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Eugene District Proposed Resource Management Plan/ Environmental Impact Statement

Volume II

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

BLM/OR/WA/ES-94/33+1792

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Appendix A
Legal Guidelines

The following statutes and executive orders (as amended) constitute the major legal guidance for planning and management of lands administered by BLM in western Oregon. This list is not necessarily all inclusive but does represent the primary legal guidance to be considered in preparation of the Resource Management Plan.

Federal Land Policy and Management Act of 1976 (FLPMA)	43 USC 1701
The O&C Sustained Yield Act of 1937	43 USC 1181a
National Environmental Policy Act of 1969 (NEPA)	42 USC 4321
Environmental Quality Improvement Act of 1970	42 USC 4371
Executive Order 11514, Protection and Enhancement of Environmental Quality (1970)	
Taylor Grazing Act	43 USC 315
Recreation and Public Purposes Act	43 USC 869
Unlawful Inclosures or Occupancy Act	43 USC 1061
Mining and Minerals Policy Act of 1970	30 USC 21a
Mining Act of 1872	30 USC 26
Mineral Leasing Act of 1920 (Mineral Lands Leasing Act)	30 USC 181
Materials Act of 1947	30 USC 601
Geothermal Steam Act of 1970	30 USC 1001
Geothermal Energy Act of 1980	30 USC 1501
Antiquities Act of 1906	16 USC 431
Historic Sites, Buildings, and Antiquities Act	16 USC 461
National Historic Preservation Act	16 USC 470
Archaeological Resources Protection Act of 1979	16 USC 470aa
Reservoir Salvage Act of 1960	16 USC 580m-n
Fish and Wildlife Coordination Act	16 USC 661
Bald Eagle Protection Act	16 USC 668
Sikes Act	16 USC 670a
Migratory Bird Treaty Act	16 USC 703
Migratory Bird Conservation Act	16 USC 715
Wilderness Act	16 USC 1131
National Trail Systems Act	16 USC 1241
Wild and Scenic Rivers Act	16 USC 1271
Executive Order 11644, Use of Off-Road Vehicles on the Public Lands (1972)	
Executive Order 11989, Off-Road Vehicles on Public Lands (1977)	
Wild Free-Roaming Horses and Burros Act	16 USC 1331
Coastal Zone Management Act of 1972	16 USC 1451
Endangered Species Act of 1973	16 USC 1531
Soil and Water Resources Conservation Act of 1977	16 USC 2001
Executive Order 11988, Floodplain Management (1977)	
Executive Order 11990, Protection of Wetlands (1977)	
Coastal Barriers Resources Act	16 USC 3501
Land and Water Conservation Fund Act of 1965	16 USC 4601-4
Federal Water Pollution Control Act/Clean Water Act	33 USC 1251
Safe Drinking Water Act	42 USC 300 (f)
American Indian Religious Freedom Act	42 USC 1996
Resource Conservation and Recovery Act of 1976	42 USC 6901
Clean Air Act	42 USC 7401
Comprehensive Environmental Response, Compensation and Liability Act of 1980	42 USC 9601
Emergency Planning and Community Right-to-Know Act of 1986	42 USC 11001

Appendix B
State Director Guidance for the RMP Process

According to Bureau regulations for preparing RMPs, "the State Director shall provide quality control and supervisory review, including plan approval, for plans and related environmental impact statements and shall provide additional guidance, as necessary, for use by District and Area Managers." "Guidance" means "any type of written communications or instructions that transmits objectives, goals, constraints or any other direction that helps District and Area Managers and staff know now to prepare a specific resource management plan."

Early in the process of concurrently preparing this RMP and five other RMPs which together cover all BLM-administered lands in western Oregon, the BLM State Director decided to develop comprehensive procedural guidance as planning criteria to assure consistent treatment of a variety of issues and concerns in the six plans. The intent to do this was conveyed to known interested parties in a mailer sent out by each BLM district office with planning responsibility on March 27, 1987. Suggestions for content of that guidance were solicited in the mailer.

There was limited public response, but that response, along with internal BLM recommendations, led to formulation of a proposed set of topics for State Director guidance. A mailer describing those topics were sent to the public for comment on August 11, 1987. Using further but still limited public comments, BLM modified its list of topics slightly and drafted Proposed State Director Guidance, which was sent out for public review by interested parties on May 13, 1988.

Although less than a hundred individuals and groups responded, many of the comments received were thoughtful and constructive, and addressed the proposals in depth. BLM undertook a substantial revision of many sections of the proposed guidance. This revision was done on a staggered schedule, to distribute the workload and provide timely guidance to the districts for each step in the process.

The first element of the guidance completed was Guidance for the Preparation of the Analysis of the Management Situation (AMS). This document summarizes important information about existing resource conditions, uses and demands, as well as about management activities and natural relationships. It provides the baseline for subsequent steps in the planning process, such as the design of alternatives and analysis of environmental consequences. The AMS also provides most of the data to be summarized in the "affected environment" chapter of the EIS. The AMS guidance prescribed minimum contents and table formats for the AMS for each plan. That guidance was essentially completed in October 1988, and slightly revised during 1989 and 1990.

A master glossary for the AMS was prepared as part of the State Director Guidance. It was completed in 1989, and later revised for inclusion in each Draft RMP.

The Guidance for Formulation of Alternatives was essentially completed in October 1990 but underwent modest revision during 1991 and 1992. A copy of the final version of this guidance is included in this appendix.

Two other sections, Guidance for Analytical Techniques Needed to Estimate Effects of Alternatives and Guidance for Use of the Completed Plan, were completed in July 1991, with slight modification of the former in 1992. Descriptions of complex analytical techniques have been appendicized to discussions of the relevant analyses in Chapters 3 and 4. The Use of the Completed Plan section was wrapped into the equivalent section of Chapter 2 of the Draft RMP/EIS.

The original draft guidance had two other sections that never became final. Guidance for the Executive Summary was dropped because the State Director's staff prepared that summary. Guidance for expressing consistency with plans, programs and policies of other agencies was never formalized, as BLM staff worked with state agencies and county planners until the Draft RMP/EISs were almost complete, on ways to express such consistency.

Guidance for Formulation of Alternatives

Introduction

The purpose of alternatives is to identify a range of reasonable combinations of resource uses and management practices that respond to planning issues and provide management direction for all resources. Five common alternatives will be addressed in each RMP, to provide a consistent set of distinct choices among potential management strategies.

A no change from the existing land use plan alternative will also be addressed. This is the "no action" alternative. In the other alternatives all existing land use decisions not found valid for continued implementation after 1990 (through an analysis summarized in the Analysis of the Management Situation), will be reconsidered.

Common alternatives that identify specific management actions along District boundaries will be consistent. Examples include elk management areas, spotted owl corridors or visual corridors.

This Guidance for Formulation of Alternatives may be modified later based on information identified in the districts' analyses of the management situation, or refinements that flow from the districts' site-specific development of common alternatives.

Goals and Objectives of the Common Alternatives

The purpose of the goal and objective statements for the five common alternatives (A through E) is to guide development of specific criteria. Each alternative, if implemented, is intended to achieve or meet its goal. Goal and objective statements focus on general direction of alternatives rather than technical points in issue-related criteria for the alternatives. In each alternative all resource management values would be accommodated to the extent consistent with the primary goals and objectives for that alternative.

Specific Guidance on Common Alternatives

The common alternatives would differ primarily in the way they allocate primary uses of lands (for example, lands allocated to intensive forest management, and lands allocated to protection of riparian zones).

The discussion on page 4 through part of pages 14 and 15 describes criteria for addressing each of the eleven planning issues in the formulation of the common alternatives. It also describes how land use allocations and management actions would vary in response to each issue. Within the specific constraints provided by the guidance for addressing each issue, the districts have flexibility to formulate the common alternatives as they consider appropriate to meet the goals and objectives of each alternative.

	Alternative A	Alternative B
GOALS:	Emphasize high production of timber and other economically important values on all lands to contribute to community stability.	Emphasize timber production to contribute to community stability consistent with the variety of other land uses such as fish and wildlife habitat, recreation, and scenic resources on O&C and CBWR lands. Give equal consideration to all resource values on public domain lands.
OBJECTIVES:	• Produce the highest sustained yield of timber on all suitable forest lands legally available for harvest. • Contribute to ecological functions important to timber productivity and to habitat diversity to the extent possible consistent with the allocation for timber production. • Manage threatened and endangered species habitat as legally required. • Provide Research Natural Areas and eligible Areas of Critical Environmental Concern to the extent consistent with the allocation for timber production. • Manage appropriate Congressionally designated areas to maintain and enhance their scenic values. • Meet legal requirements for protection of wetlands and water quality, to protect anadromous fish habitat and other relevant values. • Emphasize substantial developed and dispersed motorized recreation uses. • Find no additional rivers suitable for designation under the Wild and Scenic Rivers Act. • Make land tenure adjustments which enhance BLM long-term sustained yield timber harvest opportunities. • Provide no special management in rural (residential) interface areas.	• Produce a high sustained yield of timber on O&C and CBWR lands, and on public domain lands where nontimber uses and values are of lesser importance than timber production. • Contribute to ecological functions important to timber productivity and to habitat diversity using a system that maintains old growth and mature forest in large and small blocks. • Protect habitat of all threatened and endangered species and species with high potential for listing. Protect habitat of other species of substantial concern to the extent consistent with high timber production. • Retain existing Research Natural Areas (RNAs) and Areas of Critical Environmental Concern (ACECs). Provide new ones from eligible areas to the extent consistent with the emphasis on timber production. • Manage scenic resources in selected areas of high recreation use. • Meet legal requirements for protection of wetlands and water quality and provide moderate additional protection for anadromous fish habitat, other substantial streams, and other water. • Provide for a wide range of developed and dispersed motorized recreation uses and opportunities, to minimize conflicts among recreation user groups. • Find eligible river segments suitable for designation as recreational, if they are important and manageable, and designation would not cause adverse economic impact. • Make land tenure adjustments which enhance BLM long-term sustained yield timber harvest opportunities on O&C and CBWR lands, and which benefit a variety of uses and values on public domain lands. • Adopt appropriate special forest management practices on BLM-administered lands intermingled with or adjacent to rural interface areas zoned for most dense residential occupancy.

Alternative C	Alternative D	Alternative E
Provide timber production to contribute to community stability consistent with maintenance of biological diversity and the variety of other uses such as fish and wildlife habitat, recreation, and scenic resources on all lands.	Emphasize protection and reestablishment of spotted owl habitat, along with management and enhancement of other values such as dispersed nonmotorized recreation opportunities and scenic resources, while sustaining some timber production.	Emphasize protection of older forests and management and enhancement of values such as dispersed nonmotorized recreation opportunities and scenic resources.
• Produce a moderate sustained yield of timber. • Provide biological diversity using a system that maintains some old growth and mature forest, focusing on protection of areas where special status plant and animal species cluster. • Protect habitat of all threatened and endangered species and species with high potential for listing. Protect habitat of other species of substantial concern through emphasis on biological diversity and to the extent consistent with moderate timber production. • Retain existing RNAs and ACECs. Provide new ones from eligible areas except where lands managed by others are considered to provide more appropriate opportunities. • Manage scenic resources in selected high use areas, particularly emphasizing protection in corridors of existing and proposed wild and scenic rivers and major trails. • Provide substantial protection for anadromous fish habitat, other substantial streams and other water environments. • Provide for a wide range of recreation opportunities emphasizing dispersed use, while reducing conflicts among recreational user groups. • Find eligible river segments suitable for designation as scenic or recreational, if they are important and manageable, but not suitable for designation as scenic if designation would cause adverse economic impact. • Make land tenure adjustments to benefit a variety of uses and values. • Adopt appropriate special forest management practices in rural interface areas zoned for moderate or high density residential occupancy.	• Produce a sustained yield of timber consistent with allocations for other uses and values. • Protect habitat of the spotted owl in accordance with the Owl Conservation Strategy. • Protect habitat of all threatened and endangered species, species with high potential for listing, and species of related concern. • Retain all existing RNAs and ACECs. Provide new ones from eligible areas except where lands managed by others are considered to provide more appropriate opportunities. • Manage all identified scenic resources. • Provide substantial protection for wetlands and riparian areas along most streams and other water. • Emphasize dispersed nonmotorized recreation opportunities. • Find eligible river segments suitable for designation as wild, scenic or recreational, if they are important and manageable. • Make land tenure adjustments which would emphasize enhancement of nontimber uses and values. • Adopt special timber harvest and forest management practices in rural interface areas zoned for moderate or high density residential occupancy.	• Produce a sustained yield of timber consistent with allocations for other uses and values. • Protect all old growth and older mature forests. • Protect habitat of all threatened and endangered species, species with high potential for listing and species of related concern. • Retain all existing RNAs and ACECs and designate all eligible areas. • Manage all identified scenic resources and provide some visual resource protection for all lands. • Manage all riparian areas and wetlands to maintain and improve water quality and fisheries habitat, and contribute to wildlife habitat diversity. • Emphasize dispersed nonmotorized outdoor recreation opportunities. • Find all eligible river segments suitable for designation as wild, scenic or recreational rivers. • Make land tenure adjustments which would emphasize enhancement of nontimber uses and values. • Adopt special timber harvest and forest management practices extensively buffering rural interface areas zoned for moderate or high density residential occupancy and other rural interface areas as appropriate.

	All Common Alternatives	Alternative A
Issue No. 1: Timber Production Practices: Which forest lands should be available for timber management, and what practices should be used on those lands?	Guidance for All Common Alternatives: Lands allocated to intensive forest management under any of these alternatives would normally provide the highest nondeclining harvest level (even flow) of timber when the following conditions prevail: • Effective silvicultural techniques (such as clear cutting, shelterwood or partial cutting) appropriate to the land allocations are used. • All feasible site preparation and intensive management practices are applied. • Anticipated merchantability is the only constraint on minimum average stand diameter slated for future harvest. (In some areas this may result in harvest of timber stands as young as 40 years for several decades during the early to middle part of the next century under some alternatives.) • Adequate budgets are available to support the resultant timber sale program and allied intensive management practices, as well as scheduled monitoring linked to those activities. The common alternatives assume these practices and conditions on the lands allocated to intensive timber management, but incorporate less intensive management practices on other available forest lands to the extent needed to be consistent with the allocation of those lands. Where consistent with the goals and objectives of each alternative, the following silvicultural and harvest practices would be implemented on lands allocated primarily to timber management, to meet multiple land use objectives: Minimize regeneration delay by reforesting harvested sites as soon as practical. Calculate an empirical regeneration period based on representative stocking survey results, expected timber sale contract lengths and management objectives. Reforest harvested lands with indigenous commercial tree species. Emphasis would be placed on utilization of genetically improved stock in accordance with the Western Oregon Tree Improvement plan. Manage tree seed orchards to produce adequate supplies of genetically improved seed. Use available site preparation and seedling protection practices, including herbicides, using an integrated vegetation management approach. Emphasize those techniques that have proved most effective in assuring seedling survival and growth. (Actual practices will be based on site-specific analysis following completion of the RMP.) Convert to conifers those lands classified as commercial forest lands presently occupied by grass, hardwoods and brush.	Allocate all forest lands for timber production consistent with the management direction for other resources (Issue Nos. 2 and 3, etc.) in this alternative, except the following: Nonsuitable Woodland (See Figure 1-E-1 for Chart showing TPCC categories.)

Alternative B	Alternative C	Alternative D	Alternative E
Allocate all forest lands for timber production consistent with the management direction for other resources in this alternative, except the following: Nonsuitable Woodland Suitable Woodland - Low Site	Allocate all forest lands for timber production consistent with the management direction for other resources, except the following: Nonsuitable Woodland Suitable Woodland - Low Site Suitable Woodland - Nonsuitable Commercial Forest Land	Allocate all forest lands for timber production consistent with the management direction for other resources, except the following: Nonsuitable Woodland Suitable Woodland - All Categories	Allocate all forest lands for timber production consistent with the management direction for other resources, except the following: Nonsuitable Woodland Suitable Woodland - All Categories The Fragile Gradient-Restricted component of the Fragile Suitable TPCC category Site Class V

	All Common Alternatives	Alternative A
Issue No. 1 (Continued)	Plan hardwood sites for management of a sustained yield of hardwoods, where consistent with allocations for other uses or values. Implement commercial thinning of present and future stands where practicable and where research indicates increased gains in timber production are likely. Practice initial spacing control of seedlings/ saplings through planting or thinning in conjunction with the control of competing vegetation, to maximize wood production by concentrating site resources in individual tree growth. Plan nitrogen fertilization applications for all present and future stands where research indicates increased wood yields would result. Plant specific root disease centers with resistant tree species. Consider uneven-age management in stands where this method would be economically feasible and would maintain environmental values. Consider efficiency of field operations and assurance of prompt reforestation in selecting the size of timber harvest units. Apply proper soil management measures to maintain soil productivity.	
Issue Nos. 2 and 3: Old-Growth Forests and Habitat Diversity To what extent and where should old-growth and/or mature forest habitats be retained, maintained or reestablished to meet various resource objectives? To what extent and where should BLM manage habitat to support populations of native wildlife species?	Any wildlife habitat management practice (such as nest boxes, road closures and forage seeding) not listed in the following could be implemented under any of the alternatives, as long as it is compatible with other management objectives. All special habitat features would be managed to protect their values. Mature and old-growth forests would be retained where Congressional designation of areas requires it. Snags and/or wildlife trees (to be converted to snags) would be retained where they occur on lands not allocated to timber harvest, except where public safety is a concern, and if left standing as nonmerchantable material on available forest lands. Where it would contribute to meeting wildlife tree objectives, create snags in areas not allocated primarily to timber production. A habitat goal of timber sale contracts would be to leave all snags and nonmerchantable trees that can be left consistent with safety considerations.	Mature and old-growth forests would be retained on most lands excluded from planned timber harvest by inclusion in the following allocations and TPCC categories: Nonsuitable Woodland Riparian Management Areas Existing high-use recreation sites T&E species recovery areas where timber harvest is prohibited Wilderness Areas

Alternative B	Alternative C	Alternative D	Alternative E
Contribute to habitat diversity using a system that protects mature and old-growth forest in large and small blocks. Mature and old-growth components of the forest would be distributed in a corridor system by seed zone and elevation. In the corridor system large blocks of approximately 640 acres would be connected by a series of small, stepping stone blocks of approximately 80 acres, spaced at about one-mile intervals. Blocks would be limited to defined corridor areas. Public Domain lands and the following allocations and TPCC categories on O&C and CBWR would receive priority for placement into the system, to the extent that they fit; for instance, if they provide needed habitat and are suitably located to contribute to the system. Nonsuitable Woodland Suitable Woodland - Low Site Riparian Management Areas Recreation Sites T&E species recovery areas where timber harvest is prohibited Special Areas (Natural Areas, ACECs) Wilderness Areas	This alternative would provide for retention and improvement of biological diversity. Blocks of forest land at least 600 acres in size and, where relevant opportunities exist, at least 2500 acres in size (including cornering tracts) would be identified as old-growth restoration and retention areas, totalling 15 to 20 percent of BLM-adminstered forest land. Identification of these areas would focus on protection of older forest stands, connectivity between larger reserves and subregions, and protection of identified areas where special status plant and animal species cluster. The remaining BLM-administered forest lands, not excluded from timber harvest to address other issues, would be subject to intermediate harvests for density management where feasible, to maintain open canopy conditions and promote retention of mixed species, as well as accelerate development of old-growth structure conditions and prepare the stands for regeneration	This alternative would manage habitats on BLM-administered lands to provide for a number and distribution of spotted owls that ensures continued existence of a well distributed population on those lands, so they may interact with spotted owls throughout the geographic range of the species, as recommended by the Conservation Strategy for the Northern Spotted Owl. Suitable wildlife trees would be retained to contribute to the maintenance or attainment of cavity-dweller populations on BLM-administered lands at 60 percent of the optimum woodpecker population level. Wildlife tree and down log management practices would be used on the available forest lands, including but not limited to retention of green culls, snags and down logs. All special habitat features would be appropriately buffered.	This alternative would preserve the following: - all existing forest stands over 150 years old. - additional lands within 400 feet of the above stands, to assist in maintaining natural ecological elements, protect the older stands from edge effect and natural disaster, and interconnect them into a sustainable network. - all suitable habitat forest stands which most closely match the lands within two miles of each spotted owl site occupied by a single or pair of owls in the last six years (1985-1990). In addition protect younger forest where needed to provide contiguous habitat within a mile of those sites. - in each section where BLM administers at least half of the land, a 40-acre block of the oldest stands remaining, con-centrated around headwaters streams, to provide habitat for amphibians and nesting for pileated woodpeckers.

	All Common Alternatives	Alternative A
Issue Nos. 2 and 3 (Continued)		
Issue No. 4: Threatened and Endangered (and Other Special Status) Species Habitat What should BLM do to manage Federally listed threatened or endangered plants and animals and to prevent future Federal listing of plants and animals as threatened or endangered species?	Protect, monitor and manage habitats of Federal listed and proposed species in accordance with the Endangered Species Act and recovery plans, as legally required for self-sustaining survival.	Timber production constraints would be assumed in the formulation of the alternative only if critical habitat has been designated or there is a recovery or conservation plan within a month after completion of the Analysis of the Management Situation. Manage for the conservation of, and mitigate actions to protect habitats of, Federal Candidate, State Listed and Bureau Sensitive species where such actions would not diminish commercial use such as timber production.
Issue No. 5: Special Areas What areas on BLM-administered lands need special management to prevent irreparable damage to important historic, cultural or scenic values; to protect botanical or fish and wildlife resources or other natural systems or processes; and to protect life and safety from natural hazards? Which of these areas should be formally designated as Areas of Critical Environmental Concern (ACEC)?	Any areas considered appropriate for Research Natural Area (RNA) designation would also be considered appropriate for ACEC designation.	Designate potential ACECs that meet criteria only if the relevant values are not protected by other authorities (e.g., Wild River designation, 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 no substantial mineral potential. Other existing ACECs and RNAs would be revoked.

Alternative B	Alternative C	Alternative D	Alternative E
Suitable wildlife trees and/or snags would be retained to maintain, where possible, cavity-dweller populations at 40 percent of the optimum woodpecker population levels in new timber harvest units. Wildlife tree management practices would be used on the available forest lands, including retention only of green culls and snags.	harvest in the future. Regeneration harvests on these lands would be either heavy partial cuts (green-tree retention) or group selection cuts, and would not occur until after a stand had established old-growth characteristics. The lands in old-growth restoration and retention areas, which have not attained old-growth characteristics, would be subject to similar density management, where feasible, until they attain such a condition. Suitable wildlife trees would be retained to contribute to the maintenance or attainment of cavity-dweller populations on BLM administered lands at 60 percent of the optimum woodpecker population level. Wildlife tree and down log management practices would be used on the available forest lands, including but not limited to retention of green culls, snags and down logs. All special habitat features would be appropriately buffered.		In addition to retention of wildlife trees on lands not allocated to timber management, suitable wildlife trees would be retained to contribute to the maintenance of cavity-nester populations at 60 percent of the maximum potential population level on lands allocated to timber management. Wildlife tree and down log management practices would be used on the available forest lands, including but not limited to retention of green culls, snags and down logs. All special habitats would be appropriately buffered.
Same as Alternative A, except protect habitats of Federal Candidate, State Listed and Bureau Sensitive Species to the full extent on public domain land, and protect habitats of Federal Candidate (i.e., Category 1 and 2) species known only to occur on BLM-administered lands to the extent considered necessary to prevent their federal listing.	Same as Alternative B except for additional protection of special status species provided by criteria for Issues 2 and 3.	Manage all BLM-administered lands to support the conservation and protection of all Federal Candidate, State Listed, and Bureau Sensitive species and their habitats.	Same as Alternative D.
Retain all existing ACECs and RNAs. Designate potential ACECs that meet criteria only if the relevant values are not protected by other authorities. Do not allocate new RNAs on available O&C or CBWR land if a similar feature can be protected on a National Forest. Designate all potential ACECs (including RNAs) on Public Domain lands, nonforest lands, nonsuitable woodlands, and other lands allocated to nontimber uses.	Retain all existing ACECs and RNAs. Designate potential ACECs that meet criteria only if the relevant values are not protected by other authorities.	Retain all existing and designate all potential ACECs.	Same as Alternative D.

	All Common Alternatives	Alternative A
Issue No. 6: Visual Resources Which, if any, areas of BLM lands should be managed to reduce visual impacts or enhance visual (scenic) quality?	Note: Guidance for Issue 11 (Rural Interface Area Management) also addresses and defines visual resource management for Alternatives B, C, D and E in rural interface areas, except where this Issue 6 guidance sets a higher standard of visual resource management. Guidance for Issue 9A (Wild and Scenic Rivers) establishes criteria that will substantially dictate visual resource management by alternative in proposed wild and scenic river corridors. See Issue 9A and Issue 11 guidance for details.	Provide VRM Class I management within existing boundaries designated by Congress for exclusive management. Manage all other available (for timber harvest) forest land under VRM Class IV management objectives. Manage other lands as inventoried. Provide VRM Class I management within
Issue Nos. 7 and 8: Stream/ Riparian/Water Quality Where and how should riparian zones be managed to protect and improve water quality, fisheries and wildlife habitat? What actions should be undertaken to comply with state water quality standards? What should BLM do to manage for special needs such as municipal and domestic use?	Guidance for All Common Alternatives: Establish Riparian Management Areas (RMAs) on perennial streams (generally, 3rd order and larger streams), lakes, ponds and other waters, to meet Oregon Forest Practices Act requirements and Oregon water quality standards. Typical average widths of RMAs by alternative are displayed in Table 1. Within those RMAs no lands would be considered "available" (to offer timber for sale as part of the allowable sale quantity). Some timber harvest may occur, however, to achieve resource management objectives. These activities may include road construction and yarding corridors across streams and riparian zones to facilitate timber harvest outside the RMA. Logging, road building and site preparation methods would be designed to minimize the number and/or size of mass soil movements and to maintain the integrity of the RMAs. Other activities such as mining, recreation and ORV use would be regulated to protect water quality. Stream and riparian habitat improvement measures may be taken on any streams to improve water quality, fish habitat and/or wildlife habitat. Activities would be designed to meet Oregon Forest Practices Act (OFPA) requirements and Oregon water quality standards. Protect wetlands in accordance with Executive Order 11988 and 11990. Comply with written agreements with public water systems serving municipalities.	
Issue No. 9: Recreation Resources What areas or sites should be designed and/or managed to protect or enhance a variety of recreational opportunities?	Manage for dispersed recreation activities consistent with managed forest settings, including hunting, fishing, sightseeing, riding/hiking, and rafting. Maintain and manage existing recreation facilities which make available significant dispersed recreation opportunities, including recreation sites, boat ramps, trails, interpretive signs and related improvements. Manage existing Special Recreation Management Areas (SRMAs) and delineate Extensive Recreation Management Areas (ERMAs).	Manage existing high-use recreation sites and trails and expand them where needed. Close low use recreation sites and trails. Designate lands open to off-road vehicles (ORV) and leave roads open to motorized use, except where such designation would conflict with other allocations.

Alternative B	Alternative C	Alternative D	Alternative E
existing boundaries designated by Congress for exclusive management. Manage as inventoried all available forest land adjacent to (within a quarter mile) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the federal Wild and Scenic Rivers Act. Manage all other available forest land under VRM Class IV management objectives. Manage other lands as inventoried.	Same as Alternative B, except on available forest land where BLM-administered land makes up more than half of a viewshed, manage lands as inventoried.	Manage all lands as inventoried.	Same as Alternative D, except manage as VRM Class III all BLM-administered lands inventoried as Class IV; and manage as VRM Class I 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.

Table 3-1. Riparian Management Areas

Stream Order	Average RMA Width* (each side of the stream in feet) ALT. A	ALT. B	ALT. C	ALT. D	ALT. E
1					50
2				60	60
3	75	75	105	140	200
4	75	100	150	200	200
5	75	140	210	280	280
6	75	160	240	320	320
Lakes, Ponds & Other Waters	75	100	150	200	400

* Actual RMA widths would be determined by on-the-ground riparian vegetation, terrain and stream characteristics, but would be a minimum of 50 feet on all 3rd order and larger streams. First and second order streams would have RMAs designated if perennial or if the beneficial uses warrant.

Same as Alternative A, except support the State's Regional Economic Development Plan for the geographic area, retain options for new SRMAs and high value potential recreation sites and trails on Public Domain lands, maintain and/or improve all existing developed recreation sites, and consider reopening sites closed in recent years.	Allocate and manage new SRMAs. Continue management of all existing recreation sites and trails, and consider reopening sites closed in recent years. Emphasize wildlife viewing, interpretation and related old-growth forest recreation opportunities, both to attract nonlocal visitors and to serve local users. Retain options for future development of high value potential sites, trails and sightseeing opportunities. Impose additional ORV limitations or road closures to protect wildlife habitat or old-growth forest recreation opportunities, minimize conflicts with hikers and horseback riders, or meet other resource objectives.	Same as Alternative C, except manage for an optimum range of nonmotorized recreation. Retain options for future development of recreation sites and facilities for dispersed recreation opportunities. Retain existing pockets of old-growth forest that are both adjacent to and accessible from existing or potential recreation areas. Prohibit ORV and road use as appropriate to improve wildlife habitat or protect the ecosystem.	Same as Alternative D.

	All Common Alternatives	Alternative A
Issue No. 9A: Wild and Scenic Rivers What, if any, rivers should be found suitable for designation?	Provide interim protection for all river segments determined to be suitable, until Congressional action on BLM plan recommendations. Interim protection should be appropriate to the highest category for which the river is determined to be suitable. Manage Congressionally designated rivers consistent with their designation.	No rivers found suitable for designation under any classification.
Issue No. 10: Land Tenure In what areas would BLM-administered lands be sold, exchanged or transferred out of federal ownership under other authorities to improve management efficiency and benefit resource program objectives? In what areas would BLM attempt to acquire lands to improve management efficiency and benefit resource program objectives?	A major lands program effort would use exchanges to consolidate land ownership patterns to benefit one or more of the resources managed, such as timber, watershed, wildlife habitat, recreation, cultural, botanical, and minerals. Land tenure adjustment would be guided by a three-zone concept utilizing the following standards: Zone 1 includes areas currently identified as having high public resource values, and other efficiently managed lands. The natural resource values may require protection by federal law, Executive Order or policy. These lands may have other values or natural systems which merit long term public ownership. They do not meet the criteria for sale under FLPMA Section 203(a) and would generally be retained in public ownership. The Zone 1 boundaries should be relatively close to or on BLM property lines except where the intent is to show preferred acquisition areas. Zone 2 includes lands that are suitable for exchange because they form discontinuous ownership patterns, are less efficient to manage than Zone 1 lands, and may not be accessible to the general public. Where appropriate opportunities are identified, these BLM-administered lands may be exchanged for other lands in Zones 1 or 2, transferred to other public agencies, or given some form of cooperative management. These lands would not be expected to meet the criteria for sale under Section 203(a), and would not be identified as suitable for such sale.	Zone 3 includes lands that are scattered and isolated with no known unique natural resource values. Zone 3 lands are 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 Exchanges would be made to acquire lands which would enhance the nondeclining harvest level of the commercial forest land managed by BLM, by improving age class distribution or other harvest level determination factors. Factors to consider include site quality, access to public forest land, logical logging units, and management of public forest land to facilitate timber harvest. No exchanges would be made to acquire lands more valuable for nontimber uses. No commercial timberland would be sold or leased. Leases or conveyance of land in Zones 2 and 3 other than commercial timberland would be made under the Recreation and Public Purposes Act to provide appropriate facilities or services.

Alternative B	Alternative C	Alternative D	Alternative E
No rivers found suitable for designation as wild or scenic. River segments eligible for wild, scenic or recreational classification found suitable for designation as recreational, if all of the following circumstances exist: - no net adverse economic impacts on the local economy. - river segment possesses at least one outstandingly remarkable value for which it is considered by BLM to be the top river in the State Comprehensive Outdoor Recreation Plan (SCORP) region. - BLM can effectively manage the outstanding values of the river segment.	River segments eligible for scenic or recreational river status found suitable for designation consistent with their highest potential classification, and river segments eligible for wild classification found suitable for designation as scenic, if all of the following circumstances exist. If only the economic impact test is not met, find suitable for designation as recreational. - no net adverse impacts on the local economy. - river segment possesses at least one outstandingly remarkable value for which it is considered by BLM to be among the top two rivers in the SCORP region. - BLM can effectively manage the outstanding values of the river segment.	Eligible river segments found suitable for designation consistent with their highest potential classification if the following circumstances exist. - river segment possesses at least one outstandingly remarkable value for which it is considered by BLM to be among the top four rivers in the SCORP region. - BLM can effectively manage the outstanding values of the river segment.	All eligible river segments found suitable for designation consistent with their highest potential classification.
Exchanges of O&C and CBWR lands would be made primarily to acquire lands which would enhance timber management opportunities. Exchanges of public domain lands would be made to benefit one or more of the resources managed, including nontimber values. Sale of O&C and CBWR lands other than available commercial forest lands, and of public domain lands, would be made to dispose of lands that meet any of the criteria of FLPMA Section 203(a). Leases on 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.	Same as Alternative B, except emphasis would also be given to exchanges of O&C and CBWR lands that would contribute to conservation of biological diversity.	Land exchanges would be made to benefit one or more of the resources managed. Exchanges involving disposal of timber to acquire lands containing greater nontimber values would be emphasized. Sales of lands other than available commercial forest lands would be made to dispose of lands that meet criteria (1) or (2) of FLPMA Section 203(a), but sales of land that meet only criterion (3) would not be made. 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 facilities or services for the benefit of the public.	Same as Alternative D.

	All Common Alternatives	Alternative A
Issue No 10. (Continued).	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. The discussion of Zone 3 lands must state which of the disposal criteria in FLPMA, Section 203(a), apply. 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.	
Issue No. 11: Rural Interface Area Management Which BLM-administered lands should be allocated to receive special management practices due to the concerns of residents who live in close proximity? (Rural interface areas are areas where BLM-administered lands are adjacent to or intermingled with privately owned lands where county zoning has created or allows for creation of lots as small as 1 to 20 acres. In most rural interface areas concerns of the residents are related to forest management practices, visual quality and potential affects on domestic water sources and water supplies.)		No special management actions except those that address other issues.

Alternative B	Alternative C	Alternative D	Alternative E
On BLM-administered lands within one quarter mile of private lands in identified rural interface areas zoned for 1 to 5-acre lots, customary forest management practices would be altered, where realistically feasible, to mitigate the adjacent neighbors' concerns (i.e., management would look for alternative methods of practicing intensive forest management). Examples of management options include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, inclusion of additional buffers for domestic water sources, and hand piling slash for burning as opposed to broadcast burning. All BLM-administered lands within a quarter mile of designated rural interface areas 1 to 5-acre lots) would be managed for VRM class III objectives.	Same as Alternative B except that lands zoned for 1 to 20-acre lots would also be included as the rural interface area.	On BLM-administered lands within one quarter mile of private lands in rural interface areas zoned for 1 to 20-acre lots, there would be no herbicide spraying, no clear cutting, and no prescribed burning. BLM-administered lands within this area would be managed for VRM class II objectives.	Same as Alternative D except BLM-administered lands within one half mile of private lands in rural interface areas would be managed as discussed in Alternative D. Areas zoned for lots larger than 20 acres, but with tax lots of 20 acres or less and/or existing legal multiple residences, may also be addressed in this alternative.

Appendix C
Land Tenure Adjustment Criteria

Adjustment Evaluation Factors

In accordance with FLPMA and other laws, Executive Orders, and Departmental and Bureau policy, the following factors will be considered in evaluating opportunities for disposal or acquisition. This list is not considered all inclusive, but represents the major factors to be considered.

Threatened or Endangered or Sensitive plant and animal species habitat

Riparian areas and wetlands

Fish habitat

Nesting/breeding habitat for game and non-game animals

Key big game seasonal habitat

Contribution to biodiversity

Developed recreation sites and recreation use areas

High quality scenery

Timber production potential

Energy and mineral potential

Land adjacent to rivers eligible for designation under the National Wild and Scenic Rivers Act

Significant cultural resources and sites eligible for inclusion on the National Register of Historic Places

Accessibility of the land for public recreation and other uses

Amount of public investments in facilities or improvements and the potential for recovering those investments

Difficulty or cost of administration (manageability)

Suitability of the land for management by another Federal agency

Significance of the decision in stabilizing business, social and economic conditions, and/or lifestyles

Whether private sites exist for the proposed use

Encumbrances, including but not limited to, withdrawals or existing leases or permits

Consistency with cooperative agreements and plans or policies of other agencies

Suitability (need for change in land ownership or use) for purposes including but not limited to community expansion or economic development, such as industrial, residential, or agricultural (other than grazing) development

Acquisition Criteria

General Criteria for Acquisition

1. Facilitate access to public land and resources retained for long-term public use.
2. Maintain or enhance important public values and uses.
3. Facilitate National, State and local BLM priorities or mission statement needs.
4. Facilitate implementation of other aspects of the approved Resource Management Plan.
5. Maintain or enhance local social and economic values in public ownership.
6. Meet long-term public land management goals as opposed to short-term.
7. Be of sufficient size to improve use of adjoining public lands or, if isolated, large enough to allow identified potential public land use.
8. Enhance the opportunity for new or emerging public land uses or values.
9. Contribute to a wide spectrum of uses or large number of public land users.
10. Facilitate management practices, uses, scales of operation or degrees of management intensity that are viable under economic program efficiency standards.
11. Secure for the public significant water related land interest. These interests will include islands, lake shore, river or stream frontage, or ponds.
12. Contribute to increased biodiversity at the local or regional level.
13. Facilitate the recovery of threatened and endangered species.
14. Riparian areas.
15. Important wetland areas.

Program Specific Acquisition Criteria

Forestry: Focus acquisition priority on areas which are:

1. Site Class IV or above unless the area will enhance the management of adjacent forest lands.
2. Contiguous to, or which facilitate access to and management of, public forest land.
3. Contain enough existing harvestable volume for a commercial logging unit after physical, biological or other land use constraints are considered.
4. Have minimum conflicts with other resource programs and rural residences.
5. Parcels with existing, well-maintained road systems have higher priority than unroaded parcels or parcels with roads in poor condition. Parcels with existing surveys have a higher priority than parcels requiring large amounts of surveying per acre of commercial forest land.

Minerals: Focus acquisition priority on areas which:

1. Consolidate Federal mineral estate to create economic mineral development units.
2. Reunite split surface and mineral estates.

Cultural Resources: Any cultural site to be acquired should meet the following standards: high research value, moderate scarcity, possess some unique values such as association with an important historic person or high aesthetic value, or contribute significantly to interpretive potential of cultural resources already in public ownership.

Wildlife Habitat Management: Areas for acquisition will be lands with significant wildlife values as defined below. These areas may be of any size.

1. Special Status Species.
   a. Federally Listed Threatened or Endangered species.
   b. Federal Candidate species.
   c. State Listed species of special concern.
2. Fisheries.
   a. Riparian lands with potential to protect or enhance anadromous fisheries.
   b. Lakes, ponds or other impoundments important for anadromous or non-anadromous fisheries.
3. Big game: Important habitat such as crucial winter areas, fawning/calving areas, mineral licks, and security/cover areas.
4. Upland Game Birds, Migratory Birds and Waterfowl: Crucial breeding, nesting, roosting, feeding, and wintering habitat areas or complexes.
5. Raptors: Existing and potential nesting areas for sensitive species or significant nesting complexes for nonsensitive species.
6. Nongame: Crucial habitat complexes; buffers to enhance management of special habitat features and crucial wildlife habitats, including critical habitats for threatened and endangered species.
7. Biodiversity: Contributes to increased connectivity of important wildlife habitats.

Botanical and Special Area Management: Areas for acquisition will be lands with significant botanical or other biological values as defined below. These areas may be of any size.

1. Special Status Species.
   a. Federally Listed Threatened or Endangered species.
   b. Federal Candidate species.
   c. State Listed species of special concern.
2. Unique or rare biological communities.
3. Buffers for protection of existing special areas.

Recreation: Acquire land with the following significant values:

1. National values that enhance Congressionally designated areas, rivers, or trails.
2. State values that enhance recreation trails and waterways for interstate, State and multi-county use.
3. Local values for extensive use, such as hunting, fishing and OHV use.
4. Lands that expand, protect, or buffer existing or potential developed recreation sites.

Disposal Criteria: Parcels of BLM land are identified for disposal through exchange under the authority of section 206 of FLPMA. The management objective is to use the disposal parcels to meet the acquisition goals for each alternative. The following criteria will be used to identify parcels in Land Tenure Zones 2 and 3 for disposal by exchange:

1. Lands of limited public value.
2. Widely scattered parcels that are difficult for BLM to manage and have no significant resource values warranting retention.
3. Lands with high public values proper for management by other Federal agencies or State or local government.

4. Lands that would aid in aggregating or repositioning other public lands or public land resource values in retention areas to facilitate National, State and local objectives where the public values to be acquired outweigh the values to be exchanged.

Each parcel used in an exchange is subject to certain reviews before disposal can be approved: State and local government agency consultations, hazardous waste surveys, wildlife and threatened/endangered species evaluations, cultural and mineral clearances, and reports. The results of the evaluations and reports are included in an Environmental Assessment. Parcels are removed from disposal consideration if the consultations, clearances, reports, or Environmental Assessment show any resource values worthy of permanent Federal retention.

Appendix D
Monitoring and Evaluation of the Approved Resource Management Plan

All Land-Use Allocations

Expected Future Conditions and Outputs

Protection of SEIS special attention species so as not to elevate their status to any higher level of concern.

Implementation Monitoring

Questions

1. Are surveys for the species listed in Appendix O conducted before ground-disturbing activities occur?

2. Are protection buffers being provided for specific rare and locally endemic species and other species in the upland forest matrix?

3. Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix O being protected?

4. Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix O being surveyed?

5. Are high priority sites for species management being identified?

6. Are general regional surveys being conducted to acquire additional information and to determine necessary levels of protection for arthropods, fungi species that were not classed as rare and endemic, bryophytes, and lichens?

Monitoring Requirements

1. At least 20 percent of all management actions will be examined prior to project initiation and re-examined following project completion, to determine if surveys are conducted for species listed in Appendix O, protection buffers are provided for specific rare and locally endemic species and other species in the upland forest matrix, and sites of species listed in Appendix O are protected.

2. The Annual Program Summary will address Implementation Questions 4, 5, and 6.

Effectiveness and Validation Monitoring

Questions

1. Are measures taken to protect the SEIS special attention species effective?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Riparian Reserves

Expected Future Conditions and Outputs

See Aquatic Conservation Strategy Objectives.

Provision of habitat for special status and SEIS special attention species.

Implementation Monitoring

Questions

1. Are watershed analyses being completed before on-the-ground actions are initiated in Riparian Reserves?

2. Is the width and integrity of the Riparian Reserves being maintained? (For Example: Did the conditions that existed before management activities change in ways that are not in accordance with the SEIS ROD Standards and Guidelines, and RMP management direction?)

3. What silvicultural practices are being applied to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy Objectives?

4. Are management activities in Riparian Reserves consistent with SEIS/ROD Standards and Guidelines, RMP management direction, and Aquatic Conservation Strategy Objectives?

5. Are new structures and improvements in Riparian Reserves constructed to minimize the diversion of natural hydrologic flow paths, reduce the amount of sediment delivery into the stream, protect fish and wildlife populations, and accommodate the 100-year flood?

6. a. Are all mining structures, support facilities, and roads located outside the Riparian Reserves?

   b. Are those located within the Riparian Reserves meeting the objectives of the Aquatic Conservation Strategy?

   c. Are all solid and sanitary waste facilities excluded from Riparian Reserves or located, monitored, and reclaimed, in accordance with SEIS/ROD Standards and Guidelines and RMP management direction?

7. Are new recreation facilities within the Riparian Reserves designed to meet and, where practicable, contribute to Aquatic Conservation Strategy Objectives? Are mitigation measures initiated where existing recreation facilities are not meeting Aquatic Conservation Strategy Objectives?

Monitoring Requirements

1. The files on each year's on-the-ground actions will be checked annually to ensure that watershed analyses were completed prior to project initiation and to ensure the concerns identified in the watershed analysis were addressed in the project's Environmental Assessment.

2. At least 20 percent of management activities within each Resource Area will be examined prior to project initiation and re-examined following project completion, to determine whether the width and integrity of the Riparian Reserves were maintained.

3. The Annual Program Summary will report what silvicultural practices are being applied, in order to attain Aquatic Conservation Strategy Objectives.

4. At least 20 percent of the activities that are conducted or authorized within Riparian Reserves will be reviewed in order to identify whether the actions were consistent with the SEIS/ROD Standards and Guidelines, RMP management direction, and Aquatic Conservation Strategy Objectives. In addition to reporting the results of this monitoring, the Annual Program Summary will also summarize the types of activities that were conducted or authorized within Riparian Reserves.

5. All new structures and improvements within a Riparian Reserve will be monitored during and after construction to ensure that it was constructed to minimize the diversion of natural hydrologic flow paths, reduce the amount of sediment delivery into the stream, protect fish and wildlife populations, and accommodate the 100-year flood.

6. All approved mining Plans of Operations will be reviewed to determine if (1) both a reclamation plan and bond were required; (2) structures, support facilities, and roads were located outside of Riparian Reserves, or in compliance with Aquatic Conservation Strategy objectives if located inside the Riparian Reserve, and (3) if solid and sanitary waste facilities were excluded from Riparian Reserves or located, monitored, and reclaimed in accordance with RMP management direction.

7. The Annual Program Summary will examine the status of evaluations of existing recreational facilities inside Riparian Reserves to ensure that Aquatic Conservation Strategy Objectives are met. The Summary will also report on the status of the mitigation measures initiated where the Aquatic Conservation Strategy objectives cannot be met.

Effectiveness and Validation Monitoring

Questions

1. Is the health of Riparian Reserves improving?

2. Are management actions designed to rehabilitate Riparian Reserves effective?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Late-Successional Reserves

Expected Future Conditions and Outputs

Development and maintenance of a functional, interacting, late-successional, and old growth forest ecosystem in Late-Successional Reserves.

Protection and enhancement of habitat for late-successional and old growth forest-related species including the northern spotted owl and marbled murrelet.

Implementation Monitoring

Questions

1. What is the status of the preparation of assessment and fire plans for Late-Successional Reserves?

2. What activities were conducted or authorized within Late-Successional Reserves, and how were they compatible with the objectives of the Late-Successional Reserve plan? Were the activities consistent with SEIS/ROD Standards and Guidelines, RMP management direction, Regional Ecosystem Office review requirements, and the Late-Successional Reserve assessment?

3. What is the status of development and implementation of plans to eliminate or control nonnative species that adversely impact Late-Successional objectives?

Monitoring Requirements

The Annual Program Summary will address Implementation Questions 1-3.

Effectiveness and Validation Monitoring

Questions

1. Are the timber sales and other activities (i.e., special forest product harvest activities) within Late-Successional Reserves compatible with the goal of developing and maintaining a functional, interacting, late-successional, and old growth forest ecosystem?

