and Ruth (1967) reported soil disturbance created by highlead 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 prac-

tices would have insignificant (less than 1 percent) growth loss effect (see "Management Direction Common To All Alternatives" section 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. Across all of the alternatives, the majority (61-82 percent) of proposed harvest acres would be harvested with a cable system with at least lead-end suspension. Cable systems with full suspension would be used on 3-12 percent of proposed harvest acres, no suspension will be used on 16-33 percent, and ground based systems would be used on the remaining 2-7 percent. Mechanical site preparation is scheduled for a high of 1,350 acres for Alternative B to a low of 270 acres for Alternative C (see Table 4-I-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-I-1), have the greatest risk to create adverse impacts from compaction/displacement. This is because of the greater risk for unforseen circumstances of not implementing actions required to achieve insignificant growth loss.

Soil Surface Erosion and Mass Wasting (Landsliding)

Soils in the District are subject to two 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 to natural levels for all alternatives due to protection from harvest of unstable sites and successful implementation of BMPs, mitigation measures, (Appendix 2-A), and management practices common to all alternatives (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. Alternatives D and E 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-I-1). Alternative C and the Preferred Alternative 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-S-1), have the most potential for increasing the rate of mass failures compared to natural conditions.

Nutrient Status and Soil Biology

Because of the interdependence between aboveground organic matter supplies and soil nutrient cycling and availability, management of the surface organic material can strongly influence soil productivity. Decaying plant components, including large downed woody debris, produce an organic layer on the soil surface, which decomposes into soil organic matter. This provides plant nutrients, a supply of energy to soil microorganisms, and a medium for water storage. Soil microorganism activity has been directly linked to soil productivity (Harvey et al., 1979). Nitrogen is a limiting growth nutrient in many Pacific Northwest sites, and the surface organic layer (duff) is a primary source of nitrogen for tree growth.

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. Harvesting and site preparation activities would be most intense and frequent 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-I-1). Alternative C would have the least intense and frequent regeneration harvest and site preparation activities, while the Preferred Alternative would have the second-least (Table 4-I-1). For all alternatives, management prescriptions are designed to avoid or minimize soil damage (see Chapter 2, "Management Direction Common To All Alternatives" section and BMPs, Appendix 2-A). 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 be insignificantly 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 Alternatives C and the Preferred.

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 Preferred Alternative. Fertilization may be used under Alternatives C and the Preferred 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. Alternatives C and the Preferred 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 affect 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 the 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 predict definitive yields because it has not been verified 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 4-B. 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 one 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, E, and the Preferred).

Forest management activities may affect soil organisms. Intense burning 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 associate soil organisms. Soil organisms could be affected most under Alternatives NA, A, and B (Table 4-I-1). The least impacts would occur under Alternative C due to the amount of organic material that would be retained on sites and less intensive site preparation treatments. Alternatives D and E and the Preferred would have intermediate levels of effects due to their intermediate acreages of regeneration harvest and site preparation (Table 4-I-1).

Cumulative Effects

Under all alternatives, construction of rocked and/or excavated roads, most quarries, and water impoundments are irreversible or irretrievable commitments of the soil resource. Impacts to the soil resource should be negligible for all alternatives if BMPs (Appendix 2-A) and management practices common to all alternatives (Chapter 2) are implemented.

Effects on Water Resources

Introduction

All forest management activities can cause impacts on water resources. Appendix 3-C discusses 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. Each watershed was analyzed to determine the impacts expected under the various alternatives to existing water resources, stream channel, upland portion of the watershed, water quality parameters, and overall condition of the watershed.

Because BLM administered land is intermingled with other ownerships in a checkerboard pattern, analysis of impacts to water resources from activities only on BLM administered land would have little meaning. Therefore, the analytical conclusions that follow address the cumulative impacts of activities on BLM administered lands under the various alternatives combined with expected activities on private and other lands. Because the flow (quantity of water) increases downstream, diluting any impact, cumulative impacts to rivers and streams in western Oregon tend to be the average of all impacts within the watershed rather than the sum of all impacts within the watershed. Impacts to lakes and groundwater tend to be additive because the water quantity usually remains relatively constant. Cumulative impacts over time are usually additive. In many watersheds impacts from timber harvesting last for only a few years due to the rapid growth of vegetation.

Impacts to Water Resources: There is no evidence that any of the alternatives would impact the existing water resources listed in Chapter 3. Any land transfer occurring during the planning period could change the acres or river miles described in Chapter 3; however, such changes would be very small.

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 under "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. Only that amount of water is reserved that is reasonably necessary for the preservation and protection of those features 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 (BMPs) (Appendix 2-A) than by any differences between alternatives.

The stability of some stream channels would be impacted by this plan under all alternatives as well as activities of other landowners. The BMPs (Appendix 2-A) are designed to minimize or eliminate direct impacts on BLM lands from management activities, such as roads and yarding methods, that disturb stream banks. Direct impacts to channels on private lands are expected to decrease somewhat due to changes in the Oregon Forest Practices Act (OFPA) rules. The largest

Indirect impacts to channel stability are expected to come from increases in the magnitude or duration of peak flows. These changes can be caused by management activities in the upland areas. Long-term impacts would be expected due to increases or decreases of coniferous tree species that provide future large woody debris. The lack of large woody debris causes streams to down cut and straighten their course, creating an unstable condition. The effects of this plan on large woody debris are discussed below. The impacts to stream stability have not been directly quantified. The decreases in woody debris, or increases in peak flows described below, can be used as an indirect measure of impacts to stream stability.

Successful implementation of the BMPs would prevent any significant short-term changes in the amount of large woody debris in BLM streams. Alternatives NA, A, B, C and PA 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. All alternatives would have the long-term effect of increasing large woody debris in any perennial BLM streams that are presently deficient. This material would come from coniferous trees that are preserved or intentionally grown in Riparian Management Areas (RMAs). 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, which are presently deficient, and decrease 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 of this debris in streams in the operating area (Chapter 3).

The condition of riparian vegetation affects all aspects of the functioning of the channel (see Appendix 3-C). 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 present and future impacts will happen on lands where natural riparian areas are converted to pasture, agriculture, or urban uses. The other practice that is correlated to impacts is the use of ground based equipment for silvicultural practices. Differences between alternatives are small compared to differences between watersheds. A decrease in adequate riparian vegetation is expected during the planning period in most watersheds, assuming present trends in

Table 4-W-1 - Relative Condition of Riparian Vegetation

Analytical Watershed	Present	Alternative NA	A	B	C	D	E	PA
Lake Creek	124	122	120	121	127	125	125	125
Wildcat Creek	50	33	32	34	42	41	43	40
Wolf Creek	74	58	49	54	62	68	68	65
Mid Siuslaw River	113	96	90	95	98	106	106	106
Upper Siuslaw River	83	70	71	73	72	76	77	72
Calapooia River	70	49	53	50	59	60	61	57
Mohawk River	85	70	73	74	74	74	75	75
McKenzie River	89	61	63	71	70	72	67	66
Mid Willamette River	51	68	68	68	70	71	72	66
Coast Fork Willamette	87	64	65	66	66	67	67	65
Row River	66	62	63	65	67	68	63	67
Big River	69	53	56	56	55	58	58	56
Willamette River	11	23	22	22	23	25	26	24

Note: Higher numbers represent older riparian vegetation.

management on non-BLM lands continue. Table 4-W-1 gives the relative condition of riparian areas in terms of hydrologic function.

The amount of scoured stream channel would decrease under all alternatives as the knowledge of landslide processes and control methods are improved.

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 Preferred. 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. Other mining activities are not expected to change significantly during the planning period.

Impacts to the Upland Condition: The major impacts from management on the nonstreamside portion of the watershed are erosion and increases in the intensity and duration of bank full 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 3-C. Erosion caused by Off-Road Vehicles (ORVs) would decrease under all alternatives, with the implementation of the ORV restrictions described in Appendix 2-A (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 and removal of forest vegetation, especially in the transient snow zone (Appendix-3-C). The percent of area compacted is given for each analytical watershed in Table 4-W-2. Because there is almost no difference between alternatives, only the present condition and Preferred Alternative are given. Table 4-W-3 gives the percent of each watershed that is expected to be three years old or less at the end of the planning period, by alternative. These tables are given as an indirect measure of the relative increases in peak flows and have no relation to the magnitude.

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.

The changes in water yield have a more significant impact on smaller watersheds. If large portions of these smaller watersheds are logged or roaded, significant impacts would occur. Because these impacts are affected by individual timber sale units, a cumulative effects analysis would be done on each small watershed for each annual timber sale plan. Impacts would either be mitigated or timber sale units and roads would be deferred until the small watershed has recovered.

Table 4-W-2 - Percent of Watershed Compacted

Analytical Watershed	Present Condition	Preferred Alternative	Difference
Lake Creek	7.0	7.7	0.7
Wildcat Creek	6.1	6.2	0.1
Wolf Creek	6.2	6.6	0.4
Mid Siuslaw River	5.1	5.7	0.6
Upper Siuslaw River	16.5	18.2	1.7
Calapooia River	13.4	15.2	1.8
Mohawk River	13.7	14.8	0.9
McKenzie River	9.3	11.6	2.3
Mid Willamette River	8.0	10.4	2.4
Coast Fork Willamette River	12.4	13.2	0.8
Row River	9.6	9.7	0.1
Big River	12.1	13.5	1.4
Willamette River	11.9	13.1	1.2

Table 4-W-3 - Percent of Acres of Vegetation Three Years Old or Less

Analytical Watershed	Present	Alternative NA	A	B	C	D	E	PA
Lake Creek	3.8	4.8	4.5	4.9	3.5	3.8	3.8	3.5
Wildcat Creek	4.5	5.2	5.4	5.1	3.9	4.8	4.6	4.3
Wolf Creek	13.1	5.6	7.2	6.3	4.9	4.0	4.1	4.4
Mid Siuslaw River	5.6	4.5	5.6	4.8	4.1	2.7	2.8	2.7
Upper Siuslaw River	3.3	4.5	4.0	3.8	4.0	3.9	4.4	4.1
Calapooia River	11.7	5.8	5.6	5.7	5.5	5.5	5.4	5.5
Mohawk River	7.6	4.3	3.7	3.6	3.6	4.1	4.3	4.3
McKenzie River	11.7	6.1	6.7	6.7	5.6	6.1	6.0	6.7
Mid Willamette River	12.9	3.9	3.9	3.9	3.7	3.8	3.9	4.0
Coast Fork Willamette	8.6	5.8	5.7	5.6	5.5	5.5	5.5	5.7
Row River	15.8	2.5	2.6	2.6	2.3	2.0	2.0	2.1
Big River	15.2	5.4	4.7	4.8	4.9	4.5	4.5	4.8
Willamette River	2.5	2.7	3.0	3.2	3.5	3.7	3.9	4.1

Impacts to Water Quality: The various water quality parameters are discussed in Appendix 3-C. 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 3-D, Table 3-W-14), the effects on total maximum daily loads will 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 ten-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: 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 ten 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 in a relatively short period of time occurs. 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.

The direct impacts to water quality would be analyzed in the Environmental Assessment process for each timber sale. 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-I-1 and in Chapter 2, Table 2-1.

Impacts to the General Watershed Condition: The Watershed Condition Index (WCI) described in Chapter 3 and in Appendix 3-E has been used to analyze the cumulative effects of the alternatives and other land uses on the hydrologic condition of each watershed (see Chapter 3). The results of the analysis are shown in Figure 4-W-1 and are displayed as changes from the present condition. The WCI for null represents the expected condition with no management activities on BLM lands, and can be used as a baseline to compare the impacts of the alternatives. The numerical ratings of the WCI and subindexes are available at the Eugene District Office.

Table 4-W-4 summarizes expected changes in watershed condition by alternative for the 13 watersheds analyzed.

Future activities of other landowners are not expected to change significantly in Lake Creek, Middle Siuslaw River, Wildcat Creek and Wolf Creek watersheds. Few new roads are expected to be built in these watersheds and little development of the land is expected.

It is expected that logging activities would increase in the Wildcat Creek watershed on non-BLM ownership, and that they would decrease somewhat on BLM administered lands in all four watersheds.

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. These land uses would lead to a decline in riparian protection and an increase in soil disturbance and compaction.

The Calapooia River watershed condition would probably significantly decline primarily due to loss of riparian vegetation in the east and soil disturbance in the western portion of the watershed. This analysis was done with little information about the eastern portion of this watershed.

The McKenzie River and Middle Fork of the Willamette would have significant nonforestry impacts in the western portions. The largest impacts would be forestry impacts. Increased logging activities are projected in the McKenzie watershed while logging activities are expected to be less in the Middle Fork Willamette River watershed.

Much of the Row River and Big River watersheds are in young age classes and logging activities are expected to be less during the planning period than in the past.

Table 4-W-4 - Summary of WCI Ratings

	Alternative						
	NA	A	B	C	D	E	PA
Analytical Watersheds in Which Condition Would Improve	1	1	1	1	1	1	1
Analytical Watersheds in Which Conditions May Improve	1	1	1	3	4	4	4
Analytical Watersheds in Which Conditions Do Not Change	3	1	3	4	1	2	1
Analytical Watersheds in Which Conditions May Decline	5	6	5	3	5	4	4
Analytical Watersheds in Which Conditions Would Decline	3	4	3	2	2	2	3

Figure 4–W–1: Watershed Condition

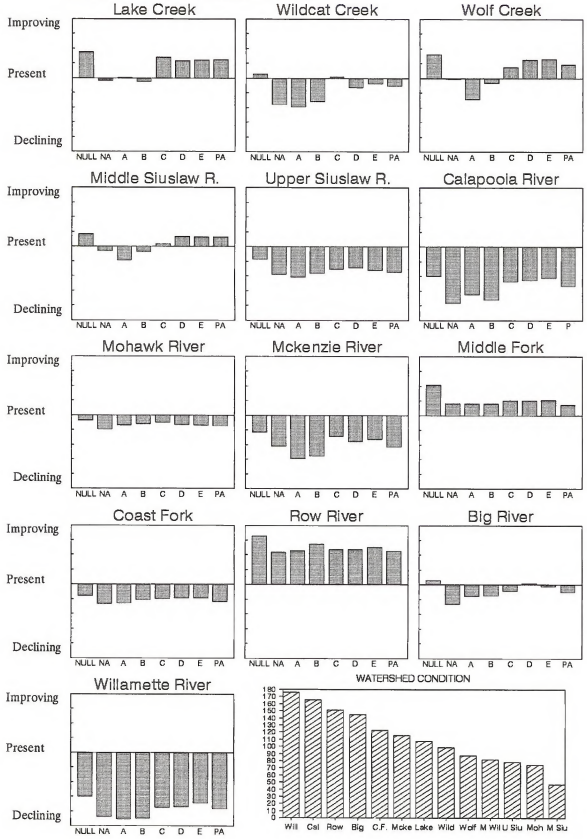


Figure 4-W-1 Watershed Condition

Effects on Biological Diversity

This section addresses how well the alternatives would manage for biological diversity, 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 loaded with uncertainty, as 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, and Appendix 3-L.

Current estimates indicate that 85 percent of all forests in the Northwest have been harvested in the past century. The remaining 15 percent is of mixed age, predominantly at higher elevations. Most of the remaining old growth is in Federal ownership, mainly the U.S. Forest Service, and is at high elevations. According to recent estimates there are 1.9 million acres of old growth forest remaining on National Forest lands in Oregon.

BLM manages lands at middle and lower elevations in the planning area. These lands are mostly intermingled with private lands and this ownership pattern limits the potential for blocks larger than 1 square mile. Much of what remains is in small isolated islands. Approximately 400,000 acres of old growth are estimated to exist on BLM administered lands in western Oregon.

A variety of land management activities are applied on these intermingled private lands, although timber management by private companies is most common. These private lands are mostly managed on short rotation, with limited structural and vegetative species diversity. Some are now in the third rotation since active timber harvesting was first initiated. In the planning area, many of these private lands have recently been harvested, and are in the earliest successional stages.

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. The fragmentation is more pronounced because of the young age of the adjoining private lands. These forestlands are in both the Coast Range and the Cascades, but are separated through most of the District by the Willamette Valley. The area near Cottage Grove, which provides an important biological connection between the Coast Range and the Cascades, has been greatly altered by timber harvesting.

Prior to white settlement, 60 to 70 percent (the amount was not static but fluctuated) of western Oregon and Washington forests were old growth (Franklin and Spies, 1984). One subregional study shows that only 40 percent of much of the Coast Range was old growth in 1850 (Teensma et al., 1991).

On Federal lands in western Oregon, the acreages in old growth and mature forests would continue to decline under proposed management actions. Recently completed plans for the Willamette and Siuslaw National Forests, as they would be modified by the decision on the Forest Service's Final EIS, Management Direction on Northern Spotted Owls, 1992, provide for the retention of 430,000 acres of old growth stands. The cumulative effect of all National Forest plans, as modified by that same decision, and the Preferred Alternatives in BLM draft Resource Management Plans for western Oregon, would be long-term retention or maintenance of approximately 1.7 million acres of old growth, a decrease from the current total of 2.3 million acres.

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. The following sections explain how the indicators are affected by 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 Tables 4-BD-1 and 4-BD-2.

Seral Stages

All seral stages are important components of habitat for many species of plants and animals, contributing to biodiversity by providing necessary life requirements.

Table 4-BD-1 - Comparison of Alternatives, Changes in Indicators of Biological Diversity, Short Term (10 years)

Indicators	NA	A	B	C	D	E	PA
Seral Stages	-	-	-	0	0	0	0
Fragmentation	-	-	-	0	0	0	0
Special Habitats	-	-	-	-	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-BD-2 - Comparison of Alternatives, Changes in Indicators of Biological Diversity, Long-Term (100 years)

Indicators	NA	A	B	C	D	E	PA
Seral Stages	-	-	-	+	+	0	+
Fragmentation	-	-	-	+	+	+	+
Special Habitats	-	-	-	-	0	0	-
Special Areas	-	-	-	-	0	0	-
Riparian Zones	0	-	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

Very little research has been done on the communities associated with the various forest successional stages (seral stages). As a result, the interrelationships are not well known, so it is difficult to predict the actual impacts of specific management actions. Information on impacts to the few species for which good information is available, such as the northern spotted owl, cavity users, and salmon, can provide some indication of the impact of management actions. For most species, it is necessary to assume that providing suitable habitat would meet the needs of the associated species. More difficult to determine is the impacts on long-term productivity, interactive processes, and on genetic variability of associated communities.

The acreage within each seral stage can be used to express the quantity of the four focal components. These acreages for the short and long-term are in Figures 4-BD-1 and 4-BD-2.

Genetic Diversity: Forest management activities including silvicultural practices can lead to genetic change, most obviously by exclusion of some species (Franklin et al., 1981). Less obvious changes can entail loss of specific genes or alleles due, to substantial reduction in the populations of some species. The changes in genetic diversity that are independent of species diversity are not expected to affect the survivability of any species. Intensive forest management practices in Alternatives NA, A and B, however, could lead to isolation of some populations of a number of species as a result of habitat loss in old growth and mature seral stages, reducing their genetic diversity both in the short and long-term. Increases in genetic diversity resulting from habitat gains in old growth and mature seral stages is a slower process than reduction in genetic diversity resulting from those habitat losses. Alternatives C, D, E and the Preferred are not expected to have significant gains in genetic diversity in either the short or the long-term.

For all alternatives the effect on genetic diversity of planned reforestation of Douglas-fir and other commercial species within various seral stages would be similar to that of natural stands. In the planning area, the range of genetic traits of these species would be similar to today's range, but the frequency of genes and genotypes would be altered. Genetic diversity could increase due to introduction of stock from locations outside each immediate harvest area, although a countervailing decrease could occur due to the competitive disadvantage and consequent suppression of natural seedlings of those species. When an entire seral stage is reforested, there could become a difference in genetic diversity between seral stages. For a detailed discussion of BLM's tree improvement program and genetic diversity, see Appendix 2-C.

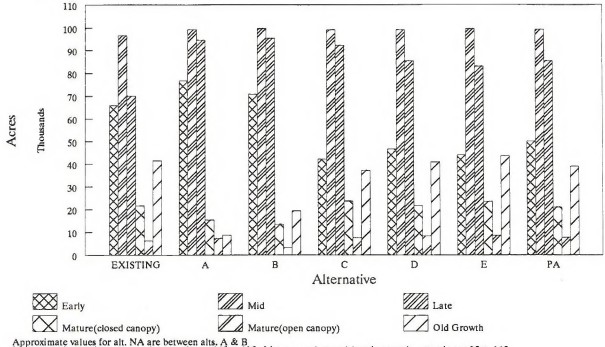
Species Diversity: Plant and animal species diversity is greatest when the forest consists of a mix of a full range of seral stages. A patchwork of this mix, comprised of a wide range of patch sizes, favors both species adapted to seral stage extremes (old growth/mature and early) and species adapted to the ecotones (edges) that occur between the extremes (Logan et al., 1985). Species diversity is least where the mid and late seral stages of regulated forests dominate the landscape (Long, 1977), and canopy closure is high.

Species occupying different successional stages tend to differ in certain life history characteristics in ways related to habitat mix. In the Pacific Northwest natural disturbances that created large expanses of early successional habitat were relatively infrequent. Hence, most 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, cited in 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). The comparative indicators of species diversity thus would be the acreages of early seral stage and of age 150 and older for each alternative. However, 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. Also, 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-BD-1 and 4-BD-2 project short and long-term acres by seral stage and open vs. closed canopy stands for each alternative.

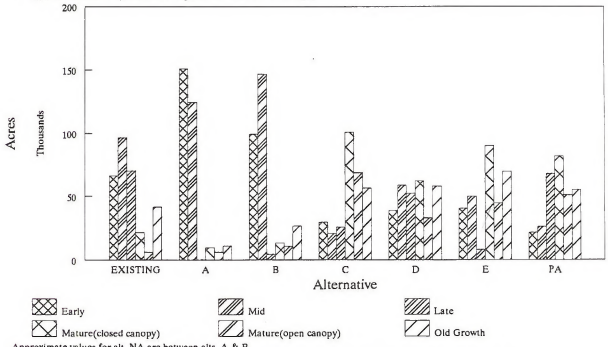
Forest stands are not static, but are dynamic, constantly changing systems. The different seral stages provide a different mix of habitat components. For selected species, some of these habitat components are known. It may be possible to actively manage to create these habitat components by silvicultural

Figure 4–BD–1 Seral Stages Short Term (10 Years)
By Alternative (Includes Open vs. Closed Canopy)



Approximate values for alt. NA are between alts. A & B
Mature seral stage (open canopy) = stand ages 145 to 195 ; Mature seral stage (closed canopy) = stand ages 95 to 145

Figure 4–BD–2 Seral Stages Long Term (100 Years)
By Alternative (Includes Open vs. Closed Canopy)



Approximate values for alt. NA are between alts. A & B
Mature seral stage (open canopy) = stand ages 145 to 195 + one decade of enhancement managed lands ages 95 to 145

practices. Such management is still being developed. These management options are untried, and their success in intensively managed forests on shorter rotations is unknown. Also unknown is the success of artificially creating and maintaining these habitat components over time, the impacts of periodic entry and roads on species that might benefit from the new silvicultural practices, and the impacts of these practices on other species.

In Alternative C and the Preferred, 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-BD-1 and 4-BD-2. For example, over the long-term the mature seral stages would have some structural characteristics of old growth and the late seral stage would have some structural characteristics of the mature. 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 age classes in the short-term.

Ecosystem Diversity: It has taken years for studies to be helpful in calculating the effect of various activities on the growth of specific conifer species. The effects on multi-dimensional functions and all biological diversity characteristics of seral stages are not well-studied. However, there are some clear examples that can be noted to show how the variations in the different alternatives may cause a different cumulative impact on ecosystem diversity and biodiversity of various seral stages. For example, density management activities clearly add growth to the larger trees, and these large trees and their eventual large woody debris are characteristic of old growth seral stands and add to the natural functions.

Management under all alternatives includes the use of prescribed fire, which affects both the structure and composition of upland vegetation communities (Halpern, 1987). Burning would reduce the amount of coarse woody debris and ground organic matter, kill or destroy some residual trees, inhibit the growth of most residual vegetation, and promote the growth of pioneering native and nonnative species. Successional changes in vegetation in the short-term are highly variable, depending on the method of timber harvest, intensity of burn, and the composition of the original vegetation. Long-term impacts from the loss of coarse woody debris and organic matter favor some species and are detrimental to others.

The proposed regeneration harvest of old growth stands in all alternatives except E, including the largest acreage of 30,587 acres in Alternative A or the 2,095 acres of the Preferred Alternative, would cause an unavoidable adverse reduction in biological diversity. It would be an essentially irreversible and irretrievable commitment of resources, at least for the 200 years it would take to recreate these stands.

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. For example, the small patch regeneration cuts in Alternative C and the Preferred would maintain some of the functions of the forest compared to clear cutting but some functions would be at least temporarily lost. For example, preliminary studies and observations suggest that epiphytic succession continues beyond 200 into 400 and 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 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 years-old stands. *Lobaria oregana* does occur in younger stands, but this may be a result of adjacent "inoculum" or propagule dispersal into younger 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.

A particularly scarce component of ecosystem diversity is low elevation (below 1,000 feet) old growth forest. Currently, there are several hundred acres of such 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 Preferred while it would continue to decrease in Alternatives NA, A and B.

Direct correlations could be made between the values in Figures 4-BD-1 and 4-BD-2 and the changes in this focal component of biodiversity. In Alternatives NA, A and B there would be a decrease in mature and old growth seral stages in both the short and long-term. Alternatives C, D, E and the Preferred 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.

Landscape Diversity: The greatest biodiversity can be achieved through a balanced distribution of seral stages throughout the landscape. The ability of the District to provide for such a distribution varies by alternative and would be influenced under all alternatives by management on intermingled non-BLM administered land. Alternatives that distribute beneficial proportions of seral stages throughout the landscape would be preferable to alternatives that impact biodiversity by leaving large sections of the District with disproportionate amounts of specific seral stages. Alternatives NA, A and B would have disproportionate amounts of early and mid seral stages throughout most of the District. Alternatives D, E and the Preferred would not provide a range of seral stages in the northeast portion of the planning area. Only Alternative C would encompass the entire landscape and retain the biodiversity values associated with the full range of seral stage distribution in the long-term.

Fragmentation

A significant aspect of biological diversity is fragmentation of forests, especially mature and old growth forest stands. Fragmentation of habitat is of critical importance to many species of plants and animals, which require specific conditions to survive and reproduce within a block of habitat, and to disperse between habitat units. Of concern are both the size of remnant patches and their isolation or spatial arrangement. 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.

It is difficult to state exactly how much suitable habitat in blocks is 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 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). Secondly, the ability of various species to disperse between patches of suitable habitat varies among species, from species which disperse only relatively short distances (e.g., amphibians) to species that are capable of more large-scale movements (e.g., birds, large mammals). Habitat blocks 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 on old growth forest.

Models of vertebrate species' response to habitat fragmentation show that species diversity will begin to decline when 50 to 75 percent of the landscape is cutover within a period not providing for the return of late-successional forest (Lehmkuhl et al., 1991). Lehmkuhl and Ruggiero (1991) developed a vulnerability analysis of 93 species associated with late-successional coniferous forests of the region. Eighty percent of the species fell into moderately high and high risk categories. At the present time (1988 conditions), about 87 percent of District lands are not in old growth condition, and 78 percent of District forestlands are not in mature or old growth stands. Thus, under both definitions of older forest, many species of wildlife are vulnerable at a moderately high to high risk, under present conditions.

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 Preferred. In the long-term, substantial declines are expected under Alternatives NA, A and B, due to further fragmentation of existing older forests.

Analyses have identified the number of blocks of mature and old growth forest combined and of interior old growth forest that would exist in the short-term. The edge effect, which can extend to well over 400 feet into a forest stand, changes light and temperature patterns, promotes growth of brush species, and can cause considerable stress to shade-tolerant moisture-requiring species that would normally be found in older groves. As discussed in Chapter 3, effective interior old growth forest is considered, in this analysis, to occur at least 400 feet from an edge with an adjacent stand younger than 40 years. For analysis, all nonfederal lands and all Federal lands allocated to intensive timber production were assumed to create such edge, other Federal lands were not. As a result of changes in temperature and moisture, interior old growth forest conditions may no longer be available for some plant and animal species that may require them. Many animal species use mature forests during periods of inclement weather, such as summer heat or deep cold periods; the edge effect can eliminate the conditions in these mature forests and old growth that allow these animals to use them as refuge cover.

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.

Presently, 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 blocks greater than 80 acres. Alternatives NA, A, B, C, D and the Preferred would be reduced by 23,500 acres, 27,900 acres, 19,000 acres, 7,900 acres, 700 acres, and 900 acres, respectively. These acreage reductions would result in a drop of 73 percent, 87 percent, 59 percent, 25 percent, 2 percent, and 3 percent of old growth acreage, respectively, in the decade. Figures 4-BD-3 and 4-BD-4 present a broader summary of the data.

Considering old growth and mature forest stands together, about 56,100 acres exists in blocks of at least 80 acres in size. Under all alternatives, some of this older forest would be cut. About 39,400 acres, 41,300 acres, 37,400 acres, 12,200 acres, 3,100 acres, 1,000 acres, and 4,300 acres, respectively, of this old growth and mature forest would be cut during the decade under Alternatives NA, A, B, C, D, E and the Preferred. This would amount to a reduction of 71 percent, 74 percent, 67 percent, 22 percent, 6 percent, 2 percent, and 8 percent, respectively, of old growth and mature forest in these stands under the alternatives. Figures 4-BD-5 and 4-BD-6 present a broader summary of the data.

For those species that depend on true interior old growth conditions, and avoid the edge effects previously mentioned, the total number of acres meeting this criteria are limited to 5,200 acres at the present time. Under Alternatives D,E and the Preferred, 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, respectively, of interior old growth habitat in the decade for these alternatives. Figures 4-BD-7 and 4-BD-8 present a broader summary of the data.

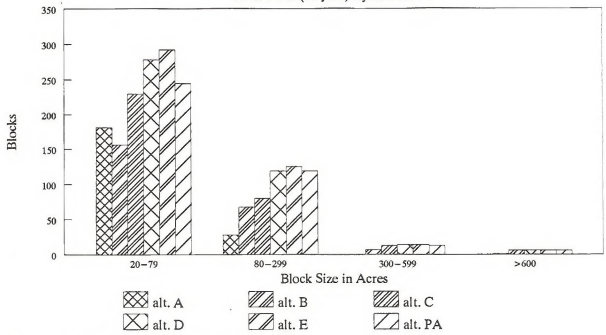
The distance between old growth stands, if large, could lead to isolation of some species of animals and plants that rely on these habitats. An indicator of spatial fragmentation is the distance between blocks of old growth (age 200+).

The total amount of old growth remaining after 10 years varies between planning alternatives, and thus the amount of old growth at each distance also varies. The total amount of old growth in each distance band provides an index of the contiguity of habitat, both to provide suitable habitat, and to provide a index of the ability of 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 Preferred 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 in-growth of habitat to old growth condition. In the long-term, substantial gains could be made under Alternatives C, D, E and the Preferred due to this ingrowth of habitat into mature and old growth conditions after 100 years. Figure 4-BD-9 shows the acres of old growth within various distances of the nearest other such block, after 10 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 Preferred. This suggests that Alternatives A and B would provide substantially poorer conditions for dispersal than the remaining alternatives. Figure 4-BD-10 shows the relationship between alternatives for average distance from an old growth block to other suitable old growth blocks. Figures 4-BD-11 and 4-BD-12 show similar relationships within the biological corridors as defined in Alternative C.

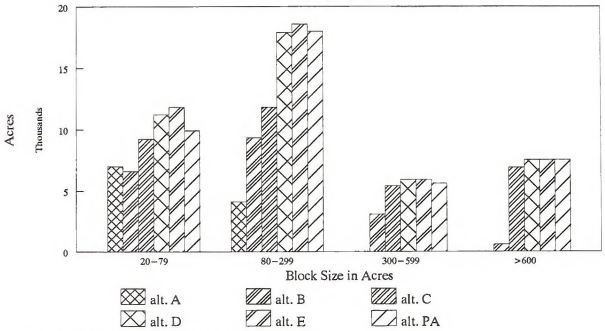
The calculations for the preceding figures consider only blocks that would be retained or restored by BLM. They do not consider blocks administered for retention by the U.S. Forest Service or any other party, as those blocks are not in the BLM Western Oregon Digital Database. The calculations also make no allowance for loss due to major natural disturbance events.

Figure 4–BD–3 Number Of Old Growth Blocks
Short Term (10 year) By Alternative



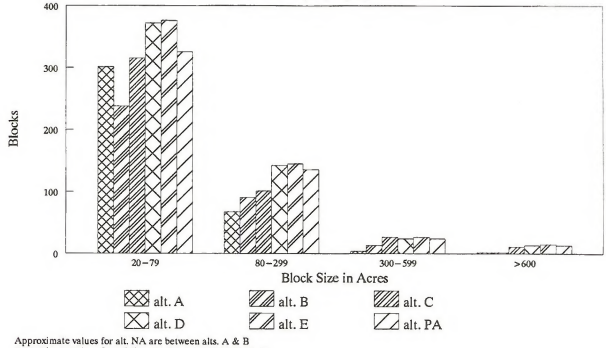
Approximate values for alt. NA are between alts. A & B
Values for existing condition are equal to alt. E

Figure 4–BD–4 Total Area Of Old Growth Blocks
Short Term (10 year) By Alternative



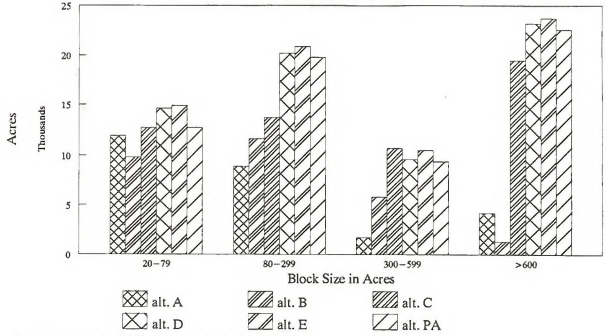
Approximate values for alt. NA are between alts. A & B
Values for existing condition are equal to alt. E

Figure 4–BD–5 Number Of Mature And Old Growth Blocks
Short Term (10 year) By Alternative



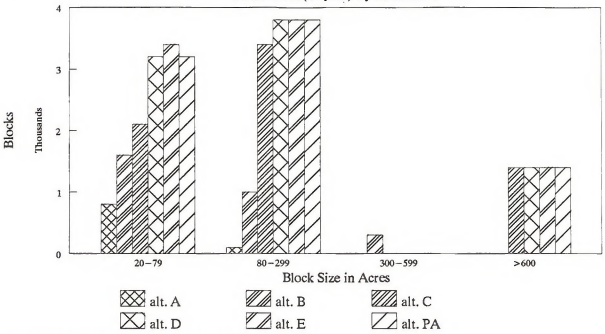
Approximate values for alt. NA are between alts. A & B
Approximate values for existing condition are equal to alt. E

Figure 4–BD–6 Total Area Of Combined Mature And Old Growth Blocks
Short Term (10 year) By Alternative



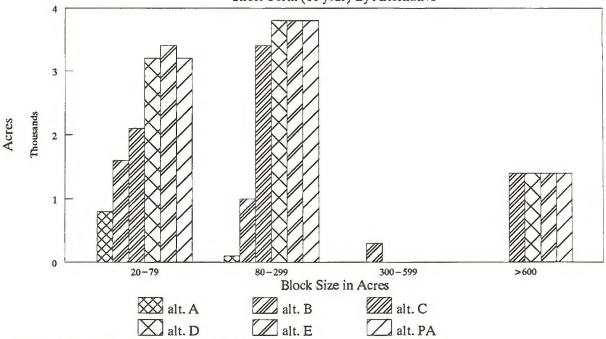
Approximate values for alt. NA are between alts. A & B
Approximate values for existing condition are equal to alt. E

Figure 4–BD–7 Number Of Interior Old Growth Blocks
Short Term (10 year) By Alternative



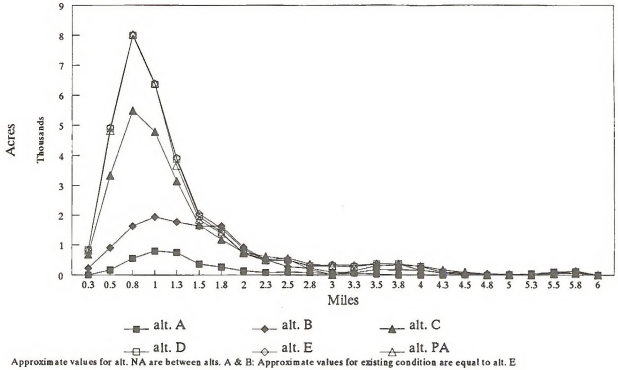
Approximate values for alt. NA are between alts. A & B
Values for existing condition are equal to alt. E

Figure 4–BD–8 Total Area Interior Old Growth Blocks
Short Term (10 year) By Alternative



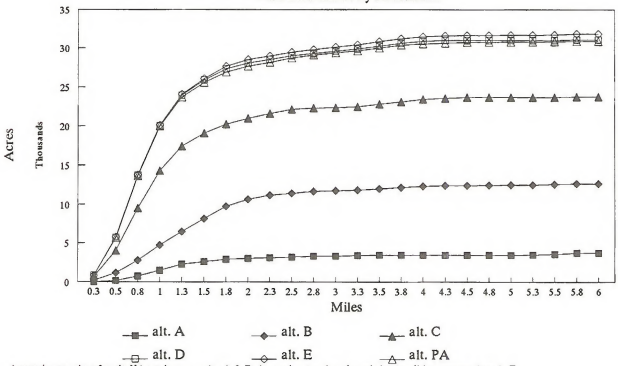
Approximate values for alt. NA are between alts. A & B
Values for existing condition are equal to alt. E

Figure 4–BD–9 Distance Between Old Growth Blocks (80+ Acres)
By Alternative



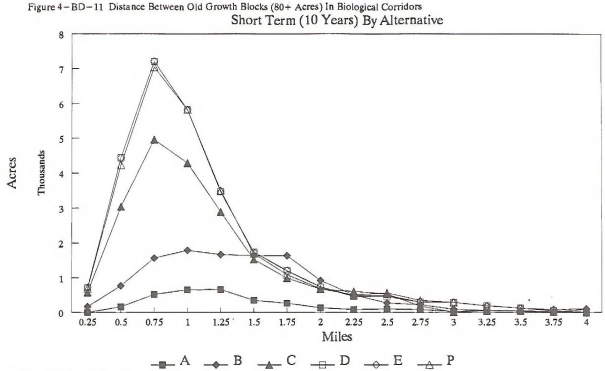
Approximate values for alt. NA are between alts. A & B: Approximate values for existing condition are equal to alt. E

Figure 4–BD–10 Cumulative Acres Of Old Growth Blocks (80+ Acres)
Within Distances By Alternative



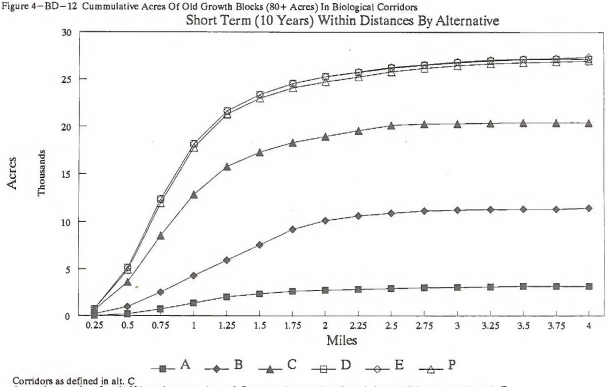
Approximate values for alt. NA are between alts. A & B; Approximate values for existing condition are equal to alt. E

Figure 4–BD–11 Distance Between Old Growth Blocks (80+ Acres) In Biological Corridors



Corridors as defined in alt. C
Approximate values for alt. NA are between alts. A & B; Approximate values for existing condition are equal to alt. E

Figure 4–BD–12 Cummulative Acres Of Old Growth Blocks (80+ Acres) In Biological Corridors



Corridors as defined in alt. C
Approximate values for alt. NA are between alts. A & B; Approximate values for existing condition are equal to alt. E

The acreage values in Figures 4-BD-3 through 4-BD-12 were produced by different procedures than Figures 4-BD-1 and 4-BD-2. There are two reasons that cause discrepancies between the values. None of the discrepancies are believed to be significant in any trends analyzed. The reasons for discrepancies are: Ingrowth for the 10-year period is included in one procedure but not the other; and acreage depletion due to the small patch regeneration cuts in Alternative C and the Preferred Alternative is treated differently in the procedures for the two groups of data.

Genetic Diversity: Fragmentation of old growth forests affects the genetic diversity of plants and animals that use these habitats through isolation of gene pools in small, scattered habitat patches, which can cause inbreeding of species. The resulting inbreeding can reduce the ability of these 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 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 Preferred would have low impacts in the short-term, but would likely have significant acreage gains in the long-term. Because gains to genetic diversity are 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 Preferred 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 extreme degree of fragmentation under Alternatives NA, A and B would likely not provide habitat conditions for a wide variety of species which 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 Preferred 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 Preferred 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 small amounts of habitat or few blocks, any reductions in the amount of habitat in these blocks is an adverse impact. 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 Preferred 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 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 ten years under all alternatives would be concentrated in the west and south 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 Preferred Alternative that are buttressed by a management scheme on BLM administered lands, which would retain substantial old growth characteristics throughout time. 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. A long-term benefit of the Preferred Alternative would be to increase the size of islands having old growth characteristics to a range of 100 to 300 acres in the Old Growth Emphasis Areas (OGEAs).

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 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 in 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 specie(s). 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 on the Eugene District. Replication of varying types of special areas that could provide genetic variation for specific plants and animals across a landscape has not been implemented. 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 Preferred Alternative, 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 and OGEAs, where old growth values would be maintained for eight decades. Alternatives D, E and the Preferred would maintain the greatest levels of genetic diversity for special areas.

In the long-term, Alternatives D and E would protect the most acres of special area habitat. Under the Preferred Alternative, where special areas such as Relict Forest Islands (RFIs) would not be designated as ACECs, areas would be available for resource development activities such as timber harvest within eight decades and genetic diversity within these stands could be reduced or lost. 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 are 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 Preferred Alternative would allocate some acres to special area status. Some

special areas that would not designated would not be protected under other authorities and in OGEAs, which would protect species diversity. However, in the long-term some areas not designated as special areas (e.g., RFIs) under the Preferred Alternative would be available for resource development activities such as timber harvest, and some species diversity could be lost within these old growth forests.

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 represented by these special areas 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 would be available for resource development activities and ecosystem diversity could decline in the short-term and long-term. Under Alternatives D, E and the Preferred, all special areas would be protected due to special area designation or protection under existing authorities or other land use allocations such as OGEAs (see Special Areas in Chapter 4). In the long-term, some of these communities may be lost such as in RFIs due to their availability for resource development activities.

Landscape Diversity: Landscape diversity for special areas refers to the landscape distribution of special areas. Special areas have been proposed for designation in all three 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 Preferred 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 Preferred Alternative, these acres would be maintained for old growth values and 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 Preferred 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 much greater plant species diversity than adjacent forested areas. Studies done by Hickman (1968), which were conducted on the west side of the Cascade Range, 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. 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 use special habitats for food, water and cover for breeding, hiding and roosting. Special habitats vary in size from areas much less than an acre to ponds or rocky ridges that encompass 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).

Genetic Diversity: Genetic diversity would follow the same concepts 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 as well. Buffering of special habitats is critical in reducing edge effects and in reducing the changes in environmental conditions such as light, soil hydrology, temperature, 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 change the genetic diversity of an area through loss of plant and animal species present. Because some of these areas exhibit disjunct populations of organisms, loss of unique genotypes could occur. 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 is still lacking on what constitutes minimum buffer widths for the protection of various communities. In the Preferred Alternative and Alternative C, a 100-200 foot buffer would be allocated to protect special habitats. Alternatives D and E provide the best short and long-term protection for special habitats by allocating 100-300 foot buffers. Genetic diversity would be affected the least where biological communities are well buffered.

Species Diversity: Like special areas, species diversity within special habitats refers to the numbers of the various species that occupy or use these areas. Species that are associated with special habitats are a result of various components (see Biodiversity - Special Areas, Chapter 4). When assessing short and long-term conditions of species diversity, it is important to recognize that diversity is not static but that species should maintain the capacity to adapt to changing environmental conditions through time or species could be lost. The size and conditions of special habitats would be critical in the long-term success of maintaining species diversity within such areas. Alternatives that provide the greatest buffer widths to special habitats would help to maintain biological communities within special habitats better than alternatives with small buffer widths or no buffers at all. In the short and long-term, Alternatives D and E would provide the greatest protection for species diversity. Alternatives A and B would provide no protective buffers, and Alternatives NA, C and the Preferred Alternative would provide some protection.

Ecosystem Diversity: Like special areas, special habitats represent a wide range of varying types of plant and animal communities. Those alternatives with the greatest buffer widths would provide better protection for special habitats and their associated biological communities, and would result in greater maintenance of ecosystem diversity than would those alternatives with no buffers or minimum buffer widths. Alternatives D and E would provide the best short and long-term protection for special habitats and for the maintenance of ecosystem diversity. Alternatives NA, C and the Preferred 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 and E would provide the greatest protection. Alternatives NA, C and the Preferred 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. No alternatives indicate active management for special habitats, which could lead to the long-term decrease 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 a transitional 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. Riparian communities are the most diverse and complex in the planning area. These communities vary from low elevation valley communities to the headwater communities, an adaptation to different conditions (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 the woody debris influence hydrologic processes, an interaction affecting 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 is a source of downed trees for the riparian and stream.

Only a small percentage of riparian communities, along all stream orders, remain unaltered by past human activities. Most of these are concentrated in smaller streams. Current communities are dominated by

hardwood overstory trees, primarily red alder and bigleaf maple, and associated brush and ground species. The most diverse communities occur where there is a more balanced, unfragmented, mixture of communities, containing conifer and hardwood overstory trees, downed logs and snags, and a diversity of understory vegetation.

Genetic Diversity: Restoration and protection of riparian under Alternative E 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 headwater areas would continue to decline along 1st order streams, but recovery would occur along perennial and 2nd order streams. Both Alternatives D and E would benefit because of wider Riparian Management Area (RMA) widths, which would help screen internal areas from edge effect and help maintain existing genetic diversity. For Alternatives NA, B, C and the Preferred, 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 and E, which would retain the widest RMA 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, C, and the Preferred, as a result of protection of existing riparian area and maturation of 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 trees upslope from the riparian area under Alternative C and the Preferred Alternative 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, which would 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 widths and protection of headwater ephemeral streams, Alternative E would best protect existing riparian ecosystems, 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 and the Preferred Alternative 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: Overall, the acreages of riparian areas would change little under all alternatives. Communities would change as a result of management activities and maturation of the riparian communities, but the overall acreages would remain similar to the present condition. While some 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.

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. Unaltered communities are predominantly along the smaller headwater streams. The major change occurred when hardwood-dominated communities replaced conifer-dominated communities after riparian vegetation was removed. 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 ephemeral streams under all alternatives except E, and along 1st order streams in Alternative D, which would reduce the overall diversity in the harvested areas. Vegetative recovery would occur along ephemeral streams. Full recovery of riparian communities along all streams would not occur within 100 years, because mature and old growth conifer trees 150 year or older are needed to fully restore diversity elements in the stream and adjoining riparian area. The rate of recovery would be much greater in the long-term than in the short-term.

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, tanoak, dogwood, ponderosa pine) this evaluation includes only the relationship between common tree species and the living community of animals and plants.

The number of plant and animal species in the planning area has been increased by the introduction of exotic species. Land converted to non-timber 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.

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 Preferred Alternative would have new silvicultural activities to provide for populations of other than the most common trees. 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 Preferred. 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 cutover stands, but in Alternatives NA, A, B, D and Preferred would reduce older age classes. 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. Alternatives NA, A and B have such a high percentage of land under timber production, the impact would be negative in the short and long-term. Alternatives C, D, E and the Preferred would maintain diversity in the short-term and improve 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 logging. The approximate reductions in hardwood acres 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 Preferred Alternative = 594 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 Preferred Alternative. 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 Preferred Alternative, 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 forestlands 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 Preferred Alternative 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. 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.

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 main-

tains biodiversity better by producing at least viable populations over most of the District over time. Alternatives C, D, E and the Preferred 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 60 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, which 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 Preferred are designed to retain 60 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 Preferred 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.

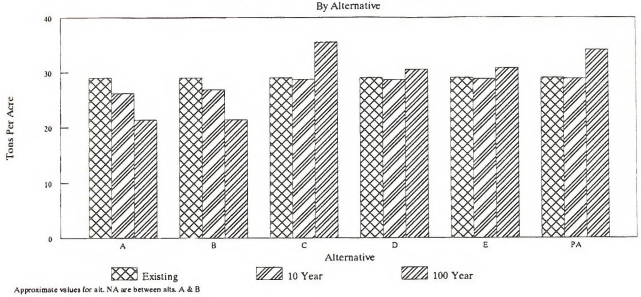
Landscape Diversity: Alternatives, which distribute snags in large numbers throughout the landscape, are preferable to alternatives that retain few trees, or distribute them over small portions of the landscape. Widely distributed, abundant snags allow species dependent on them to become integral components of the fauna and flora over the widest geographic distribution. Alternatives, which restrict snag distribution and abundance, restrict the distribution of snag dependent species, so that some habitats lack these species, and are less than optimal in 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, due to the goal of providing for 40 percent of cavity excavators, Districtwide, in the long-term. Alternatives C, D, E, and the Preferred 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 have high numbers of snags naturally.

Alternatives NA and A would cause significant losses in biodiversity in both the short-term 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 and inadvertent loss of many snags. 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 Preferred are likely to increase the biodiversity benefits of snags in both the short-term 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

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 4-D 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 as a value less than this maximum level. Values calculated for the existing condition and for each alternative are shown in Figure 4-BD-13.

Figure 4–BD–13 Dead And Down Woody Material
By Alternative



Approximate values for alt. NA are between alts. A & B

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 this substrate. Alternatives C, D, E and the Preferred would promote higher population levels (larger gene pools) 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 which 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 Preferred 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 rate of loss 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. Therefore, the amount of dead and down material would drop to its lowest levels on many acres of land in the next decade. The previous logging will show its greatest impact in the next ten years. Therefore, it is expected

that the benefits from silvicultural practices in Alternatives C, D, E and the Preferred would only compensate for this loss, causing a neutral change in the short-term. The decline would be apparent in Alternatives NA, A and B in the short-term.

In the long-term, this decline would multiply itself in Alternatives NA, A, B and E. This decline would be less as the long-term approaches in Alternatives C, D and the Preferred. 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 clear cut 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 Preferred Alternative.

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. 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.

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 a variety of habitats, over a wide geographic distribution, and through environmental perturbations. 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 and provide habitat in restricted distribution for several of the special status animal species. Alternatives C, D, E and the Preferred would provide suitable habitat over a wider area, and give a moderate to high level of confidence in species' genetic fitness.

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 Preferred 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 off of BLM lands. The effectiveness of plant reserves in maintaining the species diversity and the adaptive capacity of plants to evolve to changing environmental conditions will 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 will 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 Preferred Alternative 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.

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 Preferred, special status species would be given management protection. In all alternatives, declines of species in the Assessment species category could occur if active management is not implemented for 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 and 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 Preferred 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 Preferred Alternative would have the added advantage of flexibility of silvicultural prescriptions to accomplish habitat management goals.

Special Status Plants: In the short-term 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 Preferred would provide management protection for special status plant species and their associated habitats. Alternatives D and E 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 Preferred Alternative 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 to the largest number of special status species 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 Preferred Alternative 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 Preferred 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 Preferred, which have varying degrees of potential to manage for biodiversity for special status animals. Alternatives C and the Preferred Alternative 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 Preferred 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. Effects on special status species are addressed in a subsequent section of this chapter. For other effects on vegetation see the Riparian and Biodiversity sections in this chapter. Structure, composition and function of the forest are discussed in detail in the Biodiversity section. 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 Preferred, the BLM administered forestlands 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 NA, A and B. Under Alternatives D, E and the Preferred, 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-BD-1 and 4-BD-2 in the Biological Diversity 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, D and the Preferred. The widest and most effective buffers (100-300 feet) would be maintained in Alternatives D and E (see Table 2-5). 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. Special habitats could be impacted by mineral exploration and development activity on mining claims under all alternatives, but the only areas of high potential for mineral development overlapping special habitats are Heceta Sand Dunes and Cannery Dunes. In Alternatives A and NA there exists the possibility of open pit mining for pure silica. If mineral development should occur in these areas, it could eliminate these special habitats. However, at the conclusion of mining, the site could be reclaimed in order to benefit wildlife by creating such things as ponds or lakes.

One species of special interest, the Pacific yew, is not defined as a special status species. The interest is based on a compound, taxol, that can be extracted from yew bark that shows promise in the treatment of ovarian and breast cancer. Pacific yew are not considered abundant enough to permit their unconstrained harvesting for bark extraction. The management direction for Pacific yew will be set after completion of an Environmental Impact Statement (EIS) on Pacific yew management and collection being prepared by the U.S. Forest Service with the BLM as a cooperating

agency. The draft EIS, expected to be published later this year, will address the effects of all aspects of BLM management on the yew.

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 Riparian Zones

The effects of the alternatives on existing riparian zone conditions would vary depending upon the width of Riparian Management Areas (RMA) and the amount of vegetative disturbance occurring in those areas.

Expected conditions of riparian zones for perennial streams in the short-term for all alternatives are shown in Table 4-R-1. 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-R-1. At the end of the long-term, expected riparian conditions under Alternatives NA and B through E would be good/optimal. However, due to edge effect and other incursions, optimal conditions may not be reached for all streams in any alternatives. Alternative E includes the most upland vegetation within the RMA (see Figure 3-R-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.

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 and the Preferred provide an increasing RMA width and improving protection against edge effect. Alternative E provides the greatest protection to the microclimate and the associated riparian communities.

Under Alternatives NA, A, B, C and the Preferred, riparian areas along all intermittent streams would be subject to vegetation removal, and along 1st order streams in Alternative D. Only Alternative E will protect riparian communities along all 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.

Table 4-R-1 - 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 3-F 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.

Effects of grazing adjacent to riparian areas overall are not considered significant due to the low numbers of cattle and the amount of non-use taken. However, four out of a total of six allotments on the District include important riparian areas, and the potential for soil erosion and damage to riparian vegetation and stream channel structure does exist. There are approximately 1,400 riparian acres within the allotments.

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 and E 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 will permit BLM to more effectively manage for riparian-associated values. Closure of roads will 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 4-K) 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, will result in increased loss of riparian areas and associated values.

Effects on Wildlife

Introduction

Habitat indices are calculated for some priority habitats and species for the existing condition and alternatives by use of habitat models (USDI BLM, 1991). Several of these models are previously published, for example, elk (Wisdom et al., 1986) and cavity dwellers (Brown, 1985). Others were derived by BLM biologists and planners specifically for this and other western Oregon BLM Environmental Impact Statements (EISs). These models predict such factors as the amount, quality, and distribution of habitat. Appendix 4-E details the assumptions and analytical approaches for each model. In cases where habitat models are unavailable, analysis of impacts was based on review of scientific literature, personal communications with experts, and professional observations.

Impacts on Habitat

Land management affects wildlife primarily by modifying habitat. In western Oregon forests, the primary cause of habitat modification is timber management. Thomas (1979) and Brown (1985) indicate that many wildlife species are associated with forests of a particular age class (seral stage) and structure. The close affinity of wildlife for specific habitat conditions underscores the importance of analyzing impacts of forest harvesting on habitat composition.

Also related to effects on wildlife, and discussed in previous and subsequent sections are effects on vegetation and Biological Diversity (including amounts and distribution of snags, dead and downed wood and hardwoods). Effects on special status wildlife species, including Federal listed, proposed and candidate species, are addressed in a subsequent section of this chapter, entitled special status species.

Assessment of impacts on habitat is based on the expected availability of conifer seral stages and associated components, riparian and special habitats, and the effects of disturbance caused by roads and other human activities under each alternative in relation to existing conditions. Inherent in the analysis of impacts for each alternative is the assumption that silvicultural prescriptions and other prescribed management actions identified for the alternatives can be successfully implemented, and that vegetation responds as anticipated. Some prescriptions identified in Alternative C and the Preferred Alternative are based on the best new theories and goals for vegetation management, yet are relatively untested, especially to meet long-term goals. These prescriptions would be evaluated through careful monitoring and research during the decade, and necessary modifications would be made in order to achieve the intended management goals.

Conifer Forests

Conifer forests currently comprise about 95 percent of BLM administered land and are the dominant habitat within the Eugene District. Habitat composition under the various alternatives is displayed in the discussions of Effects on Vegetation and Biological Diversity.

The current forest age class (seral stage) distribution in the District is nonuniform, with a preponderance of younger age classes, due primarily to past timber harvest activity and secondarily to natural events. See Chapter 3 sections on Vegetation and Timber Resources for a complete discussion of the current forest seral stage distribution. Acreage of seral stages by habitat type are presented in Tables 3-V-2 and 3-T-2, presented in that chapter.

This nonuniform (skewed) distribution limits the abundance and distribution of wildlife species preferring mature and old growth habitat (see Table 3-WL-1 for a list of these species). Continuation of a skewed distribution would occur under all alternatives through the next decade, although Alternatives NA, A and B would exacerbate the problem in the short-term due to the high level of harvest of older forests. This condition would be ameliorated in the long-term under Alternatives C, D and E, but Alternatives NA, A and B would increase the currently skewed distribution in the long-term. Alternative C and the Preferred Alternative would provide substantial older seral stage structure on BLM administered land in the long-term through silvicultural prescriptions that promote rapid development of old growth structural and functional characteristics. Alternative C would retain 40 percent of the basal area in approximately 54 percent of regeneration harvest acres. 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. In the short-term, populations of older forest dependent species would remain low while populations of some species preferring younger forests would remain high. However, in the long-term, Alternative C, D, E and the Preferred would likely provide for moderate levels of old growth species.

Alternative D would maintain intermediate levels of existing old growth and would permit some younger stands located within designated old growth and other areas excluded from timber harvest to age toward old

growth. Adoption of Alternative E would maintain current levels of older forest (150 years and older) as well as allow some younger stands (which are left as buffers around 150 year-old plus stands or excluded from timber harvest for other reasons) to age toward an older forest condition. However, neither Alternative D nor E would provide for an 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).

The intent of the Preferred Alternative, 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 Preferred. Deferral of some existing old growth stands (at least 8 decades) would occur in Alternatives C, D, E and the Preferred, during which research and applied silviculture can be perfected to promote old growth functions.

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 Preferred. Alternatives C, D, E and the Preferred's goal of retaining adequate large snags following regeneration harvest is crucial for early seral stage species that require tree cavities or snags within which to construct them. These species are most likely to sustain themselves in the General Forest Management Areas (GFMAs) of the Preferred Alternative because this alternative would maintain some older forest habitat elements within the framework of a younger forest.

All species of upland game benefit from structural and plant species diversity within early and mid seral stage habitats. Of all alternatives, only the Preferred and 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.

Cumulative effects resulting 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 old growth and mature habitats under Alternatives NA, A and B. Reductions in mature and old growth habitat, and associated wildlife species, would be an unavoidable adverse impact. This cumulative effect and the probability of continuation of clear cutting practices on most non-BLM lands magnify the importance of mature and old growth habitat on public land as a relatively scarce habitat on a regional basis.

Special Habitats

Protection of the primary resource values in special habitat features (e.g. bogs, meadows, rock cliffs, talus slopes) varies by alternative. Intact forest buffers do not currently exist around some of these habitats. Alternatives NA, A and B do not afford buffer protection for special habitats, whereas protected buffer areas under Alternatives C, D and E would range from 100 to 300 feet. Buffering of special habitats would help maintain the desired habitat components (e.g., ecologically diverse ecotones, favorable microclimates) important to a diverse array of wildlife species that inhabit these areas (see Table 3-WL-1 for a list of these species). Removal of tree cover along edges of small meadows reduces bird density and results in changes in bird species composition (Monthey, 1983). The Preferred Alternative would provide for buffers of 100 to 200 feet ("ecologically significant") for these special habitats, as well as provide flexibility for protecting these habitats through interdisciplinary development of silvicultural prescriptions for habitat enhancement.

Riparian

In the short-term as riparian vegetation matures, riparian conditions for wildlife would improve at a slow rate along perennial streams under all alternatives except A. Under Alternative A, conditions along perennial streams would remain about the same. At the end of 200 years, riparian conditions along most perennial streams for wildlife under Alternatives NA and B, C, D and E would be expected to be in good/optimal condition as a result of vegetation recovery and restoration of sufficient conifers to provide for riparian and instream habitat. Harvesting of timber adjacent to riparian areas would create an edge effect under all alternatives that would cause changes in the microclimate and vegetation composition in the riparian areas. The degree of change would depend on the width of the Riparian Management Area (RMA), being least under Alternative A and greatest under Alternative E. Retention of upslope vegetation may reduce the degree of these changes, depending upon the width of the RMA and the amount of upslope vegetation retained. Silvicultural prescriptions developed under

Alternative C and the Preferred Alternative would allow flexibility to locate retention trees as partial buffers to these RMAs.

Only Alternative E would protect riparian vegetation along ephemeral 1st and 2nd order streams, while Alternative D would protect riparian vegetation along 2nd order streams. Timber harvesting along 1st and 2nd order streams, which constitute 70 percent of the stream miles and 52 percent of riparian acres in the Eugene District, would adversely affect many wildlife species, which use these areas. Some wildlife, such as amphibians, depend on riparian communities along these smaller streams for a significant portion of their total habitat. As noted above, Alternative C and the Preferred Alternative would allow flexibility to partially protect ephemeral streams through location of designated wildlife trees.

Fragmentation of riparian areas reduces the effectiveness of these plant communities under all alternatives. Fragmentation occurs as a result of mixed ownership, the presence of roads, and use of riparian areas for other activities, such as mining and recreational development. Road access management and land tenure adjustments would improve BLM management of riparian areas. However, new roads, recreational developments, and activities related to mineral exploration and development could reduce the usefulness of riparian areas for wildlife.

Roads

Roads have major impacts on wildlife habitat by direct elimination of vegetation within the road corridor and by disturbance of wildlife caused by vehicular traffic. Big game species are especially vulnerable to these road impacts (Brown, 1985). At the present time, approximately 1,920 miles of BLM controlled roads occur on the District, with at least an additional 4,000 miles of roads existing on BLM lands and non-BLM lands, which are controlled by other parties. 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, 178 miles and 220 miles of roads would be constructed under Alternatives A, B, C, D, E and the Preferred, respectively.

Under Alternatives NA, A and B, no specific road miles would have access restricted to meet other resource objectives. 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. Additional road access management would occur under Alternatives D, E, and the Preferred, primarily to protect habitat in elk emphasis areas, for a total of 750, 750 and 470 miles, respectively. Road access management proposed under Alternatives C, D, E and the Preferred would benefit wildlife on a site-specific basis by reducing disturbance and recovering lost habitat in specific cases.

Considering new road construction and road access management within each alternative, there would be a 14 percent net increase in road miles that are BLM controlled during the decade under Alternative NA. Under Alternatives A and B, there would be increases of 15 percent and 14 percent, respectively. Alternatives C, D, E and the Preferred show net decreases of accessible road mileage, at 4 percent, 32 percent, 30 percent and 13 percent of the BLM controlled total, respectively.

Road construction resulting from intensive timber management under Alternatives NA, A, and B would have an adverse effect on wildlife habitat, due to significant net increases in road mileage. Wildlife populations and habitat quality would be expected to decrease under these alternatives. Alternative C, D, E, or the Preferred, if adopted, would result in higher protection levels for other resources, including wildlife and fisheries.