2. Does the harvest of special forest products have adverse effects on Late-Successional Reserve objectives?

3. Is a functional, interacting, Late-Successional ecosystem maintained where adequate and restored where inadequate?

4. Did silvicultural treatments benefit the creation and maintenance of Late-Successional conditions?

5. What is the relationship between levels of management intervention and the health and maintenance of Late-Successional and old growth ecosystems?

Monitoring Requirements

Deferred to SEIS Monitoring Plan

Adaptive Management Areas

Expected Future Conditions and Outputs

Utilization of Adaptive Management Areas (AMAs) for the development and application of new management approaches for the integration and achievement of ecological health, and economic and other social objectives.

Provision of well-distributed, Late-Successional habitat outside reserves; retention of key structural elements of Late-Successional forests on lands subjected to regeneration harvest; restoration and protection of Riparian Zones; and provision of a stable timber supply.

Implementation Monitoring

Question

Are the AMA plans being developed, and do they establish future desired conditions?

Monitoring Requirements

The Annual Program Summary will address Implementation Question 1.

Effectiveness and Validation Monitoring

Deferred to SEIS Monitoring Plan and individual AMA management plans.

Matrix

Expected Future Conditions and Outputs

Production of a stable supply of timber and other forest commodities.

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

Assurance that forests in the Matrix provide for connectivity between Late-Successional Reserves.

Provision of habitat for a variety of organisms associated with early and Late-Successional forests.

Implementation Monitoring

Questions

1. Are suitable numbers of snags, coarse woody debris, and green trees being left in a manner that meets the needs of species and provides for ecological functions in harvested areas as called for in the SEIS/ROD Standards and Guidelines, and RMP management direction?

2. Are timber sales being designed to meet ecosystem goals for the Matrix?

3. Are Late-Successional stands being retained in fifth-field watersheds in which Federal forest lands have 15 percent or less Late-Successional forest?

Monitoring Requirements

1. At least 20 percent of regeneration harvest timber sales in each Resource Area will be examined by pre- and post-harvest (and after site preparation) inventories to determine snag and green tree numbers, heights, diameters, and distribution within harvest units. The measure of distribution of snags and green trees will be the percent in the upper, middle, and lower thirds of the sale units monitored. Snags and green trees left following timber harvest activities (including site preparation for reforestation) will be compared to those that were marked prior to harvest.

   The same timber sales will also be inventoried pre and post-harvest to determine if SEIS/ROD and RMP down log retention direction has been followed.

2. At least 20 percent of the files on each year's timber sales will be reviewed annually to determine if ecosystem goals were addressed in the silvicultural prescriptions.

3. All proposed regeneration harvest timber sales in watersheds with less than 15 percent Late-Successional forest remaining will be reviewed prior to sale to ensure that a watershed analysis has been completed.

Effectiveness and Validation Monitoring

Questions

1. Are stands growing at a rate that will produce the predicted yields?

2. Is the forest ecosystem functioning as a productive and sustainable ecological unit?

3. Are forests in the Matrix providing for connectivity between Late-Successional Reserves?

Monitoring Requirements

Deferred to the SEIS Monitoring Plan.

Air Quality

Expected Future Conditions and Outputs

Attainment of National Ambient Air Quality Standards, Prevention of Significant Deterioration goals, and Oregon Visibility Protection Plan and Smoke Management Plan goals.

Maintenance and enhancement of air quality and visibility in a manner consistent with the Clean Air Act and the State Implementation Plan.

Implementation Monitoring

Questions

1. Were efforts made to minimize the amount of particulate emissions from prescribed burns?
2. Are dust abatement measures used during construction activities and on roads during BLM timber harvest operations and other BLM commodity hauling activities?
3. Are conformity determinations being prepared prior to activities that may contribute to a new violation of the National Ambient Air Quality Standards, increase the frequency or severity of an existing violation, or delay the timely attainment of a standard?

Monitoring Requirements

1. At least 20 percent of prescribed burn projects will be randomly selected for monitoring to assess what efforts were made to minimize particulate emissions, and whether the environmental analysis that preceded the decision to burn addressed the questions set forth in the SEIS discussion of Emission Monitoring (pgs. 3 & 4-100).
2. At least 20 percent of the construction activities and commodity hauling activities will be monitored to determine if dust abatement measures were implemented.
3. The Annual Program Summary will address Implementation Question 3.

Effectiveness and Validation Monitoring

Questions

1. What techniques were the most effective in minimizing the amount of particulate emissions from prescribed burns?
2. Are BLM prescribed burns contributing to intrusions into Class I areas or nonattainment areas?
3. Of the intrusions that the BLM is reported to be responsible for, what was the cause and what can be done to minimize future occurrences?
4. Are BLM prescribed underburns causing adverse air quality impacts to rural communities?
5. Are prescribed fires decreasing the actual or potential impacts from wildfire emissions?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Water and Soils

Expected Future Conditions and Outputs

Restoration and maintenance of the ecological health of watersheds. See Aquatic Conservation Strategy Objectives.

Improvement and/or maintenance of water quality.

Improvement and/or maintenance of soil productivity.

Reduction of existing road mileage within Key Watersheds.

Implementation Monitoring

Questions

1. Are site-specific Best Management Practices identified as applicable during interdisciplinary review and carried forward into project design and execution?

2. Are prescribed management actions in municipal watersheds consistent with memorandums of understanding with the municipality or water purveyor?

3. Are the prescribed actions, programs, inter-agency coordination efforts called for in the SEIS/ ROD Standards and Guidelines, and RMP management direction being conducted?

4. What watershed analyses have been or are being performed? Are watershed analyses being performed prior to management activities in Key Watersheds?

5. What is the status of identification of in-stream flow needs for the maintenance of channel conditions, aquatic habitat, and riparian resources?

6. What watershed restoration projects are being developed and implemented?

7. What fuel treatment and fire suppression strategies have been developed to meet Aquatic Conservation Strategy Objectives?

8. What is the status of development of road or transportation management plans to meet Aquatic Conservation Strategy Objectives?

9. What is the status of preparation of criteria and standards that govern the operation, maintenance, and design for the construction and reconstruction of roads?

10. What is the status of the reconstruction of roads and associated drainage features identified in watershed analysis as posing a substantial risk? What is the status of closure or elimination of roads to further Aquatic Conservation Strategy Objectives, and to reduce the overall road mileage within Key Watersheds? If funding is insufficient to implement road mileage reductions, are construction and authorizations through discretionary permits denied to prevent a net increase in road mileage in Key Watersheds?

11. Are problems associated with high road density being addressed through the reduction of minor collector and local road densities?

12. What is the status of reviews of ongoing research in Key Watersheds to ensure that significant risk to the watershed does not exist?

13. What is the status of evaluation of recreation, interpretive, and user-enhancement activities/ facilities to determine their effects on the watershed? What is the status of eliminating or relocating these activities/facilities when found to be in conflict with Aquatic Conservation Strategy Objectives?

14. What is the status of cooperation with other agencies in the development of watershed-based Research Management Plans and other cooperative agreements to meet Aquatic Conservation Strategy Objectives? What is the status of cooperation with other agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives?

Monitoring Requirements

1. At least 20 percent of the timber sales and silviculture projects stratified by management category will be randomly selected for monitoring to determine whether or not Best Management Practices (BMP) were implemented as prescribed. The selection of management actions to be monitored will be based on beneficial uses likely to be impacted and for which BMPs are being prescribed.

2. Compliance checks will be completed for all agreements entered into with providers of municipal water.

3. The Annual Program Summary will address Implementation Questions 3-14.

Effectiveness and Validation Monitoring

Questions

1. Is the overall condition of the watersheds improving?

2. Are State water quality criteria being met? When State water quality criteria are met, are the beneficial uses of riparian areas protected?

3. Are prescribed Best Management Practices maintaining or restoring water quality consistent with basin specific State water quality criteria for protection of specified beneficial uses?

Monitoring Requirements

Deferred to SEIS Monitoring Plan

Wildlife Habitat

Expected Future Conditions and Outputs

Maintenance of biological diversity and ecosystem health to contribute to healthy wildlife populations.

Implementation Monitoring

Questions

1. Are suitable (diameter, length, and numbers) snags, coarse woody debris, and green trees being left in a manner that meets the needs of species and provides for ecological functions in harvested areas, as called for in the SEIS/ROD Standards and Guidelines, and RMP management direction?

2. Are special habitats being identified and protected?

3. Were any timber sales sold where snag requirements for white-headed woodpeckers and black-backed woodpeckers cannot be met?

4. What is the status of designing and implementing wildlife restoration projects?

5. What is the status of designing and constructing wildlife interpretive and other user-enhancement facilities?

Monitoring Requirements

1. At least 20 percent of regeneration harvest timber sales in each Resource Area will be examined by pre- and post-harvest (and after site preparation) inventories to determine snag and green tree numbers, heights, diameters, and distribution within harvest units. The measure of distribution of snags and green trees will be the percent in the upper, middle, and lower thirds of the sale units monitored. Snags and green trees left following timber harvest activities (including site preparation for reforestation) will be compared to those that were marked prior to harvest. The same timber sales will also be inventoried pre and post-harvest to determine if SEIS/ROD and RMP down log retention directions have been followed.

2. At least 20 percent of BLM actions within each Resource Area on lands including or near special habitats will be examined to determine whether special habitats were protected.

3. At least 20 percent of the files on each year's timber sales will be reviewed annually to evaluate documentation regarding white-headed woodpeckers and black-backed woodpeckers and related recommendations and decisions in light of ESA requirements, policy, and SEIS/ROD Standards and Guidelines, and RMP management direction.

4. The Annual Program Summary will address Implementation Questions 4 and 5.

Effectiveness and Validation Monitoring

Questions

1. Are habitat conditions for Late-Successional forest associated species maintained where adequate, and restored where inadequate?

2. Are the snags, green trees, and coarse woody debris being left, achieving the habitat necessary to attain the desired population at a relevant landscape level?

3. Are BLM actions intended to protect special habitats actually protecting the habitat? Is the protection of special habitats helping to protect the species population?

4. What are the effects of management on species richness (numbers and diversity)?

Monitoring Requirements

Deferred to SEIS Monitoring Plan (Will address a variety of wildlife species such as amphibians, mollusks, neotropical migratory birds, etc.)

Fish Habitat

Expected Future Conditions and Outputs

See Aquatic Conservation Strategy Objectives.

Maintenance or enhancement of the fisheries potential of streams and other waters consistent with BLM's *Anadromous Fish Habitat Management on Public Lands* guidance, BLM's *Fish and Wildlife 2000 Plan*, the Bring Back the Natives initiative, and other nationwide initiatives.

Rehabilitation and protection of at-risk fish stocks and their habitat.

Implementation Monitoring

Questions

1. Are at-risk fish species and stocks being identified?

2. Are fish habitat restoration and enhancement activities being designed and implemented that contribute to attainment of Aquatic Conservation Strategy Objectives?

3. Are potential adverse impacts to fish habitat and fish stocks being identified?

Monitoring Requirements

1. The Annual Program Summary will report on the status of watershed analysis to identify at-risk fish species and stocks, their habitat within individual watersheds, and restoration project needs.

2. The Annual Program Summary will report on the status of the design and implementation of fish habitat restoration and habitat activities.

3. The Annual Program Summary will report on the status of cooperation with Federal, tribal and State fish management agencies to identify and eliminate impacts associated with poaching, harvest, habitat manipulation, and fish stocking that threaten the continued existence and distribution of native fish stocks inhabiting Federal lands. The Summary will also identify any management activities or fish interpretive and other user-enhancement facilities that have detrimental effects on native fish stocks.

4. At least 20 percent of the files on each year's timber sales, and other relevant actions, will be reviewed annually to evaluate documentation regarding fish species and habitat and related recommendations and decisions in light of policy and SEIS/ROD Standards and Guidelines, and RMP management direction. If mitigation is required, review will ascertain whether such mitigation was incorporated in the authorization document and the actions will be reviewed on the ground after completion to ascertain whether the mitigation was carried out as planned.

Effectiveness and Validation Monitoring

Questions

1. Is the ecological health of the aquatic ecosystems recovering or sufficiently maintained to support stable and well-distributed populations of fish species and stocks?

2. Is fish habitat, in terms of quantity and quality of rearing pools, coarse woody debris, water temperature, and width to depth ratio, being maintained or improved as predicted?

3. Are the populations of listed, sensitive and at-risk fish stock stable?

Monitoring Requirements

Deferred to SEIS Monitoring Plan

Special Status and SEIS Special Attention Species Habitat

Expected Future Conditions and Outputs

Protection, management, and conservation of Federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act (ESA) and Bureau special status species policies.

Conservation of Federal Candidate and Bureau Sensitive species and their habitats, so as not to contribute to the need to list and recover the species.

Conservation of State listed species and their habitats to assist the State in achieving management objectives.

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

Protection of Bureau Assessment species and SEIS special attention species, so as not to elevate their status to any higher level of concern.

Implementation Monitoring

Questions

1. Are Special Status Species being given the appropriate amount of consideration in deciding whether or not to go forward with a timber sale or other relevant actions? During timber sales and other relevant actions that may disturb Special Status Species, are steps taken to adequately mitigate disturbances?

2. Are the actions identified in plans to recover species being implemented in a timely manner?

3. What coordination with other agencies has occurred in the management of Special Status Species?

4. What land acquisitions occurred or are under way to facilitate the management and recovery of Special Status Species?

5. What site specific plans for the recovery of Special Status Species were or are being developed?

6. What is the status of analysis that ascertains species requirements or enhances the recovery or survival of a species?

7. What is the status of efforts to maintain or restore the community structure, species composition and ecological processes of special status plant and animal habitat?

Monitoring Requirements

1. At least 20 percent of the files on each year's timber sales and other relevant actions (e.g., rights-of-way, instream structures) will be reviewed annually to evaluate documentation regarding special status species and related recommendations and decisions in light of ESA requirements, policy, and SEIS/ROD Standards and Guidelines, and RMP management direction. If mitigation is required, review will ascertain whether such mitigation was incorporated in the authorization document and the actions will be reviewed on the ground after completion to ascertain whether the mitigation was carried out as planned.

2. Review implementation schedule and actions taken annually to ascertain if the actions to recover species were carried out as planned.

3. The Annual Program Summary will address Implementation Questions 3-7.

Effectiveness and Validation Monitoring

Questions

1. Are trends for Special Status Species meeting the objectives of mitigation and/or conservation actions?

2. Have any Federal Candidate, Bureau Assessment, or Bureau Sensitive species been elevated to higher levels of concern due to BLM management?

3. Were desired habitat conditions for the northern spotted owl and marbled murrelet maintained where adequate and restored where inadequate?

Monitoring Requirements

Deferred to SEIS Monitoring Plan (Will address a variety of special status species including marbled murrelet, bald eagle, northern spotted owl, anadromous fish species, etc.)

Special Areas

Expected Future Conditions and Outputs

Maintenance, protection, and/or restoration of the relevant and important values of the special areas that include Areas of Critical Environmental Concern (ACEC), Outstanding Natural Areas (ONA), Research Natural Areas (RNA), and Environmental Education Areas (EEA).

Provision of recreation uses and environmental education in ONAs. Management of uses to prevent damage to those values that make the area outstanding.

Preservation, protection, or restoration of native species composition and ecological processes of biological communities in RNAs.

Provision and maintenance of environmental education opportunities in EEAs. Management of uses to minimize disturbances of educational values.

Retention of existing Research Natural Areas and existing Areas of Critical Environmental Concern that meet the test for continued designation. Retention of other special areas. Provision of new special areas where needed to maintain or protect important values.

Implementation Monitoring

Questions

1. Are BLM actions and BLM authorized actions/ uses near or within special areas consistent with RMP objectives and management direction for special areas?

2. What is the status of the preparation, revision, and implementation of ACEC management plans?

3. Are interpretive programs and recreation uses being developed and encouraged in ONAs? Are the outstanding values of the ONAs being protected from damage?

4. What environmental education and research initiatives and programs are occurring in the RNAs and EEAs?

5. Are existing BLM actions and BLM authorized actions and uses not consistent with management direction for special areas being eliminated or relocated?

6. Are actions being identified that are needed to maintain or restore the important values of the special areas? Are the actions being implemented?

7. Are protection buffers being provided for specific rare and locally endemic species and other species in the upland forest matrix?

Monitoring Requirements

1. Annually the files on all actions and research proposals within and adjacent to special areas will be reviewed to determine whether the possibility of impacts on ACEC values were considered, and whether any mitigation identified as important for maintenance of ACEC values was required. If mitigation was required, the relevant actions will be reviewed on the ground after completion to ascertain whether it was actually implemented.

2. The Annual Program Summary will address Implementation Questions 2 through 7.

Effectiveness and Validation Monitoring

Questions

1. Are the implemented management actions designed to protect the values of the special areas effective?

2. Are the special areas managed to restore or prevent the loss of outstanding values and minimize disturbance?

Monitoring Requirements

1. Each special area will be monitored at least every 3 years to determine if the values for which it was designated are being maintained.

2. Each ACEC will be monitored annually to determine if proactive management actions met their objectives.

Cultural Resources Including Native American Values

Expected Future Conditions and Outputs

Identification of cultural resource localities for public, scientific, and cultural heritage purposes.

Conservation and protection of cultural resource values for future generations.

Provision of information on long-term environmental change and past interactions between humans and the environment.

Fulfillment of responsibilities to appropriate Native American groups regarding heritage and religious concerns.

Implementation Monitoring

Questions

1. Are cultural resources being given the appropriate amount of consideration in deciding whether or not to go forward with a timber sale or other relevant actions? During timber sales, and other relevant actions that may disturb cultural resources, are steps taken to adequately mitigate disturbances?

2. What mechanisms have been developed to describe past landscapes and the role of humans in shaping those landscapes?

3. What efforts are being made to work with Native American groups to accomplish cultural resource objectives and achieve goals outlined in existing memoranda of understanding and develop additional memoranda as needs arise?

4. What public education and interpretive programs were developed to promote the appreciation of cultural resources?

Monitoring Requirements

1. At least 20 percent of the files on each year's timber sales and other relevant actions (e.g., rights-of-way, instream structures) will be reviewed annually to evaluate documentation regarding cultural resources and American Indian values and decisions in light of requirements, policy and SEIS/ROD Standards and Guidelines, and RMP management direction. If mitigation were required, review will ascertain whether such mitigation was incorporated in the authorization document, and the actions will be reviewed on the ground after completion to ascertain whether the mitigation was carried out as planned.

2. The Annual Program Summary will address Implementation Questions 2-4.

Effectiveness and Validation Monitoring

Questions

1. Are sites of religious and cultural heritage adequately protected?

2. Do Native American groups have access to and use of forest species, resources,and places important for cultural, subsistence, or economic reasons, particularly those identified in treaties?

Monitoring Requirements

1. All cultural resource sites, where management and/or mitigation measures are utilized to protect the resource, will be monitored at least once a year to determine if the measures were effective.

The balance is deferred to SEIS Monitoring Plan.

Visual Resources

Expected Future Conditions and Outputs

Preservation or retention of the existing character of landscapes on BLM administered lands allocated for VRM Class I and II management; partial retention of the existing character on lands allocated for VRM Class III management; and major modification of the existing character of some lands allocated for VRM Class IV management.

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

Implementation Monitoring

Question

Are visual resource design features and mitigation methods being followed during timber sales and other substantial actions in Class II and III areas?

Monitoring Requirements

Twenty percent of the files for timber sales and other substantial projects in VRM Class II or III areas will

be reviewed to ascertain whether relevant design features or mitigating measures were included.

Effectiveness and Validation Monitoring

Questions

1. Are timber sales and other major actions in Class II and Class III areas meeting or exceeding Visual Resource Management (VRM) objectives?

2. Are Visual Resource Management (VRM) objectives being met consistently over long periods of time in Class II management areas?

Monitoring Requirements

1. All timber sales and other selected projects in VRM Class II areas and at least 20 percent of sales or projects in Class III areas that have special design features, or mitigating measures for visual resource protection, will be monitored to evaluate the effectiveness of the practices used to conserve visual resources.

2. In VRM Class II management areas, where 2 or more sales or actions have occurred, impacts will be monitored at a minimum interval of 5 years.

Wild and Scenic Rivers

Expected Future Conditions and Outputs

Protection of the Outstandingly Remarkable Values (ORV) of designated components of the National Wild and Scenic Rivers System through the maintenance and enhancement of the natural integrity of river-related values.

Protection of the ORVs of eligible/suitable Wild and Scenic Rivers and the maintenance or enhancement of the highest tentative classification pending resolution of suitability and/or designation.

Protection of the natural integrity of river-related values for the maintenance or enhancement of the highest tentative classification determination for rivers found eligible or studied for suitability.

Designation of important and manageable river segments suitable for designation where such designation contributes to the National Wild and Scenic Rivers System.

Implementation Monitoring

Questions

1. Are BLM actions and BLM authorized actions consistent with protection of the ORVs of designated suitable and eligible, but not studied, rivers?

2. Are existing plans being revised to conform to Aquatic Conservation Strategy Objectives? Are revised plans being implemented?

Monitoring Requirements

1. Annually the files on all actions and research proposals within and adjacent to Wild and Scenic River corridors will be reviewed to determine whether the possibility of impacts on the Outstandingly Remarkable Values (ORV) were considered, and whether any mitigation identified as important for maintenance of the values was required. If mitigation was required, the relevant actions will be reviewed on the ground after completion to ascertain whether it was actually implemented.

2. The Annual Program Summary report will summarize progress on preparation and revision of Wild and Scenic River management plans, their conformance with the Aquatic Conservation Strategy Objectives, and the degree to which these plans have been implemented.

Effectiveness and Validation Monitoring

Questions

1. Are the ORVs for which the Wild and Scenic Rivers were designated being maintained?

2. Are the ORVs of the rivers that were found suitable or eligible, but not studied, protected?

Monitoring Requirements

1. Each Wild and Scenic River will be monitored at least once a year to determine if the ORVs are being maintained.

2. Each river that was found suitable or eligible, but not studied, will be monitored at least once a year to determine if the ORVs are being maintained.

Rural Interface Areas

Expected Future Conditions and Outputs

Consideration of the interests of adjacent and nearby rural landowners, including residents, during analysis, planning, and monitoring related to managed Rural Interface Areas (RIA). (These interests include personal health and safety, improvements to property, and quality of life.)

Determination of how landowners might be or are affected by activities on BLM administered land.

Implementation Monitoring

Question

Are design features and mitigation measures developed and implemented to avoid/minimize impacts to health, life, property, and quality of life and to minimize the possibility of conflicts between private and Federal land management?

Monitoring Requirements

At least 20 percent of all actions within the identified Rural Interface Areas (RIA) will be examined to determine if special project design features and mitigation measures were included and implemented as planned.

Effectiveness and Validation Monitoring

Question

Are the RIA design features and mitigation measures effective in minimizing impacts to health, life, property, and quality of life?

Monitoring Requirement

At least 20 percent of actions within the identified RIAs that had design features or mitigation measures will be examined following completion to assess the effectiveness of the action.

Socioeconomic Conditions

Expected Future Conditions and Outputs

Contribution to local, State, National, and international economies through sustainable use of BLM managed lands and resources and use of innovative contracting and other implementation strategies.

Provision of amenities for the enhancement of communities as places to live and work.

Implementation Monitoring

Questions

1. What innovative strategies and programs have been developed through coordination with State and local governments to support local economies and enhance local communities?

2. Are innovative RMP implementation strategies being identified that support local economies?

3. What is the status of planning and developing amenities that enhance local communities, such as recreation and wildlife viewing facilities?

Monitoring Requirements

The Annual Program Summary will address Implementation Questions 1, 2, and 3.

Effectiveness and Validation Monitoring

Questions

1. What level of local employment is supported by BLM timber sales and forest management practices?

2. What were O&C and CBWR payments to counties?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Recreation

Expected Future Conditions and Outputs

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

Provision of nonmotorized recreational opportunities and creation of additional opportunities consistent with other management objectives.

Implementation Monitoring

Question

What is the status of the development and implementation of recreation plans?

Monitoring Requirement

The Annual Program Summary will address Implementation Question 1.

Effectiveness and Validation Monitoring

Questions

1. Is the range of recreation opportunities on BLM lands (i.e., roaded vs. unroaded) meeting public needs based on the Statewide Comprehensive Outdoor Recreation Plan (SCORP) supply and demand data and public comments?

2. Are BLM developed recreation facilities meeting public needs and expectations, including facility condition and visitor safety considerations?

3. Are Off Highway Vehicle (OHV) designations adequate to protect resource values while providing appropriate motorized vehicle recreation opportunities?

Monitoring Requirements

1. Each Special Recreation Management Area (SRMA) will be monitored at least every 3 years to determine if the types of recreation opportunities being provided are appropriate.

2. All developed recreation sites will be monitored annually to determine if facilities are being properly managed and all deficiencies documented.

3. All ORV designations will be reviewed annually to determine if revisions are necessary to protect resource values and resolve user conflicts.

Timber Resources

Expected Future Conditions and Outputs

Provision of a sustained yield of timber and other forest products.

Reduction of the risk of stand loss due to fires, animals, insects, and diseases.

Provision of salvage harvest for timber killed or damaged by events such as wildfire, windstorms, insects, or disease, in a manner consistent with management objectives for other resources.

Implementation Monitoring

Questions

1. By land-use allocation, how do timber sale volumes, harvested acres, and the age and type of regeneration harvest stands compare to the projections in the SEIS/ROD Standards and Guidelines, and RMP management objectives?

2. Were the silvicultural (e.g., planting with genetically selected stock, fertilization, release, and thinning) and forest health practices anticipated in the calculation of the expected sale quantity implemented?

Monitoring Requirements

1. The Annual Program Summary will report both planned and nonplanned volumes sold. The report will also summarize annual and cumulative timber sale volumes, acres to be harvested, and stand ages and types of regeneration harvest for General Forest Management Areas, Connectivity/ Diversity Blocks, and Adaptive Management Areas stratified to identify them individually.

2. An annual Districtwide report will be prepared to determine if the silvicultural and forest health practices identified and used in the calculation of the PSQ were implemented. This report will be summarized in the Annual Program Summary.

Effectiveness and Validation Monitoring

Questions

1. Is reforestation achieving desired stocking?

2. Are stands growing at a rate that will produce the predicted yields?

3. Is the long-term health and productivity of the forest ecosystem being protected in the Matrix?

Monitoring Requirements

First, third, and fifth year surveys will be used to determine if reforestation is meeting reforestation objectives.

The balance is deferred to the SEIS Monitoring Plan.

Special Forest Products

Expected Future Conditions and Outputs

Production and sale of special forest products when demand is present and where actions taken are consistent with primary objectives for the land use allocation.

Utilization of the principles of ecosystem management to guide the management and harvest of special forest products.

Implementation Monitoring

Questions

1. Is the sustainability and protection of special forest product resources ensured prior to selling special forest products?

2. What is the status of the development and implementation of specific guidelines for the management of individual special forest products?

Monitoring Requirement

The Annual Program Summary will address Implementation Questions 1 and 2.

Effectiveness and Validation Monitoring

Question

Are special forest products being harvested at a sustainable level?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Noxious Weeds

Expected Future Conditions and Outputs

Containment and/or reduction of noxious weed infestations on BLM administered land using an integrated pest management approach to improve natural features.

Avoidance of the introduction or spread of noxious weed infestations in all areas.

Implementation Monitoring

Question

Are noxious weed control methods compatible with Aquatic Conservation Strategy Objectives?

Monitoring Requirement

Review the files of at least 20 percent of each year's noxious weed control applications to determine if noxious weed control methods were compatible with Aquatic Conservation Strategy Objectives.

Effectiveness and Validation Monitoring

Question

Are management actions effectively containing or reducing the extent of noxious weed infestations?

Monitoring Requirement

All noxious weed sites subjected to treatment will be monitored to determine if the treatment was effective.

Fire/Fuels Management

Expected Future Conditions and Outputs

Provision of the appropriate suppression responses to wildfires in order to meet resource management objectives and minimize the risk of large-scale, high intensity wildfires.

Utilization of prescribed fire to meet resource management objectives. (This will include, but not be limited to, fuels management for wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat, and silvicultural treatments.)

Adherence to smoke management/air quality standards of the Clean Air Act and State Implementation Plan standards for prescribed burning.

Implementation Monitoring

Questions

1. What is the status of the preparation and implementation of fire management plans for Late-Successional Reserves and Adaptive Management Areas?

2. Have additional analysis and planning been completed to allow some natural fires to burn under prescribed conditions?

3. Do wildfire suppression plans emphasize maintaining Late-Successional habitat?

4. Are Wildfire Situation Analyses being prepared for wildfires that escape initial attack?

5. What is the status of the interdisciplinary team preparation and implementation of fuel hazard reduction plans?

Monitoring Requirements

1. The Annual Program Summary will address Implementation Questions 1-5.

Effectiveness and Validation Monitoring

Questions

1. Are fire suppression strategies, practices, and activities meeting resource management objectives and concerns?

2. Are prescribed fires applied in a manner that retains the amount of coarse woody debris, snags, and duff at levels determined through watershed analysis?

3. Are fuel profiles being modified in order to lower the potential of fire ignition and rate of spread; and to protect and support land use allocation objectives by lowering the risk of high intensity, stand-replacing wildfires?

Monitoring Requirements

Deferred to SEIS Monitoring Plan.

Appendix E
Timber Supply Analysis For BLM Planning

Background

In 1992 the USDI, Bureau of Land Management, released Draft Environmental Impact Statements (DEIS) for the Coos Bay, Eugene, Medford, Roseburg, Salem, and Klamath Falls Resource Area (Lakeview District) DRMPs. These drafts included a comprehensive analysis of timber supply in western Oregon. The analysis covered a period of initial plan implementation (1991-2000) and the period thereafter (2001-2010). The baseline period that provided a historical benchmark for comparison was 1984-1988.

Details of the original analysis are described in the draft EISs (Anonymous, 1992). Regional stumpage price results were used to calculate price changes for the assessment of personal income, employment, and population effects. Harvest and log consumption results are presented in Chapter 4.

Key Concepts

Implemented in all Districts, each set of similar Resource Management Plan (RMP) alternatives represented a different timber supply policy, or alternative theme, for Bureau of Land Management (BLM) administered lands in western Oregon. The question being addressed by this analysis is, "How do changes in BLM timber supply policy affect how much timber is harvested and consumed in various parts of western Oregon?" Western Oregon was divided into subregions that differed in ownership distribution, private timber availability, and silvicultural management, while at the same time served as logical reporting areas for western Oregon BLM Districts. Changes in one subregion could affect another through the transportation of logs from harvest origin to processing destination. The analysis recognized that the BLM is just one timber supplier within western Oregon and that the impact of harvest changes is felt where the timber is actually consumed. The amount of timber offered for sale by the BLM affects stumpage price. In turn, stumpage price influences private timber harvest. The lower the BLM sale quantity, the higher stumpage prices, and the higher the level of private timber harvest.

Timber demand is determined by factors outside the control of the BLM such as housing starts and other national economic variables, like gross domestic product and the interest rate. Year to year fluctuations in timber demand were averaged over a 10-year period. Timber supply is determined by ownership, location, and stand condition. Ownership determines the policy specifying the conditions under which the timber may be harvested. Location accounts for variations in species composition and the amount of timber available for harvest. Stand condition measures the amount of harvestable volume available on a per acre basis, as well as the growth rate and stage of development of this volume. Private timber harvest is directly proportional to stumpage prices. This analysis accounted for changes in private timber supply by assessing inventory conditions at the beginning of each analysis period. For public agencies such as the USDA, Forest Service, and the BLM, timber supply is fixed at the planned Allowable Sale Quantity (ASQ); regardless of the stumpage price.

Market equilibrium defines a balance between timber supply and demand: the amount of timber harvested equals the amount of timber consumed at the market clearing price. Implementing a new BLM timber policy would disrupt this balance and lead to adjustments in the stumpage price such that a new timber supply and demand balance is created. In this analysis, market equilibrium is explicitly recognized for the Pacific Northwest westside region, and this implies a local equilibrium within each western Oregon subregion.

Updated Procedures

As was the case in 1992, the analysis consisted of the following steps for the 1991-2000 period[1]: (1) regional market equilibrium; (2) disaggregation of the private harvest; (3) timber harvest by ownership; (4) reapportioning harvest into log consumption; and for the 2001-2010 period, (5) updating the private inventory, projecting the private harvest, and reestimating log consumption.

The procedures and assumptions used to complete steps (2) through (5) above remained the same as those used in the 1992 analysis (see Anonymous, 1992).

Timber Assessment Market Model (TAMM) (Adams and Haynes, 1980; Haynes, 1990) run[2] results for the 1992 analysis indicated a linear relationship between private timber supply and BLM alternative sale quantity (Anonymous, 1992). This analysis relied on interpolating the results from two updated TAMM runs representing Federal timber supply levels of 187 million cubic feet per year (mmcf/year) and 322 mmcf/year, respectively. The first run[3] corresponds to the Resources Planning Act (RPA) base run used to evaluate the Forest Plan for *Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.* The second run[4] represented an arbitrarily set higher level of Federal timber supply. The interpolations were based on changes in the BLM share of the Pacific Northwest westside Federal timber supply for the alternative theme being analyzed. National Forest harvest levels were held at their level in the 1994 RPA base run (93 mmcf/ year). The other public harvest for the Pacific Northwest - westside supply region was left unchanged at 147 mmcf/year.

When compared to the base run used in the 1992 analysis[5], the April 1994 RPA TAMM base run included several updates relevant to the Pacific Northwest westside supply region (R. Haynes and J. Mills,). The most relevant was an overall reduction in private timber supply due to inventory updates. This had the effect of lowering the TAMM estimate of private growing stock removals given similar policy and economic conditions used in the 1992 analysis. Other TAMM updates included revisions in historical input data for revised estimates of the proportion of sawtimber volume from growing stock removals. Observed harvest values for the years 1991 and 1992 replaced estimates used in the 1992 analysis.

Results and Discussion

Results are presented in Tables 1-3. When compared with the 1992 analysis, the results indicate an overall lower level of private timber supply under higher stumpage price levels. The higher stumpage prices reflect the markedly lower level of timber supply from National Forests. In the 1992 analysis, National Forests were held at a supply level of 240 mmcf/year (consistent with their proposed plan modifications under the Interagency Scientific Committee conservation strategy for the northern spotted owl). However, under implementation of the President's Forest Plan, the National Forest timber supply is reduced to 93 mmcf/year. In spite of higher stumpage price levels, the level of private harvest is lower than estimated in the 1992 analysis. This reflects the private inventory updates in TAMM.

Table 1 - Regional Market Equilibrium Results by BLM Resource Management Plan Theme

Bureau of Land Management		Timber Supply Analysis Results	
Resource Management Plan Theme	Allowable Sale Quantity (mmcf/year)	1991-2000 Regional Stumpage Price (1982 $/mbf)	1993-2000 Western Oregon Private Growing Stock Removals (mmcf/year)
1984-1988 Historical	199	112.42	602
NO ACTION	187	255.63	618
A	250	250.41	610
B	224	252.53	613
C	67	266.05	635
D	74	264.94	633
E	56	267.07	637
PRMP	35	268.86	640
TAMM LR-207	**94**	**263.64**	**631**
TAMM LR-CT2	**136**	**251.85**	**612**

mbf thousand board feet, long log scale.
mmcf/year million cubic feet per year.

Table 2 - Results for the 1993-2000 Private Harvest Disaggregation and 2001-2010 Harvest Projections

BLM Resource Management Plan Theme	Private Harvest, Western Oregon (million cubic feet per year)					
	1993-2000			2001-2010		
	IND	NIPF	TOTAL	IND	NIPF	TOTAL
PRMP (BLM ASQ = 35)	465	175	640	558	213	771
No Action (BLM ASQ = 187)	449	169	618	549	208	757
Alternative A (BLM ASQ = 250)	443	167	610	545	206	751
Alternative B (BLM ASQ = 224)	446	168	614	547	207	754
Alternative C (BLM ASQ = 67)	461	174	645	556	212	768
Alternative D (BLM ASQ = 74)	460	174	634	555	211	766
Alternative E (BLM ASQ = 56)	462	175	637	556	212	768
Timber Availability[1] (BLM ASQ = 190)	544	125	669	557	125	682
	IND	NIPF	TOTAL			
1984-1988 Baseline (BLM Harvest = 202)	525	77	602			

Notes: PRMP - Proposed Resource Management Plan
IND - Private Industrial Ownership.
NIPF - Private Nonindustrial Ownership.
BLM ASQ - Bureau of Land Management Resource Management Plans (RMP) cumulative Allowable Sale Quantity for western Oregon (million cubic feet per year). Includes the Klamath Resource Area (Lakeview District).
BLM Harvest - Bureau of Land Management actual harvest (million cubic feet per year).

[1] Sessions, John., coordinator. 1990. Timber for Oregon's tomorrow. The 1989 update. Corvallis, OR. Oregon State University, College of Forestry, Forest Research Lab. 183 p.

Table 3 -Log Consumption Results by BLM Resource Management Plan Theme

BLM Resource Management Plan Theme	Log Consumption by Western Oregon Processing Facilities (million cubic feet per year)							
	1993-2000				2001-2010			
	HARV	END CNSMP	EXOG CNSMP	TOTAL CNSMP	HARV	END CNSMP	EXOG CNSMP	TOTAL CNSMP
8PRMP	797	761	97	858	928	882	97	979
No Action	929	890	98	987	1,067	1,018	98	1,115
Alternative A	982	942	97	1,039	1,123	1,072	97	1,170
Alternative B	961	922	97	1,019	1,101	1,051	97	1,148
Alternative C	825	789	97	886	958	911	97	1,008
Alternative D	831	794	97	892	964	917	97	1,014
Alternative E	816	779	97	876	947	900	97	997
	HARV	END CNSMP	EXOG CNSMP	TOTAL CNSMP				
1984-1988 Baseline	1,248	1,196	98	1,294				

Notes: PRMP — Proposed Resource Management Plan

HARV — Total harvest from all ownerships within western Oregon (million cubic feet per year).

END CNSMP — Consumption of logs originating from ownerships within western Oregon (million cubic feet per year). The difference between HARV and END CNSMP represents the volume of timber originating in western Oregon, but processed by out-of-state or eastern Oregon mills.

EXOG CNSMP — Consumption of logs originating from ownerships from eastern Oregon and out-of-state (million cubic feet per year). Differences reflect the effect of implementing different BLM Resource Management Plan alternatives on Klamath Resource Area (Lakeview District) in eastern Oregon.

TOTAL CNSMP — Total log consumption (all origins) by western Oregon processing facilities (million cubic feet per year).

When compared to the 1984-1988 baseline, the private harvest under each BLM alternative theme increases over 1991-2000. This can be attributed to increases from the nonindustrial private ownership. Comparison of the 2001-2010 projections with the 1991-2000 harvest disaggregation shows a dramatic increase in the total private harvest, over 130 million cubic feet per year. One important qualification for this harvest gain is that pre-1990 forest practice rules and related environmental constraints on the private timberlands remain unchanged through 2010. Therefore, these increases may not be entirely attainable given recent changes in Oregon forest practice regulations for stream protection and proposed conservation restrictions on private lands for the marbled murrelet, northern spotted owl, and possibly coho salmon.

Western Oregon was a net importer of logs over the 1984-1988 period as total consumption exceeds harvest. This was not allowed to vary in this analysis. Differences in log consumption across BLM Resource Management Plan alternatives were less noticeable given the large share of timber harvest still forthcoming from all other ownerships. For all BLM Resource Management Plan alternatives, log consumption in western Oregon is projected to decrease when compared to the 1984-1988 baseline period. Most of this decrease is from reduced National Forest Allowable Sale Quantities under the President's Forest Plan and TAMM reductions in private timber availability. Private harvest increases in the 2001-2010 period translate into higher levels of consumption for this period.

[1]See Anonymous (1992) for a detailed description of each step.
[2]TAMM90 log runs 582, 583, 584, and 587.
[3]Timber Assessment Market Model, 1993 Montana Version, LR-207 (RPA-Base, 4/14/94).
[4]Timber Assessment Market Model, 1993 Montana Version, Log Run CT2, June 24, 1994.
[5]TAMM90, Log Run 581, April 9, 1992.

Appendix F
Key Sections of the 1993 Record of Decision on Pacific Yew Environmental Impact Statement

The following is excerpted verbatim from the Record of Decision,Pacific Yew of September, 1993. The remainder of the Record of Decision is incorporated by reference.

The Decision

It is our decision to select Alternative B as the Pacific yew harvest strategy for the National Forest System lands and lands administered by the Bureau of Land Management in Washington, Oregon, California, Idaho, and Montana for the next five years (1993-1997). Our selection of Alternative B is based on the analysis in the FEIS, consideration of public comments on the DEIS, and a significant reduction in demand for yew from federal lands for taxol production.

Alternative B permits harvest of any part of the Pacific yew for taxol production from timber sale units and where it might otherwise be destroyed. For the purpose of this document, timber sale units are defined as any area within a timber sale which has a silvicultural prescription for a clearcut[2], shelterwood[2], or seed tree[2] harvest method. Pacific yew may also be harvested for taxol from other areas where the yew would otherwise be destroyed by such activities as other timber harvesting, road building or other construction, a prescribed fire treatment, or similar activities. Site-specific environmental analyses are required before any yew harvest takes place.

We recognize that other parts of the yew, such as seed or scion material, may be needed for research or propagation purposes. This decision permits non-destructive harvest (where tree or shrub is not killed) of small quantities of such material for these purposes in any area where allowed by forest plans, BLM resource management plans (draft or final), or new agency resource plans.

Under this alternative, 258,000 to 386,000 pounds of dry bark and/or 686,000 to 1,030,000 pounds of dry needles from an estimated 52,000 to 78,000 yew would be available each year for harvest from National Forest System and BLM lands. These estimates are based on the number of yew per acre found in the 1992 Pacific yew inventory and the projected number of acres for timber sales described in forest plans and adjusted according to the FEIS for Management for the Northern Spotted Owl in National Forests (for Forest Service) or in draft resource management plans (for BLM). Many other decisions are currently being made that will most likely reduce the number of timber sale acres and therefore reduce the number of available yew trees and pounds of bark and needles. Under Alternative B, the production of yew from federal lands is largely dependent on the timber harvest program.

Alternative B provides for protection of some of the yew remaining after yew harvest; every sale unit would be regenerated to preharvest or prescribed levels. Special genetic reserves would not be established; however, all acres not committed to timber sales as defined above, would function as genetic reservoirs.

In summary, Alternative B emphasizes utilization of Pacific yew where it would otherwise be wasted. Production of yew would be dependent on the Forest Service and BLM timber harvest programs. It affords the highest degree of protection to the yew by virtue of allowing the lowest level of harvest (with the exception of Alternative A).

Mitigation Measures

The mitigation measures in the FEIS were developed using "An Interim Guide to the Conservation and Management of Pacific Yew, as revised April 1993"[3] as well as suggestions from the public. They were designed to protect the yew and the ecosystem. All practical means to avoid or minimize environmental harm from the selected alternative have been adopted. The mitigation measures for Alternative B follow. These apply only to areas where yew is harvested for taxol.

- If a timber sale is planned in a unique area where the only yew in the drainage is located in the sale area, then mitigation is required to assure the protection of this yew population. The purpose for this would be to protect the genetic importance of this unique population from timber sale unit locations.

- Consider including vigorous, undamaged yew trees or shrubs in the green tree reserves whenever possible.

- Harvest yew only where practical (i.e. sufficient number of stems of utilizable size).

- Where yew harvest is planned, harvest yew in the sale unit prior to the harvest of other tree species, to the extent that timber harvesters' health and safety will not be jeopardized. Preharvesting may be accomplished by decking yew logs in specific locations within the sale unit during logging operations.

- Harvest yew that is not in the residual green tree reserve.

- Do not harvest yew for the primary purpose of yew products within 75 feet slope distance from the average high-water level of a perennial stream. Where forest plans, resource management plans, or other plans or prescriptions set wider streamside buffers, these greater buffers will be adhered to.

- Site-specific prescriptions will identify logging systems, site preparation and fuels reduction treatments, and conifer regeneration plans with regard to yew survival and regeneration.

- Use one or more of the following methods to maintain or replace yew on the site at preharvest levels. Where preharvest yew densities are estimated to be greater than 50 yew plants per acre, then a minimum of 50 yew plants per acre will be prescribed in site-specific prescriptions.

  1. Retain and protect as much of the residual yew (stumps, trees, shrubs, advanced regeneration remaining after harvest) as possible and practical from post-harvest activities such as slash piling and burning. Plan logging systems and slash disposal methods which favor the survival of residual yew plants and stumps, e.g., grapple piling or combined machine and burning methods or special burn prescriptions. Include retention of yew and yew stumps as one of the prescribed fire objectives in burning plans. Leave litter and down wood in those patches for seedling establishment.

     Protect yew stumps by the following.

     a. To facilitate sprouting, leave yew tree stumps at the scientifically recommended height (currently 12" high). Yew shrubs should be cut to leave a similar length from the root collar.

     b. Leave bark intact on yew stumps.

     c. Whenever possible and practical, shade yew stumps with slash or adjacent vegetation and position reserve green trees to provide shade for yew stumps and advanced yew regeneration. Shading is not normally necessary on shrub form yew; site-specific analysis may help determine how much shading is needed.

  2. Encourage natural regeneration (from seed already present on site) by using any site preparation methods known to favor yew seed germination and establishment. Site-specific prescriptions will provide seed sources and desired site conditions for natural regeneration of yew and protect concentrations of existing yew where feasible, while still meeting other management objectives. Where on-the-ground conditions preclude this, planting of yew will be prescribed.

  3. Plant seedlings according to site-specific prescriptions if prescribed regeneration of yew has not been achieved and there is assurance that regeneration by other means is not occurring. Obtain rooted cuttings or seed or seedlings from sources within the local management area. Cuttings could be collected before harvest. Animal protection measures need to be considered where browsing of young yew is predicted. Refer to "An Interim Guide to the Conservation and Management of Pacific Yew," page 27, for transfer of genetic material guidelines.

- *Monitoring:* Where possible, monitor yew regeneration in conjunction with normal regeneration and other area surveys.

- *Endangered Species Act Consultation:* Yew harvest will be conducted in accordance with all conditions, restrictions, and monitoring procedures that are developed during project level Section 7 consultation required by the Endangered Species Act.

- *Seasonal Restrictions for Listed Species:* Pacific yew harvest will follow the appropriate seasonal restrictions for the affected listed species indicated during the project level (site-specific) Section 7 consultation required by the Endangered Species Act.

- *Utilization of Yew Material:* Follow current Forest Service and BLM policies for utilization of yew wood, bark, and needles. These policies may differ between Forest Service regions or national forests or between BLM districts.

- *Transfer of Yew, Administration of Permits, and Theft Prevention:* Follow current Forest Service and BLM policies for transfer of yew, administration of permits, and theft prevention.

- *Tribal Treaties:* Comply with all Native American tribal treaties and consult with tribes where yew harvest may impact trust lands.

Monitoring

Monitoring yew harvest, yew survival and regeneration, and protection of other resources will be guided by Forest Service and BLM harvest policies and requirements in forest plans and resource management plans, as well as monitoring identified in site- specific analyses. The FEIS requires that yew regeneration be monitored in conjunction with other conifer regeneration surveys (Appendix B-1 in FEIS).