Impacts on Priority Species

Priority wildlife species, associated habitats, and limiting factors are listed in Table 3-WL-1. 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 uses 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 all priority wildlife species (or groups of species) that occur on the District and that would be influenced by proposed management actions. Table 4-WL-1 summarizes the impacts to these species.

Elk

BLM assessed impacts on elk habitat on BLM administered land are based on a modification of the habitat effectiveness model developed by Wisdom et al. (1986). The Wisdom Model was modified for this analysis by dropping the spacing index (HEs), due to the confounding nature of the checkerboard ownership pattern of BLM lands on the Eugene District. Individual values for indices of roads (HEr), cover (HEc) and forage (HEf) are presented, rather than producing a composite score for all indices - a modification agreed to by the Oregon Department of Fish and Wildlife (ODFW). Indices for forage and cover within each of five 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.

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.

Table 4-WL-1 - Estimated Effects of Alternatives on Priority Wildlife Species

	Short/Long-Term Impacts to Priority Wildlife[1]						
Species or Group	NA	A	B	C	D	E	PA
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.

Assessments of impacts on elk habitat under the various alternatives are shown in Table 4-WL-2. The habitat effectiveness scores for roads, cover and forage for each of the five elk emphasis areas are presented, with the anticipated effects over the ten-year life span of the plan, for each plan alternative.

Existing conditions show that all elk emphasis areas have higher than desirable road densities (above ODFW target of 1.5 miles per square mile), although a substantial portion of the roads in the Mosby Creek elk emphasis area currently lie behind locked gates. The scores for habitat effectiveness for cover (HEc) range from a low of 0.18 to a high of 0.60, compared to ODFW targets of 0.40 to 0.50. Higher scores occur in the Mosby Creek and Siuslaw River areas, due to the higher proportion of old growth and mature seral stage forests in these areas, as compared to the Walker Creek area, which has substantial forest in the mid to late seral age classes (46-95 years of age). Although the total amount of optimal habitat is low, the scores are high due to the quality of the cover that exists, i.e., substantially old growth forest. In general, the total amount of cover habitat available within all elk management areas is low, relative to the amount of forage acreage available, due to the intensive harvesting done during the past 50 years. In addition, the habitat effectiveness scores for forage are low, ranging from 0.16 to 0.24, compared to ODFW recommendations of 0.60 to 0.75. The current scores lie in the marginal range of elk management. This low quality reflects the lack of forage seeding done in the past on timber harvest areas, and the lack of prescribed burning on some areas. Appendix 4-E summarizes cover and forage acreage within the five elk emphasis areas. Although the sizing and spacing index was not calculated in this analysis, it is expected to be low due to the relatively large size of the forage/cover patch sizes (e.g., entire sections may be categorized solely as "hiding cover").

Subjective forage and cover evaluations on non-BLM lands within the elk emphasis areas suggest low scores for these habitat parameters due to 1) large acreage of lands in early seral (forage) stages; 2) lack of quality forage development or slash treatment; and 3) very little acreage in mature and old growth seral stages, which normally provide high quality cover. With the future projection of short rotation lengths, lack of forage development, additional road development, and relatively large harvest units (up to 120 acres), habitat effectiveness scores are likely to remain low on these lands.

Due to the high amount of optimal and thermal cover that would be harvested during the decade in Alternatives A, B and C, these alternatives are likely to have significant adverse impacts to elk. Alternatives D, E and the Preferred would harvest far less acreage of these important cover types and thus would retain current cover quality in the emphasis areas. Although forage areas would be created through the harvest of timber, the already large acreage of forage on BLM and non-BLM lands appears adequate for increasing populations. Alternatives D and E specifically identify goals to promote production of higher quality forage

Table 4-WL-2 - 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	PA
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.

through seeding or other forage enhancement projects. Table 4-WL-3 summarizes data about the harvest of cover types under the various alternatives. Only Alternative E would provide for the development of "permanent" pastures during periods of low forage production when the bulk of private lands are in second growth. This is important over the long-term because it would serve to moderate the anticipated "boom and bust" cycles.

Alternatives A, B, C and the Preferred would add an estimated 140, 132, 97 and 81 miles of road development, respectively, to elk emphasis areas during the decade, a significant increase in areas that already have high road mileage. Alternatives D and E would increase road miles by about 29 and 42 miles, respectively. Offsetting the road miles projected for development, Alternatives C, D, E and the Preferred would recommend access management actions on 130, 580, 580 and 300 miles of BLM controlled roads, respectively, within elk emphasis areas during the decade.

Silvicultural prescriptions used under Alternative C and the Preferred Alternative, where there is significant retention of overstory canopy and/or small opening development during harvest, should result in significant increases in the use of forage areas created during this harvest due to a favorable interspersion of cover and forage areas.

In the short-term, Alternatives D and E would produce improving conditions for elk, and Alternatives NA, A, B and C would result in declining conditions. Improvements in habitat and populations of elk under Alternatives C, D and E would be anticipated due to significant retention of optimal cover, lower levels of new road construction, an access management program, and forage development projects. The effects under the Preferred Alternative would likely have similar impacts.

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. 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 limited amounts of optimal or thermal cover. In addition, road densities are often high on private lands, and clear cuts are usually larger, resulting in reduced availability of forage/cover edge habitat. Forage would likely be available for elk using cover on BLM administered lands under Alternatives D and E because of intensive timber harvest on adjacent private lands.

An unavoidable adverse impact of the Preferred Alternative on elk habitat would be the reduction in the amount of optimal cover, which is considered an important component of elk habitat (Brown, 1985). This reduction, although low, is considered a long-term

Table 4-WL-3 - Acres and Percent of Total Acres Available of Cover Type Which 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
PA	275	1.8	821	3.9	1,912	4.4
Total Acres Available in Cover Habitat Type:	15,371		20,977		43,036	

[1] Acres harvested under the No Action Alternative are approximate.

commitment of resources due to the length of time required in replacing these stands. Reduced habitat quality as a result of elimination of optimal and thermal cover would be expected to have long-term adverse impacts on the population size of elk herds. Approximately 87,700 acres of optimal cover would be retained or created in the long-term under the Preferred Alternative. In addition, approximately 27,000 acres; 17,000 acres; 36,900 acres; 97,400 acres; 90,100 acres; and 113,600 acres of optimal cover would be retained or created in the long-term under Alternatives NA, A, B, C, D and E, respectively. This represents a 43 percent, 64 percent and 22 percent decline under Alternatives NA, A and B, respectively, and a 105 percent, 86 percent, 128 percent and 86 percent increase under Alternatives C, D, E and the Preferred, respectively, in the long-term.

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. Thus, in the short-term the abundance of black-tailed deer would be roughly comparable under all alternatives. However, in the long-term, black-tailed deer numbers are expected to fluctuate in response to the "boom-and-bust" phenomenon of forage levels resulting from even-aged management of timberlands in western Oregon (Brown, 1985). This phenomenon is characterized by an initial high abundance of forage in response to overstory canopy removal, followed by low production of forage due to increasing shade from the overstory canopy. Deer populations tend to increase during periods of high browse availability only to decline when forage is scarce.

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 (HCAs) and older forest blocks, and low but stable populations within HCAs (D). Alternatives C and the Preferred Alternative 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 Preferred because of intensive forest management on intermixed private lands. The Preferred Alternative would increase numbers of black-tailed deer.

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 through E, and in the Preferred Alternative.

Black Bear

Black bears are omnivorous and forage heavily on fruits, green forage, and tree cambium. Such foods tend to be more prevalent in younger seral stages. However, Noble et al. (1990) recently pointed out that, because black bears use large logs, root wads and hollow trees as den sites, they should also benefit from areas of mature forests. The authors further stated that policies which protect snags and dead and downed woody material, and maintain areas secure from human intrusion, should improve bear habitat. Thus, moderate to high populations of bear would be anticipated in areas with a good mixture of younger seral stages for food and mature stands for denning habitat, and adequate access management.

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 downed woody material of sufficient size to provide adequate den sites, and increases in road density. Alternative A would have even 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 and fewer roads. The Preferred Alternative and Alternative C would increase black bear abundance, due to silvicultural prescriptions that provide adequate forage, accumulations of woody debris and snags for den sites, and reductions in road accessibility at critical times of the year.

Mountain Lion

Mountain lions depend upon the abundance of deer, their major food. Therefore, alternatives, which benefit black-tailed deer habitat, should at least maintain or increase mountain lion numbers in western Oregon (ODFW, 1987). 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 would support potentially higher, more stable levels of mountain lion. The Preferred Alternative would increase numbers of lions,

due to maintenance of stable deer populations, retention of potential den sites and reduced road levels and reduced disturbance.

Carnivores/Furbearers

Of the seven priority species identified in Table 3-WL-1, only the gray fox, raccoon and bobcat are not discussed above. All three use dead and down woody debris for cover and reproduction - large material provides the best habitat quality. Alternatives C, D, E and the Preferred would provide adequate habitat for viable populations of these species over both the short and long term. Alternatives NA, B and A may be expected to result in significant population losses over large areas remote from third order, and larger, streams/riparian zones - where suitable dead and down woody material would be retained and abundant food supplies are available.

Osprey

Osprey abundance is dependent on the availability of suitable nesting habitat and prey base near reservoirs, lakes, and major rivers and streams. 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.

In the short-term, osprey populations are likely to maintain present levels under all alternatives, due to adequate nest site protection. In the long-term, populations may decline under Alternative A due to the long-term potential reduction in fisheries potential, and 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 and the Preferred Alternative 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 would provide the best potential for long-term productivity of ospreys, given healthy fish populations within the best fish habitat/riparian protection levels.

Golden Eagle and Red-tailed Hawk

The abundance of golden eagles and red-tailed hawks in western Oregon appears to be related to both the availability of early seral stages as foraging sites and mature/old-growth timber as nesting habitat. These species are fairly adaptable and apparently can nest in small blocks of appropriate habitat, older forests within suitable distance of early seral stage forage habitat (Robert Anderson, pers. comm., 1989). In the short and long-term, Alternatives D and E would likely result in maintenance of current levels of these species due to a high level of protection of known and potential nest sites. Foraging sites would likely be available over the land base on adjacent private lands even under Alternatives C through E, but local situations would experience "boom or bust" conditions. Alternatives NA, A and B would likely result in very low populations in the Eugene District, and local extirpation, due to elimination of older forest stands. The Preferred Alternative would likely increase numbers of these species.

Great Blue Heron

Great blue heron abundance is related to the availability of suitable nesting habitat secure from human disturbance and prey base in nearby riparian areas. 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 lower availability of nesting habitat. Conversely, numbers of herons would be expected to increase under Alternatives C, D and E, given adequate access management, due to increased availability of suitable nesting habitat, and better riparian and wetland protection. The Preferred Alternative would likely increase numbers of great blue herons, with adequate access management. The two remaining active rookeries on BLM administered lands occur within forest stands nominated for Area of Critical Environmental Concern (ACEC) status.

Riparian habitat on private lands currently receives less protection than on Federal lands and, in addition, very little mature/old-growth habitat remains on private lands. The OFPA rules currently protect existing great blue heron rookeries to some degree, but there is little allowance for maintenance of suitable nesting habitat. The cumulative effect of Alternatives NA, A and B would likely result in reduced numbers of herons. Greater numbers of herons would be expected under Alternatives C, D, E and the Preferred Alternative.

Accipiter Hawks

Two species of accipiter hawk (i.e. Cooper's and sharp-shinned) use dense, unthinned stands for nesting (Reynolds, 1983), primarily in mid and late seral stage stands 25-75 years of age. Sharp-shinned hawks are generally adapted to the early years and Cooper's hawks to later years within this age class. Populations would probably vary in accordance with the availability of unthinned habitat. Based on research to date, extensive commercial thinning or other density management activities that alter habitat conditions within this age class may have adverse impacts to these two raptor species. Retention of at least two 15-acre stands per square mile would provide most nest habitat needs.

The effects of precommercial thinning in stands between 10 and 17 years of age may have some adverse impacts due to alteration of structural characteristics and reduction of the total number of stems on a stand below the optimal number for nesting. However, no research has been done to demonstrate absolute effects on the stand structure, future canopy closure, or canopy depth (three factors that determine the desirability of future stands for nesting) after this activity. It is assumed under all alternatives that all present and future stands in the 10 to 17 year age class would be precommercially thinned.

Currently, in the District there are approximately 110,000 acres of forest habitat in the 25 to 75 year age class. 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-WL-4). Stands age 25 to 75 years that would remain unaltered by commercial thinning would amount to approximately 15 to 18 percent of the available acreage (in the age class) in Alternative C and the Preferred Alternative, and 26 to 42 percent in Alternatives NA, A, B, D and E.

In the long-term, there would be slight to severe reductions in the acreage of stands unaltered by commercial thinning, ranging from 80,000 acres total available habitat (27 percent reduction) in Alternative A to 3,000 acres (97 percent reduction) in Alternative C. The other alternatives would have more moderate reductions in available habitat.

Over the long-term, Alternative C would be likely to have significantly adverse impacts to accipiter hawks because only about 1 percent of stands on BLM lands aged 25 to 75 years would remain unaltered by commercial thinning or density management. This would likely result in large portions of the District having virtually no suitable nesting habitat for either species. Alternative E would provide for retention of unaltered 15-acre nest sites specifically for these species. All other alternatives would likely provide an abundance of this age class throughout the District but there would be localized areas where none of this age class would be available. However, it is difficult to predict amounts of suitable nesting habitat available for these species because 1) most of the habitat in the 25 to 75 year age class may be too young for Cooper's hawks; and 2) the effects of precommercial thinning (at ages 10 to 17) on potential sharp-shinned habitat (beginning at about age 25) may be significant. Essential inventories have not been performed.

Under all alternatives, unthinned stands on intermingled small private ownerships within the BLM operating area are expected to be more prevalent than on BLM administered lands, contributing suitable nesting habitat in some areas. However, this habitat is most likely to be less than 50 years of age (more suitable to sharp-shinned hawks) due to the rotation length of forests harvested on private lands. Unthinned stands on lands of large timber companies are expected to be similar to BLM lands under Alternatives NA, A and B. Private harvest schedules may, therefore, limit nesting habitat for Cooper's hawks, which normally use unthinned stands 50 to 75 years of age.

Table 4-WL-4 - 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	PA
Existing Condition	110	110	110	110	110	110	110
Short-Term (10 years)	133	133	133	121	132	133	118
Long-Term (100 years)	80	62	97	3	64	35	50

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.

Other Raptors

Of the 14 raptors identified as priority species (Table 3-WL-1), all but four (American kestrel, pygmy owl, western screech owl and barred owl) are discussed above or in the Special Status Species section. These four species depend upon tree cavities for nesting, and three species (pygmy owl, western screech owl and barred owl) use older forest habitat for one or more life needs. Therefore, Alternatives C, D, E and the Preferred 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 Management Areas (RMAs).

Woodpeckers

Snag densities were estimated for BLM administered lands using procedures outlined in Appendix 4-E. 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 has been validated only for nest tree requirements, its predictive capability for meeting all habitat needs for woodpeckers, including foraging habitat, is uncertain. This analysis compares woodpecker population levels to the optimal nesting condition, which is defined as the situation where woodpeckers populations are not limited by the availability of potential nest sites, and to the present conditions.

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.

At the end of the first decade, Alternative A would retain about 34 percent of optimal population levels. Alternatives NA, B, C, D, E and the Preferred would retain about 37 percent, 39 percent, 47 percent, 48 percent, 48 percent, and 48 percent of optimal population levels, respectively. These population changes, when compared to the existing condition, show a net decrease of approximately 22 percent of present woodpecker populations during the decade under Alternative A. Alternatives NA and B also show net declines of 16 percent and 10 percent, respectively. In contrast, Alternatives C, D, E and the Preferred show net increases of 7 percent, 8 percent, 9 percent and 9 percent, respectively, over the present condition during the decade.

In the long-term (10 decades), Alternative A would retain only about 23 percent of the optimal woodpecker population levels, due to substantial removal of mature and old growth seral stages, short rotation lengths on intensively managed forests, and expected low levels of snag retention on harvested stands. Alternatives NA, B, C, D, E and the Preferred would retain about 37 percent, 50 percent, 70 percent, 80 percent, 86 percent, and 69 percent of optimal population levels, respectively, in the long-term. Compared to present conditions, Alternatives A and NA show net declines of woodpecker populations of 48 percent and 16 percent, respectively. In contrast, Alternatives B, C, D, E and the Preferred show net increases of 14 percent, 60 percent, 81 percent, 96 percent and 57 percent, respectively, over present conditions at the end of 10 decades.

Snag densities were estimated for 10 and 100-year intervals as shown in Tables 4-WL-5.

In addition to the quantity of habitat (acres), another consideration in evaluating the ability of management alternatives to provide habitat for woodpeckers is the quality of the habitat (size and seral stage distribution of snags) that is retained. Under Alternative A, 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 will 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 40-year rotation would mean that nearly all new snags will be near the lower size limit (15 inch dbh) of useful nesting snags. Nearly all (91 percent) of acres with snags will be in early and mid seral stage forests, and none will 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. Alternatives NA and B would be expected to have similar, although not as severe, adverse impacts.

In contrast to this, Alternative C would produce a much wider distribution of snag diameters, Districtwide, over all seral stages, in both the short and long-term. Tree retention criteria are such that a representative cross section of diameters is 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 Preferred Alternative would provide similar, though slightly less, size and spacing flexibility to snags and retention trees, and accompanying benefits to woodpeckers. Alternative D would provide beneficial impacts to woodpeckers, but suffers slightly from spatial distribution (mature and old growth only in HCAs in the long term). Alterative E would provide benefits as well, but would suffer from the low amount of late seral stage 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. Few trees of a size to be nesting habitat for woodpeckers are left on private lands clear cut in the last 30 years, except in State mandated buffer strips. This situation will likely continue in the foreseeable future, given present forest practices. Within the BLM operating area, where Federally managed lands comprise less than 50 percent of the total landscape acreage, most suitable habitat will 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 Preferred, 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 Preferred 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.

Secondary Cavity Users

For purposes of this analysis, priority species of secondary cavity users are those identified on Table 3-WL-1 as requiring tree cavities for reproduction. Because many of these species depend on woodpeckers to provide the necessary tree cavities, it is assumed that management to maintain woodpecker populations at 60 percent of optimum levels would maintain viable populations of all secondary cavity-using species, provided that snags are present in all seral stages. Therefore, anticipated impacts for the group as a whole parallel those of woodpeckers, i.e., 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 Preferred.

Table 4-WL-5 - 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	PA
Short-term	44	37	34	39	47	48	48	48
Long-term	44	37	23	50	70	80	86	69

[1] See Appendix 4-E for description of technique used to calculate population levels.

Although few studies are available, it is assumed that 1) the needs of individual species within this group vary greatly, and 2) the alternatives are not equal in their ability to provide for the needs of all species. They vary, for example, in short-term protection, or long-term productivity, of non-woodpecker-excavated cavities, e.g., chimney-like cavities in the broken tops of large trees required by Vaux's swift and cavities behind loose bark of old growth trees and snags used by brown creepers. They also vary to the extent that they protect and maintain production of nest trees in relatively closed-canopy stands and in open habitats such as early and mid seral stage; they vary in their ability to provide nest trees in stands with an abundance of hardwoods, and in riparian zones. 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 Preferred Alternative and Alternative C are believed most capable of meeting these goals. Alternatives NA and A are clearly incapable of meeting these goals, while Alternatives B, D and E would provide varying degrees of diversity.

Neotropical Migrant Birds

Of the 38 species of birds listed as priority species on Table 3-WL-1, 23 (61 percent) are neotropical migrants. Of these 23 species, six (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, i.e., Alternatives NA, A and B are likely to result in population reductions of some species over large areas, while Alternative C and Preferred Alternative 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.

Waterfowl

Because of their dependence upon large trees with cavities located within close proximity of fish producing streams, the four ducks identified as priority species in Table 3-WL-1 are of concern. Anticipated impacts to these species are directly related to the amount of riparian habitat along the larger stream orders managed for old growth conditions. Accordingly, riparian management on BLM lands is expected to improve habitat conditions for these species under all alternatives except A where continued habitat loss is certain. Acquisitions of stream/riparian habitat, and management for older forest conditions, provided for under all alternatives except NA and A, would provide added benefits where they can be accomplished. Acquisitions of existing wetlands, and lands with potential for wetland development, followed by successful project development (e.g., Hult Pond) could mitigate the historic loss of wetlands in the Willamette Valley and benefit many other species of waterfowl.

Passerine Birds and Bats

Of the 36 species of passerine birds and bats identified as priority species in Table 3-WL-1, all but four are associated with older seral stage forests; cliffs and caves are also primary habitats for several species of bats. During the short-term, Alternatives NA, A and B would drastically reduce current levels of mature and old growth to approximately 10 to 12 percent of the District's forest land base. Assuming private lands represent about 50 percent of the total landscape within the BLM operating area, less than 6 percent of the landscape would remain in mature and old growth forest. This level is believed incapable of supporting viable populations of some wildlife species. Alternatives C, D, E and the Preferred retain significant amounts of mature and old growth unaltered by timber management, (i.e., approximately 23 percent, 24 percent, 25 percent, and 22 percent, respectively) of the District's forest land base. This amounts to 11.5 percent, 12 percent, 12.5 percent and 11 percent, respectively of the total forest landscape.

Over the long-term, Alternatives C, D, E, and the Preferred would increase amounts of older forest habitat to approximately 75 percent, 50 percent, 67 percent, and 52 percent of BLM lands, and 38 percent, 25 percent, 34 percent, and 26 percent of the operating area forested landscape. Although further population reductions may be expected in the McKenzie Resource Area, Alternative C and the Preferred Alternative offer the best chance of increasing populations above current levels over a large area (the OGEAs and R&R blocks) because they are the only alternatives designed to increase older forest habitat island sizes to a range of 100 to 300 acres. This is believed crucial for many species of songbirds in this group in order to minimize nest parasitism by cowbirds and predation by other species (Terborgh, 1992).

Upland Game Birds

All six species of upland game birds listed as priority species on Table 3-WL-1 are associated with the presence of hardwoods in their primary habitats; three of the six 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 HCA status. Populations of upland game birds are expected to be highest under Alternative C and the Preferred Alternative in both 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-WL-1 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 Preferred would provide adequate habitat for viable populations over both the short and long-term. Alternative E and the Preferred Alternative would provide high amounts of habitat protection in the short-term. The Preferred Alternative 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.

Amphibians

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. Some amphibians depend on surface water for breeding, while others deposit their eggs in moist situations on land.

Water quality, particularly low levels of silt and cool water temperatures, is important for the survival and development of amphibian eggs and larvae while cool, moist riparian zones are crucial to the survival of adult animals (Nussbaum et al., 1983). Under all alternatives some stream/riparian habitat would be lost, or damaged, although implementation of Best Management Practices (BMPs) (refer to Chapter 2, Water Quality), would help mitigate the impacts. Although habitat damage would vary by alternative, it would be greatest in the 1st and 2nd order drainages in all alternatives.

Stream/riparian habitat previously damaged by management activities would recover in varying degrees under all alternatives. This would facilitate some recovery of amphibian populations. Recovery rates (of amphibian populations) would vary by alternative. Recovery would be slowest in Alternatives NA, A and B where extensive amounts of adjacent upland habitat would be removed, and more rapid in alternatives that retain more of the remaining older forest habitat on adjacent upland habitats, e.g., C, D, E and the Preferred. Intensive harvesting in subbasins dominated by BLM administered lands, such as Bear, Marten, or Greenleaf Creeks, which have rich amphibian communities, would result in a decline or a loss of these amphiblans during the short-term, with probable continuation into the long-term.

Alternative E, which retains riparian vegetation along all streams, provides the widest Riparian Management Areas (RMAs), 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. Although the Preferred Alternative does not retain RMAs along 1st and 2nd order streams and its RMAs are reduced (in comparison to Alternative E), it would also provide a high degree of protection because it would also retain a large number of 1st and 2nd order drainages entirely in an undisturbed, or minimally disturbed, condition. Although Alternative D would retain riparian vegetation along 2nd order and larger streams, it would retain significantly fewer 1st order drainages in an entirely undisturbed condition, i.e., those located within spotted owl HCAs. The other alternatives retain riparian habitat along perennial streams, but lack significant protection of temperature and moisture regimes within the riparian zones due to the low RMA widths and retention of forest stands on 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 Preferred Alternative that have the greatest RMA widths and the most 1st and 2nd order drainages retained in an entirely undisturbed condition provide the greatest protection from changes in the microclimate in the riparian area as a result of upslope timber harvest, which can impact the temperature and moisture regimes needed by the amphibians.

Alternatives C, D, E and the Preferred, because of their greater retention of downed woody material and mature and old growth stands, would assist amphibian

populations associated with upland habitats as compared to Alternatives NA, A and B. In the long-term, the Preferred Alternative would provide the greatest amount of large downed woody material, followed by Alternatives C, D and E. The least amounts of large woody material would be provided under Alternatives A, NA and B. Alternative C and the Preferred Alternative provide slightly higher habitat quality in upslope areas adjacent to riparian areas due to wildlife tree retention.

Assuming management of BLM lands under Alternatives C, D, E, or the Preferred, 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. With BLM lands managed under Alternatives NA, A and B, management of nonfederal lands over the long-term using short cutting cycles would contribute to the decline of many amphibian populations and increase the potential for extirpation of some species over wide areas. Habitat loss, and population declines would be due to a combination of several factors, e.g., direct mortality due to timber management activities on short cutting cycles, loss of cover provided by older seral stages, and inability of short cutting cycles to provide replacement habitat.

Effects on Fisheries

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, which 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 impacts 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 (BMPs) for constructing roads and landings and protecting potentially unstable areas, may mitigate most potential habitat losses.

Very few streams in the Eugene District remain unaltered by past activities on BLM and adjacent lands. Recovery of this habitat depends upon the establishment of the full mature riparian community, a process that may take up to 200 years. Management of the forest and riparian for shorter rotations does not allow the conifers to reach a mature age, at a size where they remain in the stream for extended periods after falling, so that the fish production potential does not fully recover.

Fish will use 1st and 2nd order streams for part or all of the year, but most use is concentrated in the perennial 3rd order and larger streams. These stream channels are directly influenced by the presence of large trees that fall into the stream and create habitat; provide channel stability and habitat complexity; create pools and nursery areas; retain gravels; and retain nutrients in the channel.

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 and the species present determine 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), and a 164-foot width is capable of providing an optimum amount of large woody debris (Van Sickle and Gregory, 1990).

Retaining vegetation along a stream as a buffer can help maintain aspects of aquatic habitat. Narrower strips of vegetation provide some shading and help reduce temperatures and siltation. They do not provide adequate large woody debris to maintain the channel or instream habitat. Monitoring by the Eugene District suggests that buffer strips under fifty feet, particularly those composed primarily of deciduous trees, do not survive well, and benefits from the retained vegetation decrease during the decade after harvest. Since 1983, BLM has retained the full riparian area along most 3rd order and larger streams. Monitoring to date indicates retention of the full riparian area is more effective at maintaining aquatic habitat. Most loss of habitat since 1983 has resulted from mass failures on adjacent land upstream from BLM managed habitat.

Riparian habitat on adjacent lands is managed under guidelines of the Oregon Forest Practices Act, which requires less retention of riparian vegetation and downed logs than is proposed under any alternatives on BLM administered lands. Large trees and large

woody debris have been removed from these lands and probably will not be replaced in the future. Therefore, one cumulative effect of timber management in individual watersheds, especially those with large holdings of other owners, would be an overall shortage of woody debris and habitat for salmonids and other native fish species over the long-term.

Fish habitat conditions in stream segments with adjacent BLM administered lands are currently improving. (Other than the descriptions of cumulative effects, the impact assessments in this section apply only to 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 depends on conversion to conifers and the maturation of these conifers to mature size. Current potential fish production values are the same as shown in Table 4-F-1 for the short-term values.

The assumptions, analytical techniques, and factors used to derive these estimates are described and displayed in Appendix 4-F.

In the long-term, there would be no significant differences in fish production among the alternatives except under Alternative A. The Riparian Management Areas (RMAs) proposed by Alternatives NA and B, C, D and E and PA would provide for a continuing increase in the quality and quantity of riparian vegetation and a gradual conversion of vegetation to large conifer trees. These large trees would provide most of the large woody debris required for achieving optimum stream conditions. While improvement is expected in all streams in all alternatives except A, full recovery is expected in only two-thirds of the streams because of the impacts of management activities on adjacent lands managed under less stringent guidelines, fragmentation of riparian areas, and long-term conversion of some riparian areas to other uses. The RMA width in Alternative A would not provide sufficient large woody debris in the long-term for full recovery and would preclude development of optimum habitat conditions. Based on research findings and District stream monitoring, Alternative A would likely fall short of potential large woody debris by 50 percent or more in the long-term. The expected short and long-term conditions of fish habitat under all alternatives except A are displayed in Table 4-F-2.

While the actual production of fish from streams on public lands is strongly impacted by actions outside the planning area, particularly the harvest of anadromous salmonids, the productive capability is directly correlated with quality of habitat. As habitat improves, the productive potential of the habitat for fish also improves. Recovery depends on regrowth of conifers in the riparian area to mature age classes so that large conifer trees are available to fall into the stream and create fish habitats. Because of the length of time needed for riparian vegetation recovery, the potential productivity is similar for all alternatives in the short-term, and is constant for Alternative A in the long-term. Productivity potential will increase for Alternatives NA and B, C, D and E, as shown in Table 4-F-1.

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 are undertaken only to mitigate existing problems in the short-term, and are not a substitute for restoring and maintaining the stream channel and riparian areas. Natural habitat has a much greater longevity than

Table 4-F-1 - Fish Production Potential and Population Trends on Public Lands[1]

	Average Annual Fish Production Potential				Population Trends	
	Short-Term		Long-Term			
Species	Smolts	Adults	Smolts	Adults	Short-Term	Long-Term
Coho	223,534	16,765	352,351	26,426	Decline	Improve
Chinook	23,742	2,137	33,544	3,721	Stable	Improve
Steelhead	57,600	5,800	97,800	9,800	Decline	Improve
Cutthroat	23,800	7,140	38,800	11,640	Stable	Improve
Rainbow	33,092	3,309	39,918	3,992	Stable	Improve

[1] The assumptions, analytical techniques, and factors used to derive these estimates are described and displayed in Appendix 4-F.

Table 4-F-2 - Aquatic Habitat Quality on Public Lands (Miles)

Stream Order	Stream Miles	Short-Term Minimal	Short-Term Fair	Short-Term Good/Optimal	Long-Term [1] Good/Optimal
3	309.03	69.73	151.26	88.04	198.54
4	147.43	20.33	84.77	42.33	94.88
5	39.14	6.23	18.94	13.97	26.56
6+	37.28	3.84	16.54	16.90	27.09
Total	532.88	100.13	271.51	161.24	347.07

[1] Long-term is after 200 years. It is anticipated that half the streams in the Minimal and Fair categories will achieve Good/Optimal condition during this time. Stream habitat quality is directly linked to tree size in riparian areas (see Appendix 3-F).

projects that last an average of 10 years and is more cost-effective over the timber rotation cycle of 50 to 80 years or longer.

A recent publication (Nehlson et al., 1991) identified 32 stocks of salmonids on BLM managed lands in western Oregon that are at risk or of special concern. Four of these stocks are in the Siuslaw and Willamette Basins in the Eugene District. Monitoring by the Eugene District has documented declines in three of the four stocks since 1983. These declines are not related to management activities by the District, but are due to other factors that have caused declines coastwide.

Anticipated leasable mineral activities are not expected to impact aquatic habitat. Locatable mineral activity during the past decade has centered on placer mining for gold in the Sharps Creek Basin. The small scale suction dredging practiced during this period has not had an impact on aquatic habitat. Potential development of larger scale placer mining, as described in Appendix 4-K, 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 and steelhead and fall chinook, has been a major problem in some accessible areas. Closure of roads in riparian areas will reduce the threat to these fish. Increased recreational development in some areas, especially along the Siuslaw River, will increase access to spawning areas and the probability of disturbance and poaching of spawning fish. In most areas, recreation development will not have negative impacts on fish and will enhance fishing opportunities for resident and anadromous salmonids and other game species.