[2] Harvest method terminology may change. These terms maybe replaced with their equivalents using ecosystem management or other terminology.

[3] U.S. Department of Agriculture, Forest Service, 1992. An Interim Guide to the Conservation and Management of the Pacific Yew. Pacific Northwest Region. 78 p.

Appendix G
Best Management Practices and TPCC Fragile Code Guidance

Introduction

This Appendix has two major sections: Best Management Practices (BMPs), and TPCC (Timber Production Capability Classification) Fragile Code Guidance. The BMPs described in this document are intended to maintain or improve water quality and soil productivity, and prevent or mitigate adverse impacts while meeting other resource objectives. For any given action, the actual BMPs needed to meet management goals are selected by an interdisciplinary team on a site specific basis. These BMPs are a compilation of existing policies, guidelines, and commonly employed practices designed to minimize water quality degradation and loss of soil productivity and may not necessarily be the best management practices for all other resources. The implementation of these BMPs will be the beginning of an iterative process that includes the monitoring and modification of BMPS. This process is considered the primary mechanism to achieve Oregon State Water Quality Standards.

The BMPs are designed to provide compliance with the Clean Water Act of 1972, as amended in 1977 and 1987. For proposed management actions, BMPs designed and implemented in accordance with a State approved process will normally constitute compliance with the Clean Water Act (CWA). The set of procedures prescribed by Oregon Forest Practice Act is the standard by which all forestry BMPs in Oregon are measured. The BMPs employed by BLM often are different in detail from the Oregon Forest Practice Act but must be equal or more protective of resources in terms of end results.

The iterative process by which nonpoint controls, including BMPS, are to be selected and implemented to achieve water quality standards include: (1) design of BMPs based upon site specific conditions, technical, economic and institutional feasibility, and the water quality of those waters potentially impacted; (2) monitoring to ensure that practices are properly designed and applied; (3) monitoring to determine the effectiveness of practices in meeting water quality standards, and the appropriateness of water quality criteria in reasonably assuring protection of beneficial uses; and (4) adjustment of BMPs when it is found that water quality standards are not being protected to a desired level and/or possible adjustment of water quality standards based upon considerations in 40 Code of Federal Regulations 131.

BMPs would be developed on a site specific basis and consist of a mix of conservation practices such as those listed below and management guidance identified in Chapter 2.

Best Management Practices (BMPS)

I. Timber Harvest

A. Timber Sale Planning Design

Objective: Use the planning process to ensure that timber sales are designed to maintain favorable conditions of soil productivity, water flow, and water quality for beneficial uses in the watershed. Selection of some of the following practices will help meet this objective.

Practices:

1. Use Watershed Analysis to identify issues, concerns, and beneficial uses.
2. Use interdisciplinary teams to identify applicable BMPS.
3. Use Timber Production Capability Classification (TPCC) and field investigation to classify areas as nonsuitable for timber production and/or other resources manipulation.
4. Use TPCC and field investigations to classify areas as fragile suitable, restricted.
5. Identify, evaluate, and map potential problems (e.g., unstable areas and landforms, saturated areas, etc.). Design measures to avoid negatively impacting potentially unstable ground.

6. Design harvest units to avoid or mitigate potential adverse impacts to soil and water. Evaluation factors include the following: soil characteristics, watershed physiography, current watershed and stream channel conditions, proposed roads, skid trails, and logging system design.

7. Plan mitigation measures, if adverse impacts to water quality/quantity or soil productivity are anticipated from the proposed action.

8. Analyze watershed cumulative effects and, if necessary, provide mitigation measures that meet water quality standards and the aquatic conservation strategy objectives.

9. Within a watershed, disperse management activities over time and space in order to meet water quality standards and the aquatic conservation strategy objectives.

10. Where cumulative effects analysis predicts degradation, reevaluate the watershed analysis to reflect the degradation.

11. Include on timber sale maps and/or contracts the location of all stream channels and wetlands (springs, meadows, lakes, bogs, etc.).

12. Locate fragile (nonsuitable and suitable) areas that require special management practices.

13. Include on timber sale maps and/or contracts the location of protection required for each stream channel, wetland, and fragile area.

14. Design Riparian reserves to meet the criteria set in the Watershed Analysis.

15. Select the logging methods that meet water quality standards and soil productivity goals.

16. Leave large downed woody debris on-site in amounts that are equal to or greater than those designated aquatic conservation strategy.

B. Riparian/Wetland Protection

Objectives: To prevent damage to riparian/ wetland ecosystems and disturbance to streambanks, protect the natural flow of streams, and preserve nutrient cycling from woody debris. Maintain the integrity and functional ability of wetlands by avoiding disturbance of these areas whenever possible. Selection of some of the following practices will help meet these and the aquatic conservation strategy objectives.

Practices:

1. Allow no chemical loading operations or similar toxic pollutant activities within 200 feet of all water bodies.

2. When operating within a tree length of riparian reserves/wetlands, directionally fall trees in order to meet the Aquatic Conservation Strategy.

3. Do not fell any snags within riparian reserves. (This BMP will be implemented in all instances where safety and fire hazards are avoidable)

4. Logs in the riparian reserve that were down prior to a planned management activity will be managed to meet the aquatic conservation strategy.

5. No skid trails are to be placed in the riparian reserves/wetlands except at designated crossings.

6. Avoid locating log landings within 50 feet of riparian/wetland areas.

7. Provide total protection to lands susceptible to mass wasting, for example, unstable or oversteepened streambanks and headwalls.

8. Restrict use of tractors in and adjacent to water.

9. When absolutely necessary to yard through riparian areas, restrict yarding to corridors that are perpendicular to streams. Management guidelines for corridors are:

    - Restrict corridors to the minimum number feasible.

- Corridors will not exceed 50 feet in width, nor reduce crown cover on a project stream segment to less than 75 percent of predisturbance conditions.

- Logs will be fully suspended over water and adjacent banks.

10. Remove all logging slash in streams (resulting from the current timber sale) for a distance of 100 feet above culverts, or the distance necessary to protect the culvert. Place slash above high-water mark.

11. Plan and implement any activities (e.g., construction, falling and yarding timber, operation of equipment, etc.) in wetlands and permanent high water table areas to meet the objectives of the Aquatic Conservation Strategy.

12. Manipulate vegetation in order to enhance or create springs and wetland areas.

C. Yarding Methods

Objectives: To minimize loss of soil productivity, and reduce potential for surface runoff, erosion, and subsequent degradation due to surface disturbance or compaction. Selection of some of the following practices will help meet these objective.

1. Cable

   a. Suspend the front end of logs above the ground during yarding. (This BMP is desirable at all times and will be selected when yarding is to be done over streams or highly erodible soils).

   b. Fully suspend logs above the ground during yarding when crossing riparian vegetation, streams with fragile banks and sideslopes, and TPCC designated fragile soils.

   c. Use seasonal restriction, if required suspension cannot be achieved by yarding equipment.

   d. Hand water bar cable yarding corridors immediately after use on sensitive soils where gouging occurs.

   e. Respool cables where necessary to protect riparian reserves or other sensitive areas.

2. Ground-based

   a. Use existing skid trails wherever possible.

   b. Limit new skid trails to slopes less than 35 percent.

   c. Use designated skid trails to limit area extent of skid trails plus landings to less than 10 percent of the unit.

   d. Restrict tractor operations to designated trails, and limit operations to periods of low soil moisture, when soils have the most resistance to compaction (dry season).

   e. In partial cut areas, locate skid trails so that they can be used for final harvest.

   f. Till compacted trails, including skid trails from previous entries, with a properly designed self-drafting winged subsoiler.

   g. Avoid tractor yarding on areas where soil damage cannot be mitigated.

   h. Avoid placement of skid trails through areas of high water tables or where the skid trails would channel water into unstable headwall areas.

   i. Water bar skid trails whenever surface erosion is likely.

   j. Avoid use of wide track vehicles or more than one machine on a skid trail at any given time to minimize the width. (On multiple pass skid trails, wide track vehicles result in wider skid trails and, after multiple passes, drive the compaction deeper than a regular width track; however, they are good for one-pass operations such as incidental scattered salvage or site preparation.)

k. If timber harvesting activities will produce slash that covers the skid trails to the extent they cannot be relocated, prior to felling timber and with a property designed winged subsoiler, till existing skid trails that are not scheduled for reuse.

3. Aerial

a. Use helicopter, balloon, or skyline yarding to avoid or minimize new road construction, or to provide for complete suspension in sensitive watersheds.

b. Place landings away from watercourses to prevent petroleum products or other pollutants from entering the water.

II. Roads

A. Planning

Objective: To plan road systems in a manner that will meet resource objectives and minimize resource damage. Selection of some of the following practices will help meet this objective.

Practices:

1. Use an interdisciplinary process to develop an overall transportation system.
2. Establish road management objectives that minimize adverse environmental impacts.
3. Avoid fragile and unstable areas.
4. Minimize the percent of the land base converted to roads and landings; avoid heavy concentrations of roads and landings to minimize impacts from increased peak flows and erosion of the compacted surface.
5. Develop a District road closure plan using an interdisciplinary team.

B. Location

Objective: To minimize mass soil movement, erosion, and sedimentation. Selection of some of the following practices will help meet this objective.

Practices:

1. Locate roads on stable positions (e.g., ridges, natural benches, and flatter transitional slopes near ridges and valley bottoms). Implement extra mitigation measures when crossing unstable areas is unavoidable.
2. Avoid headwalls whenever possible.
3. There will be no construction on potentially unstable areas.
4. Locate roads to minimize height of cuts. Avoid high, steeply sloping cuts in highly fractured bedrock or deep soil.
5. Locate roads on well-drained soil types. Avoid wet areas by rolling the grade.
6. Avoid locating roads through areas where the geologic bedding planes or weathering surfaces are inclined with the slope.
7. Locate stream crossing sites where channels are well defined, unobstructed, and straight.

C. General Road Design Features

Objective: To design the lowest standard of road consistent with use objectives and resource protection needs. Selection of some of the following practices will help meet this objective.

Practices:

1. Road design standards and design criteria are based on road management objectives such as traffic requirements of the project and the overall transportation plan, an economic analysis, safety requirements, resource objectives, and the minimization of damage to the environment.
2. Consider future maintenance concerns and needs when designing roads.

3. Preferred road gradients are 2-10 percent with a maximum sustained grade of 15 percent. Use steeper grades in those situations where they will result in less environmental impact. Avoid grades less than two percent.

4. Outsloping of the road prism for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. It is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is desired. Outsloping is not recommended on sustained gradients over 8-10 percent.

5. Insloping of the road prism is an acceptable practice on roads with gradients over 10 percent and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.

6. Crown and Ditch - This traditional configuration is recommended for arterial and collector roads where traffic volume, speed, intensity, and user comfort are a consideration. Gradients may range from 2 to 15 percent as long as adequate drainage away from the road surface and ditchlines is maintained.

7. Minimize excavation.

8. Locate stable waste disposal areas suitable for depositing excess excavated material.

9. Endhaul waste materials generated during road and ditch maintenance, if side slopes exceed 60 percent or where unacceptable environmental damage may occur if sidecasting is used.

10. Endhaul sidecast materials where slopes have been overloaded.

11. Surface roads, if they will be subject to traffic during wet weather. The depth and gradation of surfacing will usually be determined by traffic type, frequency, weight, maintenance objectives, and the stability and strength of the road foundation and surface materials.

12. Provide for vegetative or artificial stabilization of cut and fill slopes in the design process.

13. Prior to completion of design drawings, field check the design to ensure that it fits the terrain, drainage needs have been satisfied, and all critical slope conditions have been satisfied.

14. Do not divert water directly into headwalls - vary the grade or install cross drains to channel water away from headwalls. Check maintenance on existing roads to ensure water is not allowed to remain on the road and/or diverted into unstable headwall areas.

15. Unless a road is needed for future entry, use a temporary road and reclaim it after use using methods such as blocking, tilling, seeding, mulching, fertilizing, and water barring. No excavation or minimal excavation with topsoil stockpiling and placement onto road after use could also be utilized.

16. Minimize potential erosion on a road. If it is dirt surface, reclaim it; otherwise apply rock aggregate to minimize surface erosion.

17. Select landing locations on the basis of minimal excavation, erosion potential, or slope stability concerns.

18. Avoid landing locations alongside or in meadows, wetland areas, or other special habitat features.

19. Shape landings to direct surface water runoff to preselected spots where it can be dispersed to natural, well-vegetated, stable ground.

D. Design of Cross Drains

Objective: To minimize concentrated water volume and velocity within the road prism, in order to reduce the risk of slope movement, erosion, and sedimentation. Selection of some of the following practices will help meet this objective.

Practices:

1. Design placement of all cross drains to avoid discharge onto erodible (unprotected) slopes or directly into stream channels. Provide a buffer or sediment basin between the cross drain outlet and the stream channel.

2. Locate cross drains or drainage dips in such a manner as to avoid outflows onto unstable terrain such as headwalls, landslide features, or block failure zones. Provide adequate spacing to avoid accumulation of water in ditches or surfaces through these areas.

3. Provide energy dissipators or armoring at cross drain outlets or drain dips where water is discharged on loose material, erodible soil, or steep slopes.

4. Use the guide for drainage spacing according to soil erosion classes and road grade shown in Section II.F.23., Table 1.

5. Use drainage dips and/or lead-off ditches in lieu of culverts on roads that have gradients less than 10 percent, or where road management objectives result in blocking roads. Avoid drainage dips on road gradients over 10 percent.

6. Locate drainage dips where water might accumulate, or where drainage is prevented by a berm.

7. Cut all cannon culverts to the proper length, downspout, and provide for energy dissipation if needed.

8. Design cross drainage culverts or drainage dips immediately upgrade of stream crossings to prevent ditch sediment from entering the stream.

9. Varying road gradients is a recommended design practice in erodible and unstable soils to reduce surface water volume and velocities, and the necessity for culverts.

10. Use slotted riser inlets in areas with highly erosive soils to prevent culvert plugging.

E. Design of Stream Crossings

Objective: To preclude stream crossings from being a direct source of sediment to streams, thus minimizing water quality degradation and providing unobstructed movement for aquatic fauna. Selection of some of the following practices will help meet this objective.

Practices:

1. Pipe arch culverts are appropriate on most fishery streams. Bottomless arch culverts and bridges will be necessary in some instances where gradients greater than 5 percent, stream discharge, and value of the fishery resource dictate that special engineering considerations are necessary to ensure uninterrupted fish passage. A round culvert may be suitable on streams where fish passage is not a concern.

2. Use the theoretical 100-year flood as design criteria for pipe arches or culverts.

3. Minimize the number of crossings on any particular stream.

4. Where feasible, design culvert placement on a straight reach of stream to minimize erosion at both ends of the culvert. Design adequate stream bank protection (e.g., riprap) where scouring could occur. Avoid locations requiring that the stream channel be straightened beyond the length of a culvert to facilitate installation of a road crossing.

5. Evaluate the advantages and disadvantages of a temporary versus permanent crossing structure. This evaluation should take into account economics, maintenance, and resource requirements for access to the area during all seasons over the long-term.

6. Reconstruct deteriorating or poorly built stream crossings with bridges or culverts, ensuring proper alignment and grade.

7. Increase the size of culverts to reduce the amount of highly erosive fill.

F. Construction

Objective: To create a stable roadway that will minimize soil erosion and water quality degradation. Selection of some of the following practices will help meet this objective.

Practices:

1. Limit road construction to the dry season (generally between May 15 and October 15). When conditions permit operations outside of the dry season, keep erosion control measures current with ground disturbance to the extent that the affected area can be rapidly closed/blocked and weatherized, if weather conditions warrant.

2. Manage road construction so that it can be completed and bare soil can be protected and stabilized prior to fall rains.

3. Confine construction of pioneer roads to within the roadway construction limits.

4. Conduct pioneer road construction to prevent undercutting the designated final cutslope as well as avoiding the deposition of materials outside the designated roadway limits.

5. Construct embankments out of appropriate materials (no slash or other organic matter) using one or more of the following methods:

   a. Layer placement (tractor compaction)
   b. Layer placement (roller compaction)
   c. Controlled compaction (85-90 percent maximum density).

6. Do not sidecast where it will adversely affect water quality or weaken stable slopes.

7. Install surface water drainage measures prior to fall rains.

8. Clear drainage ditches and natural watercourses of woody material deposited by construction or logging upstream from culvert installations.

9. Confine major culvert installation to the period of July 1 to September 15 to minimize sedimentation and the adverse effects of sediment on aquatic life.

10. For larger streams, divert streams around culvert installation work areas to minimize sedimentation during construction.

11. On streams with important fishery values, install the culvert as close to horizontal as possible (do not exceed 0.5 percent slope). Place culverts on larger nonfishery streams in the streambed at the existing slope gradient. Energy dissipators (e.g., large rock) placed at the outfall of culverts on small nonfishery streams are recommended to reduce water velocity and minimize scour at the outlet end.

12. Countersink culverts 6-8 inches below the streambed to minimize scouring at the outlet. Increase culvert diameters accordingly to minimize chances of plugging.

13. Confine activities by heavy equipment in the streambed to the area that is necessary for installation or removal of the structure. Restrict construction equipment to within the approved work area and out of the streambed.

14. Permanent stream crossing structures are recommended to be in place before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.

15. Place riprap on any fill material next to culvert inlets and outlets.

16. Where possible, limit the installation and removal of temporary crossing structures to once during the same year and within the prescribed work period. Installation and removal should occur between June 15 and September 15 to minimize adverse effects of increased sediment on aquatic life.

17. Use rock that is as soil-free as possible with temporary culverts. Whenever possible, use washed river rock covered

by crushed rock as a compacted running surface.

18. Spread and reshape clean fill material as close as possible to the original topography after a crossing is removed in order that the stream remains in its channel during high flow.

19. Limit activities of mechanized equipment in the stream channel to the area that is necessary for installation and removal operations.

20. Remove stream crossing drainage structures and in-channel fill material during low flow and prior to fall rains. Reestablish natural drainage configuration.

21. Use washed rock/gravel in a low water ford crossing, if frequent use is anticipated. Surface the approaches with rock aggregate within 150 feet of each side of a low water ford to minimize washing and softening of the road surface.

22. Construct water bars on dirt roads, spur roads, and skid trails prior to fall rains.

23. Use the following table for water bar spacing, based on gradient and erosion class.

Table 1 - Water Bar Spacing (in Feet)

Gradients (%)	Erosion Class High	Moderate	Low
3-5	200	300	400
6-10	150	200	300
11-15	100	150	200
16-20	75	100	150
21-35	50	75	100
36+	50	50	50

Spacing is determined by slope distance and is the maximum allowed for the grade.

G. Road Renovation/Improvement

Objective: To restore or improve a road to a desired standard to minimize sediment production and water quality degradation. Selection of some of the following practices will help meet this objective.

Practices:

1. Change flat gradients to a minimum of 2 percent or provide raised subgrade sections (turnpike) to avoid accumulation of surface water on the road prism.

2. Reconstruct unstable culvert catch basins to specifications. Catch basins in solid rock need not be reconstructed provided that culvert entrance specifications are met.

3. Identify potential off-site water problems or excessive flows and add necessary drainage facilities

4. Identify ditchline and outlet erosion caused by excessive flows, and add necessary drainage facilities and armoring.

5. Replace undersized culverts and repair damaged culverts and downspouts.

6. Add additional full-round culverts, half-round culverts, and energy dissipators as needed.

7. Correct special drainage problems (i.e., high water table, seeps) that affect stability of subgrade through the use of perforated drains, geotextiles, drainage bays, etc.

8. Eliminate undesirable berms that impair drainage away from the road prism.

9. Restore outslope or crown sections.

10. Avoid disturbing cutbanks while reconstructing ditches or catch basins.

11. Surface inadequately surfaced roads that are to be left open to traffic during wet weather.

12. When roadside brushing is necessary, require it be done in a manner that prevents disturbance to root systems (i.e., prohibit using excavators for brushing).

13. Revegetate all cut and fill slopes by seeding and/or planting trees or shrubs (use Native Species Manual 1745 and Eugene District's Implementation Strategy for Native Plants as guides), fertilizing, hydromulching, netting, and/or mulching.

14. Install stabilization features such as debris racks, binwalls, and rock blankets as needed.

H. Maintenance

Objective: To maintain roads in a manner that will provide for water quality protection by minimizing surface erosion, rutting failures, sidecasting, and blockage of drainage facilities. Selection of some of the following practices will help meet this objective.

Practices:

1. Provide the basic custodial maintenance required to protect the road investment to ensure that erosion damage to adjacent land and resources is held to a minimum.

2. Perform blading and shaping in such a manner as to conserve existing surface material, retain the original crowned or outsloped self-drainage cross-section, and prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid dumping loose ditch or surface material over the shoulder where it would cause stream sedimentation or weaken landslide prone areas. Avoid undercutting of road cuts.

3. Keep road inlet and outlet ditches, catch basins, and culverts free of obstruction, particularly before and during prolonged winter rainfall. Minimize routine machine cleaning of ditches during wet weather.

4. Promptly remove landslide material when it is obstructing the road surface and ditchline drainage, and utilize the landslide material for needed road improvements elsewhere or dispose of it in a stable waste area. Avoid sidecasting landslide material where it would overload embankments or natural slopes, or flow into downslope drainage courses.

5. Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Accomplish roadside brushing by cutting vegetation rather than pulling it out and disturbing the soil.

6. Patrol areas subject to road damage during periods of high precipitation.

7. Reclaim/revegetate all roads not needed for future management activities.

8. Revegetate bare cut and fill slopes.

9. Stabilize major slope failures (landslides) by subsurface drainage, rock blankets, or other methods.

I. Road Closures

Objectives: To prevent erosion and sedimentation of streams from unmaintained roads, and restore site productivity to roads no longer needed. Selection of some of the following practices will help meet these objectives.

Practices:

1. Barricade or block the road surface using gates, guard rails, earth/log barricades, boulders, logging debris or a combination of these methods. Avoid blocking roads that would need future maintenance (i.e., culverts, potential landslides, etc.) with unremovable barricades. Use guardrails, gates, or other barricades capable of being opened for roads needing future maintenance.

2. Follow-up on road closures to ensure they are maintained in accordance with design criteria.

3. Install water bars, cross sloping or drainage dips, if not already on road, to ensure drainage.

4. Till with a winged subsoiler, mulch and/or seed for erosion control and site productivity restoration.

5. Coordinate road closures with the (Off Highway Vehicle) OHV Plan (Appendix T) and the Transportation Management Plan.

J. Water Source Development

Objective: To supply water for road construction, dust abatement, and fire protection while maintaining existing water quality and supply. Selection of some of the following practices will help meet this objective.

Practices:

1. Design and construct durable, long-term water sources that maintain or enhance aquatic organism habitat.

2. Avoid reduction of downstream flow that would detrimentally affect aquatic resources, fish passage, or other uses.

3. Direct overflow from waterholding developments back into the stream.

4. Locate road approaches in instream water source developments to minimize potential impacts in the riparian zone. Rock surface these approaches to reduce the effects of sediment washing into the stream.

5. Avoid use of road fills for water impoundment dams unless specially designed for that purpose.

6. Construct water sources during the dry season (generally between May 15 and October 15).

K. Restoration of Rock Quarries

Objective: To minimize sediment production from quarries that are susceptible to erosion due to steep sideslopes, lack of vegetation, or their proximity to water courses. Selection of some of the following practices will help meet this objective.

Practices:

1. Wherever possible, prior to excavation of the site, remove and stockpile topsoil for surface dressing to be used in the reclamation of the site.

2. Use seeding, mulching, and drainage to minimize erosion.

3. Till, water bar, block, fertilize, and seed access roads to rock quarries where no future entry is planned. Reclaim depleted quarries to enhance other resource uses.

III. Silviculture

A. Riparian Protection/Enhancement

Objectives: To comply with the Aquatic Conservation Strategy. To prevent damage to riparian ecosystems, disturbance to streambanks, deterioration of water quality, and accumulation of slash in streams. Selection of some of the following practices will help meet this objective.

Practices:

1. No cutting of vegetation within Riparian reserves except to meet watershed and/or aquatic conservation strategy objectives.

2. When cutting vegetation within a tree length of any stream or riparian zone, fell trees to meet objectives in the Aquatic Conservation Strategy.

B. Mechanical Methods

Objective: To maintain soil productivity and water quality while meeting the silviculture objectives. Selection of some of the following practices will help meet this objective.

Practices:

1. When using tracked equipment for site preparation, limit the use of such equipment to areas of less than 35 percent slopes.

2. Do not compact skeletal or shallow soils.

3. Till all compacted areas with properly designed equipment. This could be waived if inspection reveals that less than 2 percent of the area is compacted. Compaction of less than 2 percent is considered to impair less than 1 percent growth loss.

4. On sites that do not annually dry out enough to provide resistance to traditional tracked equipment, use low-ground-pressure, track-type excavators. The narrow window for dry soils on these sites presents a high risk for impacts, as they do not offer the consistency needed for contract administration. These sites are located in the *Udic* moisture regime, which is dry less than 45 days within the 4 months following June, in 6 years out of 10.

5. Restrict tractor operations to dry conditions with less than 25 percent soil moisture content in the upper six inches of soil.

6. Construct small diameter piles or pile in windrows.

7. Avoid piling large logs and stumps.

8. Pile small material (3-8" diameter size predominantly).

9. Burn piles when soil and duff moistures are high.

C. Chemical Methods

Objectives: To protect water quality from chemical pollution and to enhance soil productivity. Selection of some of the following practices will help meet these objectives.

Practices:

1. Refer to Vegetation Management EIS.

2. Select areas for fertilization listed as TPCC FNR (low nutrient).

3. Target fertilizer for areas that have been impacted from past practices (e.g., intense burns) for possible mitigation.

4. Avoid aerial application of chemicals when wind speeds would cause drift.

5. Locate heliports and storage areas away from stream channels.

6. Do not apply chemicals within 100 feet of perennial streams, or channels with beneficial use(s) recognized by the State.

7. Do not apply chemicals directly into intermittent streams or channels with beneficial use(s) recognized by the State.

D. Broadcast Burning

Objectives: To maintain long-term soil productivity, organic matter, duff, and water quality when burning is used as a management practice. Selection of some of the following practices will help meet this objective.

Practices:

1. Evaluate need for burning based on soils, plant community, and site preparation criteria. Burn under conditions when a light burn can be achieved (see guidelines below) to protect soil productivity. The following standards should not be exceeded.

   a. Category 1 Soils (highly sensitive) - Avoid burning.

   b. Category 2 Soils (moderately sensitive) - Reduce disturbance, fire intensity, and duration by using the following methods:

      - Burn under conditions that result in low intensity fires.
      - Burn when soils and duff are moist.
      - Avoid burning sparsely vegetated areas on slopes greater than 65 percent.
      - Pull slash and woody debris adjacent to landings onto landings before burning.

c. Category 3 Soils (least sensitive) - Write prescriptions to protect a large percentage of the nutrient capital and other beneficial properties in the soil and the forest floor (low and moderate intensity burns).

2. Burn within Riparian reserves only to meet aquatic conservation strategy objectives.

3. Fire Trails

   a. Construct tractor fire trails utilizing a brush blade with one-pass construction during periods of dry soil moisture.

   b. Where the fire trail construction has resulted in compacted surfaces, till and water bar the fire trail (use property designed equipment).

   c. Avoid the placement of tractor constructed fire trails on slopes in excess of 35 percent.

   d. Avoid the placement of any fire trails where water would be channeled into areas of slope instability.

   e. Water bar all fire trails that may carry water in order to minimize surface erosion.

IV. Other Activities

A. Firewood

Objective: To prevent erosion from road use and water quality degradation during firewood operations. Selection of some of the following practices will help meet these objectives.

Practices:

1. Seasonal restriction on firewood cutting when access to cutting area is on an unsurfaced road.

2. Clean all road surfaces, ditches, and catch basins of debris from wood cutting.

B. Wildfire Control

Objective: To minimize water quality degradation and maintain soil productivity while achieving rapid and safe suppression of wildfire. Selection of some of the following practices will help meet these objectives.

Practices:

1. Develop a fire contingency plan for sensitive areas.

2. Limit use of heavy equipment near streams and on steep slopes when possible. Where fire trail entry into a riparian area is essential, angle the approach rather than have it perpendicular to the stream.

3. Attempt to keep fire retardant out of water sources.

4. Utilize information from burned area surveys to determine if watershed emergency fire rehabilitation is needed.

5. Develop a fire rehabilitation plan through an interdisciplinary process.

6. Select treatments on the basis of on-site values, downstream values, probability of successful implementation, social and environmental considerations (including protection of native plant community), and cost as compared to benefits.

7. Examples of emergency fire rehabilitation treatments include: (1) seeding grasses or other vegetation as needed to provide a protective cover as quickly as possible; (2) mulching with straw or other suitable material; (3) fertilizing; (4) channel stabilization structures, (5) trash racks above road drainage structures; and (6) water bars on fire lines.

C. Watershed Restoration and Fish Habitat Improvement Projects

Objective: To minimize damage to riparian vegetation, streambanks, and stream channels. Selection of some of the following practices will help meet this objective.

Practices:

1. Use an interdisciplinary team.

2. Use corrective measures to repair degraded watershed conditions and restore to predisturbance conditions with a vegetative cover that will maintain or improve soil stability, reduce surface runoff, increase infiltration, and reduce flood occurrence and flood damages.

3. Carefully plan access needs for individual work sites within a project area to minimize exposure of bare soil, compaction, and possible damage to tree roots. Utilize existing trails to the extent practical.

4. Schedule the timing of work in stream channels in accordance with the Memorandum of Understanding with Oregon Department of Fish and Wildlife to minimize the area of the stream that would be affected by sedimentation during the low flow period.

5. Keep equipment out of streams to the extent possible.

6. Limit the amount of streambank excavation to the minimum that is necessary to ensure stability of enhancement structures. Place excavated material where it will be stable and will not cause adverse stream effects.

7. Whenever possible, obtain logs for habitat improvement structures from outside the riparian zone or at least 200 feet from the stream channel to maintain integrity of riparian habitat and streambanks. Riparian zone management actions will comply with Aquatic Conservation Strategy.

8. Inspect all mechanized equipment daily to help ensure toxic materials such as fuel and hydraulic fluid do not enter the stream.

9. Utilize water bars, barricades, seeding, and/or planting to stabilize bare soil areas.

10. When needed to meet Aquatic Conservation Strategy objectives, place woody debris in RMAs and streams, create snags and plant conifers and woody riparian vegetation where previous management activities have removed them.

11. Design water source developments and improvements to protect riparian values.

12. Manage livestock use of riparian areas by fencing, other water source development, livestock numbers, season of use, and in accordance with the Aquatic Conservation Strategy.

D. Mineral Exploration and Development

Objective: To minimize unnecessary disturbance to soils, riparian ecosystems, streambanks, and stream channels within constraints of applicable regulations. Selection of some of the following practices will help meet this objective.

Practices:

1. Require that operator obtain all required State and Federal operating permits.

2. Locate, design, operate, and maintain sediment settling ponds in conformance with State Department of Environmental Quality (DEQ) guidelines.

3. If possible, design, locate, and construct stream crossings in conformance with practices described in Sections II.D and II.E and the Aquatic Conservation Strategy.

4. Use existing roads, skid trails, and stream crossings whenever possible.

5. Adequate drainage of surface runoff will be necessary for roads that are constructed or reconstructed for vehicular access to the operating area. If roads are to be utilized during winter months (October 15 - April 15) rock aggregate should be used to surface those roads.

6. As appropriate, till, water bar, seed, mulch, and barricade according to BLM specifications, all roads and trails constructed for exploratory purposes that are not needed for the operation.

7. Reclamation of the disturbed area, access roads, and trails shall be conducted at the conclusion of operations.

8. Construct a berm or trench between disturbed areas and water courses when needed to protect water quality.

9. Stockpile topsoil for use during reclamation of the site. In the interim, stockpiled topsoil must be stabilized to prevent erosion and contamination of other resources in the area.

10. If erosion is predicted to occur during the period from October 15 to May 15, contour and mulch disturbed areas that will not be utilized for at least 30 days.

11. If possible, retain an undisturbed riparian buffer strip between mining operations and water courses to protect integrity of streambanks, provide for water temperature control, and for filtration of sediment from surface runoff.

12. Whenever possible, confine operations to areas above the high water line of streams.

13. Locate and maintain sanitation facilities in accordance with State and local regulations and District policies.

TPCC Fragile Codes/Guidance

The Timber Production Capability Classification (TPCC) inventory is designed to identify sites capable of sustaining intensive timber management without degradation of their productive capacity. Factors such as soil depth, available moisture, slope, drainage, and stability are evaluated to determine the degree of timber management activity on a particular site. This would include sites capable of sustaining standard timber harvest practices, special practices or limitations to prevent degradation, and sites too fragile to tolerate any timber management without long-term loss of productivity.

A complete description of the system can be found in *BLM State Office Handbook 525 1- 1, Timber Production Capability Classification.* This is available at the District office.

This section describes the fragile codes used in the TPCC, identifies the concerns associated with each code, and recommends potential practices for management of such areas. The recommended practices listed in this section are measures necessary to avoid unacceptable soil productivity loss for lands classified in the TPCC as fragile. The goal of the practices listed is to prevent or mitigate adverse impacts while meeting other resource objectives. Practices listed in this section are not all-inclusive. The actual practices used for land classified as fragile are selected by an interdisciplinary team on a site specific basis.

A. Fragile Nonsuitable Woodland - Soil Moisture (FSNW)

Soils on these sites are excessively well drained. Soils have a very low Available Water Holding Capacity (AWHC) and are subject to being dry for long periods during spring and summer months. Vegetation communities are primarily uneven-aged, open-grown Douglas-fir with a low vigor ground cover of salal. Soils typically have sandy or gravelly textures with coarse fragments consisting of more that 70 percent of the top 12 inches of the soil. AWHC is generally between 0.5 and 1 inch.

Concerns:

Because of the limited soil resource, survival of newly planted vegetation is low. Any site disturbance severely reduces the future productivity potential. These losses cannot be mitigated even using best management practices.

Recommended Practices:

These sites should be managed for nontimber uses.

B. Fragile Suitable Restricted - Soil Moisture (FSR)

Sites with thin, light-colored topsoils and gravelly, often shallow soils with low moisture storage capacity. Available water holding capacity in the top 12 inches ranges from 1 to 1.5 inches.

Concerns:

Because of low moisture supplying capacity and thin topsoil, soil displacement or compaction

significantly impacts the growth of biomass. Soil compaction or displacement further reduces the soil's ability to absorb and store moisture, reducing survival and growth of conifer seedlings.

Recommended Practices:

1. Avoid ground-based logging equipment.
2. Avoid wet-season yarding, except with suspension of logs.
3. Avoid scarification or tilling of soil.
4. Avoid tractor constructed fire trails.
5. Do not prescribe burn or, if burning is absolutely necessary, burn only when fire intensity and duration will be low (see burning guidelines).

C. Fragile Suitable Restricted - Nutrient (FNR)

Soils on this site are typically well to excessively drained. They occur primarily on ridges, ridge noses, and steeper convex hillslopes, at elevations above 2,800 feet. Soils typically have thin topsoils. Organic matter turnover rates are slow and a high proportion of site nutrients is stored in the aboveground biomass.

Concerns:

The highest demand for plant nutrients occurs during the first 15 to 20 years after a plantation is established. Removal of nitrogen on sites already below optimum levels for growth would have an immediate impact on new plantations. Although natural precipitation supplies small amounts of nitrogen, it must be emphasized that nutrients in deficient soils will not be available in sufficient quantities during the period of maximum need by the young stand of trees.

Studies indicate that scarification and burning that result in high biomass removal on nutrient-deficient soils could have an immediate detrimental impact on growth.

Recommended Practices:

1. Avoid burning on these sites when possible. Burning is often not needed to control plant competition on low fertility sites.
2. Avoid burning on steeper slopes and southerly aspects.
3. Encourage nitrogen-fixing vegetation.
4. Use fertilizer to increase nutrient levels.
5. Avoid use of ground-based yarding equipment such as tractors and rubber-tired skidders.
6. Avoid scarification and tractor slash piling.
7. Consider extended rotations.

D. Fragile Nonsuitable Woodland - Slope Gradient (FGNW)

Slopes/areas that have been determined to be potentially unstable.

Slopes greater than 80 percent adjacent to streams and in headwalls of drainages.

Concerns:

Logging or road construction activity is likely to accelerate surface erosion and/or trigger slides or debris avalanches into streams.

Recommended Practices:

1. Manage for uses other than timber production with a primary emphasis on maintaining water quality.
2. Avoid and buffer these sites whenever possible, especially if there are indicators of instability.
3. If included in timber sale units, fall and yard away or use full suspension. Buffer the headwalls or streams.

E. Fragile Suitable Restricted - Slope Gradient (FGR)

Steep hillslopes of greater than 70 percent, adjacent to streams or in headwalls of drainages. Soils are shallow to moderately deep, noncohesive and gravelly.

Concerns:

Disturbances of logging or road construction may accelerate soil erosion, ravelling, and sliding, and

may contribute to debris avalanches. When such materials enter streams, there are serious impacts to water quality and to riparian (streamside) vegetation.

Recommended Practices:

1. Avoid placing roads in headwalls steeper than 70 percent and minimize sidecasting of excess road construction materials.
2. Avoid practices that add water to headwalls or disrupt the natural drainage.
3. Patrol culverts in high-hazard areas during high runoff events.
4. Avoid placement of new materials into landslide areas.
5. Direct road runoff into ditch lines by insloping or use of dips.
6. Place downspouts on culverts where they discharge onto steep slopes.
7. Utilize full suspension yarding.

F. Fragile Suitable Restricted - Mass Movement Potential (FPR)

These sites occur primarily in undulating topography containing depressions and sag ponds. Parent material is primarily volcanic rock. Slopes of the slump scarp may be steep but the average hillslope is on gradients of less than 70 percent. Soils are typically deep and highly productive.

Concerns:

These sites are subject to slow mass movement. Any practice that increases weight or soil pore pressure, or reduces support at the toe, accelerates movement. Run-off from compacted soil on roads and skid trails that diverts water into unstable areas is a common cause of increased instability.

Recommended Practices:

1. Avoid unloading toeslopes of landslides.
2. Avoid placing waste material on landslide features.
3. Divert road drainage away from unstable areas.
4. Maintain or reestablish natural drainage after harvest operations.
5. Evaluate unstable slopes and design measures to enhance their stability.

G. Fragile Nonsuitable Woodland - Groundwater (FWNW)

Very poorly drained areas with water at the surface for much of the year. Vegetation includes scattered alder and cottonwood with an understory of salmonberry, skunk cabbage, sedges or rushes, and devils club.

Concerns:

Commercial conifer trees are unable to survive on these sites except on scattered hummocks or mounds with better drainage. The high water table makes it easily damaged by timber management or other activities.

Recommended Practices:

Manage for uses other than timber production with primary emphasis on water quality and wildlife.

H. Fragile Suitable Restricted - Groundwater (FWR)

These are very moist, imperfectly drained sites, usually in depressions or adjacent to streams or unstable areas where the water table is near the surface much of the year. (Soils have high-chroma mottles or greying within 6 to 14 inches of the surface. Slough sedge and skunk cabbage are absent.) The vegetation is dominated by alder and western hemlock overstories, and oxalis, vine maple, and sword-fern understories. Salmonberry and devils-club are minor components.

Concerns:

These sites may or may not contain water-tolerant species, but removal of trees could reduce transpiration rates. Yarding may disrupt surface water flows. This can raise the water table and increase the time in which soils are wet. In turn, this could reduce production, increase competition of unwanted vegetation, and change the adapted species.

Recommended Practices:

1. Minimize practices that disrupt natural drainage, such as dragging logs through wet areas or leaving skid trails that block natural drainage.

2. Avoid use of ground-based logging equipment when soils are wet.

3. Avoid scarification.

4. Plant species adapted to the site, such as western hemlock, western red cedar, or alder.

Appendix I
Soil Compaction, Erosion, and Nutrient Status

Introduction

This appendix contains two major sections. The first section is a general discussion concerning soil compaction, erosion, and nutrient status. The second section contains a general discussion of the FORCYTE-11 model.

The District's soils differ in their degree of sensitivity to management activities. The type and condition under which activities occur determine the effects on soil productivity. Timber management practices, including road construction, are the dominant management activities that create disturbances (i.e., compaction/displacement, surface erosion, mass wasting, and alteration of organic material and nutrition levels) that could potentially impact productivity.

Compaction/ Displacement

Soil compaction is the process where soil pore space is reduced because of physical pressure and vibration exerted on the soil surface. Compaction results in reduced plant growth due to reduced water infiltration and gaseous and nutrient exchange rates. Physical resistance to root growth can occur with high soil densities. Compaction may also affect populations of soil organisms, but resultant tree growth impact is unknown.

Soil displacement is a process where a portion or all of the surface soil is moved by mechanical action. This may affect plant growth, depending on distance moved, by removing nutrients and soil organisms and by reducing available water and rooting depth.

Timber harvest and site preparation methods together with soil conditions during operation influence the degree of soil compaction and displacement. The yarding system utilized during harvest affects the amount of soil disturbed. Amount of compaction/displacement created by ground based yarding primarily depends on areal extent of yarding trails, soil moisture during yarding, number of passes over each trail, and amelioration practices used. The more a log is suspended during yarding with a cable system, the less the soils are impacted; thus, skyline systems generally disrupt less than highlead systems (Dyrness, 1967). Cable yarding compaction growth effects are unknown. Amount of soil compaction/ displacement and tree growth losses created by mechanical site preparation vary with differing conditions (amount of material to be piled, soil moisture, machine type and operation, depth of organic matter layers, number of machine passes, etc.). Timber harvesting and site preparation systems can be designed and implemented with only negligible impacts to soil productivity.

The areal extent of detrimental soil compaction/ displacement created by ground based yarding can be minimized by utilizing designated or preplanned skid trails that are restricted to a predetermined percentage of the harvest unit (Froehlich et al., 1981; Garland, 1982; BLM Compaction Guidelines, 1983). Detrimental soil compaction created by mechanical site preparation can be minimized or avoided by utilizing a tracked backhoe/excavator and/or limiting the number of passes to 2 (forward and back) when soils are dry and most resistant to compaction. Tillage can fracture and ameliorate compacted soil. The degree of fracturing varies with tillage equipment, machine operation, and soil and site conditions (texture, moisture, coarse fragment content, etc.). Andrus and Froehlich (1983) reported fracturing of approximately 80 percent for properly designed winged subsoilers. Davis (1990) reported bulk densities of compacted areas tilled with a self-drafting winged subsoiler were not significantly different than those in uncompacted areas. Although soil structure and pores are not returned to their natural condition by tillage, it is commonly accepted that tillage of compacted soils improves conditions for root growth. No research has been conducted that correlates the degree of fracturing and restoration of soil density with a similar degree of growth potential restoration.

Soil Erosion and Mass Wasting (Landsliding)

Surface erosion and mass wasting are 2 types of soil erosion that affect long-term productivity of forest soils. Both are naturally occurring geologic processes involving gravity, soil water, precipitation events, etc.

Surface soil erosion, which includes sheet, rill, gully, and dry ravelling, is the detachment and movement of individual soil particles or aggregates downslope. It is caused either by the energy of rainfall and running water acting on bare soils, or by surface disturbance of steep slopes. In some of the higher elevation areas, freezing and thawing, especially on a daily basis, can cause considerable erosion on disturbed ground. This is particularly apparent in road cutbanks and areas with exposed soil.

Mass wasting (landsliding) is the downslope movement of soil and rock material. Volume of mass wasting events can range from a few cubic feet to thousands of cubic yards. Some of the more important factors that contribute to soil/slope instability are steep gradient, low soil strength, declining root strength, road construction, and high frequency, long duration, and intense precipitation events.

Several distinct types of mass movement are recognized. Debris avalanches and debris torrents are similar in that both occur on steep slopes, are fast moving, and are composed of soil, rock, water, and organic material. Torrents are water charged and occur in drainages, whereas avalanches lack the high water content and may or may not occur in drainages. These are the most dangerous types of landslides and usually produce the most dramatic on-site and off-site effects. Various slow moving types of mass movement, such as shallow earth flows, rotational slumps, and deep-seated geologic events occur, and are usually initiated by excessive water. Major concerns and impacts of mass wasting are public safety, private property, roads, bridges, water quality, and fisheries (see Chapter 4, Water Resources and Fish sections).

Reduction in root strength following timber harvest and site preparation activities is possibly a significant cause of landsliding in locations outside the area of road construction. These changes match the high frequency of landslides the first few years following timber harvest on slopes with high potential for failure in western Oregon (Burroughs and Thomas, 1977). Areas most sensitive to loss of root strength and subsequent translational-type (slip surface is relatively shallow, planar, and roughly parallel to the ground surface); landsliding slopes are usually steep (70 percent plus), in concave positions over hard bedrock in areas of high rainfall. Rotational-type (slip surface is relatively deep and circular) landslides are less sensitive to the root strength factor, but are sensitive to disturbances to soil and ground water and natural slope configuration.

Nutrient Status

Soil organic matter accumulation and cycling are related to site index. When compared to lower site indices, higher sites have more organic matter incorporated into the soil and a larger nitrogen pool. Therefore, productivity is usually more resilient on higher sites. For maintenance of long-term productivity, conservation of organic matter on low sites is more important than on high sites.

Harvest and site preparation intensities and frequencies influence the amount and composition of the surface organic layer. Conservation of small materials (needles, leaves, twigs) is important for site total nitrogen because these materials have the highest concentrations of nitrogen. When compared to needles and twigs, removal of large materials (stemwood and large branches) has less effect on site total nitrogen. However, the large materials are important for continuation of healthy symbiotic fungi populations (Maser et al., 1978).

Soil Biology

Soil organisms interact with each other and their environment and have a fundamental role in many site processes. Soil organisms work continually in carbon cycling, nutrient transfer, water availability, vegetation vigor, and maintenance of soil structure (Powers, 1989). Mycorrhizal fungi enhance nutrient uptake of host plants by increasing the absorbing surface area of roots and through active physiological mechanisms (Amaranthus et al., 1989). When populations of soil organisms are healthy, few nutrients, such as nitrate, leach out of the system. The increased surface absorbing area also directly increases the total soil volume roots can explore for water and nutrients.

Soil organisms are responsible for most biological fixation of nitrogen in ecosystems. Certain bacteria and actinomycetes form a mutually beneficial relationship with host plants and convert (symbiotic fixation) atmospheric nitrogen into ammonium

nitrogen, which is released into the host plant's roots (Amaranthus et al., 1989). Red alder is an important host plant occurring in the District operating area. Research literature has reported that the nitrogen content of sites growing red alder is greater than similar sites growing Douglas-fir. Also, certain organisms that are not associated with host plants can convert atmospheric nitrogen (asymbiotic fixation). Some of these organisms are associated with wood rotting fungi and mycorrhizal fungi (Amaranthus et al., 1989).

Mycorrhizae and other microbes affect soil structure by helping bind soil particles into water-stable aggregates that create soil volume with stable and adequate pore space. Soil pores are essential for adequate movement of water and air required by plant roots and soil organisms.