Effects on Special Status Species

Introduction

Common to all alternatives is the requirement to protect from any negative impacts Federally Listed Threatened, Endangered, and Proposed Threatened or Endangered species as legally required by the Endangered Species Act (ESA). Management of other Special Status Species differs under the No Action Alternative through the Preferred Alternative according to the category of the species and whether it occurs on commercial forestland, or on BLM administered O&C or Public Domain (PD) lands.

Special Status plant and animal species in the planning area are listed in Chapter 3, Tables 3-SSP-1 and 3-SSW-2, respectively. The discussion of impacts by alternative for Special Status plants is followed by discussion for Special Status animals. Special Status Species animals are discussed individually.

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 will achieve desired goals of forest regeneration and structural development. Some prescriptions to be implemented in Alternative C and the Preferred Alternative are experimental in nature, and will require substantial monitoring to evaluate the success of the prescription toward meeting wildlife habitat management goals.

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 can 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 can 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 threats that can occur in the planning area but which occur in less frequency are threats 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, both 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-road vehicle 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 thus 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 (see Fire discussions).

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 out-crossers, which rely on other populations for exchange of genetic material. Where acquisition or conservation strategies are not pursued, non-federal sites for Special Status plant species may be altered or destroyed. The resulting long-term consequence of this may be the loss of the viability of some Special Status plant species on Bureau lands.

Appendix 2-P, Tables 2-5a and 2-5b - Sensitive Plant Protection by Alternative, lists Special Status plant species known to exist in the planning area and their protection by alternative.

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 pointed out 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. 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 will 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 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. Protection of Assessment species would be under the discretion of management, but would be encouraged to reduce the risk of increasing the status of these species to Bureau sensitive or Federal candidate.

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 critical habitat designated or a recovery plan in place. In the short-term and long-term approximately 274,000 acres would be available for timber harvest. At this time, one officially listed plant species, *Lomatium bradshawii* (Bradshaw's lomatium) occurs on 7 acres of O&C land in the planning area. A draft recovery plan is currently being prepared by the U.S. Fish and Wildlife Service for this species. This site, along with several other Special Status plant species sites, occurs in special habitats other than commercial forestlands and would receive some inadvertent protection. Adequate buffers for special habitats, however, which could require commercial forestlands, may not be established (see Wildlife, Chapter 2, Table 2-5 - Buffering of Special Habitat). Species such as Federal Candidate 2 species, *Aster vialis*, and Bureau Sensitive species, *Cimicifuga elata*, 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*, and for Federal Candidate 2 species, *Frasera umpquaensis*, but the Bureau would not be directed to actively manage for these species under Alternative B because these 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*, and Bureau Sensitive species, *Cimicifuga elata*, 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 these species are known to occur off of Bureau lands. Loss of other Special Status plant sites including Federal Candidate 2, *Aster vialis*, and Bureau Sensitive, *Cimicifuga elata*, 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, E and Preferred Alternative

Under Alternatives D, E and the Preferred, 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, E and the Preferred would be consistent with current Bureau Policy (BLM Manual 6840; Instruction Memo OR-91-57) on sensitive plant species. 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, E and the Preferred, including General Forest Management Areas (GFMAs) or Old Growth Emphasis Areas (OGEAs). 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. The protection of Assessment species would be under the discretion of management but would be encouraged to reduce the potential of these species increasing in status to Bureau Sensitive or Federal Candidate.

In summary, effects resulting from the lack of protection and active management in Alternatives A, B and C would be detrimental to Special Status Species. 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 Preferred would protect known and future Special Status Species and the habitats on which 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 could occur over several land-use allocations, including GFMAs and OGEAs. Alternatives D, E, and the Preferred Alternative would provide active management for Special Status plant species and would direct the Bureau to broaden the present database on these species and to develop Habitat Management Plans for maintaining 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 assure 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.

Wildlife (animals)

The following species occur within the Eugene District and may be affected by surface and/or subsurface management activities of the planning alternatives. The Assessment of Impacts follows each species. Table 4-SSW-1 summarizes impacts for these species for both short-term and long-term.

Peregrine Falcon (Federal Endangered)

Potential peregrine falcon habitat will be protected from short-term disturbance in all alternatives pending completion of inventories and development of habitat management plans. Sites found to have potential for use by peregrines would be protected over the long-term. Therefore, no alternatives would result in either short-term or long-term impacts to this species.

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 three existing nest sites, two winter roost complexes and several potential nest sites for seven 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 will retain all occupied habitat. All alternatives except the Preferred retain all identified suitable-but-unoccupied habitat. The Preferred Alternative would impact one tract identified as suitable-but-unoccupied. However, it retains enough tracts to provide nesting habitat for all 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 Preferred 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 ten 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 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 Preferred, the cumulative effects would result in higher amounts of bald eagle habitat within the BLM operating area, thereby increasing the potential for achieving ten active nests.

Northern Spotted Owl (Federal Threatened)

Effects on Suitable Habitat

Management activities designed to produce high timber volumes have had major effects on spotted owl habitat over the last several decades (Thomas 1990). Two design features of past timber management programs have been highly significant in the loss of spotted owl habitat. One feature has been a short cutting cycle, or rotation, that replaced stands of slow growing old forests with young, rapidly growing stands over a portion of the land base in a short period of time. The other was the use of clearcutting as a tool for extracting a high volume of merchantable timber from each acre harvested. While continued use of these design features on a major proportion of the land base currently in older forest habitat would severely impact spotted owl habitat, other design features can be implemented that would greatly reduce the rate of habitat loss, insure the retention of adequate amounts of existing suitable owl habitat, and speed the development of suitable owl habitat on lands previously harvested.

Other activities that could affect spotted owls or their habitat include mining, operation of machinery, land exchanges, and the granting of rights-of-way - all of which could alter habitat or cause disturbances near spotted owl nest sites/activity centers sufficient to disrupt nesting. Wildfires are a threat to the remaining habitat as is the cumulative effects of timber salvage operations over a long period of time.

Planning Area. Aerial photography and timber inventory data were used to evaluate BLM administered forest stands in the planning area. Based on habitat

Table 4-SSW-1 - 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	PA
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/+
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: - = adverse impact; 0 = low impact; + = beneficial impact
[3] Species marked by asterisk (*) have been specifically addressed in Chapter 3.

information in the Interagency Scientific Committee (ISC) 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 conifer 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 as evidenced by the occurrence of snags and live trees with broken-tops, visible cavities, or signs of disease. The forest floor has substantial accumulations of down woody material in the form of large fallen trees.

HABITAT 2 - Comprised of coniferous forest stands that provide roosting and foraging opportunities for spotted owls, but lack the necessary structure for consistent nesting. The roosting and foraging qualities are less than those described for Habitat 1 due to the reduced quality or complete absence of one or more of the components listed above (for example, the absence of large trees in the overstory or a reduced amount of down woody material on the forest floor). Habitat 2 stands generally have less diversity in the vertical structure and have either limited or poorly defined multilayer canopy structure. The understory is somewhat open, allowing for owl movement and foraging, and canopy closure exceeds 70 percent.

Currently, there are, on the Eugene District, about 61,000 acres of Habitat 1 and 56,000 acres of Habitat 2 - for a total of 117,000 acres; that is, approximately 41 percent of the BLM forest land base, and less than 20 percent of the total forest land base (all ownerships) in the BLM operating area.

Forest stands having characteristics of the two habitat categories were evaluated. Amount of future habitat expected under each alternative was calculated by aging mapped stands and projecting the location and timing of future harvests. Future harvests in the short term were based on the 10-Year Timber Harvest Scenario; long-term projections were based on random selection from lands available for harvest. A natural disturbance-caused rate of habitat loss of 0.4 percent per decade was also included in the projection.

In estimating the rate of development of future habitat, BLM is conservative in its forecasts of habitat development on previously harvested lands because existing replacement stands lack large residual trees and snags from the previous older forests.

The assumed ages of development of future spotted owl habitat are shown in Table 4-SSW-2. These age assumptions are based on the following points:

Density management in Alternative C's Restoration and Retention (R&R) Blocks and the Preferred Alternative's Old Growth Emphasis Areas (OGEAs) is not expected to negatively affect attainment or retention of suitable habitat condition, nor is it given credit for significantly increasing the rate at which suitable habitat is produced.

In the future, no non-federal lands would have suitable habitat. (This is an admittedly pessimistic assumption, especially for Habitat 2, but it is likely that it would be true of the vast majority of those lands.)

Current acres of spotted owl habitat, and owl habitat expected in 10 years, 50 years and 100 years, by alternative are shown in Table 4-SSW-3. This data, developed from BLM timber inventories, is subdivided by the four Oregon physiographic provinces that contain spotted owl habitat: Oregon Coast Range, Western Oregon Cascades, Eastern Oregon Cascades, and Klamath (which also embraces much of northern California) (Thomas, et al. 1990). The Oregon Coast Range, and the Western Oregon Cascades Provinces are in the Eugene District. However, not all future suitable habitat would be located in concentrations needed to support clusters of spotted owls. The "Impacts on Carrying Capacity" portion of this section discusses this concept.

The data was analyzed using a population model (McKelvey, 1992) developed by the USDA Forest Service's Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California (Appendix 4-P). The distinction between Habitats 1 and 2 could not be maintained in the running of the model. Also, because the No Action Alternative is not mapped in BLM's Geographic Information System (GIS) data base, habitat data could not be calculated for it, but its outcome is assumed to be similar to that of Alternative B.

Under Alternative A, suitable habitat would continue to be reduced at rates typical of the last four decades. The amounts of suitable habitat projected for this alternative after 100 years, and the proximity to suitable habitat in the nearest National Forests is expected to be at levels insufficient to maintain clusters of owl sites, or sites that would be occupied on a consistent basis on BLM lands within the Planning Area. For example, the 21,000 acres of suitable habitat projected for Alternative A after 100 years is approxi-

Table 4-SSW-2 - 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
Old Growth Emphasis Areas (PA)	[2]
Connectivity Areas (PA)	70
General Forest Management Areas (PA)	60

[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.

mately 7 percent of the BLM forest land base, and 3 percent of the total forest land base (all ownerships) in the BLM operating area.

Loss of suitable habitat would also continue at a rapid rate under Alternative B. Although this alternative would provide over twice the amount of suitable habitat after 100 years as Alternative A, (48,000 acres) the small proportion of the total forest land base that it represents (approximately 8 percent of all ownerships) and its isolation, is also inadequate to maintain clusters of spotted owls pairs, or sites that would be occupied on a consistent basis. In both Alternatives A and B, there are no provisions for maintaining dispersal habitat between territorial owl sites.

Under the NA Alternative, effects on spotted owl habitat would be similar to Alternative B.

By 100 years, Alternatives C, D, E, and the Preferred are predicted to develop more suitable spotted owl habitat than is currently available. For example, approximately 96 percent of the BLM forest land base would be in suitable habitat under Alternative C, 50 percent under Alternative D, 53 percent under Alternative E, and 60 percent under the Preferred Alternative. (Relative to forest lands of all ownerships, suitable habitat would amount to less than 48 percent, 25 percent, 27 percent, and 30 percent respectively for Alternatives C, D, E and the Preferred Alternative, respectively.)

Although Alternatives C, D, E, and the Preferred would provide this habitat in blocks, designed to support clustered pairs, spatial arrangement of the habitat would differ significantly. Under Alternative C, suitable habitat over the long term would be distributed relatively evenly over the entire planning area. Alternative D would distribute large blocks of habitat in Habitat Conservation Areas (HCAs) as mapped by the ISC. Under Alternative E, distribution of suitable habitat would resemble that of the existing situation. The Preferred Alternative would concentrate suitable habitat in OGEAs that overlay spotted owl Designated Conservation Areas (DCAs) established by the Spotted Owl Recovery Team. The location of OGEAs forms a broad corridor stretching from the Cascades, in the southeast portion of the District, in a northwesterly direction, well into the Coast Range. This corridor encompasses, and expands, the Southern Willamette/ North Umpqua Area of Concern.

Alternatives C and the Preferred Alternative use forest management techniques to develop habitat in younger stands. The ultimate quality of such habitat is to be determined by research. The quality of unmanaged (natural) old growth, however, is known to be of excellent quality (Thomas,1990).

Under Alternative C, most suitable habitat after 100 years would be in managed stands, under the high, or low, retention regimes. Old growth R&R blocks, which currently contain about 24,000 acres of unmanaged

Table 4-SSW-3 - Suitable Spotted Owl Habitat on BLM Lands (Eugene District) by Alternative

	(1,000 acres)						
		Alternatives					
After 10 Years	Current [1]	A	B	C	D	E	PA
Coast Range Province	55	32	37	51	53	53	52
W. Cascades Province	62	39	42	56	54	54	50
Total	117	71	79	107	107	107	102
After 50 Years							
Coast Range Province	55	9	23	34	63	66	66
W. Cascades Province	62	7	17	33	50	56	50
Total	117	16	40	68	114	122	116
After 100 Years							
Coast Range Province	55	12	28	138	80	84	93
W. Cascades Province	62	9	20	136	63	67	80
Total	117	21	48	274	143	151	173

[1] Current habitat includes 32,000 acres of Habitat 1 in the Province and 29,000 acres of Habitat 1 in the Western Oregon Cascades.

(natural) stands, i.e., mature and old growth, would be approximately 9 percent of the suitable habitat (276,000 acres) that would be old growth in 100 years.

Under Alternative D, at least 36,000 acres of suitable habitat would be forest stands located in HCAs that are currently 80 years old, or older. Because HCAs total approximately 95,000 acres, at least 38 percent of suitable habitat within them would be old growth habitat after 100 years. Another 19,000 acres of suitable habitat that would occur across the forest matrix (outside HCAs) would consist of a mixture of old growth and other stands that have attained age 70, or older.

Under Alternative E, the reserved 33,000 acres of stands currently 150 years old, and older, would amount to approximately 22 percent of the 151,000 acres of suitable habitat available after 100 years. However, another important consideration relative to habitat quality produced by this alternative is that the reserved stands are widely scattered and there are no provisions for maintaining, or developing, suitable habitat in surrounding younger stands specifically for the purpose of developing large old growth blocks that would provide high quality spotted owl habitat. The additional 78,000 acres of suitable habitat would be scattered around the planning area as determined by considerations other than spotted owl habitat management.

Proportions of managed and unmanaged (natural) habitat within the OGEAs, in the Preferred Alternative, after 100 years is difficult to determine. By the end of 100 years of management, some of the currently existing 69,000 acres of mature and old growth included within the OGEAs would have been altered by harvest using small regeneration patch cuts and tree retention (in the non-deferred portion) designed to retain old growth structural components. Also, by the end of 100 years, the eight decade deferral period would have been over for 20 years, during which time about 9,500 acres (approximately 473 acres per year under the 300 acre area control) of the currently existing 69,000 acres would have been available for regeneration harvest using 0.5-5 acre patch cuts in 100 to 300 acre management blocks (with 6-8 tree retention). Because much of the suitable habitat would also include second growth stands developed to resemble older forests through the application of density management treatments, it appears that as much as 75 percent of the OGEAs may be in some type of managed condition by the end of 100 years. Given this estimate, the proportion of suitable habitat in high quality spotted owl habitat would be somewhat less than Alternative D, but the total amount would be comparable.

Effects on Western Oregon and the Region. Based on the data in the Draft Spotted Owl Recovery Plan, BLM administered lands currently provide approxi-

mately 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 lands, and 70 percent on Forest Service lands.

The projections shown in Table 4-SSW-4 indicate that in western Oregon, Alternatives NA, A and B would provide the least suitable habitat in the short and long term. Compared to the amount projected for Forest Service lands, these alternatives would not contribute substantial habitat for spotted owls in the State. Spotted owls would have to rely solely on Forest Service lands for survival.

Alternative C would provide the greatest amount of suitable habitat in the long term, increasing from approximately 25 percent to 43 percent as much as is projected for Forest Service lands. Alternative D,E and the Preferred would contribute smaller acreage; 30, 38, and 31 percent of the Forest Service, respectively. (The actual percentages on BLM 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 lands to the present and projected availability of suitable habitat in the different provinces varies substantialy (Appendix 4-P). BLM lands are most important in the Coast Range, where BLM lands currently contain more suitable habitat than Forest Service lands. Under Alternative NA, A, and B suitable habitat on BLM lands would be reduced 51 to 74 percent from current acres within the Coast Range province and provide 33 to 62 percent as much suitable habitat as Forest Service lands.

In the long term, BLM lands under Alternative C would produce 80 percent more suitable habitat compared with the existing situation, which is more than twice as much as is projected for Forest Service lands. Alternative D,E, and the Preferred would be between these two extremes within the Coast Range province.

Within the other provinces, the relative contribution of BLM lands to suitable spotted owl habitat in the long term compared with Forest Service lands, is smaller than in the Coast Range. In the Klamath province BLM lands would provide suitable habitat ranging from 62,000 acres under Alternative B to 596,000 acres under Alternative C. These correspond to 3 to 32 percent of the suitable habitat projected for Forest Service lands. In the Western Oregon Cascades province BLM lands would provide suitable habitat ranging from 50,000 acres under Alternative A to 454,000 acres under Alternative C. These correspond to 3 to 26 percent of the suitable habitat projected for Forest Service lands.

At least as important as the amount of suitable habitat is the distribution and location of suitable habitat in the landscape. Alternative NA, A, and B would result in widely scattered, generally small patches of fragmented habitat that could greatly increase the expenditure of energy associated with foraging. These conditions also favor great horned owls that prey on spotted owls and barred owls that compete with them for habitat. Alternatives C and E would result in habitat that is evenly distributed across the landscape. Blocks of habitat would be larger than in NA, A, and B, and the blocks would be closer together, which would facilitate movement between blocks. Alternatives D and the Preferred Alternative would concentrate more habitat into large blocks, either HCAs or OGEAs, than the other alternatives. This would promote clusters of owl nests relatively close to each other to ensure successful movement of individuals between territories. These large blocks are also designed to be close enough to each other to permit successful dispersal of owls between blocks (Thomas et al., 1990; USDI Fish and Wildlife Service, 1992).

Cumulative effects of past timber harvest on suitable spotted owl habitat were examined for private and federal lands. Habitat conditions in 1960, 1970, and 1980 were estimated based on birthdates of harvest units and assumptions of habitat depletion on private lands. Of particular interest in the planning area is the rapid and substantial reduction in suitable habitat in the southern Cascades and in an east-west swath across the northern part of the planning area, extending into BLM's Roseburg District and in an area that includes the southern Eugene District/Northern Roseburg District, BLM. These areas also have been identified as regional areas of concern by the U.S. Fish and Wildlife Service (USDI, Fish and Wildlife Service 1991, 1992). Habitat loss in these areas due to past logging could have already resulted in a significant loss of connectivity between physiographic provinces and consequent reproductive isolation.

Effects on Dispersal Habitat

Suitable owl habitat provides for nesting, roosting, and foraging. Also of importance is the condition of dispersal habitat between the blocks of suitable habitat where nesting is expected to be concentrated. Providing forest habitat that permits movement of owls between nest habitat areas is important to facilitate replacement of deceased individuals by dispersing juveniles (Thomas et al., 1990; USDI Fish and Wildlife Service 1992).

Table 4-SSW-4 - Suitable Spotted Owl Habitat on BLM Lands in Western Oregon by Alternative (1,000 acres)

Decade/Province	USFS[1]	BLM						
Current								
E. Cascades	[2]	17						
Klamath	1,573	380						
Coast	243	310						
W. Cascades	2,206	302						
Total	**4,022**	**1,009**						
			BLM Alternatives[3]					
After 10 Years			**A**	**B**	**C**	**D**	**E**	**PA**
E. Cascades	NA[4]		12	13	14	14	19	14
Klamath	NA		79	85	314	328	348	304
Coast	NA		190	208	272	290	290	270
W. Cascades	NA		198	210	262	260	277	242
Total	**NA**		**479**	**516**	**862**	**892**	**934**	**830**
After 50 Years								
E. Cascades	[2]		1	6	22	9	36	22
Klamath	1,690		55	129	297	315	483	270
Coast	207		58	119	154	304	321	288
W. Cascades	1,728		38	96	178	236	320	213
Total	**3,625**		**152**	**350**	**651**	**864**	**1,160**	**793**
After 100 Years								
E. Cascades	[2]		1	7	39	25	42	28
Klamath	1,840		65	62	596	442	588	506
Coast	245		82	151	558	402	431	371
W. Cascades	1,763		50	119	454	286	402	296
Total	**3,848**		**198**	**339**	**1,647**	**1,155**	**1,463**	**1,201**

[1] Data from USDA Forest Service (1992)
[2] Data was not available; acres are included in Western Oregon Cascades
[3] The No Action (NA) was assumed to be comparable to Alternative B
[4] Data not available

The ISC report suggested that adequate dispersal habitat across the managed landscape has two important components:

1. Stands of high quality old growth forest located within riparian buffer strips, sensitive soil areas, and other areas not available for timber management.

2. Other stands of forested habitat that would allow owls to move across the landscape and find some level of security until they found blocks of unoccupied suitable habitat.

The 50-11-40 standard was developed by the ISC to define a prescription for management of dispersal habitat (Thomas et al. 1990). It 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 it is based on limited field data, it has been used as a method for assessing habitat for dispersal of spotted owls. The most commonly accepted method has been to use quarter-townships (nine square miles) as the scale on which to assess this standard.

Provision of forest habitat to permit movement of young owls between clusters is important to facilitate replacement of deceased individuals by recruits from the dispersion of young and unmated subadults and adults (Thomas et al. 1990).

The 50-11-40 rule was created by the Interagency Scientific Committee to define a prescription for management of dispersal habitat (Thomas et al. 1990). This rule calls for maintaining at least 50 percent of the land outside of Habitat Conservation Areas (HCAs) 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 it is based on limited field data, it has been used as a method for assessing habitat for dispersal of spotted owls.

The ISC originally developed the 50-11-40 criteria as a standard to evaluate dispersal habitat across the landscape. This approach works well in the case of the U.S. Forest Service where there is contiguous federal land ownership. However, over much of the planning area, the BLM administers only half of the forest lands. Unless other land owners contribute to dispersal habitat, it is probable that even if the BLM attains 50 percent dispersal habitat on federal lands, the overall landscape could contain as little as 25 percent dispersal habitat.

Table 4-SSW-5 identifies the percent of quarter townships in which BLM-administered land would meet this standard after ten years outside the HCAs in Alternative D, and the DCAs in the Preferred Alternative.

Planning Area. Within the planning area, there is an uneven and widely scattered distribution of small patches of old growth and mature habitat to contribute to the first requisite of dispersal habitat in most quarter-townships. These would be protected under all alternatives.

Alternatives NA, A, and B would very likely result in a large number of quarter-townships within the planning area not meeting the 50-11-40 standard in the short or long term. This is due to the large amount of acreage available for timber management and the unconstrained minimum harvest age. Under the silvicultural systems in these alternatives, it would take approximately 50 years after a regeneration harvest before stands attained dispersal habitat characteristics. It is also important to note that under these alternatives, there would be few large blocks of suitable habitat available for concentrations of nesting owls. It would be necessary for owls in this landscape to disperse long distances between reserve areas such as wilderness areas and HCAs on Forest Service lands. The increased distances involved would greatly reduce the survival rates of dispersing owls.

Dispersal habitat would be substantially better under Alternative C, especially within the corridor where Restoration and Retention (R&R) blocks and high retention silvicultural regimes would retain existing dispersal habitat and develop additional habitat. Outside the corridors, the low retention regime would contribute to dispersal habitat in the long term as regenerating stands aged beyond 50 years following regeneration harvest. Stands in this regime would probably meet the 50-11-40 standard only after approximately 50 to 60 years. Also, as in the previous alternatives, dispersing owls would be moving greater distances between Forest Service reserves than in Alternative D and the Preferred Alternative. A few blocks under Alternative C would be large enough to support successful pairs, but these would be much smaller than the large blocks called for in the ISC report.

Alternative D essentially is the ISC report recommendations and 50-11-40 dispersal habitat conditions would be maintained when planning timber harvest. Under this alternative, the number of quarter-townships that do not meet the standard would decrease until all quarter-townships with the potential, meet the 50-11-40 standard (approximately 40-50 years). The distance that owls would be required to disperse across lands

Table 4-SSW-5 - 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
Total					
Preferred Alternative					
Coast Range Province	92	51	55	62	68
W. Cascades Province	118	73	62	81	69
Total					

[1] Outside Habitat Conservation Areas (HCAs)

available for timber production would be much less under Alternative D than Alternatives C and E due to the presence of the large category 1 and 2 HCAs. This, even more than the improved dispersal habitat conditions, would result in higher dispersal success rates.

Under Alternative E, dispersal habitat outside of existing older forest stands and stands 50 years or older within 1 mile of known owl sites, would be similar to that produced by Alternative A and B because the remainder of the land base would be managed for high timber yields.

Under the Preferred Alternative, dispersal conditions improve steadily, resulting in substantially all quarter townships meeting this standard in four decades within, and surrounding, the OGEAs. This is considered to be an extremely favorable effect on spotted owl habitat because the OGEAs include, and expand upon, the Southern Willamette/North Umpqua Area of Concern (identified by the U.S. Fish and Wildlife Service) that provides habitat needed for dispersal between National Forests and BLM lands in the Cascades and Coast Ranges. Most of the quarter townships that do not meet the standard by 2040 are in areas not considered important to owl dispersal between DCAs on BLM and National Forest lands. The analysis also indicates that, under the Preferred Alternative, dispersal habitat conditions on BLM land within the entire planning area would not decline in relation to the 50-11-40 standard and would improve over time so as to meet the standard in Alternative D.

Effects in Western Oregon. The cumulative effects on dispersal habitat are perhaps more significant than the specific effects of any one alternative. As mentioned earlier, the 50-11-40 criteria were originally developed as a standard to evaluate dispersal habitat across the landscape. Given the checkerboard ownership pattern across most of the planning area, it is probable that even if the BLM attains 60 percent dispersal habitat on federal lands that the overall landscape would not contain much more than 25 percent dispersal habitat. This would result in a much lower rate of successful dispersal than would occur if 50 percent of the total landscape provided dispersal habitat. Whether this reduced level of dispersal habitat is adequate to provide for successful dispersal of owls between suitable nesting areas is unknown. This situation was recognized by the ISC which recommended that the 50-11-40 standard be prorated by ownership for the first three years and then be reevaluated "as it applies to multipleownership areas" (Thomas et al. 1990:327).

A sensitivity analysis of dispersal habitat on all BLM administered lands in western Oregon was conducted for the Preferred Alternative. Two projections were made, one using the timber harvest model for the Preferred Alternative, and another in which timber harvest maintained 50-11-40 conditions. The latter projections approximate the conditions under Alternative D. A total of 1,411 quarter-townships in western Oregon contain BLM lands; 22 of these would never meet the 50-11-40 standard, leaving 1,389 that have the potential to develop those conditions.

The results indicate that under Alternative D, dispersal habitat would steadily improve from the existing condition and would fully meet the 50-11-40 standard

in all 1,389 quarter-townships within 40 years. Under the Preferred Alternative, it would take longer because there is no constraint for the 50-11-40 standard.

Effects on Carrying Capacity

Description of the Model

The model used for analyzing impacts on carrying capacity of the spotted owl (McKelvey, 1992) is a spatial model that attempts to simulate the movements of spotted owls in a landscape changed by forest management by modeling behavior of all individuals within the population. The model determines carrying capacity, expressed as owl pairs, for the entire BLM operating area, including intermingled lands of other ownerships. Functioning of the model and the assumptions used in its analysis of effects of the alternatives are described in Appendix 4-P.

This model is a substantial revision and update of the model used in the 1990 analysis by the Interagency Scientific Committee, in preparation of its Conservation Strategy for the Northern Spotted Owl. The model's current analytical assumptions are better validated than the original ones due to recent research and monitoring data not available at the time that strategy was written. Although the parameters used to guide the model are based on recent and ongoing research, it inevitably greatly simplifies spotted owl behavior. However, like most analytical models that attempt to predict natural biological systems, this model has not been fully validated by research and its predictive capability is uncertain. This uncertainty does not negate its usefulness as a tool for comparison between alternative management approaches. The model does not determine absolute populations.

Three parameters drive the model:

- Definition of suitable habitat.
- Percent of suitable habitat in mapped (geographically fixed) polygons of approximately 2,500.
- The spatial arrangement (clumpiness) of polygons that meet the preceding standard. (The spatial arrangement and quality of suitable habitat within a polygon, however, are not addressed.)

The model does not address owl dispersal using the 50-11-40 rule. Rather it evaluates owl movement between 2500 acre hexagons (representing spotted owl territories) based on amounts of suitable habitat, and occupancy of the hexagons. The model treats all suitable habitat (Habitats 1 and 2) as equal.

All hexagons with more than 30 percent suitable habitat were assigned a pair of owls in order to distribute initial occupancy of available habitat. This initial population level is probably higher than what actually occurs, but the difference is insignificant in the long term and does not affect the outcome of the model.

The interaction of National Forest habitat evaluated in the owl population model assumed it would remain stable in DCAs identified in the Draft Spotted Owl Recovery Plan (USDI, 1992). Suitable habitat elsewhere in National Forests was assumed to decline by 10 percent per decade until it reached 15 percent within each hexagon. The degree to which this 15 percent would reflect actual future conditions has not been evaluated.

Two rule sets were used based on demographic responses to habitat thresholds. The first rule set, based on available data, assumes that hexagons with at least 60 percent suitable habitat (Appendix 4-P) would result in stable demographic parameters. This condition is rarely met within the mapped hexagons because BLM administers only 50 percent of the forest landscape, and both the BLM land and the intermingled lands of the other ownerships have been heavily cutover in the last four decades. Therefore, a second rule set was applied, similar to the first except that it assumes that only 40 percent suitable habitat (Appendix 4-P) is necessary to achieve these reproductive rates. (Note: Use of the hexagons as mapped in the model probably underestimates numbers of owl territories with 60 - 40 percent suitable habitat because the owls are not confined to the established hexagon boundaries; i.e., owls can arrange 2,500 acre territories to incorporate suitable habitat that is excluded by the artificial hexagon boundaries.)

An attempt was made to validate the model by examining habitat and population trends from 1960 to the present. Habitat conditions in 1960, 1970, and 1980 were estimated based on birthdates of harvest units and assumptions of habitat depletion on private lands. Results indicate a general approximation of the spotted owl population and trends shown through recent inventories.

Two further concepts are important in understanding the model outputs. Projected estimates of pairs of owls were derived by averaging 10 runs of the model. Point-in-time projections of numbers of owls at 70 and 100 years can be derived from these calculations to show trends, **but they should not be interpreted to represent actual population prediction**. Long-term carrying capacity of a certain habitat situation over the landscape was obtained by holding habitat conditions constant and allowing the modeled owl population to reach equilibrium with the habitat capability (over 100

years). These numbers are meant to indicate the capacity of a specified amount and distribution of suitable habitat to sustain a population of owls. Because of a lag time involved in owl populations responding to changing habitat conditions, this may not represent the population level at a given point in time.

Results of the Model

Planning Area. Based on projected amounts of suitable owl habitat in the long term, under Alternative A and B virtually no spotted owls would persist within the planning area. Therefore calculations of long term carrying capacity for these alternative were not performed. Long term carrying capacity projections after 100 years were not available when this document went to press for Alternatives A,B, C, and E. The results for the Preferred show an increase in the carrying capacity over current levels. Using Rule set 2 results in a larger increase for the Preferred Alternative and Alternative D also increases.

The calculations indicate that the Preferred Alternative would result in the greatest number of spotted owls within the planning area in the long term, followed by Alternative D. This pattern reflects the relative abundance of suitable habitat available.

All of the above estimates are considered conservative due to the rigid nature of the biological parameters built into the model and technical barriers to building in all of the biological parameters that affect spotted owl survival. If the assumptions underlying this analysis are valid, the result is a current population level that cannot be supported over time by the remaining habitat. This decline in population as a result of habitat loss is delayed because habitat loss does not kill owls outright. The owls, rather, react by abandoning territories and ceasing reproduction, and eventually die (Thomas, et al. 1990).