Data are lacking for addressing what reduces populations of beneficial organisms and how reduced populations affect soil productivity. However, recent studies provide evidence for reasonable speculation. Long-term impacts to soil organisms can be minimized by implementing management practices that minimize soil disturbance severity, maintain organic matter levels, and emphasize revegetation by indigenous host species and associated soil organisms (Amaranthus et al., 1989).

FORCYTE-11 Model

The FORCYTE-11 (FORest nutrient Cycling and Yield Trend Evaluator) Model was developed in the late 1980s by Dr. J. P. Kimmins and K. A. Scoullar, under contract to Forestry Canada (Kimmins and Scoullar, 1990). It is a hybrid historical bioassay and ecological processes-based simulation computer model that predicts forest yields. FORCYTE-11 was developed to examine the effects of altering the nutrient status of a site.

The Eugene District has used FORCYTE-11 to estimate long-term soil productivity trends for various management practices. The trends are only used for relative comparisons because the model has not been verified with long-term experimental data.

Oregon State University's Department of Forest Science used a combination of literature and inventory data to calibrate FORCYTE-11 for Western Oregon Douglas-fir sites (Sachs, 1988). This data does not give a complete representation of all the ecosystem processes, but is the best available at the present time. Research data indicate that nitrogen is the limiting nutrient for most sites growing Douglas-fir in western Oregon. Therefore, nitrogen was the limiting nutrient used in the FORCYTE-11 simulations. Vegetative growth in FORCYTE-11 is influenced by available nitrogen.

FORCYTE-11 was used to estimate Douglas-fir total biomass production at an inherent, natural productivity level. This natural productivity level represents a baseline for comparisons of the various management prescriptions. The baseline (natural productivity level) is defined as Douglas-fir total biomass production estimated by FORCYTE-11 simulation over a 520-year time frame, with maintenance of site quality and each rotation spanning a 65-year period (culmination of mean annual increment). The baseline simulation was preceded by 900 years with no management practices and low intensity ground fires at 60-year intervals; stand replacement fires occurred at 180-year intervals. This procedure was assumed to approximate natural stand dynamics prior to timber harvest and forest management. Therefore, any changes caused by management practices would be calculated from this common base.

The following procedure was used for estimating nitrogen related growth effects due to various management prescriptions:

1. The estimate of total Douglas-fir biomass for the baseline (inherent productivity of a natural stand growing until culmination of mean annual increment) was converted to mean annual production.

   Example: 10,430 metric tons/hectare produced over eight 65-year (culmination of mean annual increment) rotations (520 years = evaluation time frame).

   $$\frac{10{,}430}{520} = 20 \text{ metric tons/hectare/year}$$

2. FORCYTE-11 was used to estimate Douglas-fir total biomass produced by various management prescriptions. These total biomass figures were reported as mean annual production.

   Example: Management prescription of 70-year rotations with a low intensity,short duration prescribed burn, one fertilization, and precommercial thinning; 11,334 metric tons/hectare produced over eight 70-year rotations (560 years = evaluation time frame).

   $$\frac{11{,}334}{560} = 20.2 \text{ metric tons/hectare/year}$$

3. The mean annual production estimates were used to calculate percent change from the baseline (inherent natural productivity level) for the various timber management prescription simulations.

   Example: $\frac{\text{20.2 (management prescription simulation) - 20 (baseline)}}{\text{20 (baseline)}} \times 100 = +1\%$

4. The direction of the productivity trend for each simulated management prescription was estimated by calculating the percent change of the mean annual production for the last rotation from the mean annual production for the entire evaluation time frame.

   Example: $\frac{\text{17.4 (annual prod. last rotation) - 20.2 (time frame production)}}{\text{20.2 (time frame production)}} \times 100 = -14\%$

5. The percent change from the baseline level for each management prescription was categorized into the following trend classes:

Maintaining:	Change is + or - _10%
Increasing:	Change is + 11-20%
Decreasing:	Change is - 11-20%
Strongly Increasing:	Change is + >21%
Strongly Decreasing:	Change is - >21%

Table 4-4 displays long-term productivity trend classes for various management practices that would be used under the various alternatives. There are 18 sets of management prescriptions that have been simulated with 2 prescribed burn intensities (moderate and low) and no burning. Site quality used for the simulations was 121 (50-year base), which is the District average. Because the FORCYTE-11 Model has not been validated and its usefulness is in trends assessment, simulations of the various management prescriptions are reported in categories that have ranges of 10 (increasing and decreasing categories) to 20 (maintaining) percent.

Trends listed in Table 4-4 indicate:

1. For simulations (prescription #3) of precommercial thinning (PCT) and harvesting at culmination of mean annual increment (CMAI), productivity decreased when burning was used as a site preparation tool.

2. 150-year rotations (prescription #4) allow enough time for the system to maintain productivity and the nitrogen cycle, even with a moderate intensity prescribed burn.

3. One fertilization with a 70-year rotation (prescription #5) maintains productivity, but productivity gradually decreases over time with light and moderate prescribed burns. This gradual decrease is not evident when rotation length is increased from 70 years to 150 years (prescription #6).

4. Three fertilizations are needed to sustain the maintaining level of productivity under a moderate burn scenario with 70-year rotations (prescription #11). Three fertilizations do not sustain productivity with 60-year rotations (prescription #14).

5. For 40-year rotations with intensive management practices (prescription #13), productivity was sustainable only when prescribed burning was not used.

6. The only prescription (#15) that simulated a sustained productivity increase for moderate burn intensities contained intensive management practices and 115-year rotations.

7. Downed, large woody material retention scenarios (prescription #17 and 18) that simulated Alternatives D and E did not alter results from simulations (prescription #9 and 11) that contained 10 percent less downed, large woody material.

Appendix J
Consistency of the Proposed RMP with Other Agency Plans

Table 4-47 - Consistency of the Proposed RMP with State of Oregon Wildlife Plans

State Plan/Statute	Objective	Consistency of Proposed RMP
Oregon Statutory Wildlife Policy, Revised Statute 496.012	Maintain all species of wildlife at optimum levels and prevent the serious depletions of any indigenous species.	May maintain some populations at less than optimum (see later discussion of big gamemanagement objectives and Effects on Wildlife).
	Develop and manage the lands and waters of the State in a manner that would enhance the production and public enjoyment of wildlife.	
		Public access would be limited by access management.
	Develop and maintain public access to the lands and waters of the State and the wildlife resources thereon.	
	Regulate wildlife populations and public enjoyment of wildlife in a manner that is compatible with primary uses of the lands and waters of the State and provide optimum public recreational benefits.	
Oregon Threatened and Endangered Species Act	Protect and conserve wildlife species that are determined to be threatened or endangered.	All State listed species found within Eugene District are also Federally listed under the Endangered Species Act. As such, these species will be protected under the requirements and provisions of the Act.
Oregon's Sensitive Species Rules	Help prevent species from qualifying for listing as threatened or endangered.	Species on Oregon's sensitive species list would be well protected. Also see later discussions of wild fish policy and fish plans.

Table 4-47 - Consistency of the Proposed RMP with State of Oregon Wildlife Plans (continued)

State Plan/Statute	Objective	Consistency of Proposed RMP
Nongame Wildlife Plan	Maintain populations of naturally occurring Oregon nongame wildlife at self-sustaining levels within natural geographic ranges in a manner that provides for optimum recreational, scientific, and cultural benefits and, where possible, is consistent with primary uses of lands and waters of the State.	See preceding discussions.
Big Game Population Management Objectives	Develop, restore and/or maintain big game (along with associated recreation, aesthetic, and commercial opportunities and benefits) at the level identified in 1980 as the planning target level by game management unit. This is accomplished through hunting season regulation and management practices on public lands that tend to stabilize the cover-forage relationship in space and time, provide for a wildlife emphasis in management of sensitive wintering areas, and offer habitat improvement opportunities.	Forage on BLM administered lands would decline. Private lands, however, are expected to provide adequate forage. Access management would improve habitat for elk.
Wild Fish Policy	Protect and enhance wild stocks.	Would not change habitat conditions enough in the short-term to alter existing stocks. In the long-term, would protect streams sufficiently to protect wild stocks and provide sufficient stream habitat protection to contribute to their enhancement.
Coho, Steelhead, and Trout Plans	Maintain and enhance production.	Similar to wild stocks (see preceding).
Basin Fish Management Plans	Establish compatible objectives for management of all fish stocks in each Basin.	Similar to wild stocks (see preceding).
Oregon Forest Practices Act Rules	Establish minimum standards that encourage and enhance the growing and harvesting of trees while considering and protecting other environmental resources, such as air, water, soil, and wildlife.	See Item 2, Table 4-48, in this Appendix.

Table 4-48 - Consistency of the Proposed RMP with the Forestry Program for Oregon (FPFO)

FPFO Objective	Consistency of the Proposed RMP (PRMP)
1. **Forest Land Use.** Preserve the forest land base of Oregon: Stabilize the present commercial forest land base. Manage habitat based on sound research data and the recognition that forests are dynamic and most forest uses are compatible over time.	Preserves most of the forest land administered by BLM, while allowing for some conversion of forest to accommodate expansion of transportation, power, and communication facilities. Also allows for exchange and/or sale of some forest lands, which could lead to their conversion to nonforest uses if local land use plans permit. Land that would be managed for commercial forest products totals 69,000 acres, less than the 265,000 acres currently allocated to commercial forest production. The allocation of additional land to uses other than timber production is based on current research data.
2. **Forest Practices.** Assure practical forest practices that conserve and protect soil productivity and air and water quality: Promote forest practices that maintain Oregon's forest values, including forest tree species, fish and wildlife, soil productivity, and air and water quality. The Forest Practices Act and rules are one vehicle for accomplishing this.	Provides for the use of practical forest practices that meet this goal and meet or exceed the requirements of the Oregon Forest Practices Act and rules of the Oregon Smoke Management Plan, with 2 possible exceptions: (1) Possible in consistency with the clear cut size and proximity requirement of Section 4 of the Forest Practices Act, as revised in 1991. Recent interpretations of that requirement indicate that, for its purposes, "clear cuts" include most shelterwood harvest units; so they would also include harvest units with retention of 6 to 8 green trees per acre and even with 10 to 18 per acre. Although BLM harvest units would be fragmented by Riparian Reserves, the 300-foot distance (from adjacent units) requirement in the Act would not cover all units on both sides of intermittent streams; thus, the 120-acre limit might be violated, though the PRMP seems consistent with the Forest Practices Act objective. (2) The requirement for smoke management clearance prior to burning slash, and need for completion of burning before replanting, may cause delay in reforestation beyond the 1-year required by the Act.

Table 4-48 - Consistency of the Proposed RMP with the Forestry Program for Oregon (FPFO) (continued)

FPFO Objective	Consistency of the Proposed RMP (PRMP)
3. **Timber Growth and Harvest.** Promote the maximum level of sustainable timber growth and harvest on all forest lands available for timber production, consistent with applicable laws and regulations, and taking into consideration landowner objectives.	Provides for the use of intensive forest management practices that are professionally and environmentally sound, to promote timber growth and harvest on all forest lands allocated as available for such intensive management, consistent with the Plan's goals and objectives.
4. **Recreation, Fish and Wildlife, Grazing, and Other Forest Uses.** Encourage appropriate opportunities for other forest uses, such as fish and wildlife habitat, grazing, recreation, and scenic values on all forest lands, consistent with landowner objectives; a full range of recreation opportunities is encouraged. Where needed to reduce harassment and/or over harvest of wildlife, road closure programs are supported.	Provides opportunities for other forest uses, consistent with the PRMP goals and objectives. Road closures to protect wildlife habitat and other values are emphasized.
5. **Forest Protection.** Devise and use environmentally sound and economically efficient strategies to protect Oregon's forests from wildfire, insects, disease and other damaging agents; use integrated pest management. Minimize total cost plus loss resulting from wildfire. Employ cost-effective fire management policies that emphasize planned ignition fires over natural ignition fires and that consider impacts to the State's forest fire protection program.	Economically efficient protection strategies would be employed, and integrated pest management would be used. Minimizing total cost plus loss from wildfire would be integral. Planned ignition prescribed fires would be emphasized over natural ignition prescribed fires, but the latter could be used to achieve resource and fire management objectives. Cooperation with other fire suppression agencies, including State and local agencies, would help ensure cost-effective fire protection and suppression by all parties.

Table 4-49 - Relationship of the Proposed Resource Management Plan to Statewide Planning Goals

Statewide Goal Number 1: Citizen Involvement

Description: To develop a citizen involvement program that ensures the opportunity for citizens to be involved in all phases of the planning process. Federal and other agencies shall coordinate their planning efforts with the affected government bodies and make use of existing local citizen involvement programs established by cities and counties.

Consistency of Proposed Resource Management Plan (PRMP): BLM's land use planning process provides for public input at various stages. Public input was specifically requested in developing issues, planning criteria, and the Proposed Resource Management Plan (PRMP). Coordination with affected government bodies, including the Governor's forest planning team, has been ongoing and will continue. BLM has used County planning departments to provide linkage to local citizen involvement programs.

Statewide Goal Number 2: Land Use Planning

Description: To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions.

Consistency of Proposed Resource Management Plan (PRMP): The PRMP has been developed in accordance with the land use planning process authorized by the Federal Land Policy and Management Act of 1976, which provides a policy framework for all decisions and actions. The process includes issue identification, inventories and evaluation of alternative choices of action. Intergovernmental coordination in the planning process is discussed in Chapter 5 of the Resource Management Plan/Environmental Impact Statement (RMP/EIS).

Statewide Goal Number 3: Agricultural Lands

Description: To preserve and maintain existing commercial agricultural lands for farm use, consistent with existing and future needs for agricultural products, forest, and open space.

Consistency of Proposed Resource Management Plan (PRMP): The PRMP does not exclude BLM administered grazing land from grazing use or affect the use of other lands for agriculture use.

Statewide Goal Number 4: Forest Lands

Description: To conserve forest lands by maintaining the forest land base and to protect the State's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with the sound management of soil, air, water, fish and wildlife resources, and provision for recreational opportunities and agriculture.

Consistency of Proposed Resource Management Plan (PRMP): BLM administered lands in the planning area are predominately forest land and woodlands. The PRMP would not lead to substantial conversion of those lands to nonforest uses. Conversion areas, such as new forest roads and utility rights-of-way would be limited to the minimum width necessary for management and safety, and the latter limited to existing corridors where practical. The PRMP is consistent with the State's forest land protection policies, with one possible exception (see item 5, Table 4-48 in this Appendix).

Table 4-49 - Relationship of the Proposed Resource Management Plan to Statewide Planning Goals (continued)

Statewide Goal Number 5: Open Spaces, Scenic and Historic Areas, and Natural Resources

Description: To conserve open space and protect natural and scenic resources.

Programs shall provide the following:

Ensure open space
Protect scenic and historic areas and natural resources for future generations
Promote healthy and visually attractive environments in harmony with the natural landscape character.

The location, quality and quantity of the following resources shall be inventoried:

Land needed or desirable for open space
Mineral and aggregate resources
Energy sources
Fish and wildlife areas and habitats
Ecologically and scientifically significant natural areas, including desert areas
Outstanding scenic views and sites
Water areas, wetlands, watersheds, and groundwater resources
Wilderness areas
Historic areas, sites, structures, and objects
Cultural areas
Potential and approved Oregon recreation trails
Potential and approved Federal Wild and Scenic waterways and State scenic waterways

Where no conflicting uses for such resources have been identified, such resources shall be managed so as to preserve their original character. Where conflicting uses have been identified, the economic, social, environmental, and energy consequences of the conflicting uses shall be determined and programs developed to achieve the goal.

Based on the analyses of economic, social, environmental, and energy consequences to Goal 5 resources listed above, conflicting uses of (BLM administered) lands and resources may be resolved by selection of 3 management options: (1) protect the resource site; (2) allow conflicting uses fully; or (3) limit conflicting uses. This is achieved by designating with certainty what uses and activities are allowed fully, what uses and activities are not allowed at all, and which uses are allowed conditionally, and what specific standards or limitations are placed on the permitted and conditional uses and activities for each resource site.

Consistency of Proposed Resource Management Plan (PRMP): Natural, historic, and visual resources were considered in the development of the PRMP. Availability of mineral, aggregate, and energy sources would continue, but be somewhat limited. Timber and ecosystem management actions would impact natural and visual resources.

Adverse impacts to visual resources, wildlife habitat, potential wild and scenic rivers, State waterways, and unique natural areas would be slight. Water areas, wetlands, and watersheds would be protected (see Chapter 4 for discussions). Also see *Forestry Program for Oregon Objective: Forest Practices* in Appendix GG for discussion of consistency with relevant sections of the Forest Practices Act and Rules.

The PRMP attempts to balance conflicting uses in light of their consequences. Conflicting resource uses are most often resolved by protecting the Goal 5 resource site or severely limiting conflicting uses to meet environmental goals.

Table 4-49 - Relationship of the Proposed Resource Management Plan to Statewide Planning Goals (continued)

Even without any tradeoffs to enhance or maintain the existing commercial forest program, tradeoffs would be necessary between Goal 5 resource values. For example, mineral and aggregate resource or energy source access and development frequently conflict with all other Goal 5 values, and strict guidelines for the management of designated or potential wilderness or Federal wild rivers may virtually preclude development or active management to benefit other Goal 5 resource values.

Statewide Goal Number 6: Air, Water and Land Resources Quality

Description: To maintain and improve the quality of the air, water, and land resources of the State.
Consistency of Proposed Resource Management Plan (PRMP): The Federal and State water quality standards would be met and water quality would be maintained and/or improved (see Effects on Water Resources, Chapter 4). Burning would have a potential effect on air quality but, without prescribed fire, the effects of wildfires on air quality would increase. The PRMP would comply with the Oregon Smoke Management Plan and the State implementation plan (see Effects on Air Quality, Chapter 4). Also see *Forestry Program for Oregon Objective: Forest Practices* in Appendix GG for discussion of consistency with relevant sections of the Forest Practices Act and Rules.

Statewide Goal Number 7: Areas Subject to Natural Disasters and Hazards

Description: To protect life and property from natural disasters and hazards.

Consistency of Proposed Resource Management Plan (PRMP): Natural hazard areas, particularly flood plains and areas with highly erosive soils, have been identified. The PRMP provides for appropriate management of natural hazard areas. BLM authorized developments within natural hazard areas would be minimal, with project construction engineering reflecting site-specific conditions and requirements.

Statewide Goal Number 8: Recreational Needs

Description: To satisfy the recreational needs of the citizens of the State and visitors and, where appropriate, to provide for the siting of necessary recreational facilities, including destination resorts. Federal agency recreation plans shall be coordinated with local and regional recreational needs and plans.

Consistency of Proposed Resource Management Plan (PRMP): The BLM actively coordinates its recreation and land use planning efforts with those of other agencies to establish integrated management objectives on a regional basis. Opportunities would be provided to meet recreation demand (identified in Oregon's Statewide Comprehensive Outdoor Recreation Plan). Projected demand for all activities on BLM administered lands would be met under the PRMP (see Effects on Recreation, Chapter 4). There has been no specific interest in development of destination resort sites on BLM administered lands.

Statewide Goal Number 9: Economic Development

Description: To provide adequate opportunities throughout the State for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens.

Consistency of Proposed Resource Management Plan: The PRMP would support reduced levels of BLM resource-dependent employment and payments to counties, due to diminished timber production. Employment in rural areas would be most affected (see Effects on Socioeconomic Conditions, Chapter 4).

Statewide Goal Number 10: Housing

Not considered applicable

Table 4-49 - Relationship of the Proposed Resource Management Plan to Statewide Planning Goals (continued)

Statewide Goal Number 11: Public Facilities and Services

Description: To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Consistency of Proposed Resource Management Plan (PRMP): BLM administered lands may be made available for development of public facilities or services by other parties, if the action would be permitted under the local government comprehensive plan and land use regulations, and relevant State setting requirements.

Statewide Goal Number 12: Transportation

Description: To provide and encourage a safe, convenient, and economic transportation system.
Consistency of Proposed Resource Management Plan (PRMP): The PRMP provides for accommodation of identified transportation needs, particularly for transportation of timber where not in conflict with Endangered Species Act requirements, but setting a major new transportation route (e.g., State Highway) would require a plan amendment. Major utility corridors were considered and would be designated. The PRMP supports State policy objectives to restrict use of BLM roads for access to nonresource development that would be inconsistent with State planning goals.

Statewide Goal Number 13: Energy Conservation

Description: To conserve energy.

Consistency of Proposed Resource Management Plan (PRMP): Conservation and efficient use of energy sources are objectives in all BLM activities. Although the PRMP finds some additional rivers suitable for inclusion in the National Wild and Scenic River System, which would restrict the possibility of development of their hydroelectric potential, there are no pending development proposals and those rivers are considered to have low potential for hydroelectric use. Firewood sales would be permitted but firewood availability would be limited by allocation of substantial acreage to limited or no timber harvest.

Statewide Goal Number 14: Urbanization - not considered applicable

Statewide Goal Number 15: Willamette Greenway

Description: To protect, conserve, enhance, and maintain the natural, scenic, historical, agricultural, economic, and recreational qualities of lands along the Willamette River as the Willamette River Greenway.

Consistency of Proposed Resource Management Plan (PRMP): The PRMP would protect BLM administered lands in the Greenway.

Statewide Goal Number 16: Estuarine Resources

Description: To recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands; and to protect, maintain, where appropriate develop, and where appropriate restore the long-term environmental, economic, and social values, diversity, and benefits of Oregon's estuaries.

Consistency of Proposed Resource Management Plan (PRMP): No measurable impacts on estuarine resources from BLM authorized activities are anticipated.

Table 4-49 - Relationship of the Proposed Resource Management Plan to Statewide Planning Goals (continued)

Statewide Goal Number 17: Coastal Shorelands

Description: To conserve, protect, where appropriate, develop; and where appropriate, restore the resources and benefits of all coastal shorelands, recognizing their value for protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources and recreation and aesthetics. The management of these shoreland areas shall be compatible with the characteristics of the adjacent coastal waters.

To reduce the hazard to human life and property, and the adverse effects upon water quality and fish and wildlife habitat, resulting from the use and enjoyment of Oregon's coastal shorelands.

Consistency of Proposed Resource Management Plan (PRMP): The PRMP would preserve and protect BLM administered and other coastal shorelands delineated in acknowledged city and County comprehensive plans and land use regulations. It would close some coastal lands to vehicle use for protection of wildlife habitat and other values.

Statewide Goal Number 18: Beaches and Dunes

Description: To conserve, protect, where appropriate, develop; and where appropriate, restore the resources and benefits of coastal beach and dune areas;

To reduce the hazard to human life and property from natural or man-induced actions associated with these areas.

Consistency of Proposed Resource Management Plan (PRMP): The PRMP would comply with this goal. In particular, BLM management direction for a proposed component of the Coastal Barrier Resources System, is consistent with management and development guidelines under the Coastal Barrier Improvement Act of 1990.

Statewide Goal Number 19: Ocean Resources - not considered applicable

Appendix K
Lands

Table 3-12 - Existing Withdrawals and Classifications

Note: Location description indicates sections within which withdrawn lands are located. Information on which portions of the cited sections are withdrawn is available at the District Office.

Withdrawals

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
ORE 05555	T.15S., R.7W. Section 7 mining and	40.00	Air Navigation Site	FAA/BLM	General land laws including mineral leasing
ORE 013117 (PLO 3610)	T.18S., R.1E. Section 31 T.19S., R.1E. Section 6 mineral leasing	81.20	Fall Creek Reservoir	COE/BLM	General land laws including mining except
OR 19234 (PLO 497)	T.17S., R.5W. Section 27 Section 28	5.27	Fern Ridge Reservoir	COE mineral leasing	General land laws including mining and
OR 19240 (PLO 727)	T.19S., R.1E. Section 34	1.37	Lookout Point Reservoir	COE	General land laws including mining and mineral leasing
OR 711 (PLO 4395)	T.16S., R.12W. Section 33 mineral leasing	1.00	Oregon Islands National Wildlife Refuge	USFWS	General land laws including mining except
OR 25306 (PLO 6287)	T.16S., R.12W. Section 33	1.00	Oregon Islands National Wildlife Refuge	USFWS	General land laws including mining except mineral leasing

Abbreviation Key:
PLO = Public Land Order
FAA = Federal Aviation Administration
COE = U.S. Army Corp of Engineers
USFWS = U.S. Fish and Wildlife Service

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
ORE 016183A (PLO 3869)	T.16S., R.7W. Section 19 T.18S., R.8W. Section 21 T.18S., R.9W. Section 14 T.19S., R.7W. Section 19 Section 35 T.22S., R.1W. Section 15	440.12	Lake Creek Rec. Site Whittaker Creek Rec. Site Turner Creek Rec. Site Clay Creek Rec. Site Haight Creek Rec. Site Sharps Creek Rec. Site	BLM	General land laws including mining except mineral leasing
ORE 012093 [1] (PLO 5490)		9000.52	Reserved for multiple use management	BLM	General land laws except R&PP, sales, exchanges, mining and mineral leasing
OR 8754 (PLO 5229)	T.15S., R.1W. Section 29 Section 30 Section 31 Section 32	260.00	Shotgun Creek Recreation Site	BLM	General land laws including mining except mineral leasing
OR 37548 (PLO 6662)	T.20S., R.5W. Section 9 Section 15 Section 21	832.50	Tyrrell Seed Orchard	BLM	General land laws including mining except mineral leasing
OR 46473 (PLO 6963)	T.18S., R.12W. Section 3 Section 15	257.60	Florence Sand Dunes	BLM	General land laws including mining except mineral leasing
OR 19133[2] (PSC 41)	T.19S., R.7W. Section 21 Section 25 Section 35 T.20S., R.6W. Section 5	550.49	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

[1] All public domain lands in and west of Range 8 East and all lands within the area, which become public domain lands in the future.
[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.

Abbreviation Key:
PLO = Public Land Order
PSC = Power Site Classification
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
OR 19148[2] (PSC 180)	T.20S., R.2W. Section 31 T.21S., R.1W. Section 33 Section 35 T.21S., R.2W. Section 15	300.60	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing
OR 19164 (PSC 287)	T.18S., R.6W. Section 5	120.00	Protect electric transmission line	BLM/FERC	General land laws except mining and mineral leasing
OR 19186[2] (PSC 426)	T.16S., R.2E. Section 23 Section 24 Section 27	276.64	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing
OR 19040[2] (PSR 95)	T.16S., R.2E. Section 28[3] Section 34[3] T.17S., R.2E. Section 2[3] T.17S., R.3E. Section 4	152.28	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing
OR 19059[2] (PSR 285)	T.16S., R.3E. Section 31[3] T.17S., R.3E. Section 4	163.56	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.
[3] Opened to entry subject to Sec. 24 of the Federal Power Act.

Abbreviation Key:
PSC = Power Site Classification
PSR = Power Site Reservation
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
OR 19113[2] (PSR 659)	T.15S., R.6W. Section 7 T.16S., R.7W. Section 19 T.17S., R.8W. Section 17[3] T.18S., R.7W. Section 31 Section 33 T.18S., R.8W. Section 21 Section 27 Section 35 T.19S., R.6W. Section 7 Section 9 Section 29 Section 31 T.19S., R.7W. Section 1 Section 3 Section 5 Section 9 Section 19 Section 21 Section 27 Section 35 T.19S., R.8W. Section 3 Section 11 Section 13 T.20S., R.6W. Section 1 Section 3 Section 5 Section 9 Section 11 T.20S., R.7W. Section 3	5961.48	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.
[3] Opened to entry subject to Sec. 24 of the Federal Power Act.

Abbreviation Key:
PSR = Power Site Reservation
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
OR 19115[2] (PSR 661)	T.16S., R.2E. Section 33[3] Section 35[3] T.17S., R.2E. Section 1[3] T.17S., R.3E. Section 3[3] Section 5[3] Section 9[3] T.20S., R.2W. Section 31 T.21S., R.1W. Section 31[3] Section 33 Section 35 T.21S., R.2W. Section 7 T.22S., R.2W. Section 5 Section 15 Section 23 T.23S., R.2W. Section 1	1103.60	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing
OR 19116[2] (PSR 662)	T.18S., R.8W. Section 28	40.00	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing
OR 19127[2] (PSR 730)	T.22S., R.1W. Section 5 Section 9 Section 15[4] Section 23 Section 27 Section 35 T.23S., R.1W. Section 1 Section 7	1249.16	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.
[3] Opened to entry subject to Sec. 24 of the Federal Power Act.
[4] Opened to entry in part subject to Sec. 24 of the Federal Power Act.

Abbreviation Key:
PSR = Power Site Reservation
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
OR 19014[2] (WPD 14)	T.15S., R.6W. Section 7 T.16S., R.2E. Section 33[3] Section 35[3] T.16S., R.7W. Section 19 T.17S., R.2E. Section 1[3] T.17S., R.3E. Section 3[3] Section 5[3] Section 9[3] T.17S., R.8W. Section 17[3] T.18S., R.7W. Section 31 Section 33 T.18S., R.8W. Section 21 Section 27 Section 35 T.19S., R.6W. Section 7 Section 9 Section 29 Section 31 T.19S., R.7W. Section 1 Section 3 Section 5 Section 9 Section 19 Section 21 Section 27 Section 35 T.19S., R.8W. Section 3 Section 11 Section 13 T.20S., R.2W. Section 31	8234.24	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.
[3] Opened to entry subject to Sec. 24 of the Federal Power Act.

Abbreviation Key:
WPD = Water Power Designation
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
	T.20S., R.6W.				
	Section 1				
	Section 3				
	Section 5				
	Section 9				
	Section 11				
	T.20S., R.7W.				
	Section 3				
	T.21S., R.1W.				
	Section 31[3]				
	Section 33				
	Section 35				
	T.21S., R.2W.				
	Section 7				
	Section 31				
	T.22S., R.1W.				
	Section 5				
	Section 9				
	Section 15[4]				
	Section 23				
	Section 27				
	Section 35				
	T.22S., R.2W.				
	Section 5				
	Section 15				
	Section 23				
	T.23S., R.1W.				
	Section 1				
	Section 7				
	T.23S., R.2W.				
	Section 1				
OR 19016[2] (WPD 16)	T.23S., R.1W. Section 1	80.00	Protect water-power and reservoir development potential	BLM/FERC	General land laws except mining and mineral leasing

Note: Table does not include lands that have been transferred out of Federal ownership subsequent to withdrawal or lands within National Forest boundaries.

[2] Withdrawals remaining to be reviewed through the FLPMA withdrawal review process or under authority of DM 603.
[3] Opened to entry subject to Sec. 24 of the Federal Power Act.
[4] Opened to entry in part subject to Sec. 24 of the Federal Power Act.

Abbreviation Key:
WPD = Water Power Designation
FERC = Federal Energy Regulatory Commission

Table 3-12 - Existing Withdrawals and Classifications (continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Effect
Classifications					
OR 905 (R&PP)	T.14S., R.2W. Section 13	2.00	McKercher County Park	BLM/Linn County	General land laws including mining except mineral leasing
ORE 06095 (R&PP)	T.16S., R.2E. Section 34 Section 35	61.73	Whitewater County Park	BLM/Lane County	General land laws including mining except mineral leasing
ORE 011226 (R&PP)	T.17S., R.2E. Section 1	2.40	Martin Rapids County Park	BLM/Lane County	General land laws including mining except mineral leasing
ORE 012264 (R&PP)	T.16S., R.6W. Section 7	2.00	Solid waste transfer site	BLM/Lane County	General land laws including mining except mineral leasing
OR 37243 (R&PP)	T.19S., R.3W. Section 35	2.79	Willamette River Greenway	BLM/State of Oregon	General land laws including mining except mineral leasing

Abbreviation Key:
R&PP = Recreation and Public Purposes Act

Appendix L
Lands

Pending and Proposed Withdrawals, Relinquishments and Modifications

OR 46473 Modification of Florence Sand Dunes Withdrawal

Federal Lands

T.18 S., R.12 W., W.M.
Sec. 15: SE1/4NE1/4

The area described above contains 40 acres (title plat) in Lane County, Oregon.

The land described above is withdrawn by Public Land Order No. 6963 of April 5, 1993 and reserved to protect significant scenic, water quality, botanical, wildlife, and recreational values. The withdrawal segregates the lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws. At such future time as the City of Florence requests transfer of the SE1/4NE1/4 of Section 15 under the Recreation and Public Purposes Act, it will be recommended that the withdrawal is modified or revoked as to the SE1/4NE1/4 of Section 15 to allow transfer of the tract to the City of Florence.

Scope: PRMP

Proposed Row River Special Recreation Management Area Withdrawal

Federal Lands

T.22 S., R.1 W., W.M.
Sec. 15: Lots 8,11 and E1/2 of Lot 10
Sec. 27: NE1/4NE1/4
Sec. 35: W1/2SE1/4

T.23 S., R.1 W., W.M.
Sec. 01: Lot 4, SW1/4NW1/4, E1/2SW1/4SW1/4, W1/2SE1/4SW1/4
Sec. 12: NE1/4NW1/4, N1/2SE1/4NW1/4

The area described above contains 403.54 acres (title plat) in Lane County, Oregon.

Private Lands

T.22 S., R.1 W., W.M.
Sec. 15: E1/2 of Lot 9, W1/2 of Lot 12
Sec. 22: Lots 3,8,9,12, E1/2 of Lot 7, S1/2SE1/4, SW1/4NW1/4SE1/4
Sec. 26: S1/2NW1/4NW1/4, SW1/4NW1/4, N1/2NW1/4SW1/4, E1/2SW1/4
Sec. 35: E1/2NE1/4NW1/4, W1/2NE1/4

T.23 S., R.1 W., W.M.
Sec. 01: NW1/4SW1/4
Sec. 02: Lots 1,2

The area described above contains 707.00 (title plat) acres in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to allow the establishment and development of a recreational mining area in an area with high recreational mining demand and potential.

Scope: Alternatives C, D, E, PRMP

Note: This proposed withdrawal is for the Sharps Creek Special Recreation Management Area under Alternatives C, D and E and for the Row River Special Recreation Management Area under the PRMP.

ORE 05555 Proposed Partial Revocation of Horton Air Navigation Site Withdrawal

Federal Lands

T.15 S., R.7 W., W.M.
Sec. 07: SW1/4SE1/4

The area described above contains 40.00 acres (title plat) in Lane County, Oregon.

The land described above is part of a larger tract withdrawn by BLM Order of July 12, 1957 and reserved for use by the Federal Aviation Administration as an air navigation site. BLM retains jurisdiction over grazing and the management and disposal of forest resources. The withdrawal segregates the land from the operation of the public land laws, including the mining and mineral leasing laws. The only FAA improvement on the acreage described above is an access road. The withdrawal has been reviewed pursuant to FLPMA 204 (l) and it has been recommended that the withdrawal be revoked as to the subject acreage. FAA interest in the access road would be protected by issuance of a right-of-way reservation under the authority of FLPMA Sec. 507 prior to completion of the partial revocation action. The partial revocation would restore the land to entry under the public land laws, including the mining and mineral leasing laws, subject to valid existing rights. FAA has concurred in the recommended partial revocation.

Scope: All Alternatives

ORE 013117 Partial Relinquishment of Fall Creek Reservoir Withdrawal

Federal Lands

T.18 S., R.1 E., W.M.
Sec. 31: All that portion of the following subdivisions lying north of the northerly right-of-way line of Lane County Road #409: S1/2NE1/4SW1/4, W1/2SW1/4, S1/2NE1/4SE1/4, S1/2N1/2NW1/4SE1/4, S1/2NW1/4SE1/4

The area described above contains 33.50 acres in Lane County, Oregon.

The land described above is part of a larger tract withdrawn by Public Land Order No. 3610 of April 8, 1965 and reserved for use by the U.S. Army Corps of Engineers for flood control purposes as part of the Fall Creek Reservoir Project. BLM retains jurisdiction over the land for all purposes other than flood control. The withdrawal does not alter the applicability of the public land laws governing the use of the lands under lease, license, or permit, or governing the disposal of their mineral and vegetative resources other than under the mining laws. The withdrawal has been reviewed pursuant to FLPMA 204 (L) and the Corps of Engineers has relinquished the withdrawal as to the lands described above since these lands are not needed or used for the purpose for which they were withdrawn. The only improvements on this acreage are BLM access roads. The lands have been examined and found to be suitable for return to full BLM jurisdiction. It has been recommended that the withdrawal be revoked as to the subject acreage. The partial revocation would restore the land to entry under the mining laws, subject to valid existing rights.

Scope: All Alternatives

ORE 016183A Proposed Partial Revocation of Turner Creek Recreation Site Withdrawal

Federal Lands

T.18 S., R.9 W., W.M.
Sec. 14: NE1/4SW1/4

The area described above contains 40.00 acres (title plat) in Lane County, Oregon.

The land described above is one of several tracts withdrawn by Public Land Order No. 3869 of November 12, 1965 and reserved for use as the Turner Creek Recreation Site. The withdrawal segregates the land from the operation of the public land laws, including the mining, but not the mineral leasing laws nor disposal of materials under the Act of July 31, 1947 (61 Stat. 681; 30 U.S.C. 601-604), as amended, or forest products under the Act of August 28, 1937 (50 Stat. 874; 43 U.S.C. 1181a). The subject recreation site has been permanently closed and the improvements removed. The partial revocation would restore the land described above to entry under the public land laws, including the mining laws, subject to valid existing rights.

Scope: All alternatives

OR 19164 Proposed Revocation of Power Site Classification 287

Federal Lands

T.18 S., R.6 W., W.M.
Sec. 05: SE1/4NE1/4, E1/2SE1/4

The area described above contains 120.00 acres (title plat) in Lane County, Oregon.

The land described above was withdrawn by Secretarial Order of March 23, 1935 and reserved as Power Site Classification 287. The land was withdrawn to authorize and protect the right-of-way for an electric transmission line. The withdrawal segregated the land from the operation of the non-discretionary public land laws, including the mining laws but not the mineral leasing laws. The land was subsequently opened to entry under the mining laws subject to the provisions of Public Law 359. The Federal Energy Regulatory Commission has jurisdiction over this land for hydropower generation and electric transmission purposes. BLM retains jurisdiction over mineral leasing, grazing, the management and disposal of mineral materials and forest resources and land use authorizations by lease, license or permit, subject to the concurrence of FERC. The electric transmission line was removed several years ago and the land is no longer needed for the purpose for which it was withdrawn. The withdrawal has been reviewed pursuant to FLPMA 204 (L) and it has been recommended that the withdrawal be revoked. Revocation would restore the land to full operation of the public land laws and to full BLM jurisdiction. Mineral entry would no longer be subject to the provisions of P.L 359.

Scope: All Alternatives

OR 19234 Modification of Fern Ridge Reservoir Withdrawal

Federal Lands

T.17 S., R.5 W., W.M.
Sec. 27: Lots 2,3
Sec. 28: Lot 5

The area described above contains 5.27 acres (title plat) in Lane County, Oregon.

The land described above is withdrawn by Public Land Order No. 497 of July 13, 1948 and reserved for use by the U.S. Army Corps of Engineers for flood control purposes as part of the Fern Ridge Reservoir Project. The withdrawal segregates the land from entry under the public land laws, including the mining and mineral leasing laws. The withdrawal has been reviewed pursuant to FLPMA 204 (L) and found to be used and needed for the purpose for which it was withdrawn. It has been recommended that the withdrawal be modified to open the land to operation of the mineral leasing laws. The modification would restore the land to operation of the mineral leasing laws, subject to the concurrence of the Corps of Engineers. The Corps of Engineers has concurred in the modification.

Scope: All Alternatives

OR 19240 Modification of Lookout Point Reservoir Withdrawal

Federal Lands

T.19 S., R.1 E., W.M.
Sec. 34: Lot 4

The area described above contains 1.37 acres (title plat) in Lane County, Oregon.

The land described above is withdrawn by Public Land Order No. 727 of June 6, 1951 and reserved for use by the U.S. Army Corps of Engineers for flood control purposes as part of the Lookout Point Dam and Reservoir Project. The withdrawal segregates the land from entry under the public land laws, including the mining and mineral leasing laws. The withdrawal has not yet been reviewed pursuant to FLPMA 204 (L). The land is being used for the purpose for which it was withdrawn. It will be recommended that the withdrawal be modified to open the land to operation of the mineral leasing laws. The modification would restore the land to operation of the mineral leasing laws, subject to the concurrence of the Corps of Engineers.

Scope: All Alternatives

Proposed Fox Hollow Research Natural Area Withdrawal

Federal Lands

T.19 S., R.4 W., W.M.
Sec. 09: E1/2E1/2

The area described above contains 160.00 acres (title plat) in Lane County, Oregon.

In furtherance of the Management Plan for the Fox Hollow Research Natural Area, the proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the existing designated Fox Hollow Research Natural Area and Area of Critical Environmental Concern.

Scope: Alternatives B, C, D, E, PRMP

Proposed Camas Swale Research Natural Area Withdrawal

Federal Lands

T.19 S., R.4 W., W.M.
Sec. 25: NW1/4, W1/2SW1/4, W1/2E1/2SW1/4, NE1/4NE1/4SW1/4, SW1/4SE1/4SE1/4SW1/4, and those portions of SE1/4NE1/4SW1/4, NE1/4SE1/4SW1/4, N1/2SE1/4SE1/4SW1/4 and W1/2NW1/4SE1/4 lying west of BLM Road No. 19-4-26.

The area described above contains 313.91 acres, more or less, in Lane County, Oregon.

In furtherance of the Management Plan for the Camas Swale Research Natural Area, the proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the existing designated Camas Swale Research Natural Area and Area of Critical Environmental Concern, as modified, and proposed addition.

Scope: Alternatives B, C, D, E, PRMP

Proposed Mohawk Research Natural Area Withdrawal

Federal Lands

T.16 S., R.2 W., W.M.
Sec. 19: Lots 3,4, S1/2N1/2 of Lot 2, S1/2 of Lot 2, S1/2N1/2SE1/4NW1/4, S1/2SE1/4NW1/4, E1/2SW1/4, W1/2E1/2W1/2SE1/4, W1/2W1/2SE1/4

The area described above contains 292.67 acres (title plat) in Lane County, Oregon.

In furtherance of the Management Plan for the Mohawk Research Natural Area, the proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the existing designated Mohawk Research Natural Area and Area of Critical Environmental Concern.

Scope: Alternatives B, C, D, E, PRMP

Proposed Upper Elk Meadows Research Natural Area Withdrawal

Federal Lands

T.23 S., R.2 W., W.M.
Sec. 35: E1/2E1/2S1/2S1/2S1/2SW1/4NW1/4; W1/2W1/2S1/2S1/2S1/2SE1/4NW1/4; that portion of E1/2NE1/4SW1/4 lying south of BLM Road No. 23-2-35.1; W1/2NE1/4SW1/4; E1/2E1/2NW1/4SW1/4; N1/2SE1/4SW1/4; E1/2SW1/4SE1/4SW1/4; SE1/4SE1/4SW1/4; S1/2NE1/4NE1/4SE1/4; those portions of NW1/4NE1/4SE1/4 and NW1/4SE1/4 lying south of BLM Road No. 23-2-35.1; S1/2NE1/4SE1/4; S1/2SE1/4

The area described above contains 242.00 acres, more or less, in Douglas County, Oregon.

In furtherance of the Management Plan for the Upper Elk Meadows ACEC, the proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the existing designated Upper Elk Meadows Research Natural Area and Area of Critical Environmental Concern and proposed addition.

Scope: Alternatives B, C, D, E, PRMP

Proposed Long Tom Area of Critical Environmental Concern Withdrawal

Federal Lands

T.16 S., R.5 W., W.M.
Sec. 33: Lot 3

The area described above contains 9.66 acres (title plat) in Lane County, Oregon.

Private Lands

T.16 S., R.5 W., W.M.
Sec. 28: SE1/4SE1/4, Lot 2 East of the center of the West branch of the Long Tom River
Sec. 33: N1/2NE1/4NE1/4

The area described above contains 79.64 acres in Lane County, Oregon.

In furtherance of the Management Plan for the Long Tom ACEC, the proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect a remnant Willamette Valley native grassland containing a population of a Federally listed endangered plant species and several additional sensitive plant species.

Scope: Alternatives D, E, PRMP

Proposed Hult Marsh Area of Critical Environmental Concern Withdrawal

Federal Lands

T.15 S., R.7 W., W.M.
Sec. 23: That portion of the E1/2 lying east of the centerline of BLM Road No. 15-7-35

The area described above contains 181.22 acres, more or less, in Lane County, Oregon.

Private Lands

T.15 S., R.7 W., W.M.
Sec. 24: SW1/4

The area described above contains 160.00 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect a wetland/aquatic/riparian habitat with significant botanical, wildlife and recreational values.

Scope: Alternatives B, C, D, E, PRMP

Proposed Horse Rock Ridge Research Natural Area Withdrawal

Federal Lands

T.15 S., R.2 W., W.M.
Sec. 01: Lots 3,4; W1/2 and W1/2E1/2 of Lot 2; W1/2E1/2SW1/4NE1/4; W1/2SW1/4NE1/4; S1/2NW1/4; N1/2NE1/4SW1/4; SE1/4NW1/4SW1/4; that portion of the SW1/4NE1/4SW1/4 lying north of BLM Road No. 15-2-1.1; that portion of the W1/2SW1/4 lying north of BLM Road No. 15-2-1.1; W1/2E1/2NW1/4SE1/4; W1/2NW1/4SE1/4; that portion of the E1/2E1/2NW1/4SE1/4, E1/2SW1/4SE1/4 and SE1/4SE1/4 lying west of a line to be described by metes and bounds following completion of survey.

The area described above contains 378.08 acres, more or less, in Linn County, Oregon.

Private Lands

T.14 S., R.2 W., W.M.
Sec. 36: S1/2SW1/4

T.15 S., R.2 W., W.M.
Sec. 02: Lot 1, SE1/4NE1/4

The area described above contains 160.92 acres (title plat) in Linn County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect outstanding botanical, wildlife and scenic values and the best remaining example of a western Cascade margin grassy bald.

Scope: Alternatives B, C, D, E, PRMP

Proposed Cougar Mountain Yew Grove Area of Critical Environmental Concern Withdrawal

Federal Lands

T.20 S., R.3 W., W.M.
Sec. 01: NE1/4SE1/4SE1/4

The area described above contains 10.00 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect a rare stand of Pacific yew.

Scope: Alternatives C, D, E, PRMP

Proposed Grassy Mountain Area of Critical Environmental Concern Withdrawal

Federal Lands

T.15 S., R.1 W., W.M.
Sec. 11: Lot 4, SW1/4NE1/4 of Lot 5, W1/2 of Lot 5, W1/2SE1/4 of Lot 5, SE1/4SE1/4 of Lot 5

The area described above contains 73.53 acres (title plat), more or less, in Lane County, Oregon.

Private Lands

T.15 S., R.1 W., W.M.
Sec. 14: Portion of N1/2NW1/4 lying north of Weyerhaeuser Road

The area described above contains 35.00 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect a rare natural system made up of a relatively undisturbed native grassy bald community.

Scope: All Alternatives except No Action

Proposed Lorane Ponderosa Pine Area of Critical Environmental Concern Withdrawal

Federal Lands

T.19 S., R.4 W., W.M.
Sec. 11: W1/2E1/2NW1/4NW1/4, W1/2NW1/4NW1/4
Sec. 17: S1/2S1/2NE1/4NE1/4, SE1/4NE1/4, N1/2NE1/4SE1/4
Sec. 21: NE1/4SE1/4, N1/2N1/2SE1/4SE1/4

The area described above contains 150.00 acres (title plat), more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect three relict stands of low elevation, mature Willamette Valley Ponderosa Pine.

Scope: PRMP

Proposed Whittaker Creek Recreation Site Addition Withdrawal

Federal Lands

T.18 S., R.8 W., W.M.
Sec. 21: N1/2SW1/4, N1/2SW1/4SW1/4

The area described above contains 100.00 acres (title plat), more or less, in Lane County, Oregon.

Private Lands

T.18 S., R.8 W., W.M.
Sec. 21: NW1/4SE1/4

The area described above contains 40.00 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw any of the subject lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the natural park setting of the existing recreation development, which encroaches inadvertently onto the subject tract and to protect an existing hiking trail system.

Scope: Alternatives C, D, E, PRMP

Proposed Clay Creek Recreation Site Addition Withdrawal

Federal Lands

T.19 S., R.7 W., W.M.
Sec. 19: Lot 4, SW1/4SE1/4, N1/2SE1/4SE1/4

The area described above contains 83.02 acres (title plat), more or less, in Lane County, Oregon.

Private Lands

T.19 S., R.7 W., W.M.
Sec. 19: Lots 2,3, NW1/4SE1/4

The area described above contains 84.99 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw any of the subject lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the natural visual quality of the existing recreation development, to protect an existing hiking trail, and to allow for expansion of the campground, a portion of which currently encroaches inadvertently onto the subject tract.

Scope: Alternatives C, D, E, PRMP

Proposed Siuslaw Bend Recreation Site Withdrawal

Federal Lands

T.19 S., R.7 W., W.M.
Sec. 21: Lot 5; those portions of Lots 2, 3 and 7 lying west of the centerline of the Upper Siuslaw Access Road; that portion of Lot 4 lying south of the centerline of the Upper Siuslaw Access Road; and those portions of Lots 6, 11 and 12 lying north of the centerline of the Upper Siuslaw Access Road.

The area described above contains 153 acres, more or less, in Lane County, Oregon.

Private Lands

T.19 S., R.7 W., W.M.
Sec. 16: Those portions of Lots 13 and 14 lying south of the centerline of the Upper Siuslaw Access Road.

The area described above contains 11 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect campground and related recreational improvements to be constructed on the site as well as scenic and natural values that contribute to its value for recreation.

Scope: Alternatives C, D, E, PRMP

Proposed McKenzie River Special Recreation Management Area Withdrawal

Federal Lands

T.16 S., R.2 E., W.M.
Sec. 28: Lot 9
Sec. 33: Lot 2
Sec. 34: Lot 10
Sec. 35: Lot 6

T.16 S., R.3 E., W.M.
Sec. 31: Lots 7,8,10,14
Sec. 32: Lot 2, S1/2 of Lot 10, Lot 11, Lots 13 and 14 excluding Goodpasture County Road right-of-way
Sec. 33: W1/2 of Lot 1, SW1/4NW1/4SW1/4

T.17 S., R.1 E., W.M.
Sec. 19: N1/2 of Lot 10

T.17 S., R.2 E., W.M.
Sec. 1: Lot 4

T.17 S., R.3 E., W.M.
Sec. 3: Lot 4, Lot 2 excluding the north 700 feet
Sec. 4: Lots 5,6,7,9, NW1/4NW1/4
Sec. 5: Lots 2,3 and SW1/4NE1/4 excluding Goodpasture County Road right-of-way; Lot 4; Lot 5 north of the north right-of-way line of Bonneville Power Administration right-of-way Ore 06100; SE1/4.
Sec. 8: NE1/4NE1/4
Sec. 9: Lots 3-5; S1/2N1/2
Sec. 10: Lots 3-5; NW1/4NW1/4; SE1/4NW1/4; N1/2SE1/4 north of Weyerhaeuser road right-of-way
Sec. 11: Lot 3; NW1/4SW1/4 north of Weyerhaeuser road right-of-way

The area described above contains 1474.02 acres, more or less, in Lane County, Oregon.

Private Lands

T.16 S., R.2 E., W.M.
Sec. 26: NE1/4SW1/4, portion of SE1/4NW1/4
Sec. 31: Lot 2
Sec. 36: Portion of Lot 6 (Tax lot 16-25-36-00-01100)

T.17 S., R.1 E., W.M.
Sec. 19: Portion of unnamed island

T.17 S., R.1 W., W.M.
Sec. 24: Rodman Island, portion of unnamed island
Sec. 27: McNutt Island
Sec. 28: McNutt Island

T.17 S., R.3 E., W.M.
Sec. 2: Lots 7-10; NE1/4SE1/4; S1/2SE1/4
Sec. 4: Lot 8
Sec. 9: Lot 6
Sec. 10: SW1/4NW1/4
Sec. 11: Lot 2; E1/2NW1/4

The area described above contains 725.00 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect campground and related recreational improvements to be constructed as well as scenic and natural values along the McKenzie River.

Scope: Alternatives C, D, E, PRMP

Proposed Gilkey Creek Special Recreation Management Area Withdrawal

Federal Lands

T.17 S., R.2 W., W.M.
Sec. 13: Lots 1-3,5,9, NW1/4NW1/4, NW1/4SW1/4
Sec. 15: N1/2NE1/4, SE1/4NE1/4
Sec. 23: NE1/4NE1/4

The area described above contains 375.61 acres (title plat) in Lane County, Oregon.

Private Lands

T.17 S., R.2 W., W.M.
Sec. 13: Lots 4,6-8, NE1/4NW1/4, SW1/4NW1/4, portions of DLC 37, DLC 41 and DLC 42
Sec. 14: N1/2, N1/2SW1/4, SE1/4
Sec. 23: Lot 3; NW1/4NE1/4; NE1/4SW1/4; portion of Lots 1,2 and DLC 67
Sec. 24: Portion of DLC 37 (tax lots 17-02-24-00-00403 and 17-02-24-00-00405)

The area described above contains 1196.03 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect recreational improvements to be constructed as well as scenic and natural values within the Gilkey Creek Special Recreation Management Area.

Scope: Alternatives C, D, E

Proposed McGowan Creek Environmental Education Area Withdrawal

Federal Lands

T.16 S., R.2 W., W.M.
Sec. 19: W1/2E1/2W1/2NE1/4, W1/2W1/2NE1/4, E1/2NE1/4NW1/4, E1/2N1/2N1/2NW1/4, SE1/4NE1/4 and E1/2E1/2SW1/4NE1/4 lying north of McGowan Creek Road.

The area described above contains 124 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the outstanding natural values of the existing environmental education area.

Scope: Alternatives B, C, D, E, PRMP

Proposed Siuslaw River Special Recreation Management Area Withdrawal

Federal Lands

T.18 S., R.8 W., W.M.
- Sec. 21: NE1/4, W1/2NW1/4, N1/2SW1/4, SW1/4SW1/4, E1/2SE1/4
- Sec. 27: ALL
- Sec. 28: E1/2SE1/4
- Sec. 33: E1/2SE1/4
- Sec. 35: W1/2NW1/4, NW1/4SW1/4

T.19 S., R.6 W., W.M.
- Sec. 29: W1/2NE1/4, W1/2, SE1/4
- Sec. 31: E1/2, E1/2W1/2

T.19 S., R.7 W., W.M.
- Sec. 17: SE1/4SW1/4, S1/2SE1/4
- Sec. 19: Lots 1,4, N1/2NE1/4, SW1/4NE1/4, S1/2SE1/4
- Sec. 21: ALL
- Sec. 23: SW1/4SW1/4
- Sec. 25: S1/2SE1/4
- Sec. 27: ALL
- Sec. 29: NE1/4NE1/4
- Sec. 30: Lots 1,2
- Sec. 35: Lots 1,2-4,6,10-13

T.19 S., R.8 W., W.M.
- Sec. 3: Lots 10,11, W1/2SE1/4
- Sec. 11: N1/2N1/2, SE1/4NE1/4, SW1/4SW1/4, SE1/4SE1/4
- Sec. 13: N1/2NW1/4, SE1/4NW1/4, NE1/4SE1/4
- Sec. 15: E1/2NE1/4NE1/4
- Sec. 23: E1/2NE1/4
- Sec. 24: SE1/4SE1/4
- Sec. 25: ALL
- Sec. 35: E1/2NE1/4, NE1/4SE1/4

T.20 S., R.6 W., W.M.
- Sec. 1: N1/2SW1/4, W1/2W1/2SE1/4
- Sec. 3: Lots 5-17
- Sec. 4: SE1/4NE1/4
- Sec. 5: ALL
- Sec. 9: ALL
- Sec. 11: N1/2NE1/4, SW1/4NE1/4, E1/2NW1/4, NE1/4SW1/4, S1/2SW1/4, SE1/4
- Sec. 13: N1/2N1/2, SE1/4NE1/4, NE1/4SE1/4
- Sec. 15: Lots 1-7,10-12

T.20 S., R.7 W., W.M.
- Sec. 3: Lots 1,2,4,5,7-12

The area described above contains 8,749.48 acres (title plat) in Lane County, Oregon and 780.00 acres (title plat) in Douglas County, Oregon.

Private Lands

T.18 S., R.8 W., W.M.
- Sec. 21: E1/2NW1/4, NW1/4SE1/4
- Sec. 22: S1/2
- Sec. 28: N1/2

Sec. 33: E1/2NE1/4
Sec. 34: ALL
Sec. 35: S1/2SW1/4, SW1/4SE1/4

T.19 S., R.6 W., W.M.
Sec. 30: Lots 2-4, E1/2, SE1/4NW1/4, E1/2SW1/4
Sec. 32: ALL

T.19 S., R.7 W., W.M.
Sec. 16: Lots 13,14, W1/2 of Lot 15
Sec. 19: Lots 2,3, NW1/4SE1/4
Sec. 20: ALL
Sec. 22: S1/2
Sec. 25: S1/2SW1/4, NE1/4SE1/4, portion of N1/2SW1/4 and SW1/4NW1/4
Sec. 26: W1/2NW1/4, S1/2, S1/2SE1/4NE1/4
Sec. 28: ALL
Sec. 30: NE1/4
Sec. 34: ALL
Sec. 35: NW1/4NE1/4
Sec. 36: N1/2NW1/4
T.19 S., R.8 W., W.M.
Sec. 3: Lots 1-9,12, SW1/4, E1/2SE1/4
Sec. 4: ALL
Sec. 9: NE1/4
Sec. 10: ALL
Sec. 11: SW1/4NE1/4, S1/2NW1/4, N1/2SW1/4, SE1/4SW1/4, N1/2SE1/4, SW1/4SE1/4
Sec. 13: SW1/4NW1/4, SW1/4, NW1/4SE1/4, S1/2SE1/4
Sec. 14: N1/2, N1/2S1/2, SE1/4SE1/4
Sec. 24: N1/2, N1/2S1/2, S1/2SW1/4, SW1/4SE1/4
Sec. 26: E1/2SE1/4SE1/4
Sec. 36: NW1/4, N1/2SW1/4

T.20 S., R.6 W., W.M.
Sec. 1: S1/2SW1/4
Sec. 2: S1/2 east of Road No. 20-6-11
Sec. 3: NE1/4SW1/4, S1/2SW1/4
Sec. 4: Lots 1-4, SW1/4NE1/4, S1/2NW1/4, S1/2
Sec. 6: Lots 1,2, S1/2NE1/4, SE1/4
Sec. 8: N1/2, SE1/4
Sec. 10: ALL
Sec. 11: SE1/4NE1/4, W1/2NW1/4, NW1/4SW1/4
Sec. 12: W1/2W1/2NE1/4, W1/2, SE1/4

T.20 S., R.7 W., W.M.
Sec. 2: Lots 3-5,12
Sec. 3: Lots 3,6

The area described above contains 13,461.15 acres, more or less, in Lane County, Oregon and 240.00 acres, more or less, in Douglas County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect campground and related recreational improvements to be constructed as well as scenic and natural values along the Siuslaw River. This proposal includes all lands within the boundaries of the proposed Special Recreation Management Area.

Scope: Alternatives C, D, E

Proposed Coburg Hills BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.14 S., R.2 W., W.M.
- Sec. 15: Lots 1-5
- Sec. 20: SE1/4NE1/4, N1/2SE1/4
- Sec. 21: Lot 3, SW1/4NW1/4, NW1/4SE1/4, S1/2SE1/4
- Sec. 22: SW1/4SW1/4

T.15 S., R.2 W., W.M.
- Sec. 16: S1/2SW1/4
- Sec. 20: Lots 4,5
- Sec. 21: Those portions of the NE1/4, SW1/4 and NW1/4SE1/4 lying west of the centerline of BLM Road No. 15-2-16.
- Sec. 29: Lots 1,2, N1/2NE1/4, SW1/4NE1/4, E1/2NW1/4; that portion of the SE1/4NE1/4 lying west of the centerline of BLM Road No. 15-2-16; and that portion of the N1/2S1/2 lying west of the centerline of BLM Road No. 15-2-16 and north of a line to be described by metes and bounds.

The area described above contains 1,204 acres, more or less, in Linn County, Oregon.

Private Lands

T.15 S., R.2 W., W.M.
- Sec. 17: Portion of Lot 5 and DLC 40
- Sec. 20: SE1/4SW1/4 and portion of DLC 40

The area described above contains 67.00 acres, more or less, in Linn County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect core bald eagle roosting areas and critical habitat.

Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Fall Creek Reservoir BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.18 S., R.1 E., W.M.
- Sec. 23: That portion of E1/2SW1/4 and SE1/4 lying south and west of the centerline of BLM Road No. 18-1E-25; That portion of the W1/2SW1/4 lying south of a line to be described by metes and bounds.
- Sec. 31: S1/2NE1/4; that portion of NW1/4 lying south of the centerline of BLM Road No. 18-1E-31; that portion of the N1/2S1/2 lying north and west of the centerline of Lane County Road No. 409.

T.19 S., R.1 E., W.M.
Sec. 03: That portion of Lots 5-12 lying north of the centerline of BLM Road No. 19-1E-2 and north and west of the centerlines of BLM Road Nos. 19-1E-3.1 and 19-1E-3.2.
Sec. 26: N1/2NE1/4, NE1/4NW1/4

The area described above contains 746 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.

Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed McKenzie River BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.16 S., R.1 E., W.M.
Sec. 25: That portion of the NW1/4 lying west of the centerline of BLM Road No. 16-1E-25 and south of a line to be described by metes and bounds; that portion of SW1/4 lying west of the centerline of BLM Road No. 16-1E-35.1 and south and west of the centerline of BLM Road No. 16-1E-25.4.
Sec. 35: Lots 1,2,4,5,8 and 12; that portion of Lot 3 lying north of the centerline of BLM Road No. 17-1E-1; that portion of Lots 6,7,9,10 and 16 lying east of the centerline of BLM Road No. 17-1E-1; that portion of Lots 6, 11, 13 and 14 lying west of the centerline of BLM Road No. 17-1E-1.

T.17 S., R.1 E., W.M.
Sec. 15: SE1/4SW1/4
Sec. 19: Lots 10, 11, W1/2SE1/4
Sec. 21: Lot 1, NW1/4NE1/4

T.17 S., R.2 E., W.M.
Sec. 04: SW1/4SW1/4
Sec. 05: S1/2
Sec. 07: N1/2NE1/4NE1/4NE1/4, E1/2SE1/4NE1/4NE1/4 lying east and south of the centerline of BLM Road No. 17-2E-7.
Sec. 08: N1/2N1/2NE1/4NW1/4; SW1/4NW1/4NE1/4NW1/4 and W1/2SW1/4NE1/4NW1/4 lying north and west of the centerline of BLM Road Nos. 17-1E-10 and 17-2E-8.1; NW1/4NW1/4 lying north and west of the centerline of BLM Road No. 17-1E-10.
Sec. 09: N1/2NW1/4NW1/4 lying north of a line to be described by metes and bounds.

T.17 S., R.3 E., W.M.
Sec. 04: Lots 6,7
Sec. 05: That portion of N1/2SE1/4 lying south and east of the centerline of an unnamed creek; N1/2NE1/4SW1/4SE1/4; E1/2SE1/4SE1/4; N1/2NW1/4SE1/4SE1/4; SE1/4NW1/4SE1/4SE1/4; E1/2SW1/4SE1/4SE1/4.
Sec. 08: NE1/4NE1/4NE1/4
Sec. 09: Lots 3,4; S1/2NE1/4; N1/2SE1/4NW1/4; SE1/4SE1/4NW1/4; that portion of NE1/4NE1/4SW1/4 lying east of the centerline of South Deer Creek; N1/2N1/2SE1/4; SE1/4NE1/4SE1/4; NE1/4SW1/4NE1/4SE1/4.
Sec. 10: Lots 3-5, NW1/4NW1/4, SE1/4NW1/4; that portion of N1/2SE1/4 lying north of Weyerhaeuser Road.
Sec. 11: That portion of NW1/4SW1/4 lying north of Weyerhaeuser Road.

T.17 S., R.1 W., W.M.
Sec. 35: That portion of W1/2W1/2 of Lot 3 lying south of the centerline of BLM Road No. 17-1-34; that portion of Lot 4 lying South of the centerline of BLM Road No. 17-1-34 and east of the centerline of BLM Road No. 17-1-35.

T. 18 S., R.1 W., W.M.
Sec. 03: Lots 5-11

The area described above contains 2,037 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.
Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Dorena Lake BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.21 S., R.1 W., W.M.
Sec. 01: Lots 5-7, SE1/4SE1/4NE1/4
Sec. 09: N1/2, N1/2NE1/4SW1/4, SE1/4NE1/4SW1/4, N1/2SE1/4
Sec. 13: Lot 1, E1/2NE1/4

The area described above contains 654.28 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.

Scope: Alternatives D and E

Proposed Siuslaw River BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.18 S., R.8 W., W.M.
Sec. 19: E1/2 of Lot 1, E1/2NW1/4 of Lot 1, N1/2NE1/4, NE1/4NW1/4, NE1/4SE1/4NW1/4, N1/2NW1/4SE1/4NW1/4, N1/2S1/2NE1/4, NE1/4SE1/4SW1/4NE1/4, N1/2SW1/4SE1/4NE1/4
Sec. 21: W1/2NW1/4, W1/2NE1/4SW1/4, NW1/4SW1/4NE1/4SW1/4, NE1/4NW1/4SW1/4, N1/2NW1/4NW1/4SW1/4, NE1/4SE1/4NW1/4SW1/4

The area described above contains 326.58 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.

Scope: Alternatives D and E

Proposed Fern Ridge BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.16 S., R.6 W., W.M.
Sec. 33: That portion of SW1/4SW1/4 lying west of the centerline of BLM Road No. 16-6-33.1 and north of the centerline of BLM Road No. 16-6-33.3.

T.18 S., R.6 W., W.M.
Sec. 05: That portion of Lots 2-4, SW1/4NE1/4 and S1/2NW1/4 lying west of the centerline of BLM Road No. 18-6-5.3 and north of a line to be described by metes and bounds; that portion of Lot 1 and SE1/4NE1/4 lying west of the centerline of BLM Road No. 18-6-5.3 and north of the centerline of BLM Road No. 18-6-5 and south of a line to be described by metes and bounds.
Sec. 11: Metes and bounds in SW1/4.

The area described above contains 166 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.

Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Triangle Lake BEHA Area of Critical Environmental Concern Withdrawal

Federal Lands

T.16 S., R.7 W., W.M.
Sec. 18: Lot 2
Sec. 19: N1/2SE1/4; that portion of Lot 6 and NE1/4SW1/4 lying east of the centerline of BLM Road No. 16-7-19.2 and a line to be described by metes and bounds.
Sec. 21: Lot 4; that portion of Lots 5 and 6 lying north of the centerline of BLM Road No. 16-7-29; that portion of Lot 3 lying west of the centerline of BLM Road. No. 16-7-13 and a line to be described by metes and bounds; that portion of SE1/4NW1/4 lying north of the centerline of BLM Road No. 16-7-29, south of the centerline of BLM Road No. 16-7-13 and west of a line to be described by metes and bounds.

T.16 S., R.8 W., W.M.
Sec. 13: Lots 1,2; metes and bounds in Lots 3 and 6-8.

The area described above contains 433 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect critical bald eagle habitat.

Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Triangle Lake Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.15 S., R.7 W., W.M.
- Sec. 25: Metes and bounds in Lots 5,6, SW1/4NE1/4, E1/2NW1/4, SW1/4NW1/4 and SW1/4
- Sec. 33: Lot 24; metes and bounds in Lots 16,17,23
- Sec. 35: NE1/4SE1/4; that portion of SE1/4NE1/4 lying south of a line to be surveyed.

T.16 S., R.7 W., W.M.
- Sec. 03: Metes and bounds in Lots 1,4, N1/2SW1/4 and SE1/4.
- Sec. 05: Metes and bounds in Lots 1,2 N1/2SE1/4 and SE1/4SE1/4.
- Sec. 07: Metes and bounds in Lot 4, SE1/4SW1/4 and SW1/4SE1/4.
- Sec. 11: That portion of N1/2NE1/4 lying west of the centerline of BLM Road No.16-7-11; metes and bounds in N1/2SE1/4.
- Sec. 15: Metes and bounds in Lots 1-5 and 7-9.
- Sec. 21: Metes and bounds in Lots 1-3, S1/2NE1/4 and SE1/4NW1/4.

T.16 S., R.8 W., W.M.
- Sec. 01: Metes and bounds in Lots 1-4.

The area described above contains 810 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: Alternatives D and E

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Coburg Hills Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.14 S., R.2 W., W.M.
- Sec. 13: Metes and bounds in Lots 5-7
- Sec. 28: Metes and bounds in E1/2
- Sec. 29: Metes and bounds in SW1/4NE1/4
- Sec. 33: Metes and bounds in NW1/4
- Sec. 35: Metes and bounds in N1/2SE1/4 and SE1/4SE1/4

T.15 S., R.2 W., W.M.
- Sec. 03: Metes and bounds in S1/2NE1/4, N1/2SE1/4 and SW1/4SE1/4.
- Sec. 09: Metes and bounds in Lot 1, SW1/4 and S1/2SE1/4.
- Sec. 31: Metes and bounds in Lots 1-4, NE1/4NE1/4, S1/2NE1/4, E1/2NW1/4, SW1/4 and W1/2SE1/4.

T.16 S., R.3 W., W.M.
- Sec. 01: Metes and bounds in Lots 1-2, S1/2NE1/4, SE1/4NW1/4 and SE1/4.

The area described above contains 804 acres, more or less, in Linn County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: Alternatives D, E, PRMP

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Cottage Grove Lake Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.21 S., R.3 W., W.M.
Sec. 27: Metes and bounds in NE1/4NE1/4, W1/2SW1/4 and SE1/4.

T.22 S., R.4 W., W.M.
Sec. 01: That portion of SW1/4NE1/4 and NW1/4 lying north of the centerlines of Cedar Creek County Road and BLM Road No. 22-4-1 and lying east of the centerline of BLM Road No. 22-4-1.4.

The area described above contains 232 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: Alternatives D and E

PRMP - See following section

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Cottage Grove Lake Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.21 S., R.3 W., W.M.
Sec. 27: Metes and bounds in NE1/4NE1/4.

T.21 S., R.4 W., W.M.
Sec. 25: Metes and bounds in NW1/4NE1/4.

The area described above contains 54 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: PRMP

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Dorena Lake Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.20 S., R.2 W., W.M.
Sec. 21: Metes and bounds in SW1/4SW1/4.
Sec. 23: Metes and bounds in Lots 3-6.
Sec. 27: Metes and bounds in SE1/4NE1/4.
Sec. 31: Lot 6; metes and bounds in Lot 7, NE1/4SW1/4 and W1/2SE1/4.

The area described above contains 209 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: Alternatives D and E

PRMP - See following section

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Dorena Lake Relict Forest Islands Area of Critical Environmental Concern Withdrawal

Federal Lands

T.20 S., R.2 W., W.M.
Sec. 27: Metes and bounds in SE1/4NE1/4.

The area described above contains 18 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect remnant islands of mature and old growth forest within a Key Raptor Area.

Scope: PRMP

Note: Final withdrawal description of lands described above as metes and bounds will utilize aliquot part descriptions down to five-acre parts. Final withdrawal acreage could thus differ slightly from that cited above.

Proposed Upper Lake Creek Special Recreation Management Area Withdrawal

Federal Lands

T.15 S., R.6 W., W.M.
Sec. 07: Lots 3,4, E1/2SW1/4, SE1/4
Sec. 17: All
Sec. 18: Lots 1-4, NE1/4, E1/2W1/2
Sec. 19: All

T.15 S., R.7 W., W.M.

Sec. 07: Lot 13, SW1/4SE1/4
Sec. 08: SW1/4, NE1/4SE1/4, S1/2SE1/4
Sec. 10: NW1/4NW1/4, S1/2N1/2, S1/2
Sec. 12: Lots 3,4, SW1/4, W1/2SE1/4
Sec. 13: All
Sec. 15: All
Sec. 16: All
Sec. 17: All
Sec. 18: All in Eugene District
Sec. 19: All in Eugene District
Sec. 20: All
Sec. 21: All
Sec. 23: All
Sec. 25: Lots 3-6, SW1/4NE1/4, W1/2, W1/2SE1/4
Sec. 27: All
Sec. 29: All

The area described above contains 10,293.54 acres (title plat) in Lane County, Oregon and 200.00 acres (title plat) in Benton County, Oregon.

Private Lands

T.15 S., R.6 W., W.M.
Sec. 18: SE1/4

T.15 S., R.7 W., W.M.
Sec. 08: S1/2NE1/4, NW1/4SE1/4
Sec. 09: Lots 1-3, 5-16
Sec. 11: Lots 5,6, 8-11, SE1/4
Sec. 14: All
Sec. 22: All
Sec. 24: All
Sec. 25: Lot 2
Sec. 26: All
Sec. 28: All

The area described above contains 4,111.32 acres, more or less, in Lane County, Oregon and 466.47 acres, more or less, in Benton County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect campground and related recreational improvements to be constructed as well as scenic and natural values in the upper Lake Creek drainage. This withdrawal proposal includes all lands within the boundaries of the proposed Upper Lake Creek Special Recreation Management Area.

Scope: Alternatives C,D,E

Proposed RMP - See following pages

Proposed Upper Lake Creek Special Recreation Management Area Withdrawal

Private Lands

T.15 S., R.7 W., W.M.
Sec. 26: NE1/4, NE1/4SW1/4, N1/2SE1/4

The area described above contains 280.00 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the private lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal would be to protect campground and related recreational improvements to be constructed as well as scenic and natural values around Hult Reservoir.

Scope: PRMP

Proposed White's Creek Administrative Site Withdrawal

Federal Lands

T.21 S., R.3 W., W.M.
Sec. 17: N1/2NE1/4SE1/4SE1/4

The area described above contains 5.00 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the public investment in the existing buildings and other facilities at the White's Creek road maintenance complex.

Scope: PRMP

Proposed Row River Trail Withdrawal

Federal Lands

T.20 S., R.2 W., W.M.
Sec. 30: M&B in Lots 3, 4, 6, DLC 40, DLC 42
Sec. 31: M&B in DLC 39
Sec. 32: M&B in Lots 1, 3, S1/2NE1/4, NE1/4NW1/4, DLC 38, DLC 39
Sec. 33: M&B in Lots 2, 6, 7, DLC 41, DLC 43, DLC 45
Sec. 34: M&B in DLC 43

T.20 S., R.3 W., W.M.
Sec. 25: M&B in DLC 74
Sec. 36: M&B in DLC 65, DLC 66, DLC 74

T.21 S., R.1 W., W.M.
Sec. 19: M&B in Lots 1, 2, 4, 5, SE1/4NW1/4, NE1/4SW1/4, DLC 37
Sec. 30: M&B in Lots 1-4, SE1/4SW1/4, DLC 37
Sec. 31: M&B in Lot 2 of Tract 38, NW1/4NE1/4, SE1/4NE1/4, NE1/4NW1/4
Sec. 32: M&B in SW1/4NW1/4, SW1/4

T.21 S., R.2 W., W.M.
Sec. 02: M&B in Lots 1, 2, DLC 44
Sec. 03: M&B in Lot 2, SE1/4NE1/4, DLC 40, DLC 44
Sec. 11: M&B in DLC 42, DLC 45
Sec. 13: M&B in DLC 42, DLC 43
Sec. 14: M&B in Lot 1, DLC 42
Sec. 24: M&B in Lots 1, 2

T.21 S., R.3 W., W.M.
Sec. 01: M&B in Lot 4, DLC 60

T.22 S., R.1 W., W.M.
Sec. 05: M&B in SW1/4NE1/4, SE1/4NW1/4 and Unnumbered Lots in NE1/4NE1/4, NW1/4NE1/4

The area described above contains 195.71 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands acquired by donation (serial number OR 49776) from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the existing Row River Trail and associated recreational facilities and recreational facilities to be developed in the future.

Scope: PRMP

Proposed Addition to Florence Sand Dunes Withdrawal

Federal Lands

T.18 S., R.12 W., W.M.
Sec. 02: Lot 1

The area described above contains 36.52 acres (title plat) in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect significant water quality, scenic, and recreational values.

Scope: PRMP

Proposed West Eugene Wetlands Withdrawal

Federal Lands

T.17 S., R.4 W., W.M.
Sec. 27: M&B in DLC 40
Sec. 29: M&B in E1/2SW1/4, SE1/4SE1/4
Sec. 30: N1/2SE1/4
Sec. 32: M&B in E1/2E1/2E1/2NE1/4
Sec. 33: M&B in S1/2NE1/4, NW1/4
Sec. 34: M&B in DLC 40
Sec. 35: M&B in NW1/4NW1/4
Sec. 35: Lot 5, Block 2, Seneca Industrial Park

The area described above contains 359.27 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands acquired by purchase under serial numbers OR 23598, OR 48441, OR 48443, OR 48444, OR 48446, OR 48462, OR 48463, OR 48585, OR 48588, OR 48589, OR 48590, OR 49367, and OR 49375 from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect important wetland, botanical, wildlife and recreational values and to facilitate management of the lands as part of the West Eugene Wetlands Land and Water Conservation Fund Project under the West Eugene Wetlands Plan.

Scope: PRMP

Proposed Lake Creek Recreation Site Addition Withdrawal

Federal Lands

T.16 S., R.7 W., W.M.
Sec. 20: Portion of SW1/4SW1/4 described as follows: Beginning at a point on the North line of the Southwest 1/4 of the Southwest 1/4 of Section 20, Township 16 South, Range 7 West of the Willamette Meridian, that is 430 feet East of the West line of said Section 20; thence South on a line parallel to and 430 feet distant from the West line of Section 20 a distance of 470 feet to the true point of beginning of the tract of land herein to be described; thence continue South on a line parallel to and 430 feet distant from the West line of Section 20 to a point on the South line of Section 20; thence West along the South line of Section 20 to the Southwest corner thereof; thence North along the West line of Section 20 to a point that is Westerly along a line parallel to and 470 feet South of the North line of the Southwest 1/4 of the Southwest 1/4 of said Section 20 from the true point of beginning; thence Easterly along a line parallel to and 470 feet South of the North line of the Southwest 1/4 of the Southwest 1/4 of said Section 20 a distance of 430 feet to the true point of beginning.

The area described above contains 8.39 acres, more or less, in Lane County, Oregon.

Private Lands

T.16 S., R.7 W., W.M.
Sec. 20: That portion of Lot 10 and the Southwest 1/4 of the Southwest 1/4 lying Northwest of the Westerly right-of-way line of Highway 36.

The area described above contains 11.00 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands and any of the lands that may become public lands in the future from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the natural visual quality of the Lake Creek Recreation Site and existing and planned recreation and fish passage developments.

Scope: PRMP

Proposed Cottage Grove Old Growth Environmental Education Area Withdrawal

Federal Lands

T.20 S., R.3 W., W.M.
Sec. 31: S1/2SW1/4

The area described above contains 80 acres, more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect the outstanding natural and educational values of the site, which receives considerable use by local schools and has potential for expanded educational and research use.

Scope: PRMP

Proposed Low Elevation Headwaters of the McKenzie River Area of Critical Environmental Concern Withdrawal

Federal Lands

T.16 S., R.3 E., W.M.
Sec. 21: S1/2
Sec. 27: SW1/4NE1/4, W1/2, SE1/4
Sec. 28: All
Sec. 29: Lots 1-4, N1/2, N1/2S1/2
Sec. 30: Lots 8, 11-19, SW1/4SE1/4
Sec. 31: NE1/4NE1/4, E1/2NW1/4NE1/4
Sec. 32: Lots 5-9, 15, SW1/4NE1/4, SE1/4NW1/4
Sec. 33: N1/2
Sec. 34: N1/2, NE1/4SE1/4

T.17 S., R.2 E., W.M.
Sec. 01: S1/2
Sec. 12: All

T.17 S., R.3 E., W.M.
Sec. 05: Lot 5 south of the north right-of-way line of Bonneville Power Administration right-of-way Ore 06100; S1/2NW1/4, SW1/4
Sec. 07: All
Sec. 08: NW1/4NE1/4, S1/2NE1/4, W1/2, SE1/4
Sec. 09: S1/2
Sec. 17: All
Sec. 18: Lots 1, 2, NE1/4, NE1/4NW1/4, E1/2SE1/4 lying east of Marten Creek Fork.

The area described above contains 7,418 acres (title plat), more or less, in Lane County, Oregon.

The proposed withdrawal would withdraw the public lands from entry under the general land laws, including the mining laws, but not the mineral leasing laws, subject to valid existing rights. The purpose of the proposed withdrawal is to protect water quality values in a "Tier 1" Key Watershed and populations and habitat of two candidate threatened and endangered species (bull trout and tailed frog).

Scope: PRMP

Appendix M
Water Resources

Summary of Basic Principles

The beneficial uses of water resources of primary concern related to land management activities are rearing and spawning habitat for salmonoids, domestic water supply, fishing, and water contact recreation. In all of these uses, high quality water is important.

Forest hydrology is a collection of complex processes that transform precipitation to streamflow or ground water.

Water Quantity

Precipitation

Oregon's latitude, topography, and location near the Pacific Ocean have a great influence upon its climate. The Coast Range and Cascade Range play a major role in rainfall patterns. As moisture-laden air travels inland from the ocean, it ascends to cross the mountains. As it rises, the moisture cools and condenses, falling as rain or snow. Large accumulations of snow occur during winter months in the higher elevations, generally above 4,000 feet.

Oregon's rainfall pattern gives the BLM Eugene District a plentiful water supply during October through May, when 92 percent of annual precipitation is received. June through September are generally dry months. This is because in winter the active Pacific storm systems move south, providing frequent rain, while in summer the storm track moves north into Canada. This gives the Eugene area lots of sunny, warm to hot summer days. The annual precipitation in the District ranges from a high of 100 inches to a low of 30 inches.

Precipitation is an important climatic variable that influences the productivity and management of forest lands. Estimates of precipitation are used for planning numerous forest management activities such as the location, design, and maintenance of forest roads, and the selection and scheduling of harvesting and reforestation systems.

Interception occurs when rain or snow lands on vegetation rather than the ground. Some of this intercepted water evaporates and the remainder falls to the ground. Evaporation of water also occurs from surfaces of water bodies and soil surfaces. Under forested conditions, evaporation from soil surfaces is minimal. The process by which water is taken up by plants and discharged to the atmosphere is known as transpiration.

Infiltration is the movement of water into the soil surface. When the rainfall rate exceeds the rate of infiltration, water will travel over the ground surface to a channel. This is known as overland flow. Infiltration rates usually far exceed the maximum rates of rainfall in undisturbed forest soils in western Oregon, thus allowing most water that reaches the earth's surface to enter the soil.

Infiltration rates are reduced by soil disturbing activities such as road building and tractor logging. These activities tend to compact the soil surface causing some water to flow overland until it reaches nearby undisturbed soils or a stream channel. Removal of forest vegetation drastically reduces the amount of precipitation that returns to the atmosphere as a result of interception and transpiration. This allows more precipitation to reach the soil surface and drain into streams or become ground water. The return of vegetation results in annual streamflows decreasing to preharvest levels as both interception and transpiration increase. Evaporation from the soil surface is generally increased after timber harvest; however, this increase is much less than the reduction in transpiration.

Streamflow

The amount of water draining from a given area in a year is referred to as the annual water yield and is usually expressed in acre-feet (43,560 cubic feet) or the average depth over an area in inches. The annual yield of an area can be converted to the average annual flow (in cubic feet per second (CFS)) of the stream draining the area.

Streamflow is the water that reaches the stream channel. Total streamflow is a product of all the other processes in the hydrologic cycle. Distribution of annual streamflow in western Oregon is closely related to the distribution of annual precipitation; thus high flows are observed during the winter and low flows are predominant in the summer.

The effect of timber management activities (road construction, timber harvest, and slash disposal) on streamflow in small headwater Basins is primarily related to removal of forest vegetation and disturbance of the natural soil surface. Removing forest vegetation reduces evapotranspiration, thereby increasing the amount of rainfall available for streamflow. Studies of small watersheds in western Oregon showed that annual water yields from clear cut areas increased 26 to 43 percent following harvest (Harris, 1977; Rothacher, 1970; Harr et al., 1979).

The amount of increase in streamflow resulting from removal of forest vegetation is proportional to the type of harvest, the area harvested within a specific watershed, and the time since harvest. Streamflow increases are most noticeable in small watersheds that have large areas of vegetation removed over a short time period. Streamflow increases in large Basins tend to be masked because the nonvegetated area is small relative to the size of the Basin.

The duration of increased water yield is not easily predicted; however, Harr (1983) found that 27 years would be required for water yield increases to disappear. Increases in streamflow due to vegetation removal are not distributed evenly throughout the year. Increases in summer flows appear large when compared to the naturally low levels of streamflow during the summer months. The increases in summer streamflow result from greatly reduced transpiration allowing more water to drain through the soil to the streams. Summer increases are relatively short-lived because of the rapid growth of vegetation along stream channels.

Increases in streamflow following timber removal are greatest in the autumn because soil moisture content on the harvested areas is higher than it was under forested conditions. Therefore, a smaller amount of autumn rains is used for soil moisture recharge and a larger proportion becomes streamflow. Timber removal has little effect on the size of large peak flows, which cause extensive downstream flooding. Large peak flows are caused by such great amounts of precipitation that differences in soil moisture content between harvested and forested areas become insignificant and both areas respond nearly the same.

Soil disturbance influences the frequency and magnitude of small and large peak flows. The degree of influence depends upon the amount of area compacted by roads and tractor skid roads, and the proximity of the compacted area to stream channels.

Recent watershed studies have shown that timber harvest in the transient snow zone has increased the magnitude of peak flows. The transient snow zone is located at elevations where the snow level fluctuates throughout the winter in response to alternating warm and cold fronts. In the Eugene District, the transient snow zone has been observed between elevations of 1,500 and 5,000 feet. Snow accumulation is greater in clear cut openings than in undisturbed forest. Rain-on-snow events result in rapid melting of these shallow snowpacks. More snowmelt is generated from clear cut openings than from forested areas, resulting in larger peak flows (Ingwersen, 1985).

Streamflow does not always increase following the removal of vegetation. In some areas, reduced fog interception and drip following logging apparently reduces annual precipitation enough to offset expected reductions in transpiration. In coastal areas, fog drip may account for as much as 30 percent of the total water reaching the forest floor; thus, removal of forest vegetation may actually decrease annual streamflow (Christner, 1981).

Water Quality

Stream temperature, turbidity, sediment, dissolved oxygen, and chemical water quality are important water quality parameters to observe, since they indicate the ability to protect those beneficial uses listed in the OAR, Chapter 340-41.

Streams flowing from undisturbed forests generally have excellent quality. This characteristic makes streams valuable for domestic water supply, fish production and recreation. Natural processes such as surface erosion, landslides, and flood events can increase sediments in stream channels, causing a detrimental effect on water quality.

Sediment and water temperature are the two water quality factors influenced most by timber harvest and road construction.

Units of Measurement

Water temperature is measured in degrees Fahrenheit (_F) or degrees Celsius (_C); turbidity is measured in Jackson or Nephelometric Turbidity Units (JTU or NTU); conductivity is measured in microseimens (uS); and bacteria are measured in number of organisms per 100 milliliters (Ml). Most chemical parameters of interest, as well as most sediment data, are reported in terms of concentrations, discharge, or yield. Water quality data is usually reported as concentrations or weight per unit volume (usually milligrams per liter (mg/l) or micrograms per liter (ug/l). In the dilute waters of western Oregon, mg/l equals parts per million (ppm), and micrograms per liter equals parts per billion (ppb). Frequently, in the case of sediment and occasionally in the case of chemicals, data is expressed in terms of discharge (i.e., weight or volume per unit time as tons per day or cubic feet (cf) per year). Occasionally sediment or chemical data is also expressed as yield (i.e., weight or volume per unit area of the watershed as tons per acre or acre-feet per square mile or kilograms per hectare).

Stream Temperature

Timber harvest affects stream temperature by removing shading vegetation from streambanks. Stream temperature increases of 10_ F or more have been recorded following removal of streamside vegetation by clear cutting and burning in both the Oregon Cascades and Coast Range (Brown and Krygier, 1970; Levno and Rothacher, 1969). Because downstream shading does not significantly lower temperatures of streams warmed by upstream exposure (Brown, 1970), water temperatures of larger streams can also increase when small tributaries are exposed by clear cutting. The magnitude of this effect is dependent on the temperature and quantity of ground water inflow, as well as inflow from other well-shaded tributaries. The primary concern with water temperature increases is the potential for detrimental effects on fish and other aquatic organisms.

Chapter 340 of the OAR sets standards for water temperature in streams. These standards require no measurable increases when stream temperatures are 58_ F or greater in the Willamette Basin or 64_ F in the Mid Coast Basin, and in no case may the increase in water temperature be more than 2_ F. For application of the standards, maximum summer stream temperatures may be estimated with an equation developed by Schloss (1985), and temperature increases from removal of shading vegetation may be estimated from an equation developed by Brown (1970). Recent computer models, such as the one developed by Beschta (1984), may be used to estimate both ambient stream temperatures and changes resulting from management, for both individual stream reaches and networks of streams.

Sediment

The larger peak flows described above have a direct relationship to increases in the amount of sediment transported downstream. Peak flows may result in streambank erosion and scouring of channel beds. Forestry practices may also influence the sediment entering streams by surface erosion or landslides. Landslide prone areas are avoided if possible in timber harvest and road construction. Roads contribute sediment directly from the road surface, cutbanks and fill slopes; and indirectly by altering the routing of water that can lead to landslides and other mass soil movement events. Roads continue to be a major source of stream sedimentation, although improved methods for design, location, construction, and resurfacing of dirt roads with rock over the past 10 years have greatly reduced the amount of sediment contributed to the streams by roads.

Sediment clouds water, chokes fish gills, blankets fish spawning areas, and smothers bottom aquatic habitats. Sediment also increases the cost of treating drinking water. Chemicals, such as pesticides and nutrients, often bind to sediment particles. Soil erosion is the main source of sediment in water. Some soil is eroded naturally through weathering processes of rain and wind. But the main causes of soil loss are agricultural practices, timber harvesting, road and building site construction, and mining activities.

Timber management (road construction, timber harvest, and slash disposal) and other ground disturbing activities can affect sediment levels in District streams by increasing the capacity of the streams to entrain and transport sediment and by increasing the supply of sediment available for transport. Forestry related sediment problems can be reduced by avoiding landslide prone areas, carefully constructing logging roads and stream crossings, installing culverts to carry runoff, and providing wide setbacks (buffer zones) from streams when timber is harvested.

Instream sediment levels are both transport (flow) and supply dependent. Paustian and Beschta (1979), VanSickle and Beschta (1983), and Jackson

and Beschta (1982) described bedload transport in terms of supply of material available for transport at various levels of flow. They found that most bedload transport occurred during short periods of high water, when flows were sufficient to entrain coarse, armoring riffle sediments, and access supplies of finer material within the riffle. Subsequent studies (Jackson and Beschta, 1984) have demonstrated that increased amounts of sand in transport can cause previously stable, coarse riffle sediments to undergo scour.

This data reveals that the effects of management activities on sediment transport is directly related to the effects on high flow events. The result of increased high flow events would be increased sediment concentrations and more frequent episodes of erosion and deposition.

The effect of management activities on the supply of sediment available for transport depends on the average slope of the contributing area and the type of erosion processes dominant in the area of the activity. On gently sloping topography (generally less than 60 percent slopes) with competent bedrock little, if any, increased erosion would be expected (Fredriksen and Harr, 1979). On steeper slopes, surface erosion (known as dry ravel) occurs, especially after slash burning. It is not known how much of this eroded material reaches streams and becomes sediment. In areas where debris avalanches are the dominant erosion process, clear cutting has increased the natural rate of avalanches two to four times, and road building can increase the natural rate of erosion as much as 25 to 340 times (Fredriksen and Harr, 1979). Roads sometimes contribute to increased sediment concentrations because of erosion from the road surface, cut slopes, and fill material. Road construction can increase erosion as much as 250 times in the first storms after construction, but concentrations usually drop off within a few months to two years (Brown, 1983). More extended periods of sediment increase may be associated with heavy truck road use during very wet weather, on poorly surfaced roads, or with unauthorized Off Highway Vehicles (OHV) use. Compacted soils from roads, skid trails, or heavy equipment use can cause gully erosion and, locally, large increases of sediment. Roads generally contribute the majority of the sediment from a logging operation.

Nutrients

Nutrients enter water mainly from treated municipal sewage discharges, failing septic tank systems, and from fertilizers washed into the water by rain or irrigation. Excessive amounts of nutrients released into slow moving waters during spring and summer can result in growths of algae and aquatic weeds. Algae blooms reduce the amount of oxygen available to fish, which can result in fish kills. Natural nutrient levels are very low in streams in the Planning Area and, therefore, are not problematic.

To address the problem of algae growth, the Oregon Environmental Quality Commission (EQC) adopted a chlorophyll standard. The amount of chlorophyll in water indicates the amount of aquatic plant growth. Waters violating this standard will be studied to determine the nutrient sources and options for controlling the problem. Maintaining or restoring the quality of the Eugene District's more heavily used lakes is also an important issue. Lakes undergo a natural aging process, which can be accelerated by human activities. Improper agricultural, forestry, and other land use practices cause soil erosion that can introduce sediment and nutrients into the lake.

Sediment from soil erosion can rapidly fill a lake or reservoir, while nutrients increase the frequency of algal blooms and accelerate aquatic weed growth.

Timber Harvest and Slash Disposal

Timber harvest and slash disposal can affect the chemical quality of surface water. Following slash burning in one watershed in the Oregon Cascades, instream concentrations of ammonia-nitrogen and manganese reached peak levels of 7.6 and 0.44 mg/l respectively (Fredriksen, 1971). Fredriksen attributed the high concentrations of ammonia-nitrogen and manganese to burned slash in stream channels.