This decline is expected to continue, following implementation of a recovery plan, until the owl population stabilizes at a then stable or improving habitat capability (Thomas, et al.1990; USDI, 1992). The model indicates (Table 4-SSW-5) that after the initial decline, carrying capacity would stabilize after many decades under Alternative D and the Preferred Alternative. Although the model was not run for the other alternatives, it is assumed that the relationships indicated for D and the Preferred hold for the others as well.

Short-term and long-term carrying capacity of the habitat, expressed as stable, for spotted owl pairs in the Eugene District are shown in Table 4-SSW-6.

Table 4-SSW-6 - Carrying Capacity of All Lands Within the BLM Operating Area for Northern Spotted Owls, Eugene District, by Alternative.

	Alternatives						
	NA[1]	A	B	C	D	E	PA
Rule Set 1[2]							
Carrying Capacity (Current)[3]	17	17	17	17	17	17	17
Carrying Capacity (10 Years)[4]	5	4	6	10	7	7	8
Carrying Capacity (100 Years)[5]	*6	*6	*6	*6	17	*6	26
Rule Set 2[2]							
Carrying Capacity (Current)[3]	31	31	31	31	31	31	31
Carrying Capacity (10 Years)[4]	16	17	15	25	28	24	29
Carrying Capacity (100 Years)[5]	*6	*6	*6	*6	47	*6	73

[1] The conclusions for the No Action Alternative are interpolated since this alternative is not mapped in BLM's GIS database.
[2] Rule Set 1 is based on the assumption that at least 60 percent of the area in a model hexagon must meet suitable habitat criteria for owls to consistently use the habitat (considered a conservative rule for population modelling). Rule Set 2 assumes 40 percent of the hexagon must be suitable habitat for successful owl occupancy.
[3] Existing habitat (1990) held constant (no timber harvest or ingrowth), and model population exists for 100 iterations until stability.
[4] Habitat remaining at the end of 10 years held constant (no timber harvest or ingrowth) and model population exists for 100 iterations until stability.
[5] Habitat remaining at the end of 100 years held constant (no timber harvest or ingrowth) and model population run for 100 years until stability.
[6] Data not calculated for Alternatives NA, A, B, C or E, but trends are anticipated to be similar to relationship between Number of Pairs and Carrying Capacity calculated under Alternatives D and the Preferred Alternative. This data will be available in September 1992.

Western Oregon Analysis. Maps showing the location of model hexagons with BLM lands in western Oregon which are projected to provide various levels of suitable habitat are included in Appendix 4-O. Assuming that hexagons are good indicators of the quality of habitat, the results confirm that under Alternatives A and B there would be very little habitat on BLM lands that provides either 60 percent or 40 percent suitable habitat after 50 years. There would be very little change between 50 and 100 years. Alternative NA would not provide substantially more habitat than under Alternatives A and B.

Alternatives C, D, E, and the Preferred would provide far more habitat that provide either the 60 percent or the 40 percent suitable habitat levels and they include several large clusters, especially in the central and southern portions of the range in Oregon. Using the 60 percent suitable habitat criteria results in less habitat than under the 40 percent level. The model indicates the only large cluster of suitable habitat would occur in the solid block ownership area in the Grants Pass and Glendale Resource Areas within the Medford planning area.

The cumulative effects of land management activities on spotted owls are dominated by the widespread removal of habitat on private and federal lands within the past 20-30 years. Private timber cutting has special significance for BLM lands because of the intermingled land ownership pattern.

The other major factor is the plans developed by the U.S. Forest Service for management of their lands. The current habitat situation identified in their recent final spotted owl EIS (USDA, Forest Service 1992) is summarized in Table 4-SSW-7 and Table 4-SSW-8.

The Forest Service's spotted owl management decision would, according to their final EIS (USDA Forest Service 1992), reduce region-wide habitat on Forest Service lands by a net acreage of eight percent over the next fifty years, but with the aging of retained stands, the net reduction would be only one percent at the end of 100 years. At the end of 150 years, there would be 12 percent more spotted owl habitat on National Forest land than there is currently, but it would be distributed differently. In Oregon, the amount of habitat would decline more in the first 50 years and would increase only slightly after 150 years.

The Forest Service's EIS projected long-term spotted owl habitat and habitat capability under their plan. Habitat capability is defined by the Forest Service as the potential number of pairs. As with BLM's conclusions, they note that its primary utility is for relative comparison of alternatives, not projections of actual owl numbers.

The Forest Service EIS projected a long-term habitat capability of approximately 1,894 pairs of owls (USDA, Forest Service 1992). Based on this estimate and the outputs of the McKelvey spotted owl,model, the carrying capacity of Forest Service and BLM lands in the range of the northern spotted owl over the long term would range from only slightly more than the 1,894 pairs projected by the Forest Service under Alternatives A and B, up to 2,099-2,277 pairs under Alternative D and 2,118-2,344 pairs under the Preferred Alternative. It should be noted that the Forest Service used a different method than the McKelvey model to determine long-term carrying capacity so the numbers of the two agencies are not strictly comparable. Values for Alternatives C and E were not calculated in a manner that permitted the estimation of carrying capacity at 100 years. The values presented represent the capability of the land to support the

Table 4-SSW-7 - Known Spotted Owl Pairs and Nesting, Foraging and Roosting Habitat

	Known Owl Pairs	Habitat Acres
Region (WA, OR, CA)	3,461	8,204,000
U.S. Forest Service	2,420	6,073,000
Oregon	1,974	4,119,000
U.S. Forest Service	1,330	2,895,000
Bureau of Land Management	541	1,031,000
Other	103	193,000

Table 4-SSW-8 - Expected National Forest Spotted Owl Habitat and Habitat Capability

	Habitat (acres)		Habitat Capability (pairs)	
	100 years	150 years	Current	150 Years
Region	6,025,000	6,781,000	2,544	1,894
Oregon Cascades	1,763,000	1,979,000	1,013	644
Oregon Coast Range	245,000	288,000	110	125

number of pairs of owls specified and should not be interpreted as the exact number of pairs present at any point in time.

A significant reduction or elimination of the interchange of individuals between subpopulations can bring about isolation Thomas et al. 1990). This isolation could affect genetic variability and the replacement rate of deceased individuals. The mechanics of isolation relative to spotted owls are not well understood but would probably first be exhibited by lower replacement rates that would lead to a decreasing population size. The decrease in population size could then lead to loss of genetic variability over time, leading to adverse effects on the population's health. Isolation may be a factor affecting the population in the long term under Alternatives NA, A, and B, but is not thought likely to be a factor under Alternatives C, D, E, and the Preferred.

The contribution of BLM administered lands in the planning area to regional spotted owl viability is important due to the planning area's location at the juncture of the Klamath and Western Cascades provinces and the bridge those lands provide between National Forests.

The Forest Service's EIS concluded that their decision would maintain viable spotted owl populations on National Forest lands in all provinces and maintain the owl population in the north portion of the Oregon Coast Range but assumed that BLM administered lands would provide linkages to permit owls in the Oregon Coast Range to freely interact with owls in other provinces, and maintain the owl population in the north portion of the Oregon Coast Range. It appears Alternatives C, D, E, and the Preferred would meet the assumptions in the Forest Service's EIS.

The model's conclusions, based on both demographic assumption sets, indicate that this opportunity would not exist under Alternatives NA, A, and B. The other alternatives would provide some level of linkage and interaction between provinces. Alternatives D and the Preferred Alternative would maintain HCAs or OGEAs comparable to the HCAs on Forest Service land.

Between these areas, both these alternatives would provide for dispersal habitat consistent with the 50-11-40 rule after four to six decades. Alternatives C and E would provide greater amounts of habitat and sufficient populations to also provide linkages. The distribution of owl pairs would be different than in the Alternatives D and the Preferred. Rather than being clustered in HCAS, the owls would be distributed more evenly across the landscape.

Conclusion

Planning Area. All alternatives result in short term declines in suitable habitat within the planning area. In the long term, spotted owls under Alternatives NA, A, and B would probably not persist on BLM lands. However, analysis of the other alternatives indicate the planning area would provide increasing amounts of habitat after the initial decline. In the long term, these alternatives would result in higher carrying capacity for northern spotted owls within the planning area than currently exists.

Western Oregon. In the short term for western Oregon, all alternatives would result in declines in suitable northern spotted owl habitat and in the population levels of spotted owls. This may be inevitable as the current habitat conditions may not be adequate to support existing populations. other modeling has concluded that the spotted owl population is already declining rapidly (USDI, Fish and Wildlife Service 1992:319).

In the long term, for Alternatives NA, A, and B, the probability of sustaining owls on BLM lands is near zero, thus increasing the risk to the overall population stability in the region. For Alternatives C, D, E, and the Preferred, the likelihood of sustained populations on BLM lands, in concert with the management strategy adopted by the Forest Service, varies as a result of two factors: 1) the amount of suitable habitat required to maintain a given pair, 2) the occurrence and distribution of suitable and dispersal habitat over time. If spotted owls require habitat configurations that yield 60

percent or greater suitable habitat for a given pair area, and the pair area resembles a hexagonal pattern, then the likelihood of sustained populations of owls on BLM lands under any of the alternatives is low. This is not a product of the management prescriptions of the alternatives, but the reflection of the fact that the majority of lands the BLM administers occur in a checkerboard pattern that will yield only a 50 percent habitat condition if all the lands which were capable of developing suitable habitat were being managed to maximize suitable habitat. Therefore, it is not physically possible to satisfy a 60 percent habitat requirement in 2,500 acre hexagons overlaying a 50/50 land ownership pattern. These projections would be conservative if private lands did contribute to suitable habitat within the planning area.

If in fact, the level of habitat required by a given pair is less than 60 percent, then the BLM's land pattern would afford greater opportunities to provide sustained populations on a regional level under Alternatives, C, D, E, and the Preferred. The level of success in doing so would vary by alternative depending upon the second factor - the arrangement of suitable and dispersal habitat in space and time. As these habitat features vary, so would the risk in attaining a given contribution to overall population stability.

The risk to the stability of spotted owl populations associated with each alternative varies because of the amount and distribution of suitable habitat or the amount and distribution of dispersal habitat in the first several decades of implementation. Alternative D carries the same level of risk of successfully contributing to the overall regional stability as would implementation of the plan recommended by the ISC (Thomas et al. 1990). This would be a substantially lower level of risk than under the existing situation. In comparison with Alternative D, there would be increasingly higher levels of risk associated with the Preferred, followed by Alternatives C and E.

The level of risk associated with the Preferred is slightly higher than Alternative D because of worse dispersal habitat conditions in the initial decades. However, in the long term, the Preferred would result in a lower risk level because of increased amounts of suitable habitat and higher overall habitat capability.

At first glance, the risk associated with Alternative C would appear to be lower due to greater projected amounts of suitable habitat. However, much of the suitable habitat that is projected to occur would be the result of intensive forest management practices such as thinnings, uneven-age management, and others. The growth modeling upon which these projections are made has an unknown level of uncertainty associated with it because of our imperfect understanding of how forest systems respond to natural and man-caused disturbances. Thus, much of the increased risk under Alternative C would result from the uncertainty that silvicultural systems would actually be successful in recreating suitable habitat over large portions of the landscape. Another factor which contributes to the risk in this alternative is the use of smaller suitable habitat blocks than are called for under Alternative D and the Preferred. It may be difficult to provide areas where multiple pairs of owls are able to successfully reproduce in close proximity to other pairs under this alternative.

Under Alternative E the allocations perpetuate the habitat conditions of the present and do not afford the opportunity for regrowth of habitat in areas currently deficient, thus reducing the amount of the range which can be occupied successfully in the long term. This would be true primarily for the northern half of western Oregon. There is an additional risk of large scale habitat loss from wildfire, insects, and disease under Alternative E. Without active management, many older forest stands would become increasingly prone to these large-scale disturbances. If this did not occur, it appears that in southwestern Oregon, including the planning area, Alternative E would successfully retain stable owl populations and the largest amount of suitable habitat of any of the alternatives. This would maintain the important links between the Cascades and Klamath provinces, identified as Areas of Concern by the U.S. Fish and Wildlife Service (USDI, Fish and Wildlife Service 1990) in this portion of the range.

Marbled Murrelet (Federal Proposed Threatened)

The habitat of marbled murrelets is not well defined due to the small amount of research that has been done on this species. In addition, 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 three primary criteria:

1. stands occupied by large to very large trees (median size 50+"), 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.

Two analyses of known or suspected murrelet habitat have been conducted. The first analysis was based on known sites where murrelets established nests or showed considerable activity within stands. The three known activity areas are identified as contiguous blocks of suitable habitat, and encompass 362, 93 and 74 acres each. A second analysis has been performed to assess the amount of potential habitat that likely will be modified due to timber management activities during the next decade and the next century.

Assessment of impacts on marbled murrelet sites is based on the amount of suitable habitat that would be harvested during the first decade within these known murrelet activity areas relative to the current acreage. Under Alternative A, approximately 327 acres in or near known or suspected murrelet nest sites will be harvested during the implementation of this plan. Under Alternatives NA, B, C, D, E and the Preferred, the harvest levels would be 0, 306, 59, 0, 0, and 0 acres, respectively. Alternative A would harvest both of the stands with documented murrelet nesting activity. Alternatives B and C will not harvest the actual nest trees, but may have impacts to these nest stands due to removal of significant portions of the suitable habitat within the stands. Alternatives NA, D, E and the Preferred will harvest no suitable habitat and are not expected to have impacts to active nest sites during the first ten years of the plan. Table 4-SSW-9 displays current acres, potential timber harvest acres during the next decade, and the relative impacts of each planning alternative on known and suspected nesting stands.

To assess impacts on potential murrelet habitat on the Eugene District, forest stands potentially capable of supporting nesting murrelets were mapped and compared to projected timber harvest areas. A total of 29,780 acres was identified that met the criteria stated above. Under Alternative A, about 17,610 acres of potential habitat would be harvested during the next ten years. Under Alternatives NA, B, C, D, and E, about 16,000 acres, 15,770 acres, 6,390 acres, 770 acres and 840 acres would be harvested, respectively. Thus, Alternatives NA, A and B would have very high impacts; Alternative C would have high impacts; and Alternatives D and E would have low impacts on potential murrelet nesting habitat throughout the District in the short-term. Under the Preferred Alternative, about 2,017 acres of suitable habitat will be harvested, including about 249 acres in the nondeferred old growth under 75 percent structural retention (25 percent removal) prescriptions on 995 acres. This amounts to approximately 6.8 percent of potential murrelet habitat on the Eugene District, and is expected to have moderate adverse impacts to present habitat during the next decade.

In the short-term, marbled murrelet habitat and population numbers would be expected to decrease under Alternatives NA, A, B, C and the Preferred, and remain similar to current levels under Alternatives D and E. Although Alternatives D and E harvest similar acreage of habitat, Alternative E harvests will be located in the marginal end of the age class spectrum for this species (120 to 150 years). All other alternatives harvest forest stands which are more likely to be higher quality nest habitat (150 years and older).

In the long-term, habitat will develop from ingrowth of forest stands to age classes suitable murrelet nesting. Under the Preferred Alternative, approximately 54,700 acres within 50 miles of the coast will be at least 150 years of age one hundred years from now. Under the NA Alternative about 15,300 acres will be suitable habitat, and under Alternatives A, B, C, D, and E about 8,500 acres; 22,100 acres; 53,400 acres; 53,900

Table 4-SSW-9 - Impacts During the First Decade Under the Various Alternatives to Known Murrelet Use Sites

Murrelet Site[1]	Current Acres[2]	Potential Harvest Acres Over Next Decade/Impact[3] NA	A	B	C	D	E	PA
1	362	0/+	234/-	247/-	0/+	0/+	0/+	0/+
2	93	0/+	93/-	0/+	0/+	0/+	0/+	0/+
3	74	0/+	0/+	59/-	59/-	0/+	0/+	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] Current habitat defined as contiguous forest around nest/use site which meets habitat definition (see text).
[3] Impacts: - = high to moderate impact
0 = low impact
+ = no impact

acres; and 43,900 acres of suitable habitat, respectively, would be available. Thus, under Alternatives NA, A and B, there would be significant long-term declines in habitat of 49 percent, 72 percent, and 26 percent, respectively. In contrast, under Alternatives C, D, E and the Preferred there would be increases in habitat of 79 percent, 81 percent, 47 percent and 84 percent, respectively. In addition, under Alternative C and the Preferred Alternative, additional older trees would be available in the overstory of younger stands due to the retention of legacy trees in some silvicultural prescriptions.

Under Alternatives NA, A and B, short rotations will eliminate the ability to regrow substantial murrelet habitat in the long term. Under Alternative C, Old Growth Retention and Restoration (R&R) blocks and some stands in the high retention zone would provide habitat after regrowth. Under Alternative D, there would be a short-term reduction of habitat in areas outside of HCAs, followed by a long-term improvement of habitat quantity within HCAs after regrowth of present young stands. Under Alternative E, a loss of marginal habitat in the short-term would be followed by an increase in long-term habitat as buffers established around older forests regrow to suitable habitat age. Under the Preferred Alternative, a moderate loss in habitat in the short-term would be followed by a moderate gain in habitat in the long-term following regrowth and development of old growth habitat conditions in the Old Growth Emphasis Areas (OGEAs).

In the long-term, the availability of suitable murrelet habitat would depend on the amount of current old growth protected and the amount of habitat allowed to regrow into old growth/mature forest habitat. Alternatives NA, A and B would provide very little potential habitat and regrowth habitat, limited to younger stands currently protected as riparian, TPCC, etc. Alternatives C and D would provide some of this habitat in the long-term, and Alternative E would protect most of the existing potential habitat. The Preferred Alternative and Alternatives C and D will allow the highest potential for regrowth and development of future habitat.

In the long-term, murrelet populations would decrease significantly under Alternatives NA, A, and B. Populations are likely to increase in the long-term under Alternatives C, D, E and the Preferred due to increased availability of old growth forest.

The cumulative effects of Alternatives NA, A and B and actions on other lands would substantially reduce current low levels of murrelet habitat (I.e., because of current low levels of old growth and limited protection measures on other lands). Based on current Oregon Forest Practices Act (OFPA) rules, murrelet habitat and populations are expected to further decline from already extremely low levels on private lands in the short and long-term. Because additional older forest protection would be available under Alternatives C, D, E and the Preferred, the cumulative effects would result in higher amounts of murrelet habitat and populations within the planning area in the long-term. From a western Oregon perspective, levels of old growth habitat protection included in the Preferred Alternatives of the USFS Region 6 spotted owl EIS and the BLM western Oregon RMP/EISs would tend to result in modest increases in murrelet habitat and populations over the long-term.

Northern Goshawk (Federal Candidate 2)

At the present time, there are approximately 10,660 acres of suitable goshawk nesting habitat (150+ years of age) on the District, and about 37,210 acres of foraging habitat (50 to 150 years of age). During the next 10 years, about 7,800 acres of nesting habitat would be harvested under Alternative A. Under Alternatives NA, B, C, D, and E about 7,000 acres, 5,890 acres, 2910 acres, 480 acres and 90 acres of nesting habitat would be harvested, respectively. Under Alternative A, about 8,410 acres of foraging habitat would be harvested during the 10-year life of the plan. Under Alternatives NA, B, C, D, and E about 9,000 acres; 10,290 acres; 5,260 acres; 7,270 acres; and 8,850 acres of foraging habitat would be harvested. The Preferred Alternative requires establishing ecologically significant buffers and disturbance restrictions around active nest sites. Under the Preferred Alternative, about 750 acres of nesting and 8,380 acres of foraging habitat would be harvested.

In the short-term, alternatives NA, A, B and C would have very high impacts to the goshawk's nesting habitat, whereas Alternative D and the Preferred Alternative will have moderate impacts, and Alternative E will have low impacts. All alternatives would remove significant amounts to goshawk foraging habitat, with the lowest impacts from Alternative C. However, this habitat is the most easily replaced in terms of stand regrowth of suitable canopy conditions, especially under the Preferred Alternative. One drawback to Alternative C and the Preferred Alternative would be the potential for brush development in the understory, which is detrimental to goshawk foraging behavior.

In the long-term, Alternatives NA, A and B are expected to have high impacts, and Alternatives C, D, E and the Preferred would have low impacts. The Preferred Alternative would have low impacts due to the loss of most goshawk habitat within the General Forest Management Areas (GFMAs), but development of substantial habitat in the OGEA deferred (48,550 acres) and OGEA nondeferred (18,100 acres). How-

ever, the same question remains regarding potential brush development and conflicts with goshawk foraging behavior.

Pileated Woodpecker (Bureau Assessment)

At the present time, there are approximately 47,140 acres of suitable habitat on the District for this species. Under Alternative A, about 25,302 acres of this habitat would be harvested. Under Alternatives NA, B, C, D, and E about 24,000 acres; 23,720 acres; 10,260 acres; 3,860 acres; and 3,350 acres of habitat would be harvested, respectively. Under the Preferred Alternative, about 5,260 acres of suitable habitat would be harvested during the decade.

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 Preferred Alternative would have moderate impacts to this species, due to the removal of about 11.2 percent of suitable habitat in the decade.

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 (HCAs), and Alternative E would provide only slightly more habitat in the long-term over existing conditions. Alternative C and the Preferred Alternative would provide the widest distribution of habitat for this species in the long-term.

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 Preferred 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 Preferred Alternative would provide the broadest distribution of this species on the District in the short and long-term, within the OGEAs and Connectivity Corridors, and within the Old Growth R&R blocks and high retention prescriptions.

Purple Martin (Bureau Assessment)

Alternative A would leave essentially no nest sites, and Alternatives NA and B would leave limited nest sites due to minimum snags remaining after harvest. The effectiveness of Alternatives C, D, E and the Preferred would depend on the degree to which soft snags are retained on harvest units and survive site preparation, as cull green trees are of extremely low value to this species. In the short-term, Alternatives NA, A and B would result in a reduced amount of potential habitat, and Alternatives C, D, E and the Preferred could result in increases above existing low population levels, given successful soft snag retention. In the long-term, Alternatives NA, A and B would provide little potential nesting habitat, and Alternatives D, C, E and the Preferred could provide increasingly higher potential nesting habitat.

Western Bluebird (Bureau Assessment)

Alternatives NA and A, while creating early successional stages required by this species through timber harvest, are not likely to produce enough snags of the proper condition to promote minimum nesting conditions. Alternative B may produce sufficient snags to maintain minimum populations. Alternatives C, D and E and the Preferred would likely leave sufficient snags to maintain nesting trees, but could suffer somewhat from distribution problems (Alternative D), and lack of fire to promote foraging habitat (Alternatives C and the Preferred Alternative).

Pacific Fisher (Bureau Assessment)

Alternatives NA, A and B are likely to preclude any populations from becoming established 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 Preferred Alternative 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 Preferred 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 (120 to 150 year old) forests. Alternative D protects significant acreage in the Bear Creek drainage in the long-term.

Marten (Bureau Assessment)

Impacts to this species are anticipated to be similar to the Pacific fisher previously discussed.

Tailed Frog (Bureau Assessment)

Under Alternatives NA, A, and B, water quality is expected to decline enough to severely impact known and suspected populations of tailed frogs in all watersheds. Alternative C may protect some habitat areas in the long-term, while losing populations in other areas. Alternative D would provide good protection within northern spotted owl HCAs, but suffer habitat 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 problems in some portions of the District. The Preferred Alternative would provide substantial protection within the deferred Old Growth Emphasis Areas, and in the long-term provide habitat within all of the OGEAs, given adequate water quality standards.

The primary impact of Alternatives NA, A, B, E and the Preferred would be the high potential for elimination of the tailed frog from the majority of the Bear Creek and Marten Creek drainages in McKenzie Resource Area, one of the last 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.

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.

Northern Red-Legged Frog (Federal Candidate 2)

Populations of red-legged frogs are likely to be adversely impacted under all alternatives prior to regrowth of adjacent harvested stands, due to the lack of protection of upslope areas near the riparian zones. However, Alternatives C, D, E and the Preferred would provide better long-term habitat conditions due to wider riparian widths and long-term shifts to more older seral stage forests. Although populations are unlikely to be eliminated from large landscape sized areas under Alternatives C, D, E and the Preferred, there would be some risk of landscape wide extermination under Alternatives NA, A and B.

Oregon Slender Salamander (Bureau Sensitive)

Alternatives NA, A and B would cause a substantial reduction of populations of this species, due to removal and other modification of substantial portions of the remaining old growth and mature forests on the District, and the ensuing desiccation and loss of residual large down wood.

Alternative C would retain some populations of this species, although none of the Old Growth R&R blocks have been inventoried to document the occurrence of Oregon slender salamander within the block. Areas of high retention of overstory canopy and longer rotation lengths would provide some conditions, which may provide habitat in the long-term, due to silvicultural development of some old growth structural and functional characteristics. Alternative D would protect this species within the northern spotted owl HCAs and would allow the recovery of habitat between the mature and old growth stands within the HCAs over time. Alternative E would provide protection within the mature and old growth blocks over 150 years of age. These blocks, however, would be disjointed in distribution due to the previous harvest activities.

The Preferred Alternative would provide protection within the old growth and mature stands in the deferred OGEAs, with intermingled younger seral stages recovering over time. Nondeferred OGEAs would provide some habitat protection initially, and may provide substantial habitat over the long term, although silvicultural prescriptions are untested.

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 primary limiting factors for the 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 Preferred Alternative.

White-footed Vole (Federal Candidate 2)

This species, the rarest of North American microtine rodents, uses 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 Preferred, as opposed to NA, A and B.

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 Preferred would protect the habitat, given seasonal stipulations to avoid disturbance.

Pacific Pallid Bat (Bureau Assessment)

This species, similar to the Pacific western big-eared bat, utilizes a variety of habitats, and is highly dependent on caves to provide hibernacula and nursery colonies. The same impacts are anticipated for this species as those previously described for the Pacific western big-eared bat.

Fringed Myotis Bat (Bureau Sensitive)

This bat species, similar to the species above, depends on undisturbed conditions of hibernacula, in order 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 Preferred would likely provide better protection to hibernaculae, as well as destroy less habitat in timber harvest.

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 2600 feet elevation. Under all alternatives, the primary habitats would be protected. Under Alternatives NA, C, D, E and the Preferred, 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.

Sharp-tailed Snake (Bureau Assessment)

This species occurs in scattered populations at low elevations (below 1500') in and near the Willamette Valley wherever oaks are a partial to dominant component of the forest stand. The species will use many seral stages where there is a component of down woody material for hiding cover. Much of the habitat (oak species) is gradually being replaced by conifer species, due to 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.

The intensive forest management activity on Alternatives NA, A and B would likely to 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 Preferred Alternative would provide identification and maintenance of oak habitats that would provide long-term sustainability of this species.

Northwest Pond Turtle (Federal Candidate 2)

This reptile requires 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. The primary mortality factors in the Willamette Valley are destruction of nests by human factors, predation by introduced bullfrogs, and vegetation invasion of nesting areas. The alternatives would provide increasing protection of wetlands and riparian areas (in Alternatives NA, A, B, C, D, E and the Preferred), 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.

Harlequin Duck (Federal Candidate 2)

This waterfowl species nests near turbulent, steep gradient streams in the Cascades Mountains above 1,300 foot elevation. Nesting habitat is restricted to riparian areas close to water (within 65 feet). All alternatives are likely to provide minimum protection of riparian zones for nesting purposes, 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 Preferred Alternative would provide a level of nest protection intermediate between Alternatives D and E. Riparian protection on non-BLM lands is unlikely to provide adequate nesting habitat. Adverse impacts due to logging (silt loads) also contribute to habitat degradation. Management activities should be aimed at preserving adequate aquatic invertebrates, a primary harlequin duck food source.

Black Swift (Bureau Assessment)

This species, while occurring in the District during migration, may nest in western Oregon. The nest conditions (cliffs behind waterfalls and protected wet forests) would be protected in Alternatives NA, C, D, E and the Preferred, but would not receive adequate protection under Alternatives A and B. Due to lack of positive nesting data, impacts under all alternatives are unknown.

Mountain Quail (Federal Candidate 2)

This species inhabits early successional stages containing herbaceous vegetation mixed with brush near the edges of forests. 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 Preferred Alternative would likely have minimal impacts to 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.

Great Gray Owl (Bureau Assessment)

This species is expanding its range into western Oregon Douglas-fir forests, and is primarily found in higher elevation forests of the Cascades. Alternatives, which reduce old growth structure in stands, may have some adverse impacts to the species.

The following species occur in coastal areas near the Eugene District, and are not likely to be affected by BLM actions under any of the planning alternatives:

Brown pelican	(Federal Endangered)
Northern sea lion	(Federal Endangered)
Western snowy plover	(Federal Candidate 1)
Fork-tailed storm petrel	(Bureau Assessment)

The following species may formerly have occurred on the Eugene District, but are no longer found on BLM lands within the District. They would not be affected by any of the planning alternatives:

Columbian white-tailed deer	(Federal Endangered)
Spotted frog	(Federal Candidate 2)

The following species occur almost exclusively within the Willamette Valley and are not usually associated with coniferous forest landscapes. They are unlikely to be affected by any of the planning alternatives:

Loggerhead shrike	(Federal Candidate 2)
Dusky Canada goose	(Bureau Assessment)
Lewis' woodpecker	(Bureau Assessment)
Painted turtle	(Bureau Assessment)

The following species occur generally at higher elevations in the Cascades Mountains, and are unlikely to occur on Eugene District lands. They are unlikely to be affected by any of the planning alternatives:

California wolverine	(Federal Candidate 2)
Three-toed woodpecker	(Bureau Assessment)
Black-backed woodpecker	(Bureau Assessment)
Barrow's goldeneye	(Bureau Assessment)

Effects on Special Areas

Resource management impacts and protection of existing and potential special areas would vary depending on land status, TPCC classification (Special habitats such as rock outcrops and meadows) and other existing authorities such as the Endangered Species Act.

Table 4-SA-1 displays probable changes in acres of existing and potential special areas by alternative, and describes land allocations for each special area.

No Action Alternative

Under the No Action Alternative, all ten existing special areas would be designated. Sixteen potential special areas would not be designated nor would proposed adjustments to four existing Areas of Critical Environmental Concern (ACEC) and Resource Natural Areas (RNA) be made. 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 areas contain special habitat features such as rocky outcrops, meadows, etc., but 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 (RMAs). (See Chapter 2, Table 2-1 - Protection of Riparian Management Areas) Occupied bald eagle habitat and most of the designated suitable-but-unoccupied habitat areas would receive protection under the Endangered Species Act. Some of these allocations, however, may not prevent all negative impacts from occurring in an area such as in the harvesting of special forest products, 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. 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 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, one 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, one existing special area and one potential special area would be designated. Nine existing and fifteen 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-Road Vehicle (ORV) use, 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 could be provided by conditions such as special habitat features, allocations such as RMAs and/or protection under existing authorities such as the Endangered Species Act. 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 four existing RNAs would cease, and one 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, nine existing special areas and four potential special areas would be designated. One existing special area would not be designated but would be protected under the Endangered Species Act, and twelve potential areas would not be desig-

nated and could be available for resource development activities such as road construction, timber harvest, mineral development, special forest products removal, ORV use, 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 RMAs and/or Alternative B old growth blocks, or could be protected under existing authorities such as the Endangered Species Act. 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 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 four existing RNAs would cease, and one 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, nine existing special areas and nine potential special areas would be designated. One of the nine existing special areas would not be designated but would be protected under the Endangered Species Act, and seven potential 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 RMAs and/or Alternative C old growth blocks or protection under existing authorities such as the Endangered Species Act. 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, 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 from designation 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 committment of special management attention to unique and irreplaceable resources from the designation of RNAs 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 ACECs.