The aerial application of herbicides is another management activity that can affect the chemical water quality of streams in the District. A detailed discussion of potential water quality impacts of herbicides proposed for use by the BLM is beyond the scope of this analysis, but the reader is referred to the Final Environmental Impact Statement (FEIS) for the Western Oregon Program for the Management of Competing Vegetation (USDI, BLM, OSO, 1989).

Application of nitrogen fertilizers may also affect the chemical water quality of streams in the District. Nitrogen is usually added to the soil by aerial application of urea pellets. Since direct fertilizer application is the major pathway for urea entry to streams, urea concentrations usually peak within one

to two days following fertilizer treatment. Ammonia nitrogen, a hydrolysis product of urea, also usually peaks shortly after treatment, since it is derived from urea entering the stream.

Ammonia nitrogen in the soil is held very tightly. Only nitrate nitrogen is readily leached from the soil, and this usually occurs after the ammonia is oxidized to nitrate during the warm growing season. For this reason, peak nitrate concentrations are often recorded one to two years after fertilization. On the other hand, if nitrogen fertilizer is applied shortly after an area has burned, the warm soil temperatures may enhance nitrification and subsequent leaching of nitrate to the stream. Moore (1975) summarized several water quality monitoring studies of forest fertilization with urea throughout the Pacific Northwest and found maximum recorded nitrate values were usually less than one mg/l and in all cases were less than 5 mg/l compared to the standard of 10 mg/l.

Stream Categorization

Streams are characterized by their "order" (Strahler, 1957). Headwater stream channels are designated 1st order; two 1st order streams combine to form a 2nd order stream. Two 2nd order streams combine to form a 3rd order, and so forth.

In western Oregon, 1st and 2nd order streams constitute 79 percent of the total stream mileage (Boehne and House, 1983). Such streams rise in very small watersheds with limited water storage capacity. These streams may have only scanty or intermittent flow during the dry season, but during high flows they may move large amounts of sediment and woody debris. Headwater streams mainly determine the type and quality of downstream fish habitat.

First and 2nd order streams are influenced by the geomorphology, soils, and vegetation of their channels. Large woody debris is common, covering as much as 50 percent of the channel (Anderson and Sedell, 1979; Swanson and Lienkaemper, 1978; Triska et al., 1982). The stream is continuously shaded by vegetation. Flow energy in the channel is continually dissipated by woody material and vegetation that slow erosion and foster deposition of organic and inorganic materials. The average gradient of these streams often exceeds 10 percent, but the channels usually have a stairstep configuration of flat reaches connected by riffles and low falls. Salmonoid reproduction may be sufficient, even in some ephemeral streams, to furnish fry to larger waters downstream (Everest, 1973, Everest et al., 1985).

Third and 4th order streams usually flow continuously. Average gradient is less than 5 percent, but there may be intermittent stretches of rapids or falls. Woody debris usually covers less than 25 percent of the channel. High flows may flush woody material from the system or deposit it in debris jams. The vegetative canopy over 3rd and 4th order streams varies in density. These streams can transport large amounts of sediments, which are often deposited around channel obstructions, in narrow, winding areas, or in other areas of low velocity, such as accretion bars, estuaries, and the flood plain.

The direct influence of riparian areas is moderated in 5th order and larger streams but remains important. Canopies of large, old growth trees provide some shade, vegetated riparian zones keep the main channel confined, and the largest stems of down trees that remain in the stream provide important summer and winter salmonoid habitat. Flood plains of the larger streams contain complex arrays of side channels, overflow channels, and isolated pools. Side channels are often created and maintained by large woody debris (Bisson et al., 1987; Sedell et al., 1984). The gradient in large streams is usually less than one percent, but rapids and falls may occur. Alluvial material and woody debris may be deposited in quiet areas, but accumulations are flushed and rearranged during high flows (Sedell et al., 1988).

Riparian Areas

Riparian areas are critical to the regulation of stream flow and to water quality protection. Stream riparian areas have important geomorphic and hydrologic roles that support their high level of biological productivity. The most productive stream riparian areas are often associated with alluvial stream systems. That is, they are deposition zones and occur in fluvial sediments transported and reworked by the stream. A major role of the riparian area is to function as a flood plain and dissipate stream energies associated with high flows. This, in turn, permits sediments to deposit and continue development of the alluvial valley floor.

Alluvial riparian areas also function as shallow aquifers that recharge at high flows and drain at low flows. This interaction between surface flows and ground water storage results in moderated high flows

and enhanced or prolonged base flows. The shallow aquifer condition also creates the moist soil conditions required for plant growth, which characterize riparian areas.

Thus, it is the geomorphic and hydrologic characteristics of riparian areas that establish the basic components of biological habitat, including wet soils and instream structural features such as pools, riffles, gravels and stream banks. The vegetation and animals that thrives in riparian areas, in turn, contributes to their proper geomorphic and hydrologic functioning. Disruption of normal geomorphic or hydrologic function, or the vegetation on which it depends, usually results in impairment of overall riparian resource values.

Geomorphic structure, such as pools and flood plains, strongly influence stream and riparian ecosystems. This is particularly true in steep, "mountain" valley floors typical of the Coast Range and the west slope of the Cascades where floods and debris flows can damage riparian vegetation and alter aquatic habitat on a frequency of years to decades.

The frequency and extent of disturbance, accessibility of riparian areas for wildlife, and magnitude of vegetation influence on stream ecosystems, varies as a function of drainage area and the associated variables of stream channel and valley floor widths. Another important source of structural variability along streams is exogenous (nonfluvial) factors such as bedrock outcrops and large hill slope landslides. Areas of very narrow valley floors can occur along headwater channels in V-shaped valleys or in bedrock or landslide controlled gorges along larger channels. Such areas may have extensive topographic shading, little opportunity for resetting of riparian vegetation by floods, little riparian habitat, and the environmental gradients for terrestrial wildlife are abrupt. In wider valley floors, on the other hand, channels can move laterally, creating complex mosaics of vegetation and secondary channels, which are rich in aquatic and terrestrial habitat. Valley floor and channel widths are likely to increase uniformly in the downstream direction as long as only fluvial processes have formed valley floor landforms and there has been no significant influence of exogenous factors. Channel and valley floor conditions may vary greatly from one geologic terrain to another (Hansen et al., 1988).

A buffer zone of up to 2.5 to 3 tree heights (approximately 400-500 feet) is needed to protect streamside riparian zones from changes in microclimate and wind damage that can threaten the integrity of vegetative structure and species composition. Microclimate impacts to riparian zones include not only increased water temperature, caused by solar radiation, but higher water temperatures due to elevated air temperature and water surface contact. Convection water temperature increases of up to 20_ F have been documented in western Oregon (Levno and Rothacher, 1967). Another microclimate change is caused by reduced humidity, which can cause compositional changes in vegetative species. This can alter allochtonous sources (sources from outside the stream) for a food chain based on decaying leaves and benthic (bottom dwelling) invertebrates. This has potential impacts to fisheries.

Subterranean invertebrates thrive in a maze of underground channels that flow among the gravels, sands, and rock that underlie many streams and rivers. These underground waterways can be as deep as 30 feet and can extend sideways for miles from the stream channel.

In this understream area, called the hyporheic zone, many types of small blind shrimp, primitive worms, bacteria, algae, and various kinds of immature insects live. These underground animals support a food chain that extends to the surface. The hyporheic zone serves as a refuge for creatures during times of drought or stress and, after floods, streams may rely on the life underground to assist in repopulation of aquatic invertebrates. The underground system is rich in bacteria that fix nitrogen, which is in great demand by surface organisms.

Timber management activities (road construction, timber harvest, and slash disposal) can remove riparian vegetation, constrain natural stream channels, and alter stream banks and channel structure at stream crossings.

Debris torrents, both natural and those caused by clear cut timber harvesting techniques and/or road construction, scour stream beds down to bedrock, damage riparian vegetation, and eliminate the ability of riparian areas to store water and function as shallow aquifers. While harvesting timber, it is sometimes necessary to yard logs through riparian areas; this can cause damage to riparian vegetation and stream banks. (See Riparian, Wildlife, and Vegetation Sections for more details concerning riparian areas.)

Ground Water

Water that infiltrates the soil surface is known as ground water. Most ground water eventually discharges into stream channels. Ground water is found in layers called aquifers, water bearing rocks or sediments that occur at depths from a few feet to several hundred feet below the surface. There are two types of aquifers: unconfined and confined. Unconfined aquifers are also known as water table aquifers. Unconfined aquifers are generally shallow with an impermeable layer of rock or soil defining the lower boundary resulting in the water table (saturated zone) being located between the impermeable layer and land surface. These shallow, unconfined aquifers are more prone to contamination from surface pollutants than confined aquifers. Confined aquifers (also known as artesian aquifers) are generally deeper and are separated from the surface by an impermeable layer of rock or soil known as an aquiclude. The quality of water in confined aquifers is generally excellent; however, in some cases, chemicals in the subsurface geologic formations can add undesirable contaminants, such as arsenic, boron, mercury, or sodium.

Ground water is replenished by rain and snow, which filters through soil and geologic formations. This underground water generally moves slowly from mountains and uplands to lowlands and valleys, where it is discharged to creeks, rivers, and marshes. Ground water discharges to surface waters provide the base flow for streams throughout Oregon. This discharge may vary significantly in different areas, depending on the geologic conditions of the aquifer.

Water tables generally rise after removal of vegetation due to increased water (from reduced transpiration) recharging ground water areas. However, reductions in ground water may occur when subsurface flow is intercepted by road cuts and transformed into surface water through a ditch-culvert system. Some of this water is deposited on undisturbed soil areas where it returns to subsurface flow. The remainder is deposited into channels where it becomes streamflow.

Appendix N
Watershed Tables

Table 3-51 - Beneficial Uses by Analytical Watershed - Willamette Basin

Beneficial Use	Willamette Basin	Big River	Row River	Coast Fork	Middle Fork	McKenzie River	Mohawk River	Calapooia River	Willamette River
Public Domestic Water Supply	x		x			x			x
Private Dom. Water Supply	x	x	x	x	x	x	x	x	x
Industrial Water Supply	x		x		x	x			x
Irrigation	x	x	x	x	x	x	x	x	x
Livestock	x		x	x	x	x	x	x	x
Anadromous Fish Rearing	x	x	x	x	x	x	x	x	x
Salmonoid Fish Passage	x	x	x	x	x	x	x	x	
Resident Fish & Aquatic Life	x	x	x	x	x	x	x	x	x
Wildlife & Hunting	x	x	x	x	x	x	x	x	x
Fishing	x	x	x	x	x	x	x	x	x
Boating	x		x	x	x	x			x
Water Contact Recreation	x	x	x	x	x	x	x	x	x
Aesthetic Quality	x		x	x	x	x	x	x	x
Hydro Power	x		x		x	x			
Commercial Navigation	x								

Table 3-52 - Beneficial Uses by Analytical Watershed - Mid Coast Basin

Beneficial Use	Mid Coast Basin	Lake Creek	Wildcat Creek	Upper Siuslaw	Middle Siuslaw	Wolf Creek
Public Domestic Water Supply	x					
Private Dom. Water Supply	x	x	x	x	x	x
Industrial Water Supply	x					
Irrigation	x	x	x	x	x	x
Livestock	x	x		x		
Anadromous Fish Rearing	x	x	x	x	x	x
Salmonoid Fish Passage	x	x	x	x	x	x
Resident Fish & Aquatic Life	x	x	x	x	x	x
Wildlife & Hunting	x	x	x	x	x	x
Fishing	x	x	x	x	x	
Boating	x	x			x	
Water Contact Recreation	x	x		x	x	
Aesthetic Quality	x	x	x	x	x	x
Hydro Power Commercial Navigation	x					

Table 3-53 - Oregon State Department of Environmental Quality Non-Point Source Pollution Assessment Report

	Turb	Low-DO	Temp	Nutr	Pest	Toxic	B/V	Solids	Sed	Eros	LowFlow	Debris	Struct	Plants	Other	Rating
Mid Coast Basin																
186 Siuslaw River	M2	-	-	M2	-	-	-	-	M2	M2	-	-	M2	-	-	B
187 Siuslaw River	M2	-	-	M2	-	-	-	-	-	M2	-	-	M2	-	-	B
188 Wildcat Creek	M2	M2	-	M2	-	-	-	-	S1	M2	M2	-	M2	-	-	A2
190 Deadwood Creek	M2	-	-	M2	-	-	-	-	M2	M2	-	-	M2	-	-	B
192 Lake Creek	M2	-	-	M2	-	-	-	-	M1	M2	-	-	M2	-	-	B
194 Congdon Creek	M2	-	-	M1	-	-	-	-	-	M2	-	M2	M1	-	-	B
195 Nelson Creek	-	M2	-	M2	-	-	-	-	-	M2	M2	-	M2	-	-	B
211 Knowles Creek	M1	M1	-	M1	-	-	-	-	M1	M1	M1	-	M1	-	-	B
212 Knowles Creek	-	-	-	M2	-	-	-	-	-	-	-	-	M2	-	-	B
213 Whittaker Cr.	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
214 Esmond Creek	-	-	M2	M2	-	-	-	-	M2	-	-	M2	M2	-	-	B
215 Wolf Creek	-	-	-	M2	-	-	-	-	-	-	-	-	M2	-	-	A2
216 Siuslaw River South Fork	M2	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	B
217 Trail Creek	-	-	S2	-	-	-	-	-	-	-	-	S2	-	-	-	A1
Willamette Basin																
73 Calapooia River	S2	-	-	-	-	-	-	-	-	S2	-	-	-	-	-	A1
74 Calapooia River	-	-	M1	-	-	-	-	-	M1	-	-	-	-	-	-	B
99 Willamette River	M2	M1	-	-	-	-	M1	M2	M2	M2	M1	-	-	-	-	B
100 Willamette River	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	-	B
101 Willamette River	-	-	-	-	-	-	M1	-	M2	-	-	-	-	-	-	B
112 McKenzie River	M2	-	-	-	-	-	-	-	M1	M2	-	-	-	-	-	B
113 McKenzie River	-	S1	-	-	-	-	-	-	M1	-	S1	-	-	-	-	A2
124 Little Fall Creek	-	-	-	M2	-	-	-	-	M1	-	-	-	M2	-	-	A2
125 Fall Creek	-	M1	-	-	-	-	-	-	M2	-	M1	-	-	-	-	B
126 Fall Cr. Res.	-	-	-	-	-	-	-	-	M1	-	-	-	-	-	-	B
127 Fall Creek	-	M2	-	-	-	-	-	-	M2	-	M2	-	-	-	-	B
128 Winberry Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
140 Lookout Point Reservoir	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
142 Willamette Middle Fork	-	M1	-	-	-	-	-	-	M2	-	M1	-	-	-	-	B
143 Lost Creek	M2	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	A2
144 Lost Creek	M2	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	A2
145 Lost Creek	M2	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	A2
148 Hills Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
151 Mohawk River	S2	-	-	-	-	-	-	-	M2	S2	-	-	-	-	-	A1
152 Mohawk River	-	-	-	M2	-	-	-	-	M2	-	-	M2	-	-	-	B
153 McGowan Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
154 Parsons Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
155 Mill Creek	-	-	-	M2	-	-	-	-	M2	-	-	-	M2	-	-	A2
156 Shotgun Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
157 Camp Creek	M2	M2	-	-	-	-	-	-	M2	M2	M2	-	-	-	-	B
158 Gate Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
159 Deer Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	A2
164 Willamette Coast Fork	-	M1	-	-	-	S1	M1	-	M2	-	M2	-	-	-	S1	B

Table 3-53 - Oregon State Department of Environmental Quality Non-Point Source Pollution Assessment Report (continued)

	Turb	Low-DO	Temp	Nutr	Pest	Toxic	B/V	Solids	Sed	Eros	LowFlow	Debris	Struct	Plants	Other	Rating
165 Willamette Coast Fork	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
166 Big River	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
167 Little River	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
168 Cottage Grove Reservoir	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	-	B
169 Mosby Creek	-	-	-	M2	-	-	-	-	S2	-	-	-	M2	-	-	A2
170 Row River	-	M2	-	-	-	-	-	-	M2	-	M2	-	-	-	-	B
171 Row River	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
172 Dorena Res.	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	-	B
173 Sharps Creek	M2	-	-	M2	-	-	-	-	M2	M2	-	-	M2	-	-	B
176 Camas Swale Cr.	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
177 Long Tom River	M2	M2	-	M2	-	-	M1	-	M1	-	-	-	M1	M1	-	B
178 Fern Ridge Reservoir	-	-	-	M1	M1	-	M1	-	M1	-	-	-	M1	M1	-	B
179 Long Tom River	M2	-	M2	-	-	-	-	-	M2	M2	-	M2	-	-	-	B
181 Amazon Creek	-	-	S2	M1	S2	-	M1	S2	M1	-	-	S2	M1	S2	-	A1
182 Poodle Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
183 Noti Creek	-	-	-	-	-	-	-	-	M2	-	-	-	-	-	-	B
200 Ferguson Creek	M2	-	-	-	-	-	-	-	M2	M2	-	-	-	-	-	B
999 Coyote Creek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B

Key:

Turb	Turbidity	Sed	Sedimentation
Low-DO	Low Dissolved Oxygen	Eros	Streambank Erosion
Temp	Elevated or Depressed Water	LowFlow	Decreased streamflow
Nutr	Nutrients	Debris	Excessive Debris Accumulation
Pest	Pesticides	Struct	Insufficient Stream Structure
Toxic	Toxics	Plants	Excessive Plant Growths
Salt	Salt Water Intrusion	Other	Other (specified in comments)
B/V	Bacteria/Viruses		
Radio	Radioisotopes		
Gases	Dissolved Gases		
Solids	Objectionable Discoloration, Scum, Oily Slick or Film, Floating Solids		

Rating:

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

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

A1: Those waterbodies in which serious NPS pollution problems are known to exist or have been reported without challenge.

A2: Those waterbodies in which moderate and/or serious NPS pollution problems have been reported by some sources but challenged by others.

B: Those waterbodies in which moderate NPS pollution problems are known to exist or have been reported without challange.

Appendix O
Management for SEIS Special Attention Species

Species to be protected through survey and management according to the ROD/Standards and Guidelines (text and Table C-3), survey strategies (from Table C-3), and special buffers and other management actions (pages C-20 and C-27).

Species	Survey Strategies[1]				Protection Buffers[2]
	1	2	3	4	
Fungi					
Mycorrhizal fungi					
Boletes					
Gastroboletus subalpinus	1		3		
Gastroboletus turbinatus			3		
Boletes, low elevation					
Boletus piperatus			3		
Tylopilus pseudoscaber	1		3		
Rare boletes					
Boletus haematinus	1		3		
Boletus pulcherrimus		1		3	
Gastroboletus imbellus		1		3	
Gastroboletus ruber	1		3		
False truffles					
Nivatogastrium nubigenum	1		3		
Rhizopogon abietis			3		
Rhizopogon atroviolaceus			3		
Rhizopogon truncatus				3	
Thaxterogaster pingue				3	
Uncommon false truffle					
Macowanites chlorinosmus	1		3		
Rare false truffles					
Alpova alexsmithii	1		3		
Alpova olivaceotinctus		1		3	
Arcangeliella crassa		1		3	
Arcangeliella lactarioides	1		3		
Destuntzia fusca	1		3		
Destuntzia rubra	1		3		
Gautieria magnicellaris		1		3	
Gautieria otthii		1		3	
Leucogaster citrinus		1		3	
Leucogaster microsporus	1		3		
Macowanites lymanensis	1		3		
Macowanites mollis	1		3		
Martellia fragrans	1		3		
Martellia idahoensis	1		3		

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Martellia monticola	1		3		
Octavianina macrospora	1		3		
Octavianina papyracea		1		3	
Rhizopogon brunneiniger	1		3		
Rhizopogon evadens var. *subalpinus*		1		3	
Rhizopogon exiguus		1		3	
Rhizopogon flavofibrillosus	1		3		
Rhizopogon inquinatus		1		3	
Sedecula pulvinata	1		3		
Undescribed taxa, rare truffles and false truffles					
Alpova sp. nov. #Trappe 9730		1		3	
Alpova sp. nov. #Trappe 1966		1		3	
Arcangeliella sp. nov. #Trappe 12382		1		3	
Arcangeliella sp. nov. #Trappe 12359		1		3	
Chamonixia pacifica sp. nov. #Trappe 12768		1		3	
Elaphomyces sp. nov. #Trappe 1038		1		3	
Gastroboletus sp. nov. #Trappe 2897		1		3	
Gastroboletus sp. nov. #Trappe 7515		1		3	
Gastrosuillus sp. nov. #Trappe 7516	1		3		
Gastrosuillus sp. nov. #Trappe 9608	1		3		
Gymnomyces sp. nov. #Trappe 4703, 5576	1		3		
Gymnomyces sp. nov. #Trappe 5052		1		3	
Gymnomyces sp. nov. #Trappe 1690, 1706, 1710	1		3		
Gymnomyces sp. nov. #Trappe 7545		1		3	
Hydnotrya sp. nov. #Trappe 787, 792		1		3	
Hydnotrya subnix sp. nov. #Trappe 1861	1		3		
Martellia sp. nov. #Trappe 311, 649	1		3		
Martellia sp. nov. #Trappe 1700	1		3		
Martellia sp. nov. #Trappe 5903	1		3		
Octavianina sp. nov. #Trappe 7502	1		3		
Rhizopogon sp. nov. #Trappe 9432	1		3		
Rhizopogon sp. nov. #Trappe 1692	1		3		
Rhizopogon sp. nov. #Trappe 1698	1		3		
Thaxterogaster sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520	1		3		
Tuber sp. nov. #Trappe 2302		1		3	
Tuber sp. nov. #Trappe 12493		1		3	
Rare Truffles					
Balsamia nigra		1		3	
Choiromyces alveolatus	1		3		
*Choiromyces venosus**		1		3	
Elaphomyces anthracinus	1		3		
Elaphomyces subviscidus	1		3		
Chanterelles					
*Cantharellus cibarius**				3	4
*Cantharellus subalbidus**			3	4	
Cantharellus tubaeformis			3	4	

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Chanterelles - *Gomphus*					
Gomphus bonarii			3		
Gomphus clavatus			3		
*Gomphus floccosus**				3	
Gomphus kauffmanii				3	
Rare chanterelles					
Cantharellus formosus		1		3	
Polyozellus multiplex		1	2	3	4 Buffer
Uncommon coral fungi					
Ramaria abietina			3		
Ramaria araiospora	1		3		
Ramaria botryis var. *aurantiiramosa*	1		3		
Ramaria concolor f. *tsugina*			3		
Ramaria coulterae			3		
Ramaria fasciculata var. *sparsiramosa*		1		3	
Ramaria gelatiniaurantia	1		3		
Ramaria largentii	1		3		
Ramaria rubella var. *blanda*	1		3		
Ramaria rubrievanescens	1		3		
Ramaria rubripermanens	1		3		
Ramaria suecica			3		
Ramaria thiersii	1		3		
Rare coral fungi					
Ramaria amyloidea	1		3		
Ramaria aurantiisiccescens	1		3		
Ramaria celerivirescens	1		3		
Ramaria claviramulata		1		3	
Ramaria concolor f. *marri*	1		3		
Ramaria cyaneigranosa		1		3	
Ramaria hilaris var. *olympiana*		1		3	
Ramaria lorithamnus		1		3	
Ramaria maculatipes		1		3	
Ramaria rainierensis		1		3	
Ramaria rubribrunnescens	1		3		
Ramaria stuntzii	1		3		
Ramaria verlotensis	1		3		
Ramaria gracilis	1		3		
Ramaria spinulosa	1		3		
Phaeocollybia					
Phaeocollybia attenuata			3		
Phaeocollybia californica	1		3		
Phaeocollybia carmanahensis		1		3	
Phaeocollybia dissiliens	1		3		
Phaeocollybia fallax			3		
Phaeocollybia gregaria		1		3	
Phaeocollybia kauffmanii	1		3		
Phaeocollybia olivacea				3	
Phaeocollybia oregonensis	1		3		

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Phaeocollybia piceae		1		3	
Phaeocollybia pseudofestiva				3	
Phaeocollybia scatesiae	1		3		
Phaeocollybia sipei	1		3		
Phaeocollybia spadicea			3		
Uncommon gilled mushrooms					
*Catathelasma ventricosa**			3		
Cortinarius azureus			3		
Cortinarius boulderensis	1		3		
Cortinarius cyanites			3		
Cortinarius magnivelatus	1		3		
Cortinarius olympianus		1		3	
Cortinarius spilomius				3	
Cortinarius tabularis			3		
Cortinarius valgus			3		
Dermocybe humboldtensis	1		3		
Hebeloma olympiana		1		3	
Hygrophorus caeruleus		1		3	
Hygrophorus karstenii				3	
Hygrophorus vernalis		1		3	
Russula mustelina			3		
Rare gilled mushrooms					
Chroogomphus loculatus	1		3		
Cortinarius canabarba		1		3	
Cortinarius rainierensis		1		3	
Cortinarius variipes	1		3		
Cortinarius verrucisporus	1		3		
Cortinarius wiebeae	1		3		
Tricholoma venenatum		1		3	
Uncommon ecto-polypores					
Albatrellus ellisii			3		
Albatrellus flettii			3		
Rare ecto-polypores					
Albatrellus avellaneus		1		3	
Albatrellus caeruleoporus	1		3		
Tooth fungi					
*Hydnum repandum**			3		
*Hydnum umbilicatum**				3	
Phellodon atratum			3		
Sarcodon fuscoindicum			3		
Sarcodon imbricatus				3	
Rare zygomycetes					
Endogone arcogena		1		3	
Endogone oregonensis		1		3	
Glomus radiatum	1		3		

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]	
Saprobes (decomposers)						
Uncommon gilled mushrooms						
Baeospora myriadophylla			3			
Chrysomphalina grossula			3			
Collybia bakerensis	1		3			
Fayodia gracilipes (syn. *F. rainierensis*)				3		
Gymnopilus puntifolius		1		3		
Marasmius applanatipes	1		3			
Mycena hudsoniana		1		3		
Mycena lilacifolia			3			
Mycena marginella			3			
Mycena monticola	1		3			
Mycena overholtsii	1		3			
Mycena quinaultensis		1		3		
Mycena tenax				3		
Mythicomyces corneipes			3			
Neolentinus kauffmanii		1		3		
Pholiota albivelata	1		3			
Stagnicola perplexa			3			
Rare gilled mushrooms						
Clitocybe subditopoda		1		3		
Clitocybe senilis	1		3			
Neolentinus adherens		1		3		
Rhodocybe nitida	1		3			
Rhodocybe speciosa		1		3		
Tricholomopsis fulvescens	1		3			
Noble polypore (rare and endangered)						
Oxyporus nobilissimus		1	2	3		
Bondarzew's polypore						
Bondarzewia montana		1	2	3		
Rare resupinates and polypores						
Aleurodiscus farlowii		1		3		
Dichostereum granulosum	1		3			
Cudonia monticola			3			
Gyromitra californica				3	4	
Gyromitra esculenta				3	4	
Gyromitra infula			3	4		
Gyromitra melaleucoides			3	4		
Gyromitra montana (syn. *G. gigas*)			3	4		
Otidea leporina		1	2	3		Buffer
Otidea onotica		1	2			Buffer
Otidea smithii		1	2	3		Buffer
Plectania melastoma				3		Buffer
Podostroma alutaceum				3		
Sarcosoma mexicana		1	2	3	4	Buffer
Sarcosphaera eximia				3		
Spathularia flavida			3			

Species	Survey Strategies[1]				Protection
	1	2	3	4	Buffers[2]
Rare cup fungi					
Aleuria rhenana	1	2			Buffer
Bryoglossum gracile		1		3	
Gelatinodiscus flavidus		1		3	
Helvella compressa	1		3		
Helvella crassitunicata		1		3	
Helvella elastica	1		3		
Helvella maculata	1		3		
Neournula pouchetii	1		3		
Pithya vulgaris		1		3	
Plectania latahensis	1		3		
Plectania milleri	1		3		
Pseudaleuria quinaultiana	1		3		
Club coral fungi					
Clavariadelphus borealis			3	4	
Clavariadelphus ligula				3	4
Clavariadelphus lovejoyae			3	4	
*Clavariadelphus pistilaris**			3	4	
Clavariadelphus sachalinensis				3	4
Clavariadelphus subfastigiatus				3	4
*Clavariadelphus truncatus**			3	4	
Jelly mushroom					
*Phlogoitis helvelloides**			3	4	
Branched coral fungi					
Clavulina cinerea			3	4	
Clavulina cristata			3	4	
Clavulina ornatipes			3	4	
Mushroom lichen					
Phytoconis ericetorum				3	4
Parasitic fungi					
Asterophora lycoperdoides			3		
Asterophora parasitica				3	
Collybia racemosa			3		
Cordyceps capitata			3		
Cordyceps ophioglossoides			3		
Hypomyces luteovirens				3	
Cauliflower mushroom					
*Sparassis crispa**			3		
Moss-dwelling mushrooms					
Cyphellostereum laeve				3	
Galerina atkinsoniana				3	
Galerina cerina				3	
Galerina heterocystis				3	
Galerina sphagnicola				3	

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Galerina vittaeformis				3	
Rickenella setipes			3		
Coral fungus					
Clavicorona avellanea				3	
Lichens					
Rare forage lichen					
Bryoria tortuosa	1		3		
Rare leafy (arboreal) lichens					
Hypogymnia duplicata		1	2	3	
Tholurna dissimilis	1		3		
Rare nitrogen-fixing lichens					
Dendriscocaulon intricatulum		1		3	
Lobaria hallii		1		3	
Lobaria linita		1	2	3	
Nephroma occultum		1		3	
Pannaria rubiginosa	1		3		
Pseudocyphellaria rainierensis		1	2	3	
Nitrogen-fixing lichens					
*Lobaria oregana**				4	
*Lobaria pulmonaria**					4
Lobaria scrobiculata					4
*Nephroma bellum**				4	
*Nephroma helveticum**					4
*Nephroma laevigatum**					4
Nephroma parile				4	
*Nephroma resupinatum**				4	
*Pannaria leucostictoides**				4	
Pannaria mediterranea					4
Pannaria saubinetii				4	
Peltigera collina				4	
Peltigera neckeri				4	
Peltigera pacifica				4	
*Pseudocyphellaria anomala**					4
*Pseudocyphellaria anthraspis**					4
*Pseudocyphellaria crocata**				4	
Sticta beauvoisii				4	
Sticta fuliginosa				4	
Sticta limbata					4
Pin lichens					
Calicium abietinum				4	
Calicium adaequatum					4
Calicium adspersum					4
Calicium glaucellum				4	
Calicium viride					4

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Chaenotheca brunneola				4	
Chaenotheca chrysocephala					4
Chaenotheca ferruginea				4	
Chaenotheca furfuracea				4	
Chaenotheca subroscida				4	
Chaenotheca pusilla					4
Cyphelium inquinans					4
Microcalicium arenarium				4	
Mycocalicium subtile					4
Stenocybe clavata				4	
Stenocybe major				4	
Rare rock lichens					
Pilophorus nigricaulis		1		3	
Strcta arctica		1		3	
Riparian lichens					
Cetrelia cetrarioides				4	
Collema nigrescens				4	
Leptogium burnetiae var. *hirsutum*				4	
Leptogium cyanescens					4
Leptogium saturninum					4
Leptogium teretiusculum				4	
Platismatia lacunosa					4
Ramalina thrausta				4	
*Usnea longissima**				4	
Aquatic lichens					
Dermatocarpon luridum	1		3		
Hydrothyria venosa	1		3		
Leptogium rivale	1		3		
Rare oceanic-influenced lichens					
Bryoria pseudocapillaris	1		3		
Bryoria spiralifera	1		3		
Bryoria subcana	1		3		
Buellia oidalea		1		3	
Erioderma sorediatum		1		3	
Hypogymnia oceanica		1		3	
Leioderma sorediatum		1		3	
Leptogium brebissonii		1		3	
Niebla cephalota	1		3		
Pseudocyphellaria mougeotiana	1		3		
Teloschistes flavicans		1		3	
Usnea hesperina	1		3		

Species	Survey Strategies[1] 1	2	3	4	Protection Buffers[2]
Oceanic-influenced lichens					
Cetraria californica	1		3		
Heterodermia leucomelos	1		3		
Loxospora sp. nov. "corallifera" (Brodo in edit)	1		3		
Pyrrhospora quernea		1		3	
Additional lichen species					
Cladonia norvegica			3		
Heterodermia sitchensis			3		
Hypogymnia vittiata			3		
Hypotrachyna revoluta				3	
Ramalina pollinaria			3		
Nephroma isidiosum				3	
Bryophytes					
Antitrichia curtipendula					4
Bartramiopsis lescurii		1		3	
Brotherella roellii	1	2	3	4	Buffer
Buxbaumia piperi	1	2	3	4	Buffer
*Buxbaumia viridis**	1	2	3	4	Buffer
Diplophyllu albicans	1		3		
Diplophyllum plicatum		1	2		
Douinia ovata					4
Encalypta brevicolla var. *crumiana*	1		3		
Herbertus aduncus	1		3		
Herbertus sakurali	1		3		
Iwatsuklella leucotricha		1		3	
Kurzia makinoana	1	2			
Marsupella emarginata var. *aquatica*		1	2		
Orthodontlum gracile		1		3	
Plagiochila satol	1		3		
Plagiochila semidecurrens	1		3		
Pleuroziopsis ruthenica		1		3	
Racomitrium aquaticum	1		3		
Radula brunnea	1		3		
Rhizomnium nudum	1	2	3	4	Buffer
Schistostega pennata		1	2	3	4 Buffer
Scouleria marginata				4	
Tetraphis geniculata		1	2	3	4 Buffer
Tritomaria exsectiformis	1	2			
Tritomaria quinquedentata	1		3		
Ulota meglospora	1	2			Buffer
Mammals					
Phenacomys longicaudus (red tree vole)*		2			

Species	Survey Strategies[1]				Protection Buffers[2]
	1	2	3	4	
Mollusks					
Cryptomastix devia	1	2			
Deroceras hesperium		1	2		
Hemphillia barringtoni		1	2		
Hemphillia glandulosa		1	2		
Megomphix hemphilli		1	2		
Prophysaon coeruleum		1	2		
Prophysaon dubium	1	2			
Vascular Plants					
*Allotropa virgata**	1	2			
Arceuthobium tsugense	1	2			
*Aster vialis**	1	2			
Botrychium minganense	1	2			
Botrychium montanum		1	2		
Coptis asplenifolia	1	2			
Coptis trifolia		1	2		
Corydalis aquae-gelidae	1	2			
*Cypripedium montanum**	1	2			

* Species known to occur on the Eugene District.

Note that some of the species in the ROD list (Table C-3), where there is no reasonable possibility of naturally occurring in the District, are not included in this list.

[1] Survey Strategies: 1 = manage known sites; 2 = survey prior to activities and manage sites; 3 = conduct extensive surveys and manage sites; 4 = conduct general regional surveys.

[2] Protection Buffers are additional standards and guidelines from the Scientific Analysis Team Report for specific rare and locally endemic species, and other specific species in the upland forest matrix (see Record of Decision for SEIS (pages C-19 and C-27). Species that are identified under the survey strategies may also need protection buffers for the management of known sites.

Appendix P
Methodology for Assessing Effects on Wildlife and Special Status Species (Wildlife)

Elk

Assumptions

1. Evaluations are conducted on each of the 5 existing elk emphasis areas.

2. The primary analytical technique is the Wisdom et al. (1986) Model, which relates cover and forage conditions to existing seral stages of forest habitat, and estimates impacts due to existing road networks in elk areas.

3. Forest stands are classified, in general, into the following forage or cover types, based on the age of the stand. Some stands have been classified differently based on site specific conditions, which included canopy closure, stocking class, aspect, or tree size.

   Forage areas = 0-20 years
   Hiding cover = 21-50 years, with appropriate stocking class
   Thermal cover = 51-150 years, with appropriate stocking class
   Optimal cover = 151+ years, with appropriate stocking class

4. Cover quality indices (HEc) and forage quality indices (HEf) are calculated for only BLM lands within the 5 Elk Emphasis Areas; whereas road mileage indices (HEr) are calculated for all roads within the Elk Emphasis Areas, including roads not owned or controlled by BLM. While it is recognized that non-BLM lands contribute significantly to elk population management in the planning area due to the checkerboard ownership pattern, specific habitat conditions on these lands are not quantified and, therefore, cannot be included in the model. This decision to not include non-BLM lands in the calculations for HEc and HEf has approval of the Oregon Department of Fish and Wildlife (ODFW).

5. A major divergence from the Wisdom Elk Model is the decision to not present a calculation for habitat spacing index (HEs). This decision is due, again, to the fact that checkerboard ownership patterns with non-BLM confounds the results of the model. Not including this index in the analysis results in the loss of some quantitative aspects of cover and forage conditions, since HEc and HEf are primarily indicators of cover and forage quality, not quantity.

6. Total acres of cover and forage habitat in each of the elk emphasis areas is shown in the Table 4-59.

7. For a complete description of the assumptions of the model, see page 11 of Wisdom et al. (1986).

Table 4-59 - Acres of Cover/Forage Type Within Each Elk Management Area, With Percentages, Found on BLM Administered Lands.

Elk Management Emphasis Area	Optimal Habitat Acres	%	Thermal Habitat Acres	%	Hiding Habitat Acres	%	Foraging Habitat Acres	%	Total Habitat Acres (BLM)
Lake Creek	1,511	6	4,075	17	10,475	42	8,547	35	24,608
Walker Creek	410	3	1,189	8	9,643	68	3,024	21	14,226
Wolf Creek	3,965	11	4,750	13	16,884	45	11,735	31	37,334
Siuslaw River	4,569	24	3,128	17	3,013	16	12,946	43	18,656
Mosby Creek	4,919	17	7,781	27	2,966	10	12,978	45	28,644
Total Acres of Habitat	15,374		20,923		42,981		49,230		123,468

Analytical Techniques

Cover Conditions (HEc)

1. Tally acres of cover by cover type in each of the elk emphasis areas, as identified in the District Map Overlay Statistical System (MOSS) database. Multiply acres in each cover type by the following scores (quality of the habitat):

   0.1 - Hiding cover

   0.5 - Thermal cover

   1.0 - Optimal cover

   This total is then divided by total acres of cover within each elk emphasis area, to obtain Habitat Effectiveness for cover (HEc).

2. Present HEc scores for each of the elk emphasis areas in tabular form, and compare these scores against ODFW benchmark scores of 0.4 to 0.5.

3. Discuss impacts of 10-Year Timber Harvest Scenario on future cover conditions.

4. Discuss probable short-term and long-term impacts of future land management activities, including timber harvest, on District elk cover management goals.

5. Discuss expected cumulative impacts of actions likely to occur on non-BLM lands, as they influence management of elk on BLM lands.

Forage Conditions (HEf)

1. Tally acres of forage by forage type on BLM lands within each of the elk emphasis areas, as identified in MOSS. Multiply acres in each forage type by the following scores (quality of the forage):

   0.10 - Shelterwood or commercial thinned

   0.25 - Clear cut

   0.50 - Clear cut and burned

   0.75 - Clear cut, burned, and seeded

   1.00 - Clear cut, burned, seeded, and fertilized

   Divide this total by total acres of forage within each elk emphasis area, to obtain Habitat Effectiveness for forage (HEf).

2. Present HEf scores for each of the elk emphasis areas in tabular form, and compare these scores against ODFW benchmark scores of 0.6 to 0.75.

3. Discuss impacts of 10-Year Timber Harvest Scenario on future forage conditions.

4. Discuss probable short-term and long-term impacts of future land management activities, including timber harvest, on elk forage management goals on the District.

5. Discuss expected cumulative impacts of actions likely to occur on non-BLM lands, as they influence management of elk on BLM lands.

Road Mileage Conditions (HEr)

1. Determine miles of driveable roads on BLM and non-BLM lands in each Elk Emphasis Area. Divide number of road miles in Elk Emphasis Area with total acreage to obtain average road density on each. Compare road density with ODFW benchmark of 1.5 miles per square mile recommended in the ODFW Forest Habitat Protection Criteria for BLM Lands (1990).

2. Discuss impacts of 10-Year Timber Harvest Scenario on future road conditions, including additional miles of road constructed under each alternative and proposals for road access management.

Woodpeckers

Assumptions

1. By managing habitat conditions (snag and retention trees) for woodpeckers in the planning area to retain at least 60 percent of optimal population levels, requirements of other cavity users would be met at approximately the 60 percent level. By meeting habitat needs of primary cavity dwellers, the model assumes the needs of secondary cavity dwellers would also be met.

2. A direct correlation exists between snag densities and population densities of cavity users.

3. The following minimum guidelines have been established for most alternatives, except where retention of snags is voluntary:

   Snags and retention trees would be greater than 15 inches diameter at breast height (dbh) and at least 20 feet in height.

   Soft snags would be retained on-site except where unacceptable for logging safety or burning concerns.

   Under some alternatives, snags, and retention trees would be left so that snags are available to woodpeckers throughout the life of the stand after timber harvest.

   Except where public safety is a concern, snags would be retained in areas reserved from timber harvest, such as riparian zones, nonsuitable woodland, Areas of Critical Environmental Concern (ACECs), bald eagle habitat, and spotted owl reserved pair areas.

4. For a complete description of the assumptions of the model used (see Neitro et al., 1985).

Analytical Techniques

1. Existing snag levels for each forest seral stage are estimated, based on District 5-point inventory data. Average number of snags per acre are multiplied times the total number of acres, Districtwide, within the seral stage to estimate snag numbers in total. Dividing by total forest acres provides a weighted estimate of the average snag density per acre on the District. Example calculations for the existing condition are presented in the Table 4-60.

2. Average snag density is related to present woodpecker population levels, through the relationship published in Neitro et al. (1985), page 145.
3. Conduct similar analysis for 10-Year Scenario by estimating snag loading in recently harvested units, based on snag retention criteria in each alternative, and estimate woodpecker population levels based on these projections.

4. Conduct similar analysis based on projected habitat levels at 100-year time interval from estimated seral stage distributions in each alternative, shown in Chapter 4 Timber, and estimate woodpecker population levels based on these projections.

5. In narrative form, discuss cumulative effects of the alternatives on woodpeckers and other cavity users.

Table 4-60 - Sample Calculation of Woodpecker Populations, Existing Conditions

Age Class	Acres (Thousands)	Average Snags/Acre	Total Snags (Thousands)	% Cavity Excavators
0-15	65,509	0.37	24,238	22
16-45	96,079	0.48	46,118	21
46-95	69,605	1.62	112,760	43
96-195	27,508	3.79	104,255	100
196+	41,267	3.64	150,212	97
Totals	299,968		437,583	

Overall Snag Density = 437,583/299,968 = 1.5 snags/acre
Average Percent Cavity Nester Population = 44

Appendix Q
Stream Habitat Quality Rating

The rationale for using riparian tree size (dbh) to rate stream habitat quality is based on research (Sedell et al., 1988), inventory data, and field experience of BLM fishery biologists. Data from these sources indicate that vegetative conditions (size of trees) in adjacent riparian areas are directly related to stream habitat quality and fish populations. Trees in riparian areas fall into streams and create desirable habitat conditions.

A "related factors" analysis was done to determine if other factors should be considered in making a final habitat quality rating. There are many interrelated physical and biological factors that affect the quality of fish habitat and fish populations. In addition to tree size in riparian areas, other factors include amount of water diversion, amounts of sediment yield, availability of natural structure, presence of beaver dams or side channels, or presence of rehabilitation structures. Some of these factors are not inventoried for all BLM stream segments. Therefore, the District biologist determined which of the known factors were most important in making a final habitat rating.

It should be noted that, although useable as a reasonable estimate for cumulative values for fisheries, the following classification does not reflect all factors that influence riparian zone quality for terrestrial plant and animal communities. Stream habitat quality ratings were based on tree size information available in the BLM Operations Inventory (OI). Since riparian zones are not separated in the OI, localized management actions such as buffers, past hi-grading and incursions such as roads that created a riparian age different from the upslope areas, are not considered in estimating stream quality. Moisture and temperature regimes, for example, are greatly influenced by vegetative conditions on adjacent (upland) lands so that, even though a particular riparian zone is covered by 21+ inch trees, its microclimate is degraded by the removal of adjacent upland forests. Another example is a riparian zone that has regenerated tree cover following timber harvest. Although the tree cover may be "good/optimal," overall conditions may be lower due to the dearth of large snags, logs and tree species diversity.

The characteristics of the condition classes are as follows:

1. **POOR** - Major alterations in watershed or water quality and quantity conditions, natural stream habitat and riparian areas; few or no larger trees present in riparian areas with most 0-11" dbh; little or no large woody debris; pools few and shallow; heavy sedimentation of streambed by sand and silt or extensive areas of bedrock or larger rock; stream productivity for aquatic life drastically reduced; fish populations at only 10-25 percent of potential.

2. **FAIR** - Watershed moderately impacted by activities; riparian vegetation altered by past events or activities; few large trees present with most 11-21" dbh, dominated by red alder and bigleaf maple; physical stream conditions substantially altered from natural conditions because of past activities, e.g., limited amount of large woody debris and fine sediments in pools and riffles above natural amounts; some adverse changes in water quality and quantity; habitat either partly recovered or still decreasing in trend; stream moderately productive for aquatic life, but fish populations far below potential (approximately 50 percent).

3. **GOOD/OPTIMAL** - Watershed either not greatly impacted by activities or mostly recovered and in good condition; riparian areas in good condition with diverse vegetation including large trees over 21" predominantly of conifers; physical stream conditions only slightly altered with nearly complete recovery or virtually unchanged from natural conditions, for example; abundant and diverse instream structure including large woody debris, numerous deep pools, bottom substrates relatively free from fine sediments, adequate spawning gravels, and stable banks and channels; water quality and quantity generally unaltered from natural conditions; stream highly productive for aquatic life, i.e., producing near or at its potential for salmon, trout, and other native fishes.

Appendix S
Proposed Management of Candidate Special Areas Dropped from Special Area Consideration

Area Name	Acres Dropped	Description of Primary Values	Proposed Management
Fawn Creek	100	Plant Community/Historic: The area was nominated for Douglas-fir stand adjacent to old homestead and school that occurs off of BLM land.	The area will be managed consistent with FSEIS/ROD for riparian and upland forest lands within the matrix.
Coburg Hill	40	Plant Community/Scenic Area/ Scenic Area/Visual: The area was nominated for a Douglas-fir stand along the crest of Coburg Hills, visible from Interstate 5.	The area will be managed consistent with FSEIS/ROD for upland forest lands within the matrix.
Bunker Hill	36	Plant Community: The area was nominated for remnant stand old growth Douglas-fir.	Same as above
Coburg Hills	1,502	Wildlife: The area was nominated for its bald eagle habitat.	The area will be managed for the conservation and recovery of the bald eagle.
Cottage Grove Lake BEHA	177	Wildlife: The area was nominated for its bald eagle habitat.	Same as above
Dorena Lake BEHA	803	Wildlife: The area was nominated for its bald eagle habitat and nest site.	Same as above
Fall Creek Lake BEHA	881	Wildlife: The area was nominated for its potential bald eagle habitat.	Same as above
Fern Ridge Lake BEHA	192	Wildlife: The area was nominated for its bald eagle habitat.	Same as above
Row River EEA	25	Education/Recreation: The area was nominated for the Douglas-fir forest and adjacent riparian forest along Row River; Area is used for fishing access.	The area will be managed for the conservation of Federal Candidate species, *Cimicifuga elata* (tall bugbane).