Preferred Alternative

Under the Preferred Alternative, all ten existing special areas and five potential special areas would be designated. Boundary modifications would be recommended for five of the existing ACECs, ACEC/RNAs or Environmental Education Areas (EEAs) and would be recommended for one potential ACEC to better protect or identify the primary values of the areas. One EEA would be dropped and would be managed as a recreation site. Twelve potential special areas would not be designated. Those not designated would receive some protection under other existing mechanisms including Old Growth Emphasis Areas (OGEAs) and requirements of the Endangered Species Act. All occupied bald eagle habitat would be managed in bald eagle habitat. Relict Forest Islands (RFI) would be managed as OGEAs. Actions such as mortality salvage and the collection of special forest products would still be permitted within OGEAs only to the extent that these activities would not degrade old growth values. Specific management actions to maintain all primary values for which the areas were nominated would not be implemented. For example, withdrawal from mineral entry would not occur in these areas and ORV use would be permitted. ACEC

Table 4-SA-1 - Proposed Land Allocations (acres) for Special Areas

Special Area	Current Designation	Proposed Designation	Proposed Allocation/Acres						
			NA	A	B	C	D	E	PA
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	0	191	191	191	191	191
Horse Rock Ridge Addition	None	ACEC/RNA	0	0	187	187	187	187	187
Mohawk	ACEC/RNA	ACEC/RNA	*292	0	292	292	292	292	292
Camas Swale	ACEC/RNA	ACEC/RNA	*280	0	280	280	280	280	280
Camas Swale Addition	None	ACEC/RNA	0	0	34	34	34	34	34
Upper Elk Meadows	ACEC/RNA	ACEC/RNA	*207	0	207	207	207	207	207
Upper Elk Meadows Addition	None	ACEC/RNA	0	0	16	16	16	16	16
Fox Hollow	ACEC/RNA	ACEC/RNA	*160	0	160	160	160	160	160
McGowan Creek EEA	EEA	EEA	229	0	229	229	229	229	79
Vik Road EEA	EEA	EEA	178	0	178	178	178	178	60
Row River EEA	EEA	Rec. Site	25	0	25	25	25	25	0
Cannery Dunes	None	ACEC/ONA	0	0	40	40	40	40	40
Heceta Sand Dunes	None	ACEC/ONA	0	0	218	218	218	218	218
Cougar Mountain Ancient Yew Grove	None	ACEC	0	0	0	*40	40	40	*10
Hult Marsh	None	ACEC	0	0	167	167	167	167	167
Grassy Mountain	None	ACEC	0	*74	74	74	74	74	74
Coburg Hills BEHA	None	ACEC	0	0	0	0	1204	1204	0
Coburg Hills RFI	None	ACEC	0	0	0	854	854	854	0
Fall Creek Reservoir BEHA	None	ACEC	0	0	0	0	746	746	0

Table 4-SA-1 - Proposed Land Allocations (acres) for Special Areas (cont.)

Special Area	Current Designation	Proposed Designation	Proposed Allocation/Acres NA	A	B	C	D	E	PA
McKenzie River BEHA	None	ACEC	0	0	0	0	2037	2037	0
Dorena Reservoir BEHA	None	ACEC	0	0	0	0	611	611	0
Dorena Reservoir RFI	None	ACEC	0	0	0	209	209	209	0
Siuslaw River BEHA	None	ACEC	0	0	0	0	282	282	0
Fern Ridge 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 Reservoir RFI[1]	None	ACEC	0	0	0	232	232	232	0

BEHA = Bald Eagle Habitat Area
RFI = Relict Forest Islands
EEA = Environmental Education Area
* Title Plat Acres
[1] The Cottage Grove Reservoir RFI contains bald eagle (suitable-but-unoccupied) habitat)
Probable management activities and major consequences for special areas are presented in Appendix 4-G.

designation could help facilitate BLM's ability to acquire adjacent nonfederal lands critical to long-term management, i.e., Land and Water Conservation Funds are allocated through a process that gives high priority to lands within designated special management areas. In addition, the long-term quality of habitat management of some eagle sites may be reduced due to the absence of protective buffers and replacement stands adjacent to some of these special areas (see Appendix 4-G).

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 motorized recreation have a high potential for impact on cultural values, while alternatives emphasizing reduced timber harvest and little motorized recreation have reduced potential for such impact. However, some impact on cultural values will 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, which affects 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 VRM management objectives differ from the inventory classifications of areas shown in Map 3-VR-1 (Chapter 3). The VRM management 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, which 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 would cause a negative impact on the affected area by diminishing the scenic values. It should be noted that 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's 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-VRM-1 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 on existing visual resource conditions taking into consideration: (1) VRM class objectives for affected areas; (2) probable effects of upgrading/downgrading; (3) land ownership patterns and adjacent land uses; and (4) level of timber harvest and other commodity developments. Appendix 4-H displays the summary of VRM management class acres, timber management acres, and VRM class acres downgraded (or upgraded) per alternative. Table 4-VRM-2 displays a ranking system to show which alternatives would have the most or least visual impacts. This table is based on timber Table 4-T-8 located in Appendix 4-J.

Common to all Alternatives

Under all alternatives, the management standards for VRM Classes I through IV remain the same (see Management Direction Common to All Alternatives, Chapter 2). Because of the upgrading and downgrad-

Table 4-VRM-1 - Probable Changes in Visual Resource Conditions

Scenic Qualities[1]	Visual Resource Condition Changes by Alternative[2] NA	A	B	C	D	E	PA
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-VRM-2 - Ranking Value for Timber Management Practices Affecting Visual Impacts Per Alternatives

Alternatives	Even-Aged	Structural Retention	Structural Retention Preferred Alternative	Shelterwood Retention	Commercial Thinning/ Density Management	Total Rating	Ranking Number
No Action	3,750[1]				4,510	23,260[2]	6
A	4,410				1,410	23,460	7
B	3,890				1,480	20,460	5
C		1,120			2,640	7,120	1
D	1,570				800	8,650	3
E	1,490			200 VRM II only[3]	790	8,640	2
Preferred	1,380		290		2,210	9,980	4
Rating[3]	5	4	3	2	1		

[1] numbers are from Timber section, Chapter 4, Table 4-T-8 (note: numbers here are **annual** as displayed on the timber table, not **decade** (10-year planning)
[2] 9,750 x rating (5) + 4510 x rating (1) = 23,260 total rating
[3] Rating given to reflect most visual impact (5) to least visual impact (1)
Management Direction
Even-Aged = clear cuts
Structural Retention = leaves 15-50% of timber after harvest (leaving 16+ trees/acre)
Structural Retension (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)

ing of inventory classes and the parameters given in the State Director's Guidance (see Chapter 1, Appendix 1-E), VRM management on BLM administered lands will vary in each alternative.

No Action Alternative

Under the No Action 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 to this 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 two 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 82,000 acres within the planning period. This alternative ranks sixth due to the quantity of harvest acres in even-aged management (see Table 4-VRM-2).

Alternative A

Alternative A would be the most detrimental alternative for visual resources, ranking seventh (Table 4-VRM-2). 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, but the Eugene District does not have any of these Congressional 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 acres within the planning period. This alternative has the most acres in even-aged management that would impact visual resources (see Appendix 4-H).

Alternative B

Under Alternative B, visual impacts would occur. This alternative ranks fifth. Even-aged cutting and commercial thinning management would be operational in this alternative, affecting over 53,700 acres within the planning period (see Appendix 4-H). 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. Management would be the same as In Alternative B except for two differences. BLM lands within a quarter mile of designated Rural Interface Areas 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 Preferred. 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. The overall ranking of management types in Table 4-VRM-2 shows Alternative C to be the least damaging to the visual landscape (see Appendix 4-H).

Alternative D

Under Alternative D, all BLM lands would be managed as inventoried. In addition, all BLM lands within a 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 (see Appendix 4-H). 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 as a whole would maintain scenic quality and possibly upgrade some viewsheds near Rural Interface Areas (RIAs). This alternative ranks third for visual impacts.

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 a quarter mile of State and Federal highways, and developed BLM recreational sites, would be managed as VRM I. All BLM lands within a half mile of Rural Interface Areas 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 (see Appendix 4-H). Under this alternative, visual resources would rank second in least impacting the visual qualities of the landscape. 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. This alternative would result in acre increases of VRM I (4,580), VRM II (33,620), and VRM III (162,250).

Preferred Alternative

The Preferred Alternative ranks fourth in visual disturbances to the landscape. Bench placer mining could occur within eight acres of Sharps Creek Special Recreation Management Area (SRMA), affecting the visual qualities of the area. Timber management practices would include even-aged, structural retention (small patch cuts of five acres or less, leaving 6-8 trees per acre), and commercial thinning, affecting over 38,000 acres (see Appendix 4-H and Table 4-VRM-2).

Effects on Wild and Scenic Rivers

Background

The impacts on river-related values from BLM resource management activities vary by alternative. If resource management activities inherent to a specific alternative would alter flow characteristics of a study river segment, or degrade the segment's Outstandingly Remarkable Value(s), the change created by these action(s) allowed under that alternative would be adverse. Table 4-WSR-1 shows probable changes in the Outstandingly Remarkable Values of each of the nine assessed river segments by alternative. The rationale supporting these determinations of condition

change is presented in Appendix 4-I. Suitability determinations for each alternative and for each assessed river segment 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.

Common to all Alternatives

Interim management would be implemented to fully protect river-related values of the seven river segments determined to be eligible for inclusion as components of the National Wild and Scenic Rivers System, but which were not assessed for suitability in the RMP. These river segments are the McKenzie River (Segment B), Fall Creek, North Fork Gate Creek, South Fork Gate Creek, Nelson Creek, Willamette River and Lake Creek (Segment B). Interim protection would continue pending resolution of these eligible river segments. Interim management will also be applied to those three river segments (McKenzie River, Segment A; and Siuslaw River, Segments B and C) assessed and found to be suitable. There were six additional eligible river segments (see Appendix 2-H, Assessment Reports) that were assessed and found not suitable for designation. These segments are Bear, Fish, Greenleaf, Marten, Sharps, and Whittaker Creeks. These six river segments will be managed under regular riparian management practices but not under the intensity of interim management.

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 nine study river segments. However, under alternatives where a river or river segment is found not suitable for inclusion as a component of the National Wild and Scenic Rivers System, 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 Outstandingly Remarkable Values within each of the nine assessed rivers corridors are summarized below.

No Action Alternative

Under the No Action Alternative, the 16 river segments determined to be eligible for inclusion as components of the National Wild and Scenic Rivers System would receive interim management to specifically protect identified Outstandingly Remarkable Values.

Outside the protective land allocations prescribed under the No Action Alternative and the protection of Outstandingly Remarkable Values, most BLM administered lands within the nine study river corridors 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 (see Appendix 4-I for summary of management practices).

Alternative A

Outside the Riparian Management Areas (RMAs) prescribed under Alternative A, most BLM administered lands within the nine study river corridors 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 Outstandingly Remarkable Values 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 nine study rivers 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 Outstandingly Remarkable Value, 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 (see Appendix 4-I for Probable Management Practices).

Table 4-WSR-1 Probable Short-Term Changes in Outstandingly Remarkable Value 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	PA
McKenzie River (Segment A)	Recreational	Fish	O	O	O	O	O	+	O
		Recreation	+	-	-	+	+	+	+
		Scenic	O	-	O	+	+	+	+
		Wildlife(T&E)	+	-	-	+	+	+	+
Siuslaw River (Segment B)	Recreational	Fish	O	O	0	O	0	+	O
		Wildlife(T&E)	O	-	-	O	+	+	+
Siuslaw River (Segment C)	Recreational	Recreation	+	-	-	+	+	+	+
		Wildlife(T&E)	O	-	-	O	+	+	+
Bear Creek	Recreational and Wild	Fish	O	O	O	O	O	+	O
Fish Creek	Recreational	Fish	O	O	O	O	O	+	O
Greenleaf Creek	Recreational	Fish	O	O	O	O	O	+	O
Marten Creek	Recreational and Wild	Fish	O	O	O	O	O	+	O
Sharps Creek	Recreational	Recreation	O	-	-	+	+	+	+
Whittaker Creek	Recreational	Fish	O	O	O	O	O	+	O

[1] + = beneficial; - = adverse; O = none or negligible
See Appendix 4-I for the rationale supporting these determinations of condition change

Alternative B

Outside the Riparian Management Areas (RMAs) prescribed under Alternative B, most BLM administered lands within the nine study river corridors 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 Outstandingly Remarkable Values 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 nine study rivers 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 a quarter mile from the highway would be managed as inventoried (in this case VRM II). Also, any BLM lands within a quarter mile of Rural Interface Areas of private lots of 1-5 acres would be managed as VRM III (see Appendix 4-I for Probable Management Practices).

Alternative C

Under Alternative C, there would be available 56 timber harvest units totally 895 acres and 7.6 new miles of road construction within the nine 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 nine study rivers' Outstandingly Remarkable Values would be negligible to beneficial. In Alternative C, recreational values would be enhanced on the McKenzie River, and the Siuslaw River, Seg-

ments 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 could enhance management opportunities within river corridors. Scenic values would be enhanced as well as wildlife due to less timber harvest activities (see Appendix 4-I for Probable Management Practices).

Alternative D

Under Alternative D, there would be available 18 timber harvest units totally 265 acres and 1.6 new miles of road construction within the nine river corridors. Management activities would impact the Outstandingly Remarkable Values negligibly to beneficial 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 upon 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 (see Appendix 4-I for Probable Management Practices).

Alternative E

Under Alternative E, there would be available 20 timber harvest units totally 156 acres and 3.1 new miles of road construction within the nine river corridors. Management activities could affect the highest potential classification of Bear and Marten Creeks, depending on the intensity of timber harvest activity. The Outstandingly Remarkable Values 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 nonexistent. Many recreational opportunities and facilities are available for development. Land exchanges would be allowed for nontimber uses. This would enhance management opportunities within river corridors (see Appendix 4-I for Summary of Management Practices).

Preferred Alternative

Under the Preferred Alternative, there would be available 43 timber harvest units totally 570 acres and 7 new miles of road construction within the nine river corridors. Management activities would not effect the eligibility status of all nine segments, but could reduce the highest potential classification of Bear and Marten Creeks. The Outstandingly Remarkable Values would either be enhanced or maintained. The McKenzie River, Segment A, and the Siuslaw River, Segments B and C, are found suitable (see Appendix 2-H of Chapter 2). See Appendix 4-I for Probable Management Practices.

Alternatives C, D, E, and the Preferred maintain or enhance all identified Outstandingly Remarkable Values. The fish value is best protected in Alternative E because all 1st and 2nd order tributaries (perennial and intermittent) have a riparian buffer zone that is not available to them in the other alternatives. Alternatives A and B have the most negative impact on values even to the point of not maintaining the eligibility status of Sharps Creek. In general, the No Action alternative maintains most of the values at status quo, with some values enhanced. The Preferred Alternative protects all values for the planning period, safeguarding the eligibility status of those rivers found not suitable as well as those found suitable (see Table 4-WSR-1 for a Summary of Probable Changes by Alternative).

Effects on Recreation

Background

Visitors recreate on BLM administered lands to participate in satisfying outdoor experiences. Visitors will achieve their diverse experiences when there are assorted recreation opportunities 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 other opportunities for others. This is due to activity participation requirements in that expectations 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 may be physical alteration of the resources available, different opportunities for social interaction

Table 4-REC-1 - 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	PA
Off-road travel (driving motorcycle, 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.

with other forest visitors, or limitations as road closures or visit time limits, which 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 more and easier 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) can no longer be realized by those visitors. When people's recreational expectations cannot be satisfied in a particular area, their natural inclination is to move to other lands, which would fulfill their recreational experiences.

Common to All Alternatives

Dispersed recreation activities on BLM administered land throughout the planning area would increase, relative to visitor demand under all alternatives. Although levels of use might change from alternative to alternative, the differences are considered minor. Of particular relevance is the fact that BLM administered lands, waters and road systems providing access to these dispersed 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-REC-1 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. The District's low elevation topography, resulting in low to no snowpack, discourages development of permanent snowplay/winter sports facilities. The remaining seven major categories would vary by alternative.

No Action Alternative

Under the No Action 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, since 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.) would also be adequately met. Off road 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 No Action 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 ten recreation sites (including Recreation and Public Purposes leases and boat landings), and three 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 three currently closed recreational sites shut down, would adversely affect visitor experience expectations to the point that participation in facility-dependent recreation activities could be sought 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 facility-dependent recreation opportunities. Negative effects of permanently losing the sites' values would happen if substantial harvest occurred within (1/4 mile) or in proximity (1/2 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, except two currently closed sites, Haight Creek and Lake Creek, could be reopened. The same adverse effects would remain for

Alternative B as for A. The allocation for timber harvest would increase 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 a quarter mile distance of the District's existing developed recreation sites would adversely affect visitor experience expectations. If visitor's expectations are not met or 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 nine use categories (see Table 4-REC-1) during the planning period. Nine new potential recreational sites and five proposed Special Recreational Management Areas (SRMAs) 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-Road Vehicles (ORVs); however, these restrictions are not anticipated to hinder ORV 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 4-K, could affect recreational mining within the Sharps Creek SRMA. 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 the same except for ORV activity. Off road travel and road closures would be more restricted in Alternative E due to wildlife concerns; however, these restrictions are not anticipated to hinder general ORV use. Hunting, hiking, horseback riding, studying nature and viewing wildlife are all activities that would be benefitted by selective road closures and off-road travel restrictions in areas providing these opportunities. While hunting quality would increase (habitat improvement in turn increasing 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 2-K, could effect recreational mining within the Sharps Creek SRMA. Projected demand for recreation categories of nonmotorized travel, camping and other land base in the short-term would increase again (see Table 4-REC-1). Seven additional proposed recreational sites could be developed as well as ten more trails supporting this increase in meeting demand. Alternatives D and E provide for land exchanges for nontimber uses. This would enhance recreational management opportunities. Other than off-road 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.

Preferred Alternative

The Preferred Alternative is able to adequately meet the projected demand for the nine recreation use categories (see Table 4-REC-1). All potential sites, SRMAs, and trails would be available for development. Nine proposed Byways would be implemented, meeting demand for motorized travel. Off road closures and limitations would be the same as in Alternative D. Allowing land exchanges for nontimber uses would enhance recreational management opportunities. Placer exploration and bench placer mining as described in Appendix 4-K could effect recreational mining within the Sharps Creek SRMA. It is anticipated that management actions carried out under this alternative would increase and/or enhance the experience expectations of most use categories, either for preferred dispersed recreation activities or for activities dependent on developed recreation facilities.

Effects on Timber Resources

Timber is a major component of the resources managed by BLM in western Oregon. The RMP analyzes a variety of approaches to timber management from intensive even aged strategies designed to produce high levels of sustained timber production on short rotations to more conservative strategies designed for limited timber production with emphasis on the protection of older forests and the enhancement of other resource values. The different strategies could result in different levels of forest health and response to disturbances, e.g., fire, wind, insects, or disease, which 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.

A series of sensitivity tests have been completed to evaluate how a variety of silvicultural systems and practices, rotation lengths, and management restrictions affect timber production. See Appendix 4-L for the results of the sensitivity analysis.

The ten-year scenario and the Annual Sale Quantity (ASQ) calculation for the Preferred Alternative were adjusted to mitigate impacts on water quality resulting from localized clustering of assumed timber sale units. Because these are just scenarios and not an integral part of each alternative, similar adjustments were not made for the common alternatives. Such adjustments for all alternatives would have substantially delayed the process. However, the adjustment exercise for the Preferred Alternative shows that similar refinements for the common alternatives could mitigate the identified impacts on water.

Some of these effects can be quantified by alternative, while others can be described only in a more general fashion.

Quantifiable Effects: Acres of Land Available for Timber Production

The suitability of land for timber production is determined through the Timber Production Capability Classification (TPCC) system, which is described in the timber resources section of Chapter 3 (see Table 3-T-1) and Appendix 3-K). Sites considered suitable for timber production include the Suitable Commercial Forest Land (SCFL) and Suitable Woodland (SWL) categories.

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 ASQ calculations under all alternatives, unless excluded for the benefit of other resource values.

SWL sites in some cases may be capable of producing a sustained yield of forest products, but would generally require a longer regeneration period (due to reforestation problems) and/or a longer rotation (due to low site quality) to produce a commercial product. Other SWL sites are capable of producing a sustained yield of only noncommercial species. Under Alternatives A, B, and C, some types of SWL sites are included in the ASQ calculations.

ASQ Levels: The ASQ for the 1990s RMP will be based on the objective of providing a nondeclining even flow of forest products. The ASQ level depends 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. Nondeclining yield may be constrained by any of the following:

- Allocations established for the benefit of other resources
- Limitations on intensity of timber management
- Minimum harvest size or age standards
- Economic feasibility of management on specific tracts

The TRIM-PLUS computerized harvest scheduling model was used to produce an estimate of the ASQ for each alternative except Alternative D. Due to the 50-11-40 rule feature of Alternative D, a different method was employed to estimate the ASQ. TRIM-PLUS was also used for many of the sensitivity analyses that estimate the impacts of different resource allocations or timber management practices on the ASQ. Appendix 2-B provides a more complete description of the TRIM-PLUS model, the Alternative D model and the 50-11-40 rule, and the ASQ computation process.

Empiric yield, derived from the timber inventory, was used to estimate the initial volume of existing stands and the future yield of unmanaged stands. The Stand Projection System (SPS), a computerized stand growth and yield simulator, was used to generate yields for future managed stands.

For each of the basic land use allocations and most of the management prescriptions, the TRIM-PLUS model projected the age, size, and cubic foot volume of timber that could be harvested each decade for the next 40 decades. Table 4-T-1 displays the ASQ projected for each alternative.

The ASQ is defined as an annual even flow quantity based on cubic foot measure. The ASQ in terms of board foot measure may vary from decade to decade, depending on the relative size of the trees to be harvested.

If the ASQ were recalculated at ten-year intervals, it would tend to increase over time as the forest develops a more balanced age-class distribution of timber stands. When the forest contains approximately the same acreage of timber within each decadal age class, the ASQ will equal the Long-Term Sustained Yield (LTSY) capacity of those forestlands under the management regime that has been selected.

Table 4-T-1 - Allowable Sale Quantity (ASQ)

Alternative	MMCF 1st	2nd	3rd	MMBF by Decade 5th	10th	20th
No Action	35.2	224	216	207	199	186	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
Preferred	19.9	119	118	116	115	124	128

Volumes are average annual MMCF and MMBF for each decade.

If timber is harvested below the age of Culmination of Mean Annual Increment (CMAI), as proposed in all alternatives in the short-term and in Alternatives NA, A, B, D, and E in the long-term; a maximum ASQ could be obtained in the short-term, but it would take longer to reach a balanced age class distribution and the long-term sustained yield status. CMAI represents the harvest age for an individual timber stand that would produce the 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 ASQ 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.

In the case of Alternative C and the Preferred Alternative, the ASQ projections are more uncertain than they are for the other alternatives. The prescriptions for Alternative C and part of the Preferred Alternative call for retention of a portion of the stand at harvest, development of stands with multiple canopy layers, maintenance of wider tree spacing by means of a series of density management cuttings, and management on longer rotations. These practices are intended to permit the forest to develop old growth structural characteristics on a significant portion of the area. There is currently little available research that quantifies the expected timber yields from such stand management regimes.

Acres **Harvested Per Decade**: In general, the number of acres that receive regeneration harvest each year within a Sustained Yield Unit (SYU) is determined by the desired rotation length. On an 80-year rotation, for example, harvest acreage should equal approximately 1/80 of the total acres per year, or 1/8 per decade. Thus, under Alternatives C, E and the Preferred, which specify future rotations of 150 to 300 years on some areas, the annual acreage receiving regeneration harvest would be much smaller than for the shorter rotations of the other alternatives.

Under all alternatives, the annual timber harvest would be regulated by the cubic foot volume sold (volume control), rather than by the acres harvested (area control). This means that the annual volume sold would be nearly equal, while the acres harvested would vary somewhat from year to year, depending on the volume per acre of the timber stands being harvested. When the intended average rotation length is achieved, the average annual acres harvested over the long-term would be approximately the same under either volume or area control. Within the high retention areas of Alternative C, the entire harvestable land base in Alternative D, the Rural Interface Area (RIA) and VRM Class II areas of Alternative E, and the Connectivity Areas and Old Growth Enhancement Areas (OGEAs) of the Preferred Alternative, harvest would be regulated by a combination of area and volume control. Appendix 4-J displays the harvest acres and harvest volume by age class and decade for each alternative.

Acres of Forestland 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 lands under the terms of reciprocal right-of-way agreements. The reduction in forestland acreage resulting from road construction would continue until all roads necessary to manage lands

allocated to timber production are constructed. The length of time needed to complete the road system would vary by alternative.

The amount of land eventually taken up by permanent roads is considered an irreversible commitment of resources. The total road acreage would be greatest under Alternatives NA, A, and B that have the largest allocations of land to timber production and, thus, the greatest need for road construction.

Table 4-T-2 displays total mileage of permanent roads, and the acres taken up by the road system, for the 1st and 5th decades of the plan, by alternative. This acreage includes not only road surfaces but ditches, turnouts, cut slopes not suitable for timber production, road intersections, rock quarries, and landing areas. The acres of roads were determined by the following formula: (road mileage X 5,280 feet X 45 feet average road area width divided by 43,560 square feet/acre).

Dedication of land to permanent roads is an unavoidable adverse effect of timber management. The loss of timber production acres would be minimized by road design objectives identified in Chapter 2.

Age Class Distribution of the Future Forest: The age at which timber stands are harvested determines the future age class distribution of the forest. Under Alternatives NA, A, B, D and E, lands allocated to timber production would be managed at rotation lengths that would effectively prevent the development of old growth stands on those lands in the future. Under Alternatives D and E, there would be large allocations of land excluded from timber harvest for the purpose of developing and maintaining old growth forest.

Under Alternative C and the Preferred Alternative, much of the area allocated to timber production would be managed on rotations of 150 to 300 years. Under such regimes, the forest of the future would contain more acres in the mature and old growth age classes than would the more intensively managed forests of the other alternatives. Refer to Appendix 4-J, which displays projected harvest by age class and decade for each alternative.

Other Effects

The seven planning alternatives would result in many effects on the timber resource that are not readily quantifiable between alternatives. These effects are summarized below in general terms.

Green Tree Retention: Under Alternatives C, D, E, and the Preferred, some live trees would be left standing within most harvest units (see Appendix 2-C). 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 per acre would vary between alternatives and from one land use allocation to another within Alternative C and the Preferred Alternative.

When merchantable live trees are reserved within harvest areas, there is a reduction in current yield because of the retained volume and reduction in growth of the next stand because of the competition of the retained overstory trees. Both of these effects would contribute to a lower ASQ level because of the greater number of trees retained and the reduction growth.

Table 4-T-2 - Miles and Acres of Roads

Alternative	End of 1st Decade		End of 5th Decade	
	Miles	Acres	Miles	Acres
No Action	2,189	11,940	2,424	13,224
A	2,211	12,060	2,466	13,449
B	2,181	11,896	2,409	13,142
C	2,147	11,711	2,346	12,794
D	2,065	11,264	2,192	11,956
E	2,098	11,444	2,254	12,293
Preferred	2,140	11,673	2,333	12,723

When trees display characteristics such as limbiness, excessive taper, crooks, or forks, there is a possibility that some or all of those traits are genetically determined. If such trees are reserved within harvest areas, the seed they produce may pass on these traits to a portion of the next stand.

Risk of Insects and Diseases: Silvicultural practices used to achieve management objectives could lead to increased incidence of insects or diseases and subsequent loss of yield. Risks include:

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 predisposes them to insect or disease attack leading to reduced yield and value. This is especially true of silvicultural systems that require more frequent harvest entries 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 forest management regimes such as those proposed for Alternatives NA, A, and B. Under all of the alternatives, identified infection sites would be replanted with tree species which are resistant or immune to the disease. However, the disease may continue to spread from infected areas that are not detected prior to replanting.

Wood Quality of Harvested Timber: Wood quality refers to the physical characteristics of harvested logs. The most important quality factors are log size; wood density and strength; number, size, and type of knots; and proportion of juvenile wood.

Larger logs, other things being equal, command a higher stumpage price per cubic foot than smaller logs. This is because larger diameter trees are more economical to fall, yard, and transport, and can be sawn into a greater variety of higher value wood products. To produce larger logs, timber stands must be grown for longer periods of time or be grown at low densities to allow more rapid diameter growth.

Wood density is closely related to strength. In general, trees with narrower annual growth rings produce wood of higher density and strength, which can then be sawn into higher-value structural lumber. Narrow growth rings are usually found in trees grown in high-density stands.

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. It is typically of 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 would usually have lower product values.

Under Alternatives NA, A, B, D, E, and the General Forest Management Areas (GFMA) in the Preferred Alternative, timber management practices are designed to maintain well-spaced stands and rapid growth, with harvest on relatively short rotations. This combination of factors is likely to result in the production of wood of lower quality and value in the future than under the longer rotations of Alternative C and the longer rotations associated with the OGEA and Connectivity land uses in the Preferred Alternative. Trees harvested from intensively managed, short rotation stands would be expected to produce medium size logs, wood of fairly low wood density with many knots, and a high proportion of juvenile wood.

Under Alternative C and in the OGEA and Connectivity areas under the Preferred Alternative, timber stands would be managed at generally lower stand densities and with rotations of 150 years or more. Though trees grown on such regimes would be expected to have large diameters, they could be limby and have low wood density, large knots, and a high proportion of juvenile wood.

In some areas, wood quality may be improved by application of pruning to 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 will be reforested within one or two growing seasons 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 current levels of reforestation success will continue. The following percentages indicate the current stocking levels: 89 percent over stocked and well stocked, 10 percent minimum stocked, and 1 percent under stocked.

Under all alternatives, most regeneration would consist of planted tree seedlings. Under Alternative C and the Preferred Alternative, a part of each new stand of trees would be naturally seeded from the overstory of large trees retained from the previous stand.

Also under Alternatives A, B, D, and E, species composition of future stands was assumed to be approximately the same as that found on existing young plantations. For Alternative C and the Preferred Alternative, the projected species composition of future stands contains greater percentages of species other than Douglas-fir.

Genetic Selection: Under all alternatives, genetically selected seedlings would be planted following regeneration harvest on some forestlands, to the extent that improved seed is available from the seed orchards. Under Alternative C, genetically selected seedlings would comprise not more than half of the trees planted following regeneration harvest.

Compared to naturally regenerated stands, reforestation using nursery-grown seedlings will change the genetic makeup of forest stands. This is true whether the seed used has been produced through a genetic selection program or other seed sources. If the genetic variation of the forest is decreased through use of genetically improved or other seed sources, resistance of the trees to attacks of disease or insects or to changes in the environment may be reduced. If the genetic variation of the forest is increased through the use of genetically selected or other sources, resistance of the trees to attacks of diseases or insects or changes in the environment will be increased.

Tree selection and breeding programs are designed to 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 whose existence is threatened by plant diseases, such as the white pine blister rust.

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 Alternatives NA, A, B, D, E, and the GFMA in the Preferred Alternative, the ASQ would reflect anticipated future yield increases from stands of genetically selected trees. In Alternative C and the land uses of the Preferred Alternative exclusive of the GFMAs, no future yield increases would be projected as a result of genetic selection. (See Appendix 2-D for a more complete discussion of genetic selection.)

Stand Management Practices: A variety of intensive stand management practices would be implemented under every alternative. However, under Alternatives NA, A, and B, the practices, except commercial thinning and density management, would be applied to a greater proportion of the area than under the other alternatives. Commercial thinning and density management are emphasized in Alternative C and the Preferred Alternative for the development of desired stand structural characteristics. Appendix 4-J displays the projected acres to which each practice would be applied, by decade and alternative. These acreage figures have been estimated for the purpose of analyzing potential environmental impacts. Actual acres of each type of harvest and stand treatment would vary in the course of implementation of the plan.

The anticipated effects of the stand management practices that would be implemented are as follows:

- **Precommercial Thinning (PCT)**: PCT would be applied to overstocked young stands under all alternatives on sites allocated to timber production. PCT would also be used under Alternative C and the Preferred Alternative to obtain density management objectives.

  PCT is generally considered to have a positive effect on timber harvest yield, thus contributing to an increase in ASQ. The practice also allows earlier development of a merchantable stand and provides an opportunity to control density, influence species composition, and eliminate poorly formed and diseased trees early in the life of the stand.