Area Name	Acres Dropped	Description of Primary Values	Proposed Management
Vik Road EEA	178	Educational: The area was nominated for young Douglas-fir forest and associated Riparian community along Vik Creek that includes active beaver ponds.	The area will be managed consistent the FSEIS/ROD for riparian and and upland forest lands within the matrix.
Cannery Dunes ACEC/ONA	40	Scenic Area/Visual: The area was nominated for the large dune system; a small ephemeral wetland was also identified on the site.	The area is being considered for transfer to the City of Florence.

Appendix T
Off Highway Vehicle Designations

Off Highway Vehicle (OHV) designations for the Eugene District have changed since publication of the Draft RMP. The majority of the District land is now within the limited designation with some open and closed areas. Lists of specific roads and areas within these designations are listed below each Resource Area. Within this dynamic planning process there could be necessary modifications within these designations based upon watershed analysis and development of an OHV plan. An OHV Plan including specific activity plan objectives and details will be developed following publication of the Record of Decision (ROD). This plan will be developed through watershed analysis and within the objectives of the Aquatic Conservation Strategy. Impacts on special status species and wildlife habitats would be part of the development of the analysis pursued during this process. BLM will seek active cooperation in the development of the plan from all affected public parties and other agencies. All closures or limitations would be made subject to valid existing rights such as existing right-of-way grants, reciprocal right-of-way agreements, O&C logging road right-of-way permits and mining claims. OHV area designations are not mapped in detail in this PRMP. They will be mapped in subsequent planning documents. Each resource area can be contacted for location concerns. The three designations of open, limited, and closed are defined from the Code of the Federal Register (CFR) 8340.0-5 as follows:

"(f) **Open area** means an area where all types of vehicle use is permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in subparts 8341 and 8342 of this title.

"(g) **Limited area** means an area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions.

"(h) **Closed area** means an area where off-road vehicle use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer."

Within the limited designation the District has three categories which are:

Limited to designated roads and trails. These are areas that allow OHV activity on specific (listed) roads and trails only. Unrestricted road and trail motor vehicle operation may result in unnecessary soil erosion and create a likelihood of inadvertent negative impacts to important wildlife habitat or sensitive plant communities. Also accidental negative environmental affects related to totally unrestricted OHV operation may occur; therefore, a limited designation is needed to ensure that potential motor vehicle use impacts can be properly mitigated or avoided. The majority of these areas are found within certain Special Recreation Management Areas (SRMAs) which are listed along with their road designations by Resource Area below.

Limited to existing roads and trails. These are areas that allow OHV activity on all existing roads and trails. Due to the steepness of the terrain, unstable soils, and high rainfall common to this region, unregulated cross-country motor vehicle operation may result in unnecessary soil erosion and create a likelihood of inadvertent negative impacts to critical wildlife habitat or sensitive plant communities. Accidental negative environmental affects related to totally unrestricted OHV operation may occur; therefore, a limited designation is needed to ensure that potential motor vehicle use impacts can be properly mitigated or avoided. Most of the District lands are included in this category.

Limited to seasonal use due to resource concerns. Roads that are identified in this category are restricted for use during seasonal periods for resource concerns such as fish, riparian, and wildlife. These roads are listed below by Resource Area, with the specific season and reason identified.

McKenzie Resource Area

Designation	Site	Acres	Reason
Closed:	Shotgun Recreation Site	277	protect recreation values
	Horse Rock Ridge ACEC/RNA*	378	protect ACEC/RNA
	McGowan Creek Environment Education Area	79	protect EEA
	Mohawk ACEC/RNA	292	protect ACEC/RNA
	Proposed Coburg Hills RFI ACEC	804	protect ACEC
	Proposed Cougar Mtn Yew Grove ACEC	10	protect ACEC
	Proposed Grassy Mtn ACEC	74	protect ACEC
	Total	**1,914**	
	Potential** Low Elevation Headwaters of the McKenzie River ACEC	7,650	will need further analysis during the OHV planning process before designations can be assigned.

* ACEC/RNA = Area of Critical Environmental Concern/Research Natural Area

** This ACEC is potential instead of proposed due to the time period it was nominated in. This ACEC will receive interim management to protect the relevant and important values until the required review period is completed. See ACEC section

Limited: **Limited to existing roads and trails:**

Vehicle use within the rest of the McKenzie Resource Area is within this designation.

South Valley Resource Area

Designation	Site	Acres	Reason
Closed:	Fox Hollow ACEC including Road No. 19-4-4.1B	160	protect ACEC
	Camas Swale ACEC including Road Numbers: 19-4-25.1 19-4-25.1 Spur South 19-4-26 segments B, C, D, E 19-4-26.2B	314	protect ACEC
	Potential* Dorena Prairie ACEC	8	protect ACEC
	Proposed Dorena Lake RFI ACEC	18	protect ACEC
	Potential* Cottage Grove Old Growth Environmental Education Area	80	protect EEA
	Proposed Cottage Grove Lake RFI ACEC	53	protect ACEC

Upper Elk Meadows ACEC including Road Numbers: 23-2-35.1 23-2-35.2 23-2-35.3 23-2-35.6	242	protect ACEC
Potential* Lorane Ponderosa Pine ACEC including Road Nos. 19-4-17.1 and 19-4-22.1	106	protect ACEC
Total	**981**	

Road	Reason
Road No. 20-4-15 segments C and D	Critical resources**
Road 20-4-15 Section 21 spurs	Critical resources
Road No. 21-3-16 segment C	Public safety and resource damage

* These ACECs and EEA areas are potential instead of proposed due to the time period when they were nominated. The areas will receive interim management to protect their relevant and important values until the required review period is completed. See ACEC section.

** Critical resources includes T&E wildlife and plant species, fish spawning and habitat areas, and wildlife such as elk emphasis areas.

Limited: **Roads limited to seasonal use:**

Road Number	Seasonal Closure	Reason
21-2-1.4	1/1 to 8/15	Critical resources
21-1-19.2	4/1 to 10/31	Critical resources
20-6-4.2 seg. B, C	2/1 to 5/31	Critical resources
20-6-5 seg. A, C	2/1 to 5/31	Critical resources
20-6-5.1	2/1 to 5/31	Critical resources
20-6-5.2 seg. A, C	2/1 to 5/31	Critical resources
20-6-5.3	2/1 to 5/31	Critical resources
20-6-5.4	2/1 to 5/31	Critical resources
20-6-5.5	2/1 to 5/31	Critical resources
20-6-8.2	2/1 to 5/31	Critical resources
20-6-9	2/1 to 5/31	Critical resources
19-3-29 SE¼SW¼	4/1 to 10/31	Critical resources
19-4-4	12/1 to 9/30	Critical resources, public safety, resource damage
19-4-9	12/1 to 9/30	same as above
19-4-9.1	12/1 to 9/30	same as above
19-4-9.2	12/1 to 9/30	same as above
19-4-17	12/1 to 9/30	same as above
19-5-15	4/1 to 10/31	Critical resources
20-1-31.1	3/1 to 9/30	Critical resources
20-1-31.2	3/1 to 9/30	Critical resources
20-4-1	12/1 to 9/30	Public safety and resource damage

20-4-1.1	12/1 to 9/30	same as above
20-4-1.2	12/1 to 9/30	same as above
20-4-1.4	12/1 to 9/30	same as above
20-4-1.5	12/1 to 9/30	same as above
20-4-4.3	4/1 to 10/31	Critical resources
20-4-5.1	4/1 to 10/31	Critical resources
20-4-8 lot 3 spur	4/1 to 10/31	Critical resources
20-4-19.5	4/1 to 10/31	Critical resources
20-4-19.6	4/1 to 10/31	Critical resources
20-4-23	4/1 to 10/31	Critical resources
20-4-23.1	4/1 to 10/31	Critical resources
20-4-29 seg. D	4/1 to 10/31	Critical resources
20-4-29.2	6/1 to 9/15	Critical resources
20-4-29.4	6/1 to 9/15	Critical resources
20-4-30 seg. F, H	10/15 to 5/15	Critical resources
20-4-35	12/1 to 9/15	Critical resources, public safety, resource damage
20-4-35.1	4/1 to 10/31	Critical resources
20-4-35.2	12/1 to 9/30	Critical resources, public safety, resource damage
20-4-35.3	12/1 to 9/30	same as above
20-5-5.1	10/1 to 3/15	Critical resources
20-6-11 seg. C	10/1 to 3/15	Critical resources
21-1-5	3/1 to 9/30	Critical resources
21-2-1.5	1/1 to 8/15	Critical resources
22-2-3.2	3/1 to 9/30	Critical resources
23-4-1.2	4/1 to 10/31	Critical resources

Limited: **Limited to designated roads:**

Vehicle use within the Siuslaw River SRMA is limited to the following designated roads:

19-6-20.1	20-6-1	20-6-9.2	20-6-14
-29	-3	-9.3	-14.1
-29.2	-3.1	-9.4	-15
-29.3 seg. A1	-3.2	-10 seg. D, E	-15.1
-29.5	-4 seg. B	-10.1	-15.3
-29.6	-4.2 seg. A	-10.3	
-33.4	-4.3	-11	20-7-2 seg. A2
	-4.4	-13	-2.1
19-7-35	-4.5	-13.5	-2.2
-35.4	-9.1	-13.6	-3
			-3.5
			-10

Limited: **Limited to existing roads and trails:**

Vehicle use within the remainder of the South Valley Resource Area is in this designation.

Coast Range Resource Area

Designation	Site	Acres	Reason
Closed:	Proposed Heceta Sand Dunes ACEC	218	Critical resources
	Long Tom ACEC	7	Critical resources
	Total	**225**	

Closed:	**Area and Roads** (Resource Area has a location map)	**Reason**
	Greenleaf Creek including Road No. 16-8-35.1	Critical Resource protection
	Leopold Creek including Road Nos. 19-8-17.1, 19-8-17.5, 19-8-8.6	Critical Resource protection
	Vic Road No. 16-6-20 including spur 16-6-19.1	Critical Resource protection
	Saleratus Creek including Road No. 18-7-31.1	Critical resources

Open: **Areas**

The following two 40 acre sanddune tracts north of the city of Florence are designated as open:

T.18S., R.12 W., W.M.
Sec. 2: Lot 1
Sec. 15: SE¼NE¼

Limited: **Roads limited to seasonal use:**

Seasonal closure times may be adjusted within these dates due to weather and resource conditions. Fish criteria included roads within the riparian zones that parallel a stream containing anadromous fish stocks at risk. Wildlife criteria included roads within 0.5 mile of a spotted owl activity center to remain closed during nesting season and roads within 0.25 mile of murrelet nesting sites.

Road Number	Seasonal Closure	Reason
17-8-14 (Nelson Creek)	10/15 to 9/15	Critical resources
17-7- 5 (Nelson Creek)	10/15 to 9/15	Critical resources
15-6-33.5	3/1 to 9/30	Critical resources
15-6-33.6	3/1 to 9/30	Critical resources
15-7-25.6	3/1 to 9/30	Critical resources

15-7-33.1	3/1 to 9/30	Critical resources
15-7-33.4	3/1 to 9/30	Critical resources
15-7-33.5	3/1 to 9/30	Critical resources
15-7-33.6	3/1 to 9/30	Critical resources
15-7-33.7	3/1 to 9/30	Critical resources
15-7-31 (along Swamp Cr.)	10/15 to 4/15	Critical resources
15-7-31.2	10/15 to 4/15	Critical resources
16-7-6.1	10/15 to 4/15	Critical resources
16-7-15.2	3/1 to 9/30	Critical resources
16-7-15.4	3/1 to 9/30	Critical resources
16-7-15.8	3/1 to 9/30	Critical resources
16-8-1.1	3/1 to 9/30	Critical resources
17-6-4	1/1 to 8/31	Critical resources
16-6-33.1	1/1 to 8/31	Critical resources
16-6-33.2	1/1 to 8/31	Critical resources
16-6-33.3	1/1 to 8/31	Critical resources
16-6-33.4	1/1 to 8/31	Critical resources
17-6-30.1	3/1 to 9/30	Critical resources
17-7-1	3/1 to 9/30	Critical resources
17-7-15	3/1 to 9/30	Critical resources
17-7-29.1	3/1 to 9/30	Critical resources
17-8-5.1	3/1 to 9/30	Critical resources
18-7-16	3/1 to 9/30	Critical resources
18-7-17	3/1 to 9/30	Critical resources
18-7-17.1	3/1 to 9/30	Critical resources
18-7-23.1	3/1 to 9/30	Critical resources
18-7-19	12/1 to 3/30	Watershed restoration
18-7-19.4	12/1 to 3/30	Watershed restoration
18-7-19.5	12/1 to 3/30	Watershed restoration
18-7-19.7	12/1 to 3/30	Watershed restoration
18-7-21	12/1 to 3/30	Watershed restoration
18-7-21.1	12/1 to 3/30	Watershed restoration
18-7-28.3	12/1 to 3/30	Watershed restoration
18-7-unnumbered spur, Sec. 29	3/1 to 9/30	Critical resources
18-8-16.1	3/1 to 9/30	Critical resources
18-8-21 (along Whittaker Creek)	10/15 to 4/15	Critical resources
18-9-25	12/1 to 3/30	Watershed restoration
18-9-25.1	12/1 to 3/30	Watershed restoration
18-9-25.2	12/1 to 3/30	Watershed restoration
18-9-25.4	12/1 to 3/30	Watershed restoration

18-9-31.1	12/1 to 3/30	Watershed restoration
18-9-31.3	12/1 to 3/30	Watershed restoration
18-9-31.4	12/1 to 3/30	Watershed restoration
18-9-31.5	12/1 to 3/30	Watershed restoration
19-6-3.5	3/1 to 9/30	Critical resources
19-6-3.6	3/1 to 9/30	Critical resources
19-6-3.7	3/1 to 9/30	Critical resources
19-6-3.8	3/1 to 9/30	Critical resources
19-6-30	12/1 to 3/30	Watershed restoration
19-6-19.1	9-/1 to 3/30	Watershed restoration
19-6-19.2	12/1 to 3/30	Watershed restoration
19-6-19.3	12/1 to 3/30	Watershed restoration
19-7-1 (along Grenshaw Creek)	10/15 to 4/15	Fish spawning & habitat
19-7-27.1	12/1 to 3/30	Watershed restoration
19-7-27.2	12/1 to 3/30	Watershed restoration
19-8-5	4/1 to 9/15	Critical resources
19-8-12	12/1 to 3/30	Watershed restoration
19-8-17.4	12/1 to 3/30	Watershed restoration
19-8-28.2	4/1 to 9/15	Critical resources
19-8-28.3	4/1 to 9/15	Critical resources
19-8-28.4	4/1 to 9/15	Critical resources
19-8-28.5	4/1 to 9/15	Critical resources
19-9-2.3	3/1 to 9/30	Critical resources
20-7-33.5	3/1 to 9/30	Critical resources

Limited: **Limited to designated roads.**

Vehicle use within the following areas is limited to designated roads due to botany T&E plant concerns:

Township Range Section	Road Number	Township Range Section	Road Number
16-8-33	16-8-33	19-8-27	19-8-13.2
15-6-35	16-6- 2.1	19-8-27	19-8-27.1
16-6- 1	16-6- 1	19-8-27	19-8-27.2
16-6-12	16-5- 7	19-8-27	19-8-27.3
16-6-12	unnamed spur	19-8-27	19-8-27.4
18-8- 3	18-8-3.5	19-8-27	19-8-27.5

Vehicle use within the Siuslaw River SRMA is limited to the following designated roads:

18-8-21; -26; -34; -35

19-7-25

19-8-3; -3.2; -3.7; -3.9; -8.2 (BLM portion); -9.7; -9.7A; -11; -11.1; -11.2; -11.3; -13; -13.1; -13.2; -14; -26.2; -30; -30.1; -30.2; -35.4; -35.5; -36; -36.3

19-7-9.1; -12.1; -16.1; -17.1; -19; -20.1; -20.4; -21.2; -22.6; -23; -23.3; -25; -25.1; -27.8; -28 (BLM portion); -28.2; -28.3

20-7-3.2

Vehicle use within the Upper Lake Creek SRMA is limited to the following designated roads:

14-6-34 (BLM portions)

15-6-7.2; -17.1; -17.2; -18; -18.4; -19.1; -19.2; -19.4; -19.5; -19.6; -26

15-7-10; -10.4; -14.2; -14.4; -15; -15.3; -15.4; -16.1; -16.4; -16.5; -16.6; -17 (BLM portions); -17.1; -17.2; -17.4; -18; -18.1; -18.2; -18.3; -19; -19.1; -19.2; -19.3; -20; -20.1; -20.3; -20.4; -21; -21.1; -21.3; -21.4; -21.5; -21.6; -22; -23 (BLM portions); -23.2; -24.1; -25.2; -25.3; -25.4; -25.5; -25.7; -26; -26.2; -27; -27.1; -28; -28.1; -29; -29.1; -29.3; -29.4; -29.5; -30 (BLM portions); -33; -34.1; -35; -36

unnumbered road in 15-7-10
unnumbered road in 15-7-14
unnumbered road in 15-7-23
unnumbered road in 15-7-24
unnumbered road in 15-7-26

Vehicle use within the Lower Lake Creek SRMA (including the Lake Creek Falls ACEC) is limited to the following designated roads:

16-7-19; -19.2
spur road to plantation in 16-7-19

16-7-23; -27; -27.1; -27.3; -27.4; -27.5; -28; -29; -29.4; -29.5; -30; -30.1; -30.4; -33.5; -33.6

Limited: **Limited to existing roads and trails:**

Vehicle use within the remainder of the Coast Range Resource Area is in this designation.

Table 3-27 - Candidate ACEC Screening Results

Candidate ACEC	Nomination Source	Nomination Acres	Historic Cultural or Scenic Value	Fish Wildlife Habitat Value	Natural System Bot/Geol Value	Special Status Species	Meets Relevance Criteria	Meets Importance Criteria	Potential ACEC Acres
Bunker Hill Friends of Bunker Hill	x	x	No	No	N/A[3]				36
Cannery Dunes	BLM	40			x		Yes	Yes	40
Coburg Hills BEHA	BLM	1,492		x		x	Yes	Yes	1,502
Coburg Hills RFI	BLM	1,445		x	x		Yes	Yes	804
Coburg Hills Scenic Area	Public	40	x				No	No	N/A[3]
Cottage[6] Grove Old Growth	Public	80		x	x	x	N/A[5]	N/A[5]	80
Cottage Grove[4] Reservoir BEHA	BLM	177		x		x	Yes	Yes	177
Cottage Grove Reservoir RFI	BLM	206		x	x		Yes	Yes	53
Cougar Mtn. Yew Grove	ONRC	40[1]			x		Yes	Yes	10
Dorena[6] Prairie	BLM	8			x		Yes	Yes	8

Table 3-27 - Candidate ACEC Screening Results (continued)

Candidate ACEC	Nomination Source	Nomination Acres	Historic Cultural or Scenic Value	Fish Wildlife Habitat Value	Natural System Bot/Geol Value	Special Status Species	Meets Relevance Criteria	Meets Importance Criteria	Potential ACEC Acres
Dorena Reservoir BEHA	BLM	743		x		x	Yes	Yes	803
Dorena Reservoir RFI	BLM	1,233		x	x		Yes	Yes	18
Fall Creek Reservoir BEHA	BLM	1,120		x		x	Yes	Yes	881
Fawn Creek	Public	100		x			No	No	N/A[3]
Fern Ridge BEHA	BLM	166		x		x	Yes	Yes	192
Grassy Mtn.	BLM	40			x		Yes	Yes	74[1]
Heceta Sand Dunes	BLM	218			x		Yes	Yes	218
Hult Marsh	BLM	167	x	x	x	x	Yes	Yes	167
Lorane [6] Ponderosa Pine	BLM	106			x		Yes	Yes	106
Low [6] Elevation Headwaters of the McKenzie River	BLM	7,650	x	x	x	x	Yes	Yes	7,650

Table 3-27 - Candidate ACEC Screening Results (continued)

Candidate ACEC	Nomination Source	Nomination Acres	Historic Cultural or Scenic Value	Fish Wildlife Habitat Value	Natural System Bot/Geol Value	Special Status Species	Meets Relevance Criteria	Meets Importance Criteria	Potential ACEC Acres
McKenzie River BEHA	BLM	2,214		x		x	Yes	Yes	2,752
McKenzie River RFI	BLM	98		x	x		Yes	Yes	0[2]
Siuslaw River BEHA	BLM	400		x		x	Yes	Yes	586
Triangle Lake BEHA	BLM	525		x		x	Yes	Yes	1,100
Triangle Lake RFI	BLM	1,640		x	x		Yes	Yes	0[2]

1 Title Plat Acres
2 Some acres of RFI were converted to acres of BEHA, based on interdiciplinary team review and review by the nominee, in order to better meet the needs of species associated with the ACEC nomination.
3 Not Applicable. These areas did not meet qualifications for further consideration as ACEC
4 Formerly part of Cottage Grove Reservoir RFI
5 Not Applicable. Cottage Grove Old Growth nomination for EEA (Environomenal Education Area) status was not subject to the relevance and importance criteria. Consideration for designation is determined based on the importance of these areas for educational purposes.
6 These ACEC nominations were received between the Draft and Final RMP. They have gone through the ACEC screening process and have been determined to qualify as potential ACEC. Because they have not yet gone through the required public review period, they will be carried forward as potential ACEC/EEA until a RMP ammendment is implemented or until a new planning process occurs.

Table 3-28 - Present Condition of Existing and Potential Special Areas

Existing Special Areas	Present Condition
Horse Rock Ridge ACEC/RNA	The site's current condition is good; however, OHV use has been historically observed in the ACEC/RNA and more recently has occurred on adjacent private lands as well as within the ACEC/RNA. The area is being inappropriately used for rock-climbing exercises and sporadic camping. The area is frequented by local wildflower enthusiasts. A gate prevents the majority of disturbance to the meadow complex but this has been repeatedly vandalized allowing unauthorized access into the meadow complex.
Long Tom ACEC	The site's current condition is good. Secondary succession is occurring within the ACEC, but this is being controlled by prescribed burning. Unauthorized vegetation maintenance has occurred along the right-of-way within the site. Livestock have historically used the area. Fences and gates have been established to control unauthorized activities. The area has been signed as a Special Research Area.
Lake Creek Falls ACEC	The site's current condition is good. An anadromous fish passage was constructed in 1989. The site is used for recreation purposes and was designated due to the potential conflicts between recreation and hazardous swimming conditions. Signs have been established with appropriate warnings about potential dangers within the area.
Mohawk ACEC/RNA	The site's current condition is good. Some Pacific yew bark theft has historically occurred within the ACEC/RNA boundary. Target shooting has occurred with the subsequent damage to some boundary trees. Garbage dumping was a significant problem within and around the ACEC/RNA. The area has been gated to help mitigate against these inappropriate uses, and this action appears to be effective.
Camas Swale ACEC/RNA	The site's current condition is good with exception of the small meadow that is adjacent to the road. Repeated OHV use in this area has degraded the natural meadow. Signs have been installed prohibiting OHV use in the ACEC/RNA, but signs are used as targets and have been stolen. Some unauthorized moss harvest has occurred within the ACEC/RNA. Campfire rings have also been observed. Sporadic littering has occurred within the meadow. Gates have historically been installed to regulate unauthorized use; however, these have been pulled out and have been ineffective. Evaluations on how to mitigate inappropriate uses within the ACEC/RNA are currently underway.
Fox Hollow ACEC/RNA	The site's current condition is good with exception of a recent trespass logging event that occurred along a narrow strip of the western boundary. Trees within the ACEC/RNA were cut and removed from the ACEC/RNA. Little disturbance has been observed except for some infrequent horseback riding and occasional hunting and hiking. The area is gated and ACEC/RNA signs have been installed.

Table 3-28 - Present Condition of Existing and Potential Special Areas (continued)

Existing Special Areas	Present Condition
Upper Elk Meadows ACEC/RNA	The site's current condition is good. The south ACEC/RNA boundary is experiencing windthrow damage. A path was found brushed into the ACEC/RNA in 1991. Some campfire rings have been observed adjacent to the ACEC/RNA. The area is gated and ACEC/RNA signs have been installed.
McGowan EEA	The site's current condition is good. Some Pacific yew bark theft has historically occurred within the EEA boundary. Garbage dumping was a significant problem within and around the EEA. The area has been gated to help mitigate against these inappropriate uses, and this action appears to be effective.
Vik Road EEA	The site's current condition is good. No negative impacts have been identified at the site.
Row River EEA	The site's current condition is good. Some recreational fishing occurs within the area. No negative impacts have been identified at the site.
Potential Special Areas	**Present Condition**
Upper Elk Meadows	The site's current condition is good. See Elk Meadows Expansion
Expansion ACEC/RNA	ACEC/RNA; existing Special Area, present condition.
Camas Swale Expansion	The site's current condition is good. See Camas Swale ACEC/RNA; existing ACEC/RNA Special Area, present condition.
Lake Creek Expansion	The site's current condition is good. See Lake Creek ACEC; existing ACEC/ONA Special Area, present condition.
Horse Rock Ridge Expansion	The site's current condition is good. See Horse Rock Ridge ACEC; existing ACEC/RNA Special Area, present condition.
Cannery Dunes ACEC/ONA	The site's current condition is good. No damage has been documented in the area. OHV use is popular in this area but, because of the ephemeral nature of the dunes, damage is not apparent. Some European beachgrass has been trespass planted onto the dunes. A small seasonal wetland receives some OHV use.
Heceta Sand Dunes ACEC/ONA	The site's current condition is good. OHV use has occurred on this dune system in the past and has impacted the natural succession on parts of the proposed ACEC. This use is still occurring within the proposed area. Plant collecting has also occurred.
Hult Marsh ACEC	The site's current condition is good. The old mill pond was drained and refilled to repair a failing dam. Natural restoration is presently occurring in the area. Sensitive plants that occupied the site are still present. All terrestrial wildlife species have recolonized at or near their carrying capacity except for fish-eating mammals and birds. Populations of non-native game fish were lost and have not re-established. It is expected that native cutthroat will recolonize the lake.

Table 3-28 - Present Condition of Existing and Potential Special Areas (continued)

Existing Special Areas	Present Condition
Cougar Mountain Yew Grove ACEC	The site's current condition is good. No negative impacts have been identified at the site. Historical logging has occurred in the area. The area is gated.
Grassy Mountain ACEC	The site's current condition is good. No negative impacts have been identified at the site. The area remains one of the District's best examples of native grassland.
Triangle Lake BEHA ACEC Triangle Lake RFI ACEC Fern Ridge BEHA ACEC Coburg Hills BEHA ACEC Coburg Hills RFI ACEC Fall Creek Reservoir BEHA ACEC McKenzie River BEHA ACEC McKenzie River RFI ACEC Dorena Reservoir BEHA ACEC Dorena Reservoir RFI ACEC Cottage Grove BEHA ACEC Cottage Grove Reservoir RFI ACEC Siuslaw River BEHA ACEC	These sites remain in good condition. They continue to provide essential elements of biotic diversity. The areas remain capable of supporting nesting by bald eagles and other raptors that require old growth habitat adjacent to large water bodies and a variety of open habitats.
Dorena Prairie ACEC	The site's current condition is good. Noxious weed invasion is occurring on the site, but is currently being controlled. On-going studies are examining the red fescue at this site to determine whether the species is native or introduced.
Lorane Ponderosa Pine ACEC	These sites remain in good condition. No negative impacts have been identified.
Cottage Grove Old Growth EEA	The site's current condition is good. Some windthrow damage is occurring within the area. No other negative impacts have been identified at the site.
Low Elevation Headwaters of the McKenzie River ACEC	This site's current condition is good. The area continues to provide essential elements of biotic diversity including habitat for several Special Status Species.

BEHA = Bald Eagle Habitat Area
RFI = Relict Forest Island

Appendix W
Probable Management Activities and Major Consequences in Existing and Potential Special Areas

Existing Special Areas

Lake Creek Falls ACEC

Alternatives NA, A, B, C, D, E, and PRMP

Lake Creek Falls would be designated through all alternatives including the PRMP. Development activities would be consistent with maintaining the primary values in the area. An additional 55 acres (Total Areas of Critical Environmental Concern (ACEC) and Outstanding Natural Area (ONA) acres = 58 acres) would be added to the ACEC in Alternatives A, B, C, D, E, and the PRMP. The area would be designated as an ACEC/ONA to emphasize the recreational use of the area while also addressing the safety concerns at the site. Locatable mineral potential in the area is considered low. The area is presently withdrawn from locatable mineral entry and withdrawal would continue. The area would be closed to salable mineral development and would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently withdrawn from commercial timber harvest because of unsuitable site conditions. The site is presently closed to Off-Highway Vehicle (OHV) use and would remain so under Alternatives A-E. The PRMP would limit OHV activity to designated roads. A management plan would be prepared to identify site specific actions necessary for addressing recreation and safety concerns at the site.

Long Tom ACEC

Alternatives A, B, and C

The area would not be designated, but the primary values at the site would be protected under the Endangered Species Act. The area would remain open for mining claim location. Locatable mineral exploration and development could occur to the extent allowed by the Endangered Species Act. However, locatable mineral potential is considered low, and such exploration and development would be unlikely. Surface disturbance may be allowed for leasable and salable mineral exploration or development, if it would not affect the primary values identified on the tract. The area would be closed to OHV use.

Alternatives NA, D, E, and PRMP

The area would be designated as an ACEC. The area is considered to have moderate potential for oil and gas and under these alternatives would be leased subject to the no surface occupancy stipulation. The area would be closed to locatable and salable mineral development. The area would be closed to OHV use. The area is presently withdrawn from commercial timber harvest because of unsuitable site conditions and would remain withdrawn under all alternatives. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Horse Rock Ridge ACEC

Alternative A

The area would not be designated as an ACEC/RNA (Resource Natural Area). The area would be open to timber harvest or other resource development activities. The area would be open for locatable and salable mineral exploration or development and subject to the standard lease terms for mineral leasing. The area would be open to OHV use. Portions of the site would be Timber Productivity Capability Classification (TPCC) withdrawn for rocky, grass meadows, but these special habitats are not given protective buffers in Alternative A. Failure to designate the area as an ACEC/RNA would adversely impact the site by not protecting the RNA cell (Grass bald on the western margin of the Oregon Cascades) and

by allowing the primary ACEC values to degrade.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an ACEC/RNA, and would increase to 378 acres. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so under these alternatives. ACEC/RNA designation would serve to protect the sensitive values of the site and would fill an RNA cell need. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Mohawk ACEC/RNA

Alternative A

The area would not be designated as an ACEC/RNA. The area would be open to timber harvest or other resource development activities. The area would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the area would be leased with the standard lease terms. The area would be open to OHV use. Portions of the site would be TPCC withdrawn for wet meadows, but these special habitats are not given protective buffers in Alternative A. Failure to designate the area as an ACEC/RNA would adversely impact the site, by not protecting the RNA cell (Old growth Douglas-fir and western hemlock forest in Oregon's Willamette Valley foothills) and by allowing the sensitive ACEC values to degrade.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an ACEC/RNA. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry, and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so under these alternatives. ACEC/RNA designation would serve to protect the sensitive values of the site and would fill a RNA cell need. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Upper Elk Meadows ACEC/RNA

Alternative A

The area would not be designated as an ACEC/RNA. The area would be open to timber harvest or other resource development activities. The area would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the area would be leased with standard lease terms. The area would be open to OHV use. Portions of the site would be TPCC withdrawn for wet meadows, but these special habitats are not given protective buffers in Alternative A. Failure to designate the area as an ACEC would adversely impact the site by not protecting the RNA cell (Multiple plant communities including, old growth Douglas-fir and grand fir forest and wet meadow and shrub communities) and by allowing the primary ACEC values to degrade.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an ACEC/RNA and would increase to 223 acres. The area would be closed to timber harvest or other resource development activities. The area would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so under these alternatives. ACEC/RNA designation would serve to protect the sensitive values of the site and would fill a RNA cell need. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Fox Hollow ACEC/RNA

Alternative A

The area would not be designated as an ACEC/RNA. The area would be open to timber harvest or other resource development activities. The area would be open to locatable and salable mineral exploration or development

and subject to standard lease terms for mineral leasing. The area would be open to OHV use. Failure to designate the area as an ACEC/RNA would adversely impact the site by not protecting the RNA cell (dry site, old growth Douglas-fir and Ponderosa pine forest in Oregon's Willamette Valley foothills) and by allowing the primary ACEC values to degrade.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an ACEC/RNA. The area would be closed to timber harvest or other resource development activities. The area would be withdrawn from locatable mineral entry and would be closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use, and would remain so under these alternatives. ACEC/RNA designation would serve to protect the sensitive values of the site and would fill a RNA cell need. A management plan would be prepared to identify site specific actions necessary for maintaining sensitive ecological values at the site.

Camas Swale ACEC/RNA

Alternative A

The area would not be designated as an ACEC/RNA. The area would be open to timber harvest or other resource development activities. The area would be open for locatable and salable mineral exploration or development and subject to standard lease terms for mineral leasing. The area would be open to OHV use. Portions of the site would be withdrawn due to a rocky, grass meadow, but these special habitats are not given protective buffers under Alternative A. Failure to designate the area as an ACEC/RNA would adversely impact the site by not protecting the RNA cell (dry site, mature Douglas-fir forest and dry meadow community in Oregon's Willamette Valley foothills) and by allowing the primary ACEC values to degrade.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an ACEC/RNA, and would increase to 314 acres. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so under these alternatives. ACEC/RNA designation would serve to protect the sensitive values of the site and would fill an RNA cell need. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

McGowan Creek Environmental Area

Alternative A

The area would not be designated an Environmental Education Area (EEA). The area would be open to timber harvest or other resource development activities. Some portions of the site may receive protection within a Riparian Reserves (RR). The site would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the area would be leased with standard lease terms. The area would be open to OHV use. Failure to designate the area as an EEA would preclude environmental educational opportunities for local schools and other interest groups. The area's old growth values could be degraded.

Alternatives NA, B, C, D, E, and PRMP

The area would be designated as an EEA. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry, would be closed to salable mineral development, and would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so in Alternatives B, C, D, E, and the PRMP. In the PRMP the area would include 79 acres to better identify the primary old growth values of the area.

Vik Road Environmental Area

Alternative A and PRMP

The area would not be designated as an EEA. In Alternative A the area would be open to timber harvest or other resource development activities. Some portions of the site may

receive protection within a RR. The site would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the area would be leased with standard lease terms. The area would be closed to OHV use to protect wildlife resources. In the PRMP the area would be managed consistently with the SEIS/ROD for riparian and upland forest lands within the matrix.

Alternatives NA, B, C, D, and E

The area would be designated as an EEA. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry. The area would be closed to salable mineral development and would be subject to the no surface occupancy stipulation for mineral leasing. The area is presently closed to OHV use and would remain so under Alternatives B, C, D, and E.

Row River Environmental Area

Alternative A and PRMP

The area would not be designated as an EEA. In Alternative A the area would not be designated as an EEA, and would be available for timber harvest or other resource development activities. Some portions of the site may receive protection within a RR. The area is closed to locatable mineral entry because these lands have acquired status. The area would be open to salable mineral development and subject to no surface occupancy for mineral leasing. The area would be open to OHV use. Failure to designate the area as an EEA could preclude environmental opportunities for local schools and other interest groups, and could lead to the degradation of the natural values of the area.

In the PRMP the area would not be designated as an EEA, but would be managed as a Botanical Reserve Area. The area would be closed to timber harvest and other resource development. OHV would be limited to existing roads and trails.

Alternatives NA and B, C, D, and E

The area would be designated as an EEA. The area would be closed to timber harvest or other resource development. The area would remain closed to locatable mineral entry and would be closed to salable mineral development. The EEA would be subject to the no surface occupancy stipulation for mineral leasing. The area would remain closed to OHV use.

Potential Special Areas

Cannery Dunes

Alternatives NA, A, and PRMP

The area would not be designated as an ACEC/ONA. The entire tract is unsuitable for timber production, but would be open to other resource development activities. The area is considered to have high potential for uncommon variety silica sand. The area is closed to locatable mineral entry or development. Salable minerals could be utilized, if consistent with surface management objectives. With regard to geothermal leasing, the tract would be subject to standard lease terms and the Special Status Species Stipulation under the PRMP. The area would be closed to oil and gas leasing. The tract would be open to OHV use. The site would be TPCC withdrawn due to the dune formation.

Alternatives B, C, D, and E

The area would be designated as an ACEC/ONA. The area is withdrawn from locatable mineral entry and would be closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for geothermal leasing and would be closed to oil and gas leasing. The area would be closed to OHV use. ACEC/ONA designation would serve to protect the recreational and ecological/geological values of the site. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Heceta Sand Dunes

Alternatives NA and A

The area would not be designated as an ACEC/ONA. The area would be open to resource development activities. This tract is considered to have high potential for uncommon variety silica sand. The area is closed to locatable mineral entry, but salable minerals could be

utilized if consistent with surface management objectives. With regard to mineral leasing, the tract would be subject to standard lease terms. The area would be open to OHV use. Portions of the site would be TPCC withdrawn due to the dune formation.

Alternatives B, C, D, E, and PRMP

The area would be designated as ACEC/ONA. The area is withdrawn from locatable mineral entry and would be closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area would be closed to OHV use. ACEC/ONA designation would serve to protect the recreational and ecological/geological values of the site. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Cougar Mountain Yew Grove

Alternatives NA, A, and B

The area would not be designated as an ACEC. The area would be open to timber harvest or other resource development activities. The area would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the tract would be leased subject to standard lease terms. The area would be open to OHV use. Failure to designate the area as an ACEC would adversely impact the site by not protecting the primary values and by allowing the ACEC to degrade. The area could be considered for exchange out of Federal ownership.

Alternatives C, D, E, and PRMP

The area would be designated as an ACEC. The area would be withdrawn from locatable mineral entry and would be closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area would be closed to OHV use. In the PRMP the acreage would be adjusted to 10 acres to better define the primary values of the area. ACEC designation would protect the sensitive ecological values of the site. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Hult Marsh

Alternatives NA and A

The area would not be designated as an ACEC. The area would be open to timber harvest or other resource development activities. The area would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the tract would be leased subject to standard lease terms. The area would be open to OHV use. Portions of the site would be TPCC withdrawn due to a fresh water pond. The pond would not be buffered in Alternative A, but would be given a 100-foot buffer in the NA Alternative. Failure to designate the area as an ACEC would adversely impact the site by not protecting the ACEC and allowing the primary ACEC values to degrade.

Alternatives B, C, D, E, and PRMP

The area would be designated as an ACEC. The area would be closed to timber harvest and other resource development activities. The area would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. OHV use would be limited to designated roads and trails. ACEC designation would protect the sensitive values of the site, while also addressing the recreational use of the area. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Grassy Mountain

Alternative NA

The area would not be designated as an ACEC. The area would be open to timber harvest or other resource development activities. The area would be open to locatable mineral entry and salable mineral development. With regard to mineral leasing, the tract would be leased subject to standard lease terms. The area would be open to OHV use. Portions of the site would be TPCC withdrawn due to the rocky, grass meadow and a 100-foot buffer would be established around the site. Failure to designate the area as an ACEC would adversely impact the site by not managing the

ACEC and allowing primary ACEC values to degrade.

Alternatives A, B, C, D, E, and PRMP

The area would be designated as an ACEC. The area would be closed to timber harvest or other resource development activities. The area would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The area would be closed to OHV use. ACEC designation would protect the sensitive values of the site. A management plan would be prepared to identify site specific actions necessary for maintaining the sensitive ecological values at the site.

Bald Eagle Habitat Areas:

Coburg Hills BEHA
Fall Creek Lake BEHA
McKenzie River BEHA
Dorena Lake BEHA
Fern Ridge Lake BEHA
Triangle Lake BEHA
Siuslaw River BEHA

Alternatives NA, A, B, C, and PRMP

The areas would not be designated as ACEC. Areas nominated for bald eagle habitat would be managed consistently with the Pacific Bald Eagle Recovery Plan. The BEHA would be classified as critical habitat and administratively withdrawn to protect existing eagles and protect or develop suitable habitat to help meet the goals of the Pacific Bald Eagle Recovery Plan. Site plans would be written for each bald eagle complex to identify recovery plan objectives. Acquisition through conservation easements, purchase, or exchange of adjacent non-BLM lands critical to long-term recovery of bald eagles, may occur under the PRMP. Most BEHA OHV use would be limited to designated roads and trails. The areas would not be withdrawn from locatable mineral entry; however, mining operations may be restricted by the existence of a threatened or endangered species. Under the PRMP, the Special Status Species leasing stipulation would be applied to these lands. The areas would be open to salable mineral development and would be subject to standard lease terms for mineral leasing to the extent that mineral activities would not affect the sensitive species. Failure to designate the area as an ACEC could have an adverse impact because the area could be disturbed by locatable mineral exploration or development. The areas would be subject to a controlled surface use leasing stipulation. The use of existing salable mineral sites would be allowed; however, site expansion could be restricted if the removal of old growth trees would be necessary.

Alternatives D and E

The areas would be designated as ACEC. The areas would be administratively withdrawn from the commercial timber base, although some habitat manipulation could occur to enhance bald eagle habitat. The areas would be withdrawn from locatable mineral entry and closed to salable mineral development. The ACEC would be subject to the no surface occupancy stipulation for mineral leasing. The areas would be closed to OHV use. ACEC designation could aid in obtaining assistance from land conservation groups, which would be needed to complete land acquisitions. Site specific management plans would be prepared that would address the primary values in the areas.

Relict Forest Islands:

Coburg Hills RFI
Dorena Lake RFI
Triangle Lake RFI
Cottage Grove Lake RFI

Alternatives NA, A, and B

The areas would not be designated as ACEC. The areas would be available for resource development activities. The areas would be open to locatable mineral entry and salable mineral development. With regard to leasable minerals, the tracts would be leased subject to standard lease terms.

Alternatives C, D, E, and PRMP

The areas would be designated as ACEC. The areas would be closed to timber harvest. OHV use in the Triangle Lake RFI would be limited to existing/designated roads and trails. All other RFI would be closed to OHV. The areas would be withdrawn from locatable mineral entry and closed to salable mineral development. With

regard to leasable minerals, the tracts would be leased subject to a no surface occupancy stipulation. Wildlife and other inventories would be performed to identify site-specific resource values. Subsequent site-specific management plans would exclude resource development activities inconsistent with maintaining the primary values for which the areas were nominated.

Under the PRMP, the following RFI would be managed as ACEC: Coburg Hills RFI, Dorena Lake RFI, and Cottage Grove Lake RFI. These areas would be managed as Key Raptor areas, as well as for other mature and late successional plants, animals, and fungi. Other RFI would be managed as Bald Eagle Habitat Areas (BEHA). The areas would be closed to timber harvest and OHV use. The areas would be withdrawn from locatable mineral entry and closed to salable mineral development. With regard to leasable minerals, the tracts would be leased subject to a no surface occupancy stipulations. Wildlife and other inventories would be performed to identify site specific resource values. Subsequent site specific management plans would exclude resource development activities inconsistent with maintaining the primary values for which the areas were nominated.

Lorane Ponderosa Pine
Cottage Grove EEA
Low-Elevation Headwaters of the McKenzie River
Dorena Prairie

Alternatives NA - E

These nominations for Special Area status were received between the Draft and Final RMP and, as such, were not part of the analysis of the alternatives.

PRMP

These nominations would be carried forward in the PRMP as potential Special Areas and, as such, would receive interim management/ protection if needed to maintain the relevant and important values for which these areas were nominated. Table 2-6 Management of Proposed Special Areas identifies some actions that will be implemented to protect the relevant and important values identified in the nominations. For additional discussion on these areas see Chapter 2, Special Area Management Actions/Direction.

Appendix X
Management Guidelines and Standards for National Wild and Scenic Rivers

The Wild and Scenic Rivers Act (Public Law 90-542 as amended) established a method for providing Federal protection for certain of our remaining free flowing rivers, and preserving them and their immediate environments for the use and enjoyment of present and future generations. Rivers are included in the system so that they may benefit from the protective management and control of development for which the Act provides. The following guidelines and standards are extracted in part from the February 3, 1970, and August 26, 1982, joint Department of the Interior and Department of Agriculture guidelines. They would apply to formally designated rivers through incorporation in formal management plans, which are normally developed within three years of designation. The guidelines also apply, on an interim basis, to BLM administered lands along BLM study rivers, as well as other rivers or river segments that have been found by the Bureau to be eligible for consideration as components of the National Wild and Scenic River (W&SR) System. In the latter instance, interim application of the guidelines will continue until lifted by a determination of nonsuitability through BLM's planning (RMP) process or by Congressional action. Management guidelines would also comply with the Acquatic Conservation Strategy objectives listed in the Standards and Guidelines of the Record of Decision for the Final Supplemental Environmental Impact Statement.

Section 10(a) of the Act states that:

> "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its aesthetic, scenic, historic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area."

This section is interpreted by the Secretaries of the Interior and Agriculture Departments as stating a nondegradation and enhancement policy for all discretionary actions on designated river areas, regardless of classification.

The Congress, with Presidential approval, may determine which river segments will be added to the W&SR System. When a river is designated, and BLM is identified as the administering Federal agency, BLM will establish administrative boundaries to protect the identified Outstandingly Remarkable Values (ORV). By law, the land inside the boundaries normally may not exceed an average of 320 acres per river mile over the designated portion of the river. BLM would delineate boundaries based on natural or man-made features (canyon rims, roads, and ridgetops, etc.) and with consideration of legally identifiable property lines.

A river management plan must also be completed by the administering Federal agency within three years after designating legislation. Existing Federal, State, tribal, and local laws continue in effect during the interim along with general Department of Interior guidelines. If Federal designation overlaps State Scenic Waterway designation, a joint Federal/State management plan would be developed. All management plans will address the roles of Federal, State, County and relevant Indian tribal governments in management of the river.

Discussion of BLM's inventory to determine which river stretches are eligible for consideration as components of the system were presented in Chapter 3, Appendix 3-J, in the Draft RMP/EIS. Also included in that appendix are discussions of the criteria for eligibility for each classification (wild, scenic, recreational) for which any river reviewed has been found eligible and the results of BLM's eligibility studies.

Wild and Scenic River management plans will address attainment of Aquatic Conservation Strategy objectives.

The guidelines that follow are presented for each separate river classification (recreational, scenic and wild).

Recreational River Areas

Recreational river areas are defined by the Act to be "Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Management Objective for Recreational River Areas

Management of recreational river areas should give primary emphasis to protecting the values that make it an Outstandingly Remarkable Value while providing river-related outdoor recreation opportunities in a recreational setting. Recreational classification is a determination of the level of development and does not prescribe or assume recreation development or enhancement. Management of recreational river areas can and should maintain and provide outdoor recreation opportunities. The basic distinctions between a "scenic" and a "recreational" river area are the degree of access, extent of shoreline development, historical impoundment or diversion, and types of land use. In general, a variety of agricultural, water management, silvicultural, recreational, and other practices or structures are compatible with recreational river values, providing such practices or structures are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment.