  There are some potential adverse effects of PCT. The increased vigor of stands that have received PCT may make the trees more susceptible to bark damage by bears in local areas. At times, PCT cuttings assist the spread of the black stain fungus, especially in stands where soil compaction resulted from previous tractor logging.

- **Commercial Thinning/Density Management**: Commercial thinning or density management harvest is planned to occur under all of the alternatives to a portion of stands with current ages between 40 and 80. Depending on the alternative, an estimated 50 to 65 percent of existing stands would be suitable for this treatment, based on topography, road locations and available logging methods (ground, cable or aerial).

  Without careful implementation, thinning can result in damage to tops, crowns, bark, and roots of residual trees, reducing wood quality and

increasing the risk of insect and disease attacks. Thinned stands may be more susceptible to windthrow in some locations.

Commercial thinnings can produce an increase in total net merchantable yield and permit a higher ASQ. The yield increase results from the harvest of merchantable trees which otherwise would have died and become unusable before final harvest of the stand. The increased ASQ results from the timing of thinning harvests as well as from the higher total yield over a rotation. Depending on spacing of residual trees, thinning also can result in production of larger trees, higher stumpage values, and lower logging costs at regeneration harvest.

Density management harvest would be applied to treatable stands to increase the rate at which large trees, multiple canopy layers, and structural diversity are produced to meet the objectives under Alternative C and in the Connectivity and OGEAs of the Preferred Alternative.

- **Forest Fertilization**: Fertilization of some managed stands would take place under all of the alternatives. Effects would include higher growth rates and earlier production of merchantable trees. Also, under Alternatives NA, A, B, D, and E, and the GFMAs of the Preferred Alternative, the ASQ would reflect expected future gains resulting from fertilization. No gains in ASQ would be projected for fertilizer application under Alternative C or in the OGEA and Connectivity areas of the Preferred Alternative.

- **Vegetation Control**: Under all alternatives, competing vegetation would be controlled to the extent necessary to permit the survival and growth of an adequate number of commercial species tree seedlings within each harvested area.

  For purposes of growth and yield projections, it was assumed that effective methods of vegetation control would be fully available and would be implemented as needed. These methods would include both herbicides and manual or mechanical methods as appropriate.

  The timber yields that have been projected depend upon successful control of competing vegetation, whatever the method employed. If herbicides are not available, necessary vegetation management would be accomplished by other methods.

Land Exchanges: Under all of the alternatives, efforts would be made to negotiate land exchanges to permit better 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 nondeclining harvest level (the ASQ) may remain the same or be increased, depending on site conditions and existing timber stands on the land. Conversely, any exchanges of commercial timberland for tracts which would be allocated to nontimber uses would result in a decrease in the ASQ. The types of land that would be considered for exchanges would vary by alternative.

Land Use Restrictions: In Alternatives NA, C, D, E, and the Preferred, varying amounts of land available for timber production are restricted to meet a variety of nontimber objectives such as visuals (VRM), wildlife, biodiversity, and soils (refer to Chapter 2). These restrictions usually involve the retention of trees and limits on the number of acres that can be harvested in a given period.

Long-Term Site Productivity: Some researchers suggest that long-term site productivity may not be sustainable under intensive management regimes such as those proposed for Alternatives NA, A, B, and E. Soil fertility may be diminished over time by repeated cycles of harvest, site preparation, and control of competing vegetation (Perry and Maghembe, 1989).

In addition, the simplification of the ecosystem that is associated with intensive management may result in a less resilient forest. Such a forest may have less resistance to insect pests and pathogens and less ability to adapt to changing environmental conditions (such as long-term climate change or increased levels of air pollution) than a more diverse unmanaged forest would have (Franklin et al., 1989).

Other potential impacts to long-term site productivity are currently being studied by the scientific community. Specific results are not yet available, but research is continuing. Some important observations appearing in scientific literature include:

- Use of shorter rotations appears to lead to more rapid depletion of nitrogen in forest soils. Nitrogen depletion would result in a reduction of long-term site productivity unless mitigated by periodic application of nitrogen to the site.

- Use of silvicultural systems, which increase temperature regimes at the soil surface, have a potential adverse impact on long-term site productivity. This is due to both a loss of soil

nitrogen (Borchers et al., 1990) and to loss of important soil mycorrhizae (Parke and Trappe, 1983) related to increased temperatures.

- Silvicultural regimes that do not retain species diversity may also have an adverse impacts 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-T-3. Because this model has not been validated, its predictive capability is uncertain.

Compared to the 1984-88 baseline period, total timber harvest in the Eugene District would decline under all alternatives (see Table 4-T-3). The change in the timber harvest would range from -30 percent (Alternative A) to -44 percent (Alternative C). The decline in overall timber harvest in Alternative A would result in spite of an increase in BLM timber harvests.

The timber supply analysis estimated the amount of timber that would be harvested in the District from all sources from 2001 to 2010 using the same assumptions as for the previous period. Total timber harvest increased under all alternatives even though BLM and National Forest harvest did not. However, it remained below the 1984-88 baseline.

The quantity of logs processed within the District depends on the net of outflows and inflows of logs harvested within the District. Outflows of logs, harvested within the District but processed outside the District, change the available supply in areas outside the District. Similarly, log inflows affect the quantity of wood processed in the lumber and wood products industry within the District. Estimates of the amount of wood processed within the District are shown in Table 4-T-3. (Note that the total is not net of overseas log exports.) The differences between the amounts of wood processed in each alternative are directly correlated to the ASQ of each alternative. The wood processing sector would consume less wood under all alternatives than during the reference 1984-88 period.

The cumulative effects of the alternatives are shown in Table 4-T-4. 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 an increase in Alternative A (+25 percent) to a decrease in Alternative E (-72 percent). Total harvests in western Oregon would decline under all alternatives, principally due to decreases in harvests on the National Forests. In the 2001-2010 time period, total harvests would increase even though BLM and National Forest harvests would not.

Timber processed in western Oregon during 1993-2000 would decrease under all alternatives. The reader should note that logs exported overseas are included in this total.

Effects on 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 four 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 (previously 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 4-K. 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

Table 4–T–3

Eugene District Timber Harvest (1993–2000) per Year – Millions of Cubic Feet (MMCF) per Year

Supplier [1]	1984–88 Baseline	Alternative No Action	A	B	C	D	E	Preferred
BLM [2]	38	35	54	50	14	16	16	20
USFS [3]	113	48	48	48	48	48	48	48
Private (industrial & non–industrial)	107	80	78	79	82	81	82	81
Other Public	1	1	1	1	1	1	1	1
Total	260	164	182	178	145	147	147	151

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Eugene District Timber Harvest (2001 –2010) – Millions of Cubic Feet (MMCF) per Year

Total	260	190	208	205	171	173	173	176

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Eugene District Timber Processed (1993–2000) – Millions of Cubic Feet (MMCF) per Year

Total	286	194	210	206	174	176	174	179

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.

[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 most recent land management plans.

Table 4–T– 4

Western Oregon Timber Harvest (1993–2000) per Year – Millions of Cubic Feet (MMCF) per Year [1/]

Supplier	1984–88 Baseline	Alternative No Action	A	B	C	D	E	Preferred
BLM	199	187	250	226	67	74	55	96
USFS [2/]	377	175	175	175	175	175	175	175
Private (industrial & non–industrial)	602	689	679	682	704	703	706	700
Other Public	64	64	64	64	64	64	64	64
Total	1243	1114	1167	1144	1009	1014	998	1034

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Western Oregon Timber Harvest (2001–2010) – Millions of Cubic Feet (MMCF) per Year

Total	1243	1224	1281	1259	1113	1122	1103	1140

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Western Oregon Timber Processed (1993–2000) – Millions of Cubic Feet (MMCF) per Year

Total	1294	1166	1216	1195	1063	1069	1053	1087

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.

1/ Totals do not include Klamath Falls Resource Area.

2/ Assumes implementation of most recent land management plans.

applicable laws and regulations which apply under all alternatives. Any additional measures for the mitigation of disturbance to lands and non-mineral resources bring about even greater impacts to mineral exploration and development. The effects of these additional measures on mineral operations are described below.

Tables 4-M-1 through 4-M-4 show by alternative the acres of mineral estate considered to have high, moderate, or low mineral potential that are available for mineral exploration and development as well as the acreage where such exploration and development would be restricted. Generally, Alternatives A and B and the No Action alternative make the most acres of land with high and moderate potential available for mineral development. In contrast, Alternatives D and E most restrict the availability of some of these lands for mineral development.

The irreversible and irretrievable commitment of resources would be 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, thus 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. Therefore, under all alternatives, over 99.95 percent of the lands are open to mineral leasing. 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. As described in Chapter 2, there are several special leasing stipulations 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. Under all alternatives, compliance with the No Surface Occupancy stipulation on certain mineral leases may 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 result in a savings to the lessee, provided those roads accessed the necessary drill site. Timing stipulations that would be used on some tracts of land under Alternatives NA, C, D, E, and the Preferred could add additional costs for the lessee in conducting operations on the leasehold.

As stated with each stipulation in Appendix 2-K, there could be situations where those stipulations could be excepted or modified, so it is possible that the restrictive nature of some of the stipulations 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 Preferred where the Controlled Surface Use stipulation 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, and the Preferred, the Controlled Surface Use stipulation would be used on leases containing Riparian Management Areas (RMAs). This stipulation could restrict drill site construction and access to established roadways.

With regard to geothermal resources, it is anticipated that drilling two temperature gradient holes and one geothermal well drilling operation would occur under all alternatives. It is anticipated that no exploration opportunities would be foregone by 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 mining claim location. Under all alternatives, lands within recreation sites, the Tyrrell and Dorena Seed Orchards, office sites, and reconveyed land not opened to locatable mineral entry, 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, these withdrawals would probably not have a significant impact.

Table 4-M-5 shows the effect of each alternative on the availability of lands for locatable mineral activities. Under Alternatives NA, A, B, and the Preferred, over 95 percent of the lands in the operating area would be open for locatable mineral operations. Under Alternatives C, D and E, over 89 percent of the lands in the operating area would be open for locatable mineral

Table 4-M-1 - Oil and Gas Availability by Alternative (1000 Acres)

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PA
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	0	0	0	0	0	0	0
Closed:	High	0	0	0	0	0	0	0
Discretionary	Moderate	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0
Open:	High	0	0	0	0	0	0	0
No Surface	Moderate	5	3	4	7	11	14	6
Occupancy[2]	Low	2	1	2	3	5	6	2
Open:	High	0	0	0	0	0	0	0
Standard	Moderate	158	180	148	2	58	8	55
Lease Terms	Low	78	86	74	19	40	22	41
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	55	35	66	209	149	196	157
Restrictions[3]	Low	20	13	24	78	55	72	57

[1] Horton Air Navigation Site; Fern Ridge Reservoir; Lookout Point Reservoir; lands within city limits.
[2] Fall Creek Reservoir; Oregon Islands National Wildlife Refuge; Tyrrell and Dorena Seed Orchards; Walton Maintenance site, Progeny Test sites; Regional Forest Nutritional Study Installations; Land Use Authorizations, Recreation sites; Special Areas; Reconveyed Land not opened to locatable mineral entry; VRM Class I lands; bald eagle and marbled murrelet nest sites; great blue heron rookeries; osprey nest sites.
[3] Special Recreation Management Areas; Suitable Recreational Rivers; Powersite withdrawals; Corps of Engineers' withdrawals; VRM Class II lands; fragile slopes; Riparian Management Areas; 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); and Old Growth Emphasis Areas and Connectivity Areas (Preferred Alternative).

Table 4-M-2 - Geothermal Availability by Alternative (1000 Acres)

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PA
Closed:	High	0	0	0	0	0	0	0
Nondiscretionary[1]	Moderate	0	0	0	0	0	0	0
	Low	<0.1	0	0	0	0	0	0
Closed:	High	0	0	0	0	0	0	0
Discretionary	Moderate	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0

Table 4-M-2 - Geothermal Availability by Alternative (1000 Acres) (cont.)

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PA
Open:	High	0	0	0	0	0	0	0
No Surface	Moderate	0	0	0	0	0	0	0
Occupancy[2]	Low	7	4	6	10	16	20	8
Open:	High	0	0	0	0	0	0	0
Standard	Moderate	0	0	0	0	0	0	0
Lease Terms	Low	236	266	222	19	98	30	96
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	0	0	0	0	0	0	0
Restrictions[3]	Low	75	48	90	289	204	268	214

[1] Horton Air Navigation Site; Fern Ridge Reservoir; Lookout Point Reservoir; lands within city limits.
[2] Fall Creek Reservoir; Oregon Islands National Wildlife Refuge; Tyrrell and Dorena Seed Orchards; Walton Maintenance site, Progeny Test sSites; Regional Forest Nutritional Study Installations; Land Use Authorizations; Recreation sites; Special Areas; Reconveyed Land not opened to locatable mineral entry; VRM Class I lands; bald eagle and marbled murrelet nest sites; great blue heron rookeries; osprey nest sites.
[3] Special Recreation Management Areas; Suitable Recreational Rivers; Powersite withdrawals; Corps of Engineers' withdrawals; VRM Class II lands; fragile slopes; Riparian Management Areas; 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); and Old Growth Emphasis Areas and Connectivity Areas (Preferred Alternative).

Table 4-M-3 - Locatable Mineral Availability by Alternative (1000 Acres)

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PA
Closed:	High	0	0	<0.3	<0.3	<0.3	<0.3	<0.3
Nondiscretionary[1]	Moderate	<0.1	<0.1	<0.7	1	1	1	1
	Low	2	2	3	27	32	32	12
Closed:	High	<0.3	0	0	0	0	0	0
Discretionary[2]	Moderate	0	0	0	0	0	0	0
	Low	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Open:	High	0	<0.3	0	0	0	0	0
Standard	Moderate	6	6	6	5	5	5	5
Requirements	Low	295	296	295	276	271	271	291
Open:	High	0	0	0	0	0	0	0
With Additional	Moderate	<0.6	<0.6	<0.6	<0.2	<0.2	<0.2	<0.2
Restrictions[3]	Low	14	13	13	8	8	8	8

[1] Horton Air Navigation Site; Fall Creek Reservoir; Fern Ridge Reservoir; Lookout Point Reservoir; Danebo office site; Tyrrell and Dorena Seed Orchards; Walton Maintenance site; Special Areas (Alternatives A, B, C, D, E and the Preferred).
[2] Pending BLM applications for withdrawal; Recreation & Public Purposes classifications or leases; land reconveyed by exchange under FLPMA.
[3] Progeny Test Sites; Regional Forest Nutritional Study Installations; community pits; Designated Recreational River segments; Threatened and Endangered Plant and Animal Species; Special Areas (NA Alternative); Federal Mineral Estate only; Powersite Classification (placer operations only).

Table 4-M-4 - Salable Mineral Availability by Alternative (1000 Acres)

Mineral Restrictions	Mineral Potential	NA	A	B	C	D	E	PA
Closed:	High	<0.1	0	0	0	0	0	0
Nondiscretionary[1]	Moderate	0	0	0	0	0	0	0
	Low	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Closed:	High	<1	0	0	0	0	0	0
Discretionary[2]	Moderate	1	0	1	1	1	1	1
	Low	7	14	16	24	43	61	30
Open:	High	<1	1	<1	<1	<1	<1	<1
Standard	Moderate	4	5	4	1	3	2	2
Requirements	Low	229	265	223	12	104	42	82
Open:	High	0	0	<1	<1	<1	<1	<1
With Additional	Moderate	<1	<1	<1	3	1	2	2
Restrictions[3]	Low	77	33	73	277	166	208	201

[1] Horton Air Navigation Site; Fern Ridge Reservoir; Lookout Point Reservoir; Oregon Islands National Wildlife Refuge.

[2] Danebo Office site; Tyrrell and Dorena Seed Orchards; Walton Maintenance site; Progeny Test sites; Regional Forest Nutritional Study installations; Recreation & Public Purposes leases; Recreation sites; VRM Class I lands; Suitable Recreational Rivers; Threatened and Endangered Plant and Animal Species; Special Areas (Alternatives A, B, C, D, E and the Preferred); Riparian Management Areas; bald eagle and marbled murrelet nest sites; great blue heron rookeries; osprey nest sites.

[3] Federal Mineral Estate only; Special Recreation Management Areas; VRM Class II lands; mineral springs used by band-tailed pigeons; Special Status Plant and Animal Species; 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); and Old Growth Emphasis Areas and Connectivity Areas (Preferred Alternative).

Table 4-M-5 - Availability of Lands for Locatable Mineral Exploration and Development by Alternative

Alternative	Open Standard Requirements (Percent)	Open Additional Restrictions (Percent)	Closed (Percent)
No Action	94.6	4.6	0.8
A	95.2	4.2	0.8
B	94.3	4.3	1.3
C	88.5	2.6	8.9
D	87.0	2.6	10.5
E	87.0	2.6	10.5
Preferred	93.1	2.7	4.2

operations. These alternatives provide for the closure of more lands with fragile surface resources by withdrawing those acres from mining claim location, and most of these areas are considered to have low potential for locatable mineral resources.

Under Alternatives B, C, D, E and the Preferred, the designation of Cannery Dunes and the Heceta Sand Dunes as Areas of Critical Environmental Concern (ACECs) would result in withdrawing those lands from locatable mineral entry. These withdrawals would prohibit mineral exploration or development on 258 acres considered to have high potential for uncommonly pure silica sand. Under these alternatives, the open pit sand exploration and mining operations as described in Appendix 4-K would be foregone. Under the No Action Alternative and Alternative A, these lands would not be designated as ACECs; therefore, the acreage would be available for locatable mineral activities. Under those alternatives it is possible that exploration activities and open pit mining (described in Appendix 4-K) could occur on these lands.

Under Alternatives B, C, D, E, and the Preferred, if suitable recreational rivers were to be designated, any mining claims eventually patented would only involve the mineral estate, and the surface estate would remain in public ownership. Because all the suitable river corridors are in areas considered to have low potential for locatable mineral resources, it is anticipated that there would be little effect on locatable mineral exploration and development by 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 in the past for these minerals in this area. It is anticipated that some hobby mineral collecting and rockhounding would be foregone on those lands under these alternatives.

Under Alternatives C, D, E, and the Preferred, the establishment of the Sharps Creek Special Recreation Management Area (SRMA) could reduce the amount of exploration for locatable minerals on those acres. The establishment of the SRMA would have little effect on existing mining claims with the exception that if the claimant did not file the required affidavit of annual assessment work with the Oregon State BLM Office, the mining claim could not be relocated because the area would be withdrawn from new mining claim locations. It is anticipated that there could be increased recreational mining activities along the creek, if existing mining claims were abandoned or if lands currently privately owned were acquired by the BLM. Acquisition of approximately 700 acres within the proposed boundaries of the SRMA would reduce inadvertent trespass by the public as well as facilitate management of the recreation area. With the establishment of other SRMAs under these alternatives, there would be an increase in the number of acres closed to locatable mineral entry as reflected in Table 4-M-3.

Salable Minerals

Under all alternatives, salable mineral activities may be affected by threatened and endangered plants or animal species at or near developed mineral sites or prospective sites. Under all alternatives, there could be seasonal restrictions to salable mineral extraction from any quarry located near 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 RMAs under Alternatives A, B, C, D, E and the Preferred 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.

The restriction to timber harvesting in certain areas under many of the alternatives could have an 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), forest stands older than 150 years (Alternative E), and Old Growth Emphasis and Connectivity areas (Preferred Alternative). Salable minerals could be removed from within the boundaries of existing sites in these areas.

Under Alternatives NA, C, D, E, and the Preferred, the designation of SRMAs could effect the availability of existing and potential salable mineral resources in those areas. Use of salable mineral resources from sites within the boundaries of a SRMA would be reviewed on a case by case basis by the Authorized Officer. If the impacts of such use were acceptable, then the salable mineral use would be permitted.

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

Personal Income, Employment and Population

Each alternative analyzed in this RMP/EIS proposes varying management prescriptions that would alter the production of commodity and amenity outputs from BLM administered lands. The annual level of timber sold and expenditures associated with timber management activities have been estimated for each alternative. The demand for recreational opportunities (hunting, fishing and other recreation), and BLM's capability to meet these demands has also been estimated. Estimates of existing personal income and employment dependent upon BLM fisheries in the Eugene District have been carried forward into all alternatives. No change in fisheries production is expected under Alternative A. An increasing trend is expected under all other alternatives; however, no detectable variation is expected in the short-term. No estimates have been made of the economic contributions to local personal income and employment that could be made by any potential development in the area. Potential mineral, energy, communication, and hydro-electric developments have not been analyzed with regard to their effect on socioeconomic conditions. The timing, duration, and degree of such development is speculative, and cannot be estimated at reasonably accurate levels given current information.

The input-output model, BLMPACT, was specifically developed to assess annual levels of personal income and employment asscciated with specific levels of BLM resource outputs. Because this model has not been validated, its predictive capability is uncertain. Changing national demand and production technology influence local and regional business cycles and levels of personal income and employment. The BLMPACT model holds national demand and technology constant resulting in estimated effects that represent only changing natural resource uses. The results, therefore, do not incorporate any effects or assumptions about future business cycles. The analysis period was limited to the expected life of the plan. Economic regions were assumed to follow County boundaries. Multiple Counties were combined to formulate Districts. Where District boundaries were substantially different from County boundaries, exceptions were made. For the Eugene District, only a portion of Linn County was included in the model, the remainder was included in the Salem District. Using BLMPACT, models were developed for each western Oregon BLM District and for the western Oregon region. Table 4-SE-1 summarizes the measurable annual outputs by alternative that were used to estimate the economic impacts within the Eugene District.

For each alternative, the measurable annual outputs were entered into the BLMPACT input-output model for analysis. Individual analyses for each alternative and resource were conducted. Direct and total personal income (1989 dollars) and employment dependent on BLM resource use in the Eugene District are displayed in Table 4-SE-2. The lumber and wood products sector represents approximately 65 percent of the total dependent personal income and 50 percent of total dependent employment. Detailed tables are on file in the District office.

Comparison of the alternatives indicates that declines in personal income and employment would be greatest under Alternative E and least under the Preferred Alternative. Alternatives A and B would increase dependent personal income and employment. The No Action alternative is a decline from the 1984-1988 baseline period. The level of resource outputs from BLM managed lands would have the greatest personal income and employment effects on resource dependent industries in the District. These include logging camps, transportation, sawmills, and veneer and plywood mills. Respending by businesses and individuals extends the economic impacts to all sectors of the economy and throughout western Oregon. Businesses such as real estate, wholesale and retail trade, eating and drinking establishments, finance, insurance and services would also be affected by the alternatives. As mentioned in Chapter 3, employment in the lumber and wood products sector has declined with the closure of several mills in the Eugene District since 1988. Additional permanent job and income losses in the wood products industry in the Eugene District would be an unavoidable adverse impact of the Preferred Alternative. Population migration is closely linked to the availability, or perceived availability, of employment. Out-migration of working age residents and their families could be expected under Alternatives C, D, E and the Preferred. In Alternative C and the Preferred Alternative the potential out-migration would be partially offset by the increased contract labor needed to accomplish the necessary forestry practices.

The management of BLM's timber resource is only one component of a larger economy. A cumulative analysis was conducted to display a more complete picture of timber dependent personal income and employment.

TABLE 4SE-1: SUMMARY OF MEASURABLE ANNUAL OUTPUTS BY ALTERNATIVE IN THE EUGENE DISTRICT

	BASE	NA	A	B	C	D	E	PA
TIMBER HARVEST (MMCF)	38.37	34.98	54.50	50.34	14.14	16.38	18.55	19.90
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
TIMBER MANAGEMENT ACTIVITY ($MM)	N/A	3.318	4.499	3.087	1.098	1.281	1.254	1.820

1/ Hospodarsky, 1989. Pacific Northwest Outdoor Recreation Consumption Projection Study: Oregon Project Final Report.
Eisenberger, Don. Oregon State Parks. Personal Communications. July 23, 1991, November 20, 1991 and December 10, 1991.

TABLE 4SE-2: ESTIMATED DEPENDENT PERSONAL INCOME AND EMPLOYMENT BY ALTERNATIVE IN THE EUGENE DISTRICT

	BASE	NA	A	B	C	D	E	PA
PERSONAL INCOME, MILLIONS (1989 DOLLARS)								
TIMBER HARVEST								
DIRECT	35.747	28.778	44.534	41.412	11.630	13.479	13.821	16.371
TOTAL	52.883	43.402	67.487	62.384	17.606	20.400	20.628	24.761
NON-RESIDENT RECREATION								
DIRECT	1.878	1.545	1.382	1.382	1.747	1.961	1.956	2.065
TOTAL	3.000	2.762	2.471	2.471	3.123	3.506	3.501	3.683
TIMBER MANAGEMENT ACTIVITY								
DIRECT	N/A	1.010	1.070	0.940	0.330	0.390	0.380	0.550
TOTAL	N/A	0.228	0.239	0.211	0.730	0.880	0.870	1.240
	BASE	NA	A	B	C	D	E	PA
EMPLOYMENT (JOBS)								
TIMBER HARVEST								
DIRECT	1,330	1,070	1,660	1,540	430	500	510	610
TOTAL	2,540	2,090	3,240	3,000	850	980	990	1,190
NON-RESIDENT RECREATION								
DIRECT	180	140	130	130	180	180	180	190
TOTAL	240	220	200	200	250	290	290	300
TIMBER MANAGEMENT ACTIVITY								
DIRECT	N/A	150	160	140	50	60	60	80
TOTAL	N/A	240	250	220	80	90	90	130

SOURCE: USDI, BLM, Oregon State Office, May 1989. BLMPACT Software and Reference Manual. OR-952-CTG-2019. Prepared by ECO Northwest.

The cumulative analysis differs from the marginal analysis of BLM alternatives for each District in that it attempts to estimate the income and employment effect of all timber harvest in western Oregon. All alternatives and the Preferred Alternative from all western Oregon Districts were used to represent regionwide BLM harvests. Alternative B in the USFS recent Final Environmental Impact Statement (FEIS) on Management for the Northern Spotted Owl in the National Forests (January, 1992) was used to represent USFS harvest levels. Harvests from State, industrial and nonindustrial private lands were estimated using the Pacific Northwest (PNW) Research Station's Timber Supply Analysis for BLM Planning.

Direct and total personal income and employment were estimated using coefficients developed for western Oregon by the USFS (Table 4-SE-3). The coefficients were developed using the same data and techniques used by the USFS for the FEIS on Management for the Northern Spotted Owl in the National Forests (January, 1992). These coefficients differed from District analyses by including income and employment resulting from additional processing of chips, peeler cores, and other by-products from plywood and sawmills; Federal employment directly tied to the timber program; and pulp and paper employment.

Payments Made to State and County Governments

Future prices for timber stumpage in the Northwest are a key determinant of future revenue impacts. O & C revenues, severance taxes, U.S. Treasury receipts, and competitiveness of the region's lumber and wood products industry depend on the stumpage price. Price is determined by the interaction of supply and demand in local, regional, national and international markets. Changing supply by other ownerships, import and export restrictions in the United States and in other nations, as well as the availability of substitute materials, will influence future prices. Price information was developed by the PNW Research Station through examination of demand and supply by all ownerships. A nominal 1993-2000 price was estimated for each alternative. These prices were used to estimate future O & C payments to the Counties. Table 4-SE-4 displays the projected payments by County attributable to harvest in the Eugene District under each alternative. Assuming that all BLM Districts in western Oregon would adopt similar alternatives, estimated total O & C payments to Counties dependent on BLM harvest levels are displayed in Table 4-SE-5. Rising prices relative to the No Action alternative under Alternatives C, D, E and the Preferred would counteract reduced harvest quantities, moderating the estimated revenue losses. Price declines under Alternatives A and B would be small and revenues under these alternatives would increase, given increased volume harvested. Foregone revenues to County discretionary funds under the Preferred Alternative is an unavoidable adverse impact that would reduce County programs unless replaced. Counties could obtain replacement revenues through a variety of taxation methods; this would increase the tax burden of county residents and property owners. Under the Preferred Alternative, County revenues are expected to increase slightly from the 1984-1988 baseline level.

Approximately five percent of the revenues generated by Public Domain lands are dispersed through the State to the Counties based on their total land area. The Counties must use these revenues to build roads and bridges. Under Alternatives A and B, these payments would increase above the No Action Alternative. Revenues would be reduced under the remaining alternatives.

Payments in Lieu of Taxes made for a variety of Federal lands within the Counties would remain unchanged under all alternatives. Potential changes in land tenure through exchanges, by BLM and other Federal agencies, could alter the level of payments made to Counties. Without specific proposals, the extent of this impact cannot be estimated.

Under Alternatives No Action, C, D, E and the Preferred, harvest volume subject to State harvest tax revenues would decline from 1984-1988 baseline levels. Alternatives A and B would increase harvest volumes. Harvest volumes and the tax rate determine revenues. Given existing tax rates, harvest tax revenues are expected to correlate highly with harvest volumes. Decreased revenues will negatively impact State forestry programs funded by this tax. Increased tax rates or alternative revenue sources may be used by the State to fund programs, possibly redistributing the tax burden.

Community Stability

Estimates of employment and personal income discussed earlier are Districtwide and regionwide aggregates. Distribution of these specific impacts will show great variation between communities in the District depending on their existing economic base and natural resource dependence. Alternatives No Action, C, D, E and the Preferred Alternative would result in reduced timber harvest in the District. Reduced harvest levels will adversely effect the local economy. All sectors of the economy would be impacted; however, the lumber and wood products industry would be particularly affected. Mill closures, decreasing employ-

TABLE 4SE–3: ESTIMATED PERSONAL INCOME AND EMPLOYMENT DEPENDENT ON TIMBER HARVEST FROM ALL SOURCES, WESTERN OREGON

	BASE	NA	A	B	C	D	E	PA
VOLUME, ALL SOURCES (MMCF)	1,243	1,114	1,165	1,143	1,009	1,014	998	1,034
PERSONAL INCOME ($MM)								
DIRECT	2,774.003	2,486.114	2,599.931	2,550.833	2,251.785	2,262.944	2,227.237	2,307.578
TOTAL	5,386.043	4,827.073	5,048.062	4,952.733	4,372.979	4,393.763	4,324.434	4,380.425
EMPLOYMENT (JOBS)								
DIRECT	59,100	53,000	55,400	54,300	48,000	48,200	47,500	49,200
TOTAL	113,000	101,300	105,900	103,900	91,700	92,200	90,700	94,000

SOURCES:

USDA, USFS, PNW Research Station. May 1992. Timber Supply Analysis for BLM Planning.

Alward, Greg. Personal Communication. May 1992. USDA, USFS, Fort Collins, CO.

TABLE 4SE–4: PROJECTED O & C PAYMENTS TO COUNTIES ATTRIBUTABLE TO TIMBER HARVEST IN THE EUGENE DISTRICT (CURRENT DOLLARS)

	1984–1988 AVERAGE	NA	A	B	C	D	E	PA
Benton	370,090	667,149	980,702	926,447	298,039	343,019	352,223	409,945
Clackamas	730,960	1,317,678	1,936,973	1,829,816	588,654	677,493	695,672	809,678
Columbia	271,311	489,084	718,948	679,175	218,491	251,466	258,214	300,529
Coos	777,056	1,400,774	2,059,124	1,945,210	625,776	720,217	739,544	860,739
Curry	480,721	866,581	1,273,865	1,203,392	387,133	445,558	457,514	532,491
Douglas	3,299,196	5,947,356	8,742,553	8,258,898	2,656,898	3,057,872	3,139,927	3,654,492
Jackson	2,063,809	3,720,362	5,468,894	5,166,345	1,662,020	1,912,848	1,964,178	2,286,063
Josephine	1,590,990	2,868,026	4,215,970	3,982,734	1,281,251	1,474,614	1,514,184	1,762,326
Klamath	308,188	555,561	816,670	771,490	248,189	285,645	293,311	341,378
Lane	2,011,127	3,625,394	5,329,293	5,034,466	1,619,594	1,864,020	1,914,039	2,227,708
Lincoln	47,414	85,471	125,641	118,691	38,183	43,945	45,125	52,520
Linn	347,700	626,787	921,371	870,399	280,008	322,267	330,914	385,144
Marion	192,288	346,632	509,546	481,357	154,853	178,223	183,006	212,996
Multnomah	143,558	258,787	380,414	359,369	115,610	133,057	136,628	159,018
Polk	284,482	512,826	753,849	712,145	229,098	263,673	270,748	315,118
Tillamook	73,754	132,955	195,442	184,630	59,396	68,360	70,194	81,697
Washington	82,974	149,574	219,873	207,709	66,820	76,905	78,968	91,909
Yamhill	94,827	170,942	251,283	237,382	76,366	87,891	90,249	105,039
Total	13,170,445	23,741,940	34,900,410	32,969,654	10,606,379	12,207,072	12,534,639	14,588,790
Assumed Price 1/	707	1,398	1,319	1,349	1,545	1,535	1,560	1,510
Total Volume (MCF) 2/	38,370	34,980	54,500	50,340	14,140	16,380	16,550	19,900
O&C Volume (MCF) 3/	37,257	33,966	52,920	48,880	13,730	15,905	16,070	19,323

1/ USDA, USFS, PNW Research Station, 1992. Timber Supply Analysis for BLM Planning. Portland, OR.
2/ USDI, BLM, Oregon State Office, Various Years. BLM Facts. Converted using 6.2 mbf/mcf.
3/ O & C Lands are 97.1 percent of BLM lands in the Planning Area.

TABLE 4SE–5: PROJECTED O & C PAYMENTS TO COUNTIES ATTRIBUTABLE TO TIMBER HARVEST IN WESTERN OREGON (CURRENT DOLLARS)

	1984–1988 AVERAGE	NA	A	B	C	D	E	PA
Benton	1,708,328	3,181,399	3,994,414	3,687,773	1,250,967	1,405,277	1,036,152	1,738,483
Clackamas	3,374,099	6,283,545	7,889,322	7,283,679	2,470,771	2,775,546	2,046,491	3,433,658
Columbia	1,252,368	2,332,271	2,928,289	2,703,492	917,079	1,030,203	759,599	1,274,475
Coos	3,586,880	6,679,805	8,386,847	7,743,010	2,626,586	2,950,581	2,175,549	3,650,195
Curry	2,219,002	4,132,422	5,188,473	4,790,167	1,624,922	1,825,359	1,345,891	2,258,172
Douglas	15,229,041	28,360,866	35,608,562	32,874,985	11,151,860	12,527,465	9,236,867	15,497,864
Jackson	9,526,510	17,741,109	22,274,897	20,564,911	6,976,034	7,836,542	5,778,112	9,694,672
Josephine	7,343,985	13,676,617	17,171,714	15,853,486	5,377,823	6,041,189	4,454,345	7,473,621
Klamath	1,422,593	2,649,279	3,326,309	3,070,957	1,041,731	1,170,230	862,845	1,447,705
Lane	9,283,332	17,288,240	21,706,297	20,039,961	6,797,960	7,636,503	5,630,617	9,447,201
Lincoln	218,860	407,581	511,740	472,455	160,266	180,035	132,745	222,724
Linn	1,604,977	2,988,930	3,752,759	3,464,669	1,175,286	1,320,260	973,456	1,633,308
Marion	887,601	1,652,969	2,075,389	1,916,057	649,969	730,144	538,356	903,269
Multnomah	662,661	1,234,066	1,549,434	1,430,488	485,251	545,107	401,924	674,358
Polk	1,313,163	2,445,488	3,070,439	2,834,729	961,597	1,080,213	796,472	1,336,343
Tillamook	340,450	634,015	796,040	734,930	249,303	280,055	206,493	346,459
Washington	383,006	713,267	895,545	826,796	280,466	315,062	232,304	389,767
Yamhill	437,721	815,163	1,023,480	944,910	320,532	360,071	265,491	445,448
Total	60,794,577	113,217,030	142,149,949	131,237,465	44,518,403	50,009,842	36,873,720	61,867,720
Assumed Price 1/	707	1,398	1,319	1,349	1,545	1,532	1,560	1,510
Total Volume (MCF)2/	202,020	190,310	251,390	226,600	67,980	79,070	55,860	96,510
O&C Volume (MCF) 3/	171,979	161,970	215,542	194,570	57,629	65,287	47,274	81,944

1/ USDA, USFS, PNW Research Station, 1992. Timber Supply Analysis for BLM Planning. Portland, OR.
2/ USDI, BLM, Oregon State Office, Various Years. BLM Facts. Converted using 6.2 mbf/mcf.
3/ Projected O&C Payments to Counties. All Districts.

ment, and migration from timber dependent communities are all common results of reduced timber harvests. Reduced Federal revenue sharing receipts would also occur under these alternatives. Timber dependent communities such Oakridge, Cottage Grove, Springfield, Elmira, Lowell and Swisshome could be severely impacted. (Source: OEDD, Status Report, November, 1991) Effects on individual mills and communities cannot be reliably predicted and, therefore, are not shown here.

It is very likely that employment losses under Alternatives C. D, E and the Preferred Alternative will increase local demand for social services. State and County provided services such as unemployment insurance, health care, and job placement will be in greater demand. The BLM has provided to the State of Oregon projected changes in employment levels for each alternative. Using estimated numbers of displaced lumber and wood products workers, additional retraining and support costs under each alternative were calculated by the State of Oregon. Estimated costs under the current programs and at an enhanced level of assistance were calculated. The results are displayed in Table 4-SE-6. Under current training and support programs an estimated 42 percent of displaced workers will receive assistance. With an enhanced program, approximately 60 percent would be assisted. The State is anticipating harvest reductions by BLM and USFS under the Endangered Species Act and other environmental constraints and is taking an active role in assisting displaced timber workers and timber dependent communities through a Coordinated Timber Response Plan. Demand for County services is also expected to increase under these same alternatives, yet County O & C revenues are expected to decline. These reductions will reduce the County's ability to respond to increased social service needs. Federal legislation in FY 1991 and FY 1992 has protected Counties from large reductions in O & C revenues. The FY 1992 legislation guarantees 90 percent of average receipts in the previous five years up to 100 percent of total receipts. Continuation of this legislation in the future would mitigate projected County revenue impacts under Alternatives C, D, E and the Preferred.

None of the proposed alternatives meet anticipated increases in recreation demand during the life of the plan. The largest portions of demand will be met under Alternatives D, E and the Preferred In communities able to attract and capture increased recreational use. Recreation associated spending could increase local personal income and employment. The specific communities and the extent is unknown. Development of tourism activities and related businesses in timber dependent communities is not anticipated to fully replace employment and personal income losses in the wood processing industry under Alternatives C, D, E and the Preferred.

Although employers are often attracted to areas where labor is readily available (communities with unemployment), other factors can discourage new businesses from locating in certain communities. Prolonged economic difficulties such as reduced revenue sharing, out-migration, business closures, and reduced tax bases can decrease the quality of schools, roads, community services, and police and fire protection. Without quality basic services, new businesses will be discouraged from locating in these communities. Impacted communities would suffer not only the permanent loss of jobs and income associated with timber harvest and processing but also reduced prospects for community redevelopment with alternative businesses. Incentives or economic assistance could be provided by Federal, State, or local governments to partially mitigate these impacts.

Non-market Values

The analysis of socioeconomic impacts of alternative BLM resource management thus far has focused on timber management and quantifying the impacts to personal income, employment, population and Federal revenue sharing. Additional impacts can be expected reflecting societal and individual values. The extent of these impacts is difficult to assess because markets rarely exist or fully capture the satisfaction or dissatisfaction society and individuals derive from the natural environment. Alternatives C, D, E and the Preferred would maintain or enhance wild fish populations, endangered species and their habitats, varying levels of biodiversity, visual resources, and other natural values. These alternatives would increase the satisfaction of individuals who value the protection of these natural resources now and for future generations. Those individuals directly impacted by changes in BLM management and others may not hold these levels of natural resource protection/preservation as valuable as the jobs, income, and revenue lost under these alternatives. It is likely these people would experience dissatisfaction under Alternatives C, D, E and the Preferred.

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 (RIAs). 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 RIAs will have or will express concerns about BLM's resource management practices, and that there are neighbors living outside these analytical RIAs 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 a 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 a 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 will receive special practices than under any other alternative; however, nearly 10 percent more acres will 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 RIAs. 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 Preferred Alternative proposes a moderate level of timber harvest with slightly more acres being affected than under Alternative C. Under the Preferred Alternative, the same number of acres are proposed for special management as under Alternatives C and D; however, considering the number of acres being affected, the number of expressed concerns and potential additional costs are expected to be roughly the same as under Alternative C.

Consistency with Other Agency Plans and Programs

Cooperative interrelationships between BLM and other agencies are discussed in Chapter 5. BLM planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other Federal agencies, State and local governments, and Indian tribes, so long as the guidance and RMPs are also consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands . . ." (43 CFR 1610.3-2). Consistency is construed as the absence of conflict. Based on BLM's knowledge of the plans of such other agencies, the alternatives have been compared to the following agencies' plans for consistency, and BLM has reached the conclusions stated.

Federal Agencies

All alternatives are believed to be consistent with the following plans of other Federal agencies:

- The Forest Service's forestwide land-use plans for the adjacent Willamette, Siuslaw and Umpqua National Forests
- Soil Conservation Service watershed plans
- The Fish and Wildlife Service's Pacific Bald Eagle Recovery Plan, and Pacific Coast Recovery Plan for the American Peregrine Falcon (see Effects on Threatened and Endangered Species)
- Army Corps of Engineers' plans for the management of recreation use on and around the Fern Ridge, Cottage Grove, Dorena, Fall Creek, Lookout Point, and Dexter Reservoirs
- The Bonneville Power Administration's latest annual Transmission System Facilities Resource Program

State Government

All alternatives are believed to be consistent with the following plans, programs and policies of State of Oregon agencies:

- Department of Environmental Quality (see Effects on Air Resources)
  - Smoke Management Plan
  - Visibility Protection Plan and air quality policies
  - Prevention of Significant Deterioration requirements
- Water Resources Department River Basin programs for the Willamette and Mid Coast Basins
- Water Resources Commission rules and statutes
- Department of Human Resources, Health Division, standards for public water systems
- Department of Agriculture, weed control plans (if any are relevant)
- Division of State Lands, Removal-Fill Law
- 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
- Department of Transportation, Highway Division
  - Oregon Highway Plan
  - Six-Year Highway Improvement Plan
- Economic Development Department, Regional Economic Development Strategies

Consistency of the alternatives with some other State plans and programs is more complex, as described in the following discussions.

Consistency with the Department of 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 BLM can lessen the cumulative impacts by scheduling its timber sales to occur at different periods than most of the anticipated private timber harvest. See Effects on Water Resources for further discussion.

Alternatives NA, A, B and D fall short of full consistency with Oregon's Statutory Wildlife Policy and the Oregon Threatened and Endangered Species Act. Consistency with the Department of Fish and Wildlife's many plans, policies, rules and objectives is addressed in Appendix 4-M, Table 4-CA-1.

Consistency with the Board of Forestry's Forestry Program for Oregon (FPFO) is complex, due to the diversity of goals of the FPFO. Alternatives B, C, D, E and the Preferred would reduce the current commercial forestland. All Alternatives could be inconsistent with some recent revisions of Oregon Forest Practices Act rules. More specificity regarding consistency with the five FPFO objectives is provided in Appendix 4-M , Table 4-CA-2.

Alternatives A, B, C, D and No Action would not provide specific protection, on all BLM administered lands, for State listed endangered plant species identified by the Oregon Department of Agriculture, unless the species are also Federally listed. At this time there are no State listed plant species in this circumstance known to exist on BLM administered

lands in the planning area. If any such species are subsequently listed by the Department, these alternatives could be inconsistent with the Department's plans for those species. See Effects on Special Status Species for further discussion.

Alternatives NA and A would designate only some of the potential research natural areas identified in the Natural Heritage Program administered by the Division of State Lands, and would thus be inconsistent with that program.

The other alternatives would be fully consistent with it. See Effects on Special Areas for further discussion.

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 BLM plan consistency is relevant. Oregon's land use program was enacted 19 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 4-M, Table 4-CA-3. The table also addresses consistency of BLM's plan alternatives 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 forestlands 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 a 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 a 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 U.S. Department of Commerce regulations require Federal agencies to examine their activities for offsite effects. An effect may be either a primary, secondary, or cumulative effect on the coastal zone.

Local Government

The Oregon Statewide planning program attaches 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 following counties' comprehensive plans could be affected by BLM's plan: Lane, Linn, Benton, Douglas.

The District has contributed data for development of County comprehensive plans, followed the development of those plans through the years, and consulted on issues of mutual interest. Based on knowledge gained through this involvement, the District planning staff believes that all alternatives are consistent with the comprehensive plans and land use regulations cited above.

Tribal and Other Agency Plans

No Tribes control lands within the planning area.

The Northwest Power Planning Council has established a fish management plan for the Willamette River Basin. Habitat improvement projects and other elements of all BLM plan alternatives are believed to be consistent with the Council's plan.

Chapter 5
Consultation and Coordination

The Draft Eugene Resource Management Plan/ Environmental Impact Statement (RMP/EIS) was prepared by an Interdisciplinary Team of specialists from the Eugene District Office. Writing of the Draft began in early 1990; however, an elaborate process that began in 1986 preceded the writing phase. The planning process involved many steps with public participation as well as consultation and coordination with many agencies and organizations throughout the process.

Other Agencies and Organizations Contacted

The RMP/EIS team or supporting individuals in the Oregon State Office contacted or received input from the following organizations during development of the Draft and/or the planning steps preceding its development:

Federal Agencies

US Environmental Protection Agency
USDA, Forest Service
USDE, Bonneville Power Administration
USDI, Bureau of Mines
USDI, Fish and Wildlife Service
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 Bodies

Association of O&C Counties
Douglas County Board of Commissioners
Lane County Board of Commissioners
Linn County Board of Commissioners
City of Eugene

Organizations

American Fisheries Society, Oregon Chapter
Associated Oregon Loggers
Bohemia Mine Owners Association
Douglas Timber Operators
East Lane Soil & Water District
Eastern Oregon Mining Association
Friends of Greensprings
Headwaters
Lane County Audubon Society
Local Residents for Old Growth
Mazamas
Motorcycle Riders Association
National Association of Conservation Districts
National Audubon Society
National Council of the Paper Industry for Air and Stream Improvement
Northwest Environmental Defense Center
Northwest Federation of Mineralogical Societies
Northwest Forest Resource Council
Northwest Forestry Association
Northwest Rivers Council
Northwest Timber Association
Oregon Natural Resources Council
Oregon Rivers Council
Public Lands Foundation
Sierra Club, Oregon Chapter
Siskiyou Audubon Society
Southern Oregon Timber Industries Association
Umpqua Valley Audubon Society

Western Forest Industries Association
Western Wood Products Association
The Wilderness Society
Willamette Timberman Association

Public Involvement in the RMP Process

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 that should be conducted in the planning process (see Appendix 1-D, 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 proposed 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.

Agencies and Organizations to Whom Copies of Draft RMP/EIS have been sent

1000 Friends of Oregon
American Fisheries Society
American Forest Council
Associated Oregon Loggers, Inc.
Associated Oregon Industries
Association of Oregon Archaeologists
Association of NW Steelheaders
Association of O&C Counties
Association of Oregon Counties
Bonneville Power Administration
Bureau of Indian Affairs
Citizens for Perpetual Resources
City of Cottage Grove
City of Eugene
City of Florence
City of Springfield
City of Veneta

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 County Board of Commissioners
Douglas Timber Operators,Inc.
Emerald People's Utility District
Emerald Road Runners
Emerald Valley Chapter of the Oregon Hunters Association
Environmental Education Association of Oregon
Environmental Protection Agency
Eugene Chamber of Commerce
Eugene Water & Electric Board
Florence Area Chamber of Commerce
Forest Conservation Council
Governor Barbara Roberts
Governor's Forest Planning Team
Greenpeace
Headwaters
Honorable Peter DeFazio
Honorable Ron Eachus
Honorable Mark Hatfield
Honorable Carl Hosticka
Honorable Bob Packwood
Isaak Walton League of America
Junction City Chamber of Commerce
Keep Oregon Green
Lake Creek Valley Association
Lane Council of Governments
Lane County
Lane County Audubon Society
Lane County Board of Commissioners
Lane County Extension Service
Lane Education Service District
Lane Electric Cooperative, Inc.
Lane Regional Air Pollution Authority
League of Women Voters
Linn County
Linn County Board of Commissioners
Long Tom Conservation and Development Committee
Marcola Community Group
McKenzie Flyfishers
McKenzie Guardians
McKenzie Motorcycle Association
McKenzie River Guides
National Association of Conservation Districts
National Forest Products Association
National Marine Fisheries
National Park Service
National Weather Service
National Wildlife Federation
Native Plant Society of Oregon
Nature Conservancy
National Council of the Paper Industry for Air and Stream Improvement
Northwest Coalition for Alternatives to Pesticides
Northwest Environmental Defense Center
Northwest Forestry Association
Northwest Mining Association
Northwest Policy Center
Northwest Power Planning 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 Northwest Forest & Range Experimental Station
Pacific Northwest 4-Wheel Drive Association
Pacific Northwest Research Station
Pacific Power and Light Company
Portland Chamber of Commerce
Save Our Ecosystems
Sierra Club
Society of American Foresters
Southern Oregon Timber Industry Association
South Lane School District
Springfield Chamber of Commerce
Springfield Forest Products
State of Oregon
- Department of Agriculture
- Department of Energy
- Department of Environmental Quality
- Department of Forestry
- Department of Human Resources Employment Division
- Department of Land Conservation and Development
- Department of Transportation Parks & Recreation Division
- Department of Water Resources
- Marine Board

State Board of Forestry
The Wilderness Society
Trail Riders Association International
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. Soil Conservation Service
Umpqua Regional Council of Governments
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
Wildlife Management Institute
Yellow Ribbon Coalition

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References, Glossary, Acronyms, Index

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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.

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 immediate increase in the current allowable sale quantity that is justified by expected future increases in yields due to present or proposed management treatments.

Allowable Sale Quantity (ASQ) - The gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period of time in accordance with the management plan. Formerly referred to as "allowable cut."

Anadromous Fish - Fish that migrate as adults from the ocean into fresh water streams to reproduce young, which return to the ocean to grow to maturity.

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 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 Forestland - That portion of the forested acres for which timber production is planned and included within the acres contributing to the allowable sale quantity (ASQ). This includes both lands allocated primarily to timber production and lands on which timber production is a secondary objective.

Back Country Byway - A road segment designated as part of the National Scenic Byway System.

Basal Area - The area of the cross section of a tree stem near its base, generally at breast height, 4.5 feet above the ground and inclusive of bark.

Baseline - The starting point for Analysis of Environmental Consequences; may be the conditions at a point in time (e.g., when inventory data is collected) or may be the average of a set of data collected over a specified period of years.

Basic Resource Unit (BRU) - A term used in TRIM-PLUS for the smallest unit of timberland that has been identified in the inventory.

Basin Programs - Sets of State administrative rules that establish types and amounts of water uses allowed in the State's major river basins and form the basis for issuing water rights.

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the State. Such uses include, but are not limited to, the following: instream, out of stream and 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 Burning - A controlled fire that burns within defined boundaries to achieve management objectives.

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 Nester - A wildlife species that nests in cavities.

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 Forestland - Forestland producing or capable of producing at least 20 cubic feet of wood per acre per year of commercial tree species.

Commercial Thinning - Partial cuttings in merchantable timber stands to increase merchantable yield by redistributing growth and salvaging existing and expected mortality.

Commercial Tree Species - Conifer species used to calculate the commercial forest land ASQ. They are typically utilized as saw timber and include species such as Douglas-fir, hemlock, spruce, fir, pine and cedar. (Also see Noncommercial Tree Species).

Commodity Resources - Goods or products of economic use or value.

Community Stability - The capacity of a community (incorporated town or county) to absorb and cope with change without major hardship to institutions or groups within the community.

Community Water System - See Public Water System.

Concern - A topic of management or public interest that is not well enough defined to become a planning issue, or does not involve controversy or dispute over resource management activities or land use allocations, or lend itself to designating land use alternatives. A concern may be addressed in analysis, background documents, or procedures, or in a noncontroversial decision.

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.

Critical Habitat - (1) Specific areas within the geographic area occupied by a threatened or endangered species at the time it is listed. These areas must have physical or biological features (a) essential to the conservation of the species, and, (b) which may require special management considerations or protection. (2) Specific areas outside the geographical area occupied by a threatened or endangered species at the time it is listed determined by the Secretary to be 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 which does not meet merchantable specifications.

Culmination of Mean Annual Increment (CMAI) - The peak of average yearly growth in volume of a forest stand (total volume divided by age of stand).

Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

Cumulative Effect - The impact 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 - A fluid mass of soil, rock and vegetative debris that moves rapidly down stream channels.

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 ASQ. 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.

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.

Dispersed Recreation - Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are primarily for access and protection of the environment rather than comfort or convenience of the user.

Domestic Water Supply - Water used for human consumption.

Early Seral Stage - See Seral Stages.

Economically Feasible - Having costs and revenues with a present net value greater than zero.

Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.

Ecosystem Management - A set of forest management concepts that seek to maintain or recreate timber stand and landscape biological diversity. Also termed "New Perspectives," "New Forestry" and "Sustainable Forestry."

Edge Effect - An ecologically important 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.

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. Creation of even-aged stands may be accomplished through the clear cut, seed tree or shelterwood methods.

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.

Forestland - 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 forestland 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.

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.

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 forestland allocated to timber production and intensively managed to obtain a high level of timber volume or quality.

Intermittent Stream - A stream that flows most of the time but occasionally is dry or reduced to pools.

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 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.

Large Woody Debris - Pieces of wood larger than ten feet long and six inches in diameter, in a stream channel.

Large Woody Material - Logs on the forest floor in pieces at least 24 inches in diameter at the large end.

Late Seral Stage - See Seral Stages.

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 ability of a soil to sustain a nondeclining yield of a timber crop in perpetuity and retain the potential for the targeted species to be grown at the same stocking level and growth rate after each rotation.

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.

Management Activity - An activity undertaken for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Management Framework Plan (MFP) - A land use plan that established coordinated land use allocations for all resource and support activities for a specific land area within a BLM District. It established objectives and constraints for each resource and support activity and provided data for consideration in program planning. This process has been replaced by the Resource Management Planning process.

Management Intensity (MI) - An expression of a potential type of management for a Group Resource Unit in TRIM-PLUS, expressed as a yield table.

Mass Movement - The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not, however, include surface erosion by running water.

Mature Seral Stage - See Seral Stages.

MICRO*STORMS - A microcomputer database system providing background information and recommended treatment for each operations inventory unit.

Mid Seral Stage - See Seral Stages.

Mineral Estate - The ownership of the minerals at or beneath the surface of the land.

Mineral Potential Classification System - Method for assessing the potential for the presence of a concentration of one or more energy and/or mineral resources.

Minimum Harvest Age - The lowest age of a forest stand to be scheduled for final harvest.

Minimum Stocking - Reforestation level lower than target stocking. Does not achieve full site occupancy in young stands but is capable of achieving optimal final harvest yield and reduced commercial thinning yield.

Minimum Streamflow - The quantity of water needed to maintain the existing and planned in-place uses of water in or along a stream channel or other water body, and to maintain the natural character of the aquatic system and its dependent systems.

Mining Claims - Portions of public lands claimed for possession of locatable mineral deposits, by locating and recording under established rules and pursuant to the 1872 Mining Law.

Mitigating Measures - Modifications of actions 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/Evaluation - The orderly collection and analysis of data to evaluate the progress and effectiveness of on-the-ground actions in meeting resource management objectives.

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 Allowable Sale Quantity calculations.

Noncommercial Forestland - 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 forestland ASQ. Some species may be managed and sold under a suitable woodland ASQ and, therefore, may be commercial as a woodland species.

Nonforest Land - Land developed for nontimber uses or land incapable of being 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 Forestland - 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 forestland.

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.

Obligate Species - A plant or animal that occurs only in a narrowly defined habitat such as tree cavity, rock cave, or wet meadow.

Off-Road Vehicle (ORV) - Any motorized track or wheeled vehicle designed for cross-country travel over natural terrain.

Off-Road Vehicle Designation

Open: Designated areas and trails where off-road 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-road 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-road 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 (ORVs) - 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.

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 - Removing premerchantable conifers to control density and species composition and to concentrate growth on a desired number of potential crop trees.

Prescribed Fire - Introduction of fire under controlled conditions for management purposes.

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.

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.

Recreational River - See Wild and Scenic River System.

Reforestation - Reestablishment of a tree crop on forestland.

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.

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.

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 Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils, which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots of young tree seedlings.

Rotation - The planned number of years between the regeneration of an even-aged forest stand and its final cutting.

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 managed under the current forest management regime. Grass, herbs, or brush are plentiful.

Mid Seral Stage - The period in the life of a forest stand from crown closure to first merchantability. Usually ages 15 through 40. Due to stand density, brush, grass or herbs rapidly decrease in the stand. Hiding cover may be present.

Late Seral Stage - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. This is under a regime including commercial thinning, or to 100 years of age, depending on wildlife habitat needs. During this period, stand diversity is minimal, except that conifer mortality rates will be fairly rapid. Hiding and thermal cover may be present. Forage is minimal.

Mature Seral Stage - The period in the life of a forest stand from Culmination of Mean Annual Increment to an old growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present.

Old Growth - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. Depending on fire frequency and intensity, old growth forests may have different structures, species composition and age distributions. In forests with longer periods between natural disturbance, the forest structure will be more even-aged at late mature or early old growth stages.

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 10 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.

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 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 1985 through 1988, in accordance with BLM's spotted owl monitoring guidelines. These sites are known to have been inhabited by spotted owls at some time in the last dozen years, but not necessarily during the 1985-1988 period.

Stand - A reasonably homogenous forest area that is easily identified from other areas by its age, composition, structure, site quality or geography.

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.

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. Each small unbranched tributary is a 1st order stream. Two 1st order streams join to make a 2nd order stream. A 3rd order stream has only 1st and 2nd order tributaries, 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 following disturbance by which one group of plants succeeds another through stages leading to the potential natural community or to climax. The developmental series of plant communities is called a sere and defined stages are called seral stages.

Suitable Commercial Forestland - Commercial forestland 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 - Forestland occupied by minor conifer and hardwood species not considered in the commercial forestland ASQ determination and referred to as noncommercial species. These species may be considered commercial for fuelwood, etc. under woodland management. Also included are low site and nonsuitable commercial forestland. 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 forestland into major classes indicating relative suitability to produce timber on a sustained yield basis.

Total Suspended Particulates - All solid or semi-solid material found in the atmosphere.

Transportation System - Network of roads used to manage BLM administered lands. Includes BLM controlled roads and some privately controlled roads. Does not include Oregon Department of Transportation, County and municipal roads.

Travel Corridor - A route used by animals along a belt or band of suitable cover or habitat.

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 single tree or group selection harvest method that creates and/or maintains a forest with a wide range of age and diameter classes and a continuous forest canopy.

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 of sufficient size to maintain its existence in spite of normal fluctuations in population levels.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visibility Protection Plan - A plan that implements the requirements of the Clean Air Act by establishing programs for visibility monitoring; short and long-term control strategies; and procedures for program review, coordination, and consultation.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Visual Resource Management Classes - Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed in the landscape.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Western Oregon Digital Data Base (WODDB) - A very high resolution (l"=400') geographic digital (computer) 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 1964.

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 - Forestland producing trees not typically used as saw timber products and not included in calculation of the commercial forestland ASQ.

Yarding - The act or process of moving logs to a landing.

Yield Table - A table of timber volumes expected to be produced under a certain set of conditions.

Acronyms

ACE	Allowable Cut Effect
ACEC	Area of Critical Environmental Concern
ACMP	Area of Critical Mineral Potential
AMS	Analysis of the Management Situation
ANS	Air Navigation Site
APD	Application for Permit to Drill
ARD	Automated Resource Data
ARPA	Archeological Resources Protection Act
ASQ	Allowable Sale Quantity
AUM	Animal Unit Month
AWS	Analytical Watershed
BEHA	Bald Eagle Habitat Area
BF	Board Feet
BLM	Bureau of Land Management
BMP	Best Management Practices
BRU	Basic Resource Unit
CBWR	Coos Bay Wagon Road
CEQ	Council of Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CF	Cubic Feet
CFS	Cubic Feet per Second
CMAI	Culmination of Mean Annual Increment
COE	U.S. Army Corps of Engineers
COPE	Coastal Oregon Productivity Enhancement
CSU	Controlled Surface Use
CT	Commercial Thinning
CZMA	Coastal Zone Management Act
DBH	Diameter Breast Height
DCA	Designated Conservation Areas
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DLC	Donation Land Claim
EA	Environmental Assessment
EEA	Environmental Education Area
EIS	Environmental Impact Statement

EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERMA	Extensive Recreation Management Area
ESC	Existing Stand Condition
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FOI	Forest Operational Inventory
FORCYTE	Forest Nutrient Cycling and Yield Trend Evaluation
FS	Forest Service
FUP	Free Use Permit
GFMA	General Forest Management Area
GIS	Geographic Information System
GRU	Group Resource Unit
HCA	Habitat Conservation Area
HMP	Habitat Management Plan
IMPLAN	Input Model Plan developed by the U.S. Forest Service to measure the economic effects of changes in program-related activities.
KGRA	Known Geothermal Resource Area
LCC	Lane Community College
LCDC	Land Conservation & Development Commission
LCOG	Lane Council of Governments
LEIS	Legislative Environmental Impact Statement
LTSY	Long-Term Sustained Yield
M&B	Metes and Bounds
MBF	Thousand Board Feet
MFP	Management Framework Plan
MI	Management Intensity
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MOSS	Map Overlay Statistical System
MOU	Memorandum of Understanding
MTP	Master Title Plat
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOS	Notice of Staking
NPS	Non Point Source

NPV	Net Present Value
NSO	No Surface Occupancy
NWR	National Wildlife Refuge
NWSRS	National Wild & Scenic River System
O&C	Oregon and California Act of 1937 (Revested Oregon and California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands)
OAR	Oregon Administrative Rules
OCMP	Oregon Coasttal Management Program
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODF&W	(used same as ODFW)
OEDD	Oregon Economic Development Department
OGEA	Old Growth Emphasis Area
OI	Operations Inventory
ONA	Outstanding Natural Area
OPRD	Oregon Parks & Recreation Department
ORS	Oregon Revised Statutes
ORV	Off-Road Vehicle
OSDF	Oregon Department of Forestry
OSMP	Oregon Smoke Management Plan
OSO	Oregon State Office (BLM)
PC	Personal Computer
PCT	Precommercial Thinning
PD	Public Domain
PILT	Payments in Lieu of Taxes
PL	Public Law
PLO	Public Land Order
PM	Particulate Matter
PNORCPS	Pacific Northwest Outdoor Recreation Consumption Project Study
PPM	Parts Per Million
PSC	Power Site Classification
PSR	Power Site Reservation
R&PP	Recreation and Public Purposes
R&R	Retention & Restoration
RCRA	Resource Conservation and Recovery Act
RFD	Reasonably Foreseeable Development
RFI	Relict Forest Island
RIA	Rural Interface Area

RMA	Riparian Management Area
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RRDC	Rural Resources Development Committee
RTR	Representative Timber Road
RTU	Representative Timber Unit
SA	Sensitivity Analysis
SCFL	Suitable Commercial Forestland
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SEIS	Supplemental Environmental Impact Statement
SIP	State Implementation Plan
SPS	Stand Projection System
SRMA	Special Recreation Management Area
SWL	Suitable Woodland
SYU	Sustained Yield Unit
T&E	Threatened and Endangered (species)
TMDL	Total Maximum Daily Load
TMEA	Timber Management Emphasis Area
TPA	Trees Per Acre
TPCC	Timber Production Capability Classification
TSIS	Timber Sale Information System
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
VRM	Visual Resource Management
W&SR	Wild and Scenic River(s)
WCI	Watershed Condition Index
WODDB	Western Oregon Digital Data Base
WPD	Water Power Designation
WSA	Wilderness Study Area

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