Management Standards for Recreational River Areas

Recreation facilities may be established in proximity to the river, although recreational river classification does not require extensive recreational developments. Recreational facilities may still be kept to a minimum, with visitor services provided outside the river area. Future construction of impoundments, diversions, straightening, riprapping, and other modification of the waterway or adjacent lands would not be permitted except in instances where such developments would not have a direct and adverse effect on the river and its immediate environment. The following program management standards apply:

1. **Forestry Practices:** Forestry practices, including timber harvesting, would be allowed under standard restrictions to avoid adverse effects on the river environment and its associated values.

2. **Hydroelectric Power and Water Resource Development:** No development of hydroelectric power facilities would be permitted. Existing low dams, diversion works, riprap, and other minor structures may be maintained provided the waterway remains generally natural in appearance. New structures may be allowed provided that the area remains generally natural in appearance and the structures harmonize with the surrounding environment.

3. **Mining:** Subject to existing regulations (e.g., 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect values of rivers included in the W&SR System; new mining claims are allowed and existing operations are allowed to continue. All mineral activity on BLM administered land is to be conducted in a manner that minimizes unnecessary surface disturbance, water sedimentation and pollution, and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Valid mining claims perfected prior to the effective date of designation may be patented as to the surface and mineral estates. Valid mining claims perfected on or after the effective date may be patented only as to the mineral estate.

4. **Road and Trail Construction:** Existing parallel roads can be maintained on one or both riverbanks. There can be several bridge crossings and numerous river access points. Roads, trails, and visitor areas must conform to construction and maintenance standards and be free of recognized hazards.

5. **Agricultural Practices and Livestock Grazing:** Lands may be managed for a full range of agriculture and livestock grazing uses consistent with current practices.

6. **Recreation Facilities:** Interpretive centers, administrative headquarters, campgrounds, and picnic areas may be established in proximity to the river. However, recreational classification does not require extensive recreation development.

7. **Public Use and Access:** Recreation use including, but not limited to, hiking, fishing, hunting, and boating is encouraged in recreational river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance recreational river values. Any new

structures must meet established safety and health standards or, in their absence, be free of any recognized hazard.

8. **Rights-of-Way**: New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically prohibited outright by other plans, orders, and laws. Where no reasonable alternate location exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on recreational river area related values and fully evaluated during the site selection process.

9. **Motorized Travel**: Motorized travel on land will generally be permitted on existing roads. Controls will usually be similar to that of surrounding lands. Motorized travel on water will be in accordance with existing regulations or restrictions.

10. **Instream Flow Assessment**: To the extent practical and consistent with resource management objectives, quantify instream flow and protection requirements related to Outstandingly Remarkable Value and other resource values identified through the RMP process. Where possible, conduct a comprehensive, interdisciplinary, resource value-based assessment in order to delineate resource values, relate flows to resource conditions, and formulate flow protection strategies that incorporate legal, technical, and administrative aspects in order to secure instream flows that address values associated with the recreational river segment.

Scenic River Areas

Scenic river areas are defined by the Act to be "Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads."

Management Objective for Scenic River Areas

Management of scenic river areas should maintain and provide outdoor recreation opportunities in a near natural setting. In general, a wide range of agricultural, water management, silvicultural, and other practices or structures could be compatible with scenic river values, providing such practices or structures are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment.

Management Standards for Scenic River Areas

The same limitations set forth for recreational river areas are applicable, except that developments should harmonize with the environment, and developments on shore lands should be screened from the river. The following program management standards apply:

1. **Forestry Practices**: Silvicultural practices including timber harvesting could be allowed provided that such practices are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment. The river area should be maintained in its near natural condition. Timber outside the boundary, but within the visually seen area, should be managed and harvested in a manner that provides special emphasis on visual quality. Preferably, reestablishment of tree cover would be through natural revegetation. Cutting of dead and down materials for fuelwood should be limited. Where necessary, restrictions on use of wood for fuel may be prescribed.

2. **Hydroelectric Power and Water Resource Development**: No development of hydroelectric power facilities would be permitted. Flood control dams and levees would be prohibited. All water supply dams and major diversions are prohibited. Maintenance of existing facilities and construction of some new structures would be permitted provided that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

3. **Mining**: Subject to existing regulations (e.g., 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect the values of rivers included in the W&SR System, new mining claims are allowed and mineral leases can be allowed. All mineral activity on BLM administered land must be conducted in a manner that minimizes unnecessary surface disturbance, water sedimentation and pollution, and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Valid mining claims perfected prior to the effective date of designation may be patented as to the surface

and mineral estates. Valid mining claims perfected on or after the effective date may be patented only as to the mineral estate.

4. **Road and Trail Construction:** Roads or trails may occasionally bridge the river area and short stretches of conspicuous roads or long stretches of inconspicuous and well-screened roads could be allowed. Maintenance of existing roads and trails, and any new roads or trails, will be based on the type of use for which the roads or trails are constructed and the type of use that will occur in the river area.

5. **Agricultural Practices and Livestock Grazing:** A wide range of agricultural and livestock grazing uses is permitted to the extent currently practiced. Row crops are not considered as an intrusion of the "largely primitive" nature of scenic corridors as long as there is not a substantial adverse effect on the natural-like appearance of the river area.

6. **Recreation Facilities:** Large-scale public use facilities, such as moderate-sized campgrounds, interpretive centers, or administrative headquarters are allowed if such facilities are screened from the river.

7. **Public Use and Access:** Recreation use including, but not limited to, hiking, fishing, hunting, and boating is encouraged in scenic river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance scenic river values.

8. **Rights-of-Way:** New transmission lines, natural gas lines, etc., are discouraged unless specifically authorized by other plans, orders, or laws. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on scenic river area related values and fully evaluated during the site selection process.

9. **Motorized Travel:** Motorized travel on land or water may be permitted, prohibited, or restricted to protect river values. Prescriptions for management of motorized use may allow for search and rescue and other emergency situations.

10. **Instream Flow Assessment:** To the extent practical and consistent with resource management objectives, quantify instream flow and protection requirements related to Outstandingly Remarkable Values and other resource values identified through the RMP process. Where possible, conduct a comprehensive, interdisciplinary, resource value-based assessment in order to delineate resource values, relate flows to resource conditions, and formulate flow protection strategies that incorporate legal, technical, and administrative aspects in order to secure instream flows, which address values associated with the scenic river segment.

Wild River Areas

Wild river areas are defined by the Act to include "Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America."

Management Objective for Wild River Areas

Management of wild river areas should give primary emphasis to protecting the values that make it an Outstandingly Remarkable Value while providing river-related outdoor recreation opportunities in a primitive setting.

Management Standards for Wild River Areas

Allowable management practices might include construction of minor structures for such purposes as improvement of fish and game habitat; grazing; protection from fire, insects, or disease; and rehabilitation or stabilization of damaged resources, provided the area will remain natural appearing and the practices or structures are compatible and in harmony with the environment. Developments such as trail bridges, occasional fencing, natural-appearing water diversions, ditches, flow measurement or other water management devices, and similar facilities may be permitted if they are unobtrusive and do not have a significant direct and adverse effect on the natural character of the river area. The following program management standards apply:

1. **Forestry Practices:** Cutting of trees will not be permitted except when needed in association with a primitive recreation experience (such as clearing for trails) and for visitor safety or to protect the environment (such as control of fire). Timber outside the boundary, but within the visual corridors should, where feasible, be managed and harvested in a manner to provide special emphasis to visual quality.

2. **Hydroelectric Power and Water Resource Development:** No development of hydroelectric power facilities would be permitted. No new flood control dams, levees, or other works are allowed in the channel or river corridor. All water supply dams and major diversions are prohibited. The natural appearance and essentially primitive character of the river area must be maintained. Federal agency groundwater development for range, wildlife, recreation or administrative facilities may be permitted, if there are no adverse effects on river related Outstandingly Remarkable Values.

3. **Mining:** New mining claims and mineral leases are prohibited on Federal lands constituting the river bed or bank or located within 1/4 mile from the ordinary high water mark on both sides of the river. Valid existing claims would not be abrogated and, subject to existing regulations (e.g., 43 CFR 3809) and any future regulations that the Secretary of the Interior may prescribe to protect the rivers included in the W&SR System, existing mining activity would be allowed to continue. All mineral activity on BLM administered land must be conducted in a manner that minimizes unnecessary surface disturbance, water sedimentation, pollution, and visual impairment. Access to valid existing mining claims and existing mineral leases will be permitted. Valid mining claims perfected prior to the effective date of designation may be patented as to the surface and mineral estates. Mining claims beyond 1/4 mile of the river, but within the wild river boundary and perfected after the effective date of the wild river designation can be patented only as to the mineral estate.

4. **Road and Trail Construction:** No construction of new roads, trails, or other provisions for overland motorized travel would be permitted within the river corridor. A few inconspicuous roads or unobtrusive trail bridges leading to the boundary of the river area may be permitted.

5. **Agricultural Practices and Livestock Grazing:** Agricultural use is restricted to a limited amount of domestic livestock grazing and hay production to the extent practiced prior to designation. Row crops are prohibited.

6. **Recreation Facilities:** Major public-use areas, such as campgrounds, interpretive centers, or administrative headquarters are located outside wild river areas. Simple comfort and convenience facilities, such as toilets, tables, fireplaces, shelters, and refuse containers may be provided as necessary within the river area. These should harmonize with the surroundings. Unobtrusive hiking and horseback riding trail bridges could be allowed on tributaries, but would not normally cross the designated river.

7. **Public Use and Access:** Recreation use including, but not limited to, hiking, fishing, hunting, and boating is encouraged in wild river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance wild river values.

8. **Rights-of-Way:** New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically authorized by other plans, orders, or laws. Where no reasonable alternate location exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on wild river area related values and fully evaluated during the site selection process.

9. **Motorized Travel:** Motorized travel on land or water could be permitted, but it is generally not compatible with this river classification. Normally, motorized use will be prohibited in a wild river area. Prescriptions for management of motorized use may allow for search and rescue and other emergency situations.

10. **Instream Flow Assessment:** To the extent practical and consistent with resource management objectives, instream flows sufficient to meet the purposes of the designated WSR river should be protected and enhanced if possible. Based on the results of an instream flow assessment, implement flow protection strategies and actions that incorporate legal, technical, and administrative aspects in order to secure instream flow protection for applicable river segments. Protection strategies should be

addressed and incorporated in river management plans.

Management Objectives Common to Wild, Scenic and Recreational Rivers

Fire Protection and Suppression: Management and suppression of fires within a designated river area will be carried out in a manner compatible with contiguous Federal lands. On wildfires, suppression methods will be utilized that minimize long-term impacts on the river and river area. Presuppression and prevention activities will be conducted in a manner that reflects management objectives for the specific river segment. Prescribed fire may be used to maintain or restore ecological condition or meet objectives of the river management plan.

Insects, Diseases and Noxious Weeds: The control of forest and rangeland pests, diseases, and noxious weed infestations will be carried out in a manner compatible with the intent of the Act and management objectives of contiguous Federal lands.

Cultural Resources: Historic and prehistoric resource sites will be identified, evaluated, and protected in a manner compatible with the management objectives of the river and in accordance with applicable regulations and policies. Where appropriate, historic or prehistoric sites will be stabilized, enhanced, and interpreted.

Water Quality: Water quality will be maintained or improved to meet Federal criteria or Federally approved State standards. (River management plans shall prescribe a process for monitoring water quality on a continuing basis.)

Special Status Species and SEIS Special Attention Species: Special status species and SEIS special attention species resource sites will be identified, evaluated, and protected in a manner compatible with the management objectives of the river and in accordance with applicable regulations and policies. Where appropriate, historic or prehistoric sites will be stabilized, enhanced, and interpreted.

Fish and Wildlife Habitat Improvement: The construction and maintenance of minor structures for the protection, conservation, rehabilitation, or enhancement of fish and wildlife habitat are acceptable provided they do not affect the free flowing characteristics of the WSR river, are compatible with the river's classification, that the area remains natural in appearance, and the practices or structures harmonize with the surrounding environment.

Water Rights: In the process of evaluating river segments, authorizing officials are held to established principles of law with respect to water rights. Under provisions of Section 13 of the Act, as well as other statutes, river studies shall not interfere (except for licenses under Section 7(b) of the Act, pertaining to Section 5(a) W&SR river studies) with existing rights, including the right of access, with respect to the beds of navigable streams, tributaries, or river segments. In addition, under the Federal Land Policy and Management Act and the Federal Power Act, the BLM has conditioning authority to control any proposed projects that would be incompatible or potentially degrading to river and/or other identified resource values.

Oregon Scenic Waterways Act

In 1969 the State of Oregon passed the Oregon Scenic Waterways Act. This legislation established a program that protects designated rivers throughout Oregon and is administered by the Oregon Department of Parks and Recreation. Its goals are to protect the free-flowing character of designated rivers for fish, wildlife, and recreation. Dams, reservoirs, impoundments, and placer mining are prohibited on lands under the jurisdiction of the State along State Scenic Waterways. Under a memorandum of understanding between BLM, USFS, and the Division of State Lands, dated 3/11/94, the Federal agencies will provide notices or plans of operations to the State for any mining operation on Federal land within Oregon Scenic Waterways. The Act requires review of new development along designated rivers. It does not affect existing water rights, development or uses.

Management Constraints on Private Lands

Designation of a river under the Wild and Scenic Rivers Act may give the Federal government authority to regulate activities on private lands likely to degrade the Outstandingly Remarkable Value. Land use controls on private lands are generally a matter of State and local zoning regulations. Although the W&SR Act includes provisions encouraging the protection of river values through State and governmental land use planning, these provisions are not binding on local governments. The Federal government is responsible for assuring that designated rivers are managed in a manner that

meets the intent of the W&SR Act and attain the Acquatic Conservation Strategy.

River management plans may prescribe land use or development limitations to protect a river's Outstandingly Remarkable Values. Many uses may be compatible with a wild, scenic, or recreational classification as long as the rivers are administered so as to protect and enhance the values that caused them to be included in the National system. Most existing uses and activities on adjoining private lands may continue. Timber harvest activities on private lands within a W&SR boundary would continue to be regulated by the Oregon Forest Practices Act.

The primary consideration in any river or land use limitation would be the protection and enhancement of a designated river's Outstandingly Remarkable Value(s). BLM would work closely with landowners to assure that all uses will be consistent with the intent of the W&SR Act. Those uses that clearly threaten identified Outstandingly Remarkable Values would be addressed on a case-by-case basis.

Specific management goals for new building, or other structure/road construction on private lands along designated rivers would be addressed through the individual river management plans. Federal guidelines allow different degrees of development along rivers classified as wild, scenic, or recreational. In consultation with landowners involved, every effort would be made to reduce adverse impacts to an acceptable level on proposals for major up-grading, realignment, and/or new construction of roads. Maintenance of existing roads generally would not alter a river's condition and thus would not be restricted.

On designated rivers, BLM could negotiate with a landowner to purchase specific development rights necessary to prevent any threat to the river's identified Outstandingly Remarkable Values, if all other efforts fail to reduce anticipated adverse impacts to an acceptable level. Another option, where mutually agreeable, would be a land exchange providing the private landowner with comparable lands outside the administrative boundary of a river.

The W&SR Act specifically prohibits the use of condemnation in the fee title purchase of lands, if 50 percent or more of the land within the boundary is already in public ownership. While the Act provides the Federal government with authority to purchase scenic, conservation, or access easements through condemnation proceedings, this is considered to be a measure of last resort. In the event condemnation were considered necessary, the only landowner rights purchased would be those considered necessary to prevent the threat to the river.

If BLM acquires an easement on private land, depending upon its terms and conditions, public access rights may or may not be involved. For example, a scenic easement could only involve the protection of narrowly defined visual qualities with no provisions for public use. A trail or road easement would involve public use provisions. Any provisions for public use of private lands must be specifically purchased from the landowner. BLM would work closely with landowners to minimize public use of nonfederal lands, through brochures, maps, signs, and/or other appropriate means, except in locations where rights to such use are acquired.

W&SR designation does not affect a private landowner's rights to control trespass. Landowners can charge a fee for crossing private lands to fish designated rivers except where a public access easement exists. The designation of a river in the National W&SR system does not change landowner rights unless all or a portion of these use rights are acquired from the landowner.

On navigable rivers, the river bed and banks to the mean high water mark are State lands and are available under State laws for public use. Private landowners control public access to their property along the banks of nonnavigable rivers. The designation of a river in the National W&SR system has no bearing upon the determination of navigability.

Ownership and use of valid water rights are not affected by a W&SR designation.

Appendix Y
Wild and Scenic Rivers Suitability Assessments

Introduction

This appendix contains three suitability assessments for river segments found suitable by the Eugene District. These include: McKenzie River, Segment A; Siuslaw River, Segment B; and Siuslaw River Segment C. Six river segments assessed but found not suitable, can be found in the Draft RMP, Appendix 2-H. These include segments of Bear Creek, Greenleaf Creek, Fish Creek, Marten Creek, Sharps Creek, and Whittaker Creek. The National Wild and Scenic Rivers System (NWSRS) suitability evaluation process and criteria used in this assessment are described here.

Background

Section 5(d) of the National Wild and Scenic Rivers Act (Public Law 90-542) requires the BLM in all planning for water and related land resources to give consideration to potential national wild, scenic, and recreational river areas. National wild and scenic river study guidelines are found in BLM Manual 8351, U.S. Department of Agriculture and Interior guidelines published in the Federal Register Volume 7, No. 173, September 7, 1982, and in other BLM memoranda and policy statements. Of the 16 river segments found eligible for inclusion in the NWSRS, 9 river segments (as listed above) met minimal manageability criteria for further suitability assessment. All 9 river segments are located within Oregon State Comprehensive Outdoor Recreation Plan (SCORP) Region 8 (see Map 2-16).

Evaluation Process

The RMP/EIS process for evaluating which river segments within the planning area have potential for addition to the National Wild and Scenic Rivers System involves three separate steps: 1) determination of eligibility, 2) establishing the highest tentative classification, and 3) finding of suitability or nonsuitability. Final designation decisions are made by Congress. The following is a summary of each evaluation step.

Determination of Eligibility

To be eligible for designation, a river or river segment must be (1) free-flowing and (2) possess at least one Outstandingly Remarkable Value. The National Wild and Scenic Rivers Act identifies these as scenic, recreational, geologic, fish, wildlife, historic, cultural, or other similar values. Fifty-eight streams were reviewed by the Eugene District to fulfill this analysis requirement for eligibility determination (see Tables 3-55 and 3-56 in Chapter 3 for river listings).

Establishing River Classification

A river area classification (Wild, Scenic, or Recreational) must be tentatively established for each eligible river segment. This classification is based on four criteria: 1) the level and extent of water resources development; 2) shoreline development; 3) water quality; and 4) accessibility associated with the river segment. See the Federal Register, Vol. 47, No. 174, September 7, 1982 for classification criteria and BLM Instruction Memorandum OR-89-632 for eligibility criteria or see Appendix 3-J and Table 3-WSR-3 of the Draft RMP. A summary of the District's eligible rivers and their highest potential classification is shown in Table 3-55 of Chapter 3.

Finding of Suitability

Each eligible river segment assessed in the RMP must be found suitable or nonsuitable for inclusion in the Wild and Scenic Rivers System. Suitability findings serve as the basis for formal and/or informal recommendations to Congress as to whether or not to add the river segment(s) to the national system. Criteria specified in Section 4(a) of the Wild and Scenic Rivers Act provides a basis for suitability assessment. These criteria are specifically addressed in the individual suitability assessments and are as follows:

1. The characteristics that do or do not make the area a worthy addition to the National system.

2. The current status of land ownership and use in the area.

3. The reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the National system.

4. The Federal agency that should administer the river area.

5. The extent to which administrative costs could be shared by State and local government agencies.

6. The estimated cost to the United States for administering the area including necessary acquisitions of land and interests in land.

The following paragraphs discuss in more detail the process/direction involved in applying each of the above suitability criteria.

Suitability Criteria 1: Characteristics that do or do not make the area a worthy addition to the National system.

Based on planning criteria from the State Director's Guidance for Formulation of Planning Alternatives (see Appendix B), BLM made a comparison of Outstandingly Remarkable Values associated with each eligible river segment in each SCORP region. The majority of the Eugene BLM District lands are in SCORP Region 8. Rivers were found suitable for designation in the NWSRS by alternative based on whether one or more of their Outstandingly Remarkable Values were ranked among the top four (Alternative D), top two (Alternative C), or highest (Alternative B) in their SCORP regions. Rivers that were already in the NWSRS were included in this ranking.

Suitability Criteria 2: Current status of land ownership and use in the area.

To qualify for suitability assessment in the RMP/EIS, the BLM should have sufficient administrative control of lands and resources within an approximately one-half mile wide corridor (extending a quarter mile from the ordinary high water mark on both sides of a river segment) to allow for the protection of river related values. For this PRMP, a 40 percent adjacent land ownership policy was set by the BLM. This 40 percent was deemed to be the minimum sufficient Federal ownership to effectively manage the area. Five of the river segments assessed by the Eugene District have 40 or more percent of BLM adjoining lands. The other four river segments assessed lack this percentage but lie within proposed Special Recreational Management Areas (SRMAs), and still have a significant amount of BLM adjacent lands. The intensity of management BLM has committed to SRMAs supports a finding of river area manageability.

Suitability Criteria 3: Reasonably foreseeable potential uses of the land and water that would be enhanced, foreclosed, or curtailed if the area were included in the National System.

The basic objective of a river designation is to maintain the river's existing condition. Private landowners sometimes fear the Federal government's power to acquire land through condemnation, which causes much opposition to designate and manage wild and scenic rivers. In actuality, however, the power of the Federal government to condemn and acquire privately owned lands within the boundaries of a river area is limited and infrequently used. If a land use or development clearly threatens the Outstandingly Remarkable Values, which resulted in the river's designation, efforts can be made to remove the threat through local, State and/or Federal means. Appendix X contains Management Guidelines and Standards for National Wild and Scenic Rivers. Under the Wild and Scenic Rivers Act (Section 6) the Federal government authority may have authority to regulate activities on private lands likely to degrade the Outstandinly Remarkable Value(s). Section 6(b) further prohibits Federal condemnation to purchase fee title lands when 50 percent or more of a designated river corridor is public land (Federal, State, County, etc.). However, Section 6(b) does allow the use of condemnation to purchase scenic easements as a measure necessary to remove or prevent a threat to the river or its Outstandingly Remarkable Values. Section 6(a) prohibits the managing agency from acquiring fee title to an average of more than 100 acres per river mile within a half-mile wide corridor. Section 6(c) states that the managing Federal agency may not condemn and acquire lands or interests in lands zoned by incorporated cities, villages, counties, or borough if their respective ordinances are consistent with the purposes of the Act.

Private land ownership is legitimate within designated river boundaries, and existing private land uses are often consistent with Wild, Scenic, or Recreational river management goals. Carefully conducted ranching, farming, mining, and forest management

activities within the "Scenic" and "Recreational" river classifications may continue. Assistance to private landowners may be provided by the Federal government to encourage practices that enhance the river's Outstandingly Remarkable Values, natural values, and conditions.

Under Statewide Planning Goal 5, the Land Conservation and Development Commission requires counties to conserve open space and protect natural and scenic resources, including potential and designated Federal wild, scenic, and recreational river areas. Where land use conflicts with inventoried Goal 5 resource sites are identified, counties are expected to resolve the conflicting uses through programs developed to achieve the goal. Therefore, depending on how the conflict is resolved, some private land uses along potential river segments may ultimately be affected by County plan and zone designations.

Hydroelectric power potential is determined by using data from Oregon State University's Water Resources Research Institute's 1979 study entitled, "*A Resource Survey of Low-Head Hydroelectric Power Potential in Oregon.*" The gross theoretical potential hydroelectric power for each river segment assessed is expressed in kilowatts. The formula used is: P = cQHe

where: P = power (kilowatts)
c = conversion factor = 0.08475
Q = stream flow (ft^3/sec)
H = head (feet)
e = efficiency = 1.0

P = (0.08475) (Q) (H) (1.0) = ____ kilowatts

Stream flow (Q) is the average annual stream flow determined at the approximate midpoint of the stream reach. Mid-point was used to be consistent with the Oregon State study. This figure is based on available stream flow records and/or from estimated drainage basin runoff. Stream flow has to be at least 35 ft^3/second for a reach to be considered to have hydroelectric power potential. Head is determined as the total difference in elevation along the entire length of the stream reach. Efficiency is the water power, after friction loss, that is converted to electricity. In this formula, an idealistic situation, efficiency equals 100 percent or no friction loss.

Stream reaches that are determined not to be eligible or suitable for wild and scenic river designation do not need an analysis of hydroelectric potential because any future hydroelectric development would not be legislatively precluded.

Suitability Criteria 4: Administering agency.

The administering agency for the purposes of these assessments is assumed to be the BLM. Congress may specify a different agency to administer a component of the NWSRS; however, given the existing Federal land management jurisdiction, transfer of management responsibility to an agency other than BLM is unlikely.

Suitability Criteria 5: Shared costs by other agencies.

In the light of the financial constraints imposed by Oregon Ballot Measure 5, and the past few years of reduced O&C timber receipts, the ability of State, County, and local agencies to share in these costs could be limiting. The burden would most likely be on the managing Federal agency, in this case, BLM.

Suitability Criteria 6: Costs to the United States. When estimating the cost to the United States for administering the river segment area, the following were taken into consideration.

1. Management plan development estimated costs that included considerations for conducting public meetings, reviews, newspaper notices, writer(s) and staff, further studies (if needed); and increased costs based on controversies, draft plans, and publishing costs.

2. Annual administration and management estimated costs that would include considerations for the level of development and protection of the identified Outstandingly Remarkable Values if the river segment is added to the NWSRS.

3. Implementation of resource protection of the identified Outstanding Remarkable Values and development of any necessary public use facilities. These costs cannot be estimated at this time but would be determined though the river management planning process.

Recommendations to Congress

The District's summary of the Analysis of the Management Situation (AMS) stated that all river segments found to be suitable for designation as a component of the NWSRS would be further addressed in a subsequent Legislative Environmental Impact Statement (LEIS). The LEIS would have been the method of forwarding the findings and recommendations to Congress. However, since

publication of this AMS summary, it has been decided that this PRMP would be the only document analyzing environmental impacts of the findings of suitability/nonsuitability for the assessed river segments.

Interim Management

For river segments found eligible but not assessed for suitability and those assessed and found suitable, all BLM administered land and resources within one-quarter mile on either side of the river segments would be afforded a level of interim protective management necessary to protect the identified Outstandingly Remarkable Values. Interim management protection would continue pending formal designation through Congressional legislation.

Public Comment

Public comment regarding the suitability of the river segments found eligible for potential designation into the NWSRS has been varied. Concerns were raised about adequately protecting the Outstandingly Remarkable Values on eligible rivers, mining restrictions, and the eligibility screening process itself. Public responses are on file at the Eugene District Office.

Suitability Assessments

The following three suitability assessments begin with a findings summary succeeded by a detailed discussion of the river segment and the factors considered in each evaluation. The suitability assessments are for McKenzie River, Segment A; Siuslaw River, Segment C; and Siuslaw River, Segment B.

McKenzie River, Segment A

Summary

The 11-mile segment of the McKenzie River from the border of the Willamette National Forest land in T. 17 S., R. 3 E., Sec. 2 to Goodpasture Bridge is found suitable for designation as a component of the National Wild and Scenic Rivers System. The tentative potential classification is recreational.

Background

Description of the River

The Eugene District identified an 11 river mile segment of the McKenzie River from T. 17 S., R. 3 E., Sec. 2 to Goodpasture Bridge as eligible (see Map 2-6). The McKenzie River is located east of Eugene/Springfield, Oregon and is a major tributary to the Willamette River. The segment generally flows in a westerly direction. This segment is located within the proposed BLM McKenzie River Special Recreation Management Area (SRMA). The SRMA will focus on developing recreational opportunities on BLM lands within its boundary. Upstream from this segment the McKenzie River, from Clear Lake to Paradise Campground, is designated as a National Scenic River by Congress and as a State Scenic Waterway.

Within this river segment the north bank is paralleled by Highway 126, which is a major transportation route over the Cascade Range. The south bank is paralleled approximately 80 percent by County Road 1094 (Goodpasture Road) until it dead ends. Primary uses of Goodpasture Road are for recreational and logging activities, and it provides vehicle access to local residences. Both roads are visible and audible at times from the river, but the scenic values usually override the sound of traffic. Both roads also provide public access to the river bank in many places.

Portions of the one-half mile wide river corridor (one-quarter mile each side of the river) have been logged. The riverbank is intermixed with hardwoods and conifers and steep rising banks and lowlands make this a very scenic area. Within this segment there are several recreational facilities and interest points, which attract both local and regional (more than 25 miles away) visitors.

The McKenzie River has good water quality and is rated "A2" by the Statewide water assessment report, which means moderate to serious nonpoint source pollution. Some problems have been reported by some sources and challenged by others. The concerns to keep the McKenzie River water quality good are based on the high values of the beneficial uses of this river. The McKenzie River is the source for Eugene's municipal water supply as well as for nearby domestic and irrigation uses. Water quality has almost always been exceptional for a river of this size. The McKenzie with its low sediment levels, low turbidity, low levels of organic nutrients, and cold temperatures has been called the "Blue McKenzie." Summer flows are usually adequate to meet all allocations.

Eligibility Determination

The McKenzie River, Segment A, is free-flowing within the 11-mile study segment. The Eugene District identified four Outstandingly Remarkable Values: fish, wildlife, recreation, and scenic, which are discussed below.

Wildlife: Many osprey nest sites have been found along this section of the river. During the summer, osprey are readily observed searching for fish along the river. The Pacific Bald Eagle Recovery Plan lists the McKenzie River as a key area in the recovery of the bald eagle population. Three nest sites along the McKenzie have been discussed in the Working Implementation Plan for Bald Eagle Recovery in Oregon and Washington.

Fish: The river segment has populations of native rainbow and cutthroat trout. Bull trout have been in decline and are now under a catch and release status imposed by the ODF&W. Normally anadromous fish runs of chinook and steelhead are good, attracting local and regional fishermen. The river also supports white fish, dace, suckers, and sculpins.

Recreational: Within this segment there are several recreational facilities and attractions: Ben and Kay Dorris State Park; two BLM boat landings (Rennie and Silver Creek); Watchable Wildlife interpretive area; and two Lane County Recreation and Public Purposes leases on BLM land (Whitewater and Marten Rapids County Parks). Within the river segment there are three well-known points of interest: Eagle Rock, a prominent rock formation, and two white water rapids, Brown's Hole and Marten's Rapids. Primary recreational attractions include fishing (both from the bank and drift boats) and white water rafting. With regards to white water rafting, this segment is considered class 2-3, and many commercial guides (fishing and rafting) conduct excursions on the river. Other recreational activities include picnicking, photography, watching wildlife, other types of boating, swimming, and driving for pleasure.

Scenic: The view from the river reveals steep to gentle rolling hillsides. Where logging has not occurred, conifers cover the hillsides and ascend vertically down to the river's edge and mix with finely textured alders and riparian vegetation. The fine texture is broken and varied by ferns, plants, thick mossy trees, branches, and rocks all of which provide an enclosed edge of contrast for the rushing river waters. In the fall, deciduous trees and plants splash colors of yellows, reds, and browns against a varied green backdrop of conifers and shrubs. Eagle Rock, a prominent natural rock formation within this river segment, protrudes several hundred feet from the south bank of the river, contributing to the scenic qualities. In general, the scenic quality viewed from the river is rated as outstanding (A) by BLM standards.

Classification Determination

The highest potential for the McKenzie River, Segment A classification is recreational, as shown below. The river is free of any impoundments, diversions, or streambank modifications. Water quality and quantity are relatively good and support the river corridor's Outstandingly Remarkable Values. Classification criteria can be found in the Federal Register, Volume 174, September 7, 1982.

McKenzie River Segment A Potential Classification Summary

Activity	Wild	Scenic	Recreational
Water resources development	M	M	M
Shoreline development	DNM	DNM	M
Water quality	M	M	M
Accessibility	DNM	DNM	M

M = Meets criteria
DNM = Does not meet criteria

Suitability Factors

Ranking of Outstandingly Remarkable Values

This river segment has three of its four identified Outstandingly Remarkable Values on the list in Table 2-18, Ranking of Outstandingly Remarkable Values in Region 8. Compared to other rivers within SCORP Region 8, this river was noted as having exceptional values.

Current Land Status

The Eugene District administers 3.5 stream frontage miles (both sides included), compromising 32 percent of the ownership. This figure is based on GIS interim boundaries, pending finalization through the development of a river management plan. Boundaries and acreages, as identified, are subject to revision through that process and may change.

McKenzie River, Segment A, Segment Ownership and Status Within the River Corridor

	Ownership	Acres	Percent	River Miles	Percent
BLM	Public Domain	348	9		
	O&C lands	846	23	3.5 (BLM)	32
	BLM subtotal	1,194	32		
State					
Lane County					
Timber Companies:					
	Giustina Land and Timber				
	John Hancock Mutual Life Ins.				
	Rosboro Lumber				
	Seneca Sawmill				
	Weyerhaeuser				
	Willamette Industries				
Private individuals (numerous)				7.5 (All Private)	68
	Non federal subtotal	2,591	68		
	Total	3,785	100	11	100

Current Land Use

Current land use within the one-half mile wide river corridor includes a wide range of dispersed and site-specific recreational activities and timber harvests. Private land uses have varied within the last ten years. Private timber companies have harvested timber within the viewshed of the river area. Privately owned developments within the river corridor include numerous residences, some with river frontage improvements such as landscaping and boat docks. Timber harvesting on BLM lands has been limited to two harvest units totalling 51 acres. There are currently no known mining claims or mineral leases located within the river corridor.

Lane County zoning is diverse along this river corridor. Most BLM and private timber lands are zoned F-1 or F-2. Zone F-1 is designed to conserve forest land for forest use. Zone F-2 is designed to conserve forest land for forest uses, while recognizing that these lands are impacted by nonforest uses. Residential construction may be allowed when the residence is deemed necessary to the forest management of the lot. The minimum lot size is 20 acres except for preexisting legal lots, which may be smaller. Private individual ownerships fall within zones RR5, RR10, and CR. Zone RR5 is rural residential with a five-acre minimum lot, RR10 is rural residential with a ten-acre minimum lot. Zone CR is commercial rural, which is designed in part to provide goods, services and facilities to residents and tourists. Lane County zoning codes (16.210-16.231) can be referred to for further details.

Reasonable Foreseeable Uses of the Land and Water That Would be Affected By Designation

Appendix X of this PRMP/FEIS provides a general description of land uses and management practices appropriate for Wild, Scenic, and Recreational river areas.

Uses That Would Be Enhanced By Designation (Including Outstandingly Remarkable Values)

The basic objective of designation is to maintain the river's existing condition and protect the identified Outstandingly Remarkable Values. Designation would lead to VRM II management of BLM administered land within the one-half mile river corridor, enhancing its scenic value and thus, indirectly, its recreational, fish, and wildlife uses. In other words, designation would ensure the continued protection of the identified Outstandingly Remarkable Values from any negative effects, and the free flowing character of this river segment (see Appendix X).

Uses That Would Be Foreclosed By Designation

Designation would prohibit development of hydroelectric power facilities within the river segment. Currently there is no Federal Energy Regulatory Commission (FERC) application, irrigation, or other proposals for dams or diversions on file within this river segment. Therefore, there is no conflict foreseen regarding this potential use. The theoretical hydroelectric power potential for this Segment A of the McKenzie River is estimated to be:

$$P = (0.08475)\ (4{,}036)\ (210)\ (1.0) = 71{,}865 \text{ kilowatts}$$

(c) (Q) (H) (e)

All public lands within the authorized boundaries of a designated component of the national wild and scenic rivers system would be withdrawn from entry, sale, or other disposition under the public land laws of the United States.

Uses That Would Be Curtailed By Designation

Designation should lead to VRM Class II management of BLM administered lands in the one-

half mile corridor, constraining timber management on those lands and diminishing the rate of timber harvest from them. Designation could lead to application of a higher water quality standard for discretionary management activities, requiring more careful timing of BLM timber harvests in the upstream watershed, which could also diminish the rate of timber harvest. New mining claims could be located; however, valid claims located after the designation date could be patented only as to the mineral estate. There may be Federal efforts to acquire scenic easements or scenic tracts along the river, which may limit development of these tracts after acquisition. There may be restrictions on new land uses, developments, and activities for the prevention of negative affects on the identified Outstandingly Remarkable Values (see Appendix X).

Uses that would be Enhanced, Foreclosed or Curtailed by Non-Designation

There would be a greater potential for adverse affect upon this river's Outstandingly Remarkable Values if the river were not designated. There would also be the possibility of hydroelectric project development, including dams or impoundments.

How the River Segment (and Outstandingly Remarkable Values) Would Be Managed if it Were Not Designated

If the river segment were not added to the National Wild and Scenic Rivers System, BLM would still provide interim management, and continue to manage the public land to protect the river's Outstandingly Remarkable Values, including protection of riparian values, fisheries, wildlife habitat, and scenic resources. Public land within the proposed McKenzie SRMA boundary would continue to be managed to enhance the area's recreational opportunities and to mitigate inappropriate uses. Scenic quality would be protected through the application of VRM Class II standards, which would ensure that timber management activities would not be noticeable to river users. Public land outside the river's viewshed would be managed under VRM Class IV standards.

BLM could trade or sell public land within the one-half mile river study corridor, if such an action were consistent with the Proposed Plan. Scenic easements probably would not be sought from willing private landowners along the river's edge. BLM could seek acquisition of certain private lands through exchange or other methods from willing owners, in an effort to consolidate public ownership in this portion of the District.

Administering Agency

If the McKenzie River, Segment A, were added to the National Wild and Scenic Rivers System, the BLM would continue to manage the public land and resources within this boundary, unless Congress designated another agency.

Costs Shared

It is not anticipated that any costs would be shared among other government agencies for this river segment.

Costs to the United States

The estimated cost of preparing a required river management plan for this river segment is $118,000. Annual river management, administration including resource protection of the Outstandingly Remarkable Values are estimated to be $42,000. Cost estimates for developing and maintaining any necessary public use facilities would be determined through the river management planning process.

Finding and Rationale

Finding

The 11-mile segment of the McKenzie River from the Willamette National Forest boundary to Goodpasture Bridge is found suitable for Federal designation under the National Wild and Scenic Rivers System. A potential classification of recreational is recommended.

Rationale, Characteristics That Make the Area a Worthy Addition to the System

With the block of Federal ownership within the one-half mile corridor of this segment, and the relative high ranking of fish, recreation, and scenic as well as wildlife values (see Table 2-18 of this Appendix), this area would make a meaningful addition to the National System. The recreation value surpasses similar resource values of many rivers within SCORP Region 8. The fisheries Outstandingly Remarkable Value is one of the most remarkable in the State. The scenic values are some of the best to preserve. The wildlife Outstandingly Remarkable Value, while somewhat common in the region, enhances the other values in the study segment. The greatest positive

effect from designation would be the long-term protection of the identified Outstandingly Remarkable Values and free-flowing character of this river segment.

Siuslaw River, Segment B

Summary

The 46-mile segment of Siuslaw River, Segment B, from the confluence with Smith Creek to the confluence with Esmond Creek is found suitable for designation under the National Wild and Scenic Rivers System. The highest potential classification is recreational.

Background

Description of the River

The Eugene District identified as eligible a 46-river mile segment between the confluences of Smith Creek and Esmond Creek (see two-part Map 2-7a and 2-7b). The Siuslaw River, Segment B, originates within the Coast Range and passes through the Coast Range and South Valley Resource Areas. The Siuslaw River itself is a major coastal river, which flows into the Pacific Ocean at Florence. The Siuslaw averages between 20 and 70 feet in width along this segment. Clay Creek Recreation Site, an existing BLM campground, also borders the riverbank. Within the one-half mile wide river study corridor, there are two proposed potential trails: Siuslaw River Trail and Haskins Trail; and five proposed potential recreational sites: Doe Creek, Oxbow, Siuslaw Bend, Frying Pan, and Sidog. The river segment is located within the proposed BLM Siuslaw River Special Recreation Management Area (SRMA). Siuslaw Falls County Park is also within the segment.

Much of the corridor has been logged in the past, and there are some recent timber harvest units visible from the river. The riparian vegetation is variable, but consists mostly of larger alder and bigleaf maple trees intermixed with some larger conifers.

BLM Road Number 18-8-34 (Siuslaw Access Road), parallels the river throughout the segment, providing public paved access to the river. There are other BLM managed and privately owned roads branching off from this mainline within the half-mile boundary. Twelve bridges cross over the river along this segment.

The Siuslaw River, Segment B, has good water quality and is rated "B" which means moderate nonpoint source pollution problems by the Statewide water assessment report. Limited monitoring has shown high summer water temperatures to be a concern and State water quality standards (Chapter 340) may not be met. Some turbidity and sediment problems have been noted. Many downstream water rights exist on the Siuslaw River for domestic and irrigation use. Summer flows are usually adequate to meet these allocations. The primary beneficial use of the Siuslaw River waters is salmonoid spawning and passage.

Eligibility

Siuslaw River, Segment B, is free-flowing within the 46-mile river segment. The two identified Outstandingly Remarkable Values are fish and wildlife. The Siuslaw River has remnant runs of summer steelhead and chinook as well as coho, sea run and resident cutthroat trout, and nongame species, the most abundant being sculpins. Out-of-State tourists visit the campgrounds and go fishing on the river. Canoeing is an activity that can be enjoyed during periods of safe and adequate flows. The northern spotted owl, an endangered species, also inhabits the timber lands in the area.

Classification

The river's highest potential classification is recreational, as shown in the table below. The river is free of any impoundments, diversions, or stream bank modifications. Water quality and quantity are relatively good and support the river corridor's Outstandingly Remarkable Values.

The river is accessible by the Siuslaw Access Road (19-7-25) and County Road 3490. These roads parallel the river for its entire length, and have numerous side roads branching from them within the one-half mile boundary. From the river, these roads are visible at some locations and logging activity and recreational traffic can be heard. The side roads are usually not heavily traveled and are also used for recreational and logging activities. Classification criteria can be found in the Federal Register, Volume 174, September 7, 1982.

Siuslaw River, Segment B, Potential Classification Summary

Activity	Wild	Scenic	Recreational
Water resources development	M	M	M
Shoreline development	DNM	M	M
Water quality	DNM	M	M
Accessibility	DNM	DNM	M

M = Meets criteria
DNM = Does not meet criteria

Suitability Factors

Ranking of Outstandingly Remarkable Values

This river segment was not listed on the Outstandingly Remarkable Value rating, Table 2-18 of this Appendix, yet it has outstanding values recognized by the Nationwide Rivers Inventory; American Rivers, Inc.; Oregon State Parks and Recreation 1987 Report; and Oregon's 1988 SCORP report. The Eugene District concurs that the values of fish and wildlife are outstanding and do make the area worthy of inclusion in the National System.

Current Land Ownership

The Eugene District administers 15.6 stream frontage miles (both sides included), which are 34 percent of the river segment and 36 percent of the land base, as shown below. These figures are based on GIS interim boundaries, pending finalization through the development of a river management plan. Boundaries and subsequent acreages, are subject to revision through that process and may change.

Siuslaw River, Segment B, Ownership and Status Within the River Corridor

Ownership		Acres	Percent	River Miles	Percent
BLM	Public Domain	—	—		
	O&C lands	4,390	36	15.6 (BLM)	34
International Paper Co.		5,806	48		
Weyerhaeuser Co.		1,763	15		
Lane County		55	<1		
Private individuals (7)		154	1		
	Warham	114	<1	30.7 (All Private)	66
	Total	12,281	100	46.7	100

Current Land Use

Current land use within the one-half mile wide river corridor includes dispersed and site-oriented recreation activities and timber harvests. Overall recreation use is moderate. Most recreational activity is dispersed but there is one existing site-specific area, Clay Creek Recreation Site, administered by BLM. Private land use within the one-half mile river corridor is based primarily on timber management. On private lands, within the last five years (1987-1991) approximately 305 acres have been clear cut. Timber harvesting on Federal lands within this corridor has been limited. Within the last ten years (1981-1991), seven timber sale units ranging from 8 to 56 acres have been sold.

Most of the acres are zoned F-1, which is designed to conserve forest land for forest use. Sixty-three acres is zoned F-2, to conserve forest land for forest uses, while recognizing that these lands are impacted by nonforest uses. Residential construction could be allowed when the residence is deemed necessary to the forest management of the lot. Lane County zoning codes (16.210-16.231) can be referred to for further details.

There are currently no mining claims or mineral leases within the river corridor.

Reasonable Foreseeable Uses of the Land and Water That Would be Affected By Designation

Appendix X of this PRMP/FEIS provides a general description of land uses and management practices appropriate for Wild, Scenic, and Recreational river areas.

Uses That Would Be Enhanced By Designation (including Outstandingly Remarkable Values)

The basic objective of river designation is to maintain or improve the river's existing condition and protect the identified Outstandingly Remarkable Values. With designation, BLM's management presence would increase and enhance the river segment's Outstandingly Remarkable Values of fish and wildlife. This segment is within the proposed Siuslaw River Special Recreation Management Area (SRMA). Designation of the river segment would coincide with the intensity of recreational management already proposed for the area. Planning for trails, boat ramps, and other facilities would compliment designation, and would ensure the continued

availability of recreation opportunities occurring such as swimming, fishing, drift boating, and canoeing. Other recreation uses in the area such as driving for pleasure, picnicking, hiking, wildlife observation, nature photography, and camping would also continue to be available. A Back Country Byway is also proposed along this segment. Northern spotted owl habitat and nesting areas would continue to be protected under the Endangered Species Act. Management of riparian areas would provide appropriate protection of fisheries habit.

Uses That Would Be Foreclosed By Designation

Designation would prohibit development of hydroelectric power facilities within the river segment. Currently there is no Federal Energy Regulatory Commission (FERC) application, irrigation, or other proposal for dams or diversions on file for this river segment, so no conflict is foreseen regarding this potential use. The theoretical hydroelectric potential power available within this segment is:

$$P = (0.08475)^{c} (473)^{Q} (273)^{H} (1.0)^{e} = 10{,}949 \text{ kilowatts}$$

All public lands within the authorized boundaries of a designated component of the national wild and scenic rivers system would be withdrawn from entry, sale, or other disposition under the public land laws of the United States.

Uses That Would Be Curtailed By Designation

Designation could lead to the application of a higher water quality standard for timber harvesting upstream from the designated component of the NWSRS. New mining claims could be located; however, valid claims located after the designation date could be patented only as to the mineral estate.

Uses that would be Enhanced, Foreclosed or Curtailed by Non-Designation

There would be a greater potential for adverse affect upon this river's Outstandingly Remarkable Values if the river were not designated. There would also be the possibility of hydroelectric project development, including dams or impoundments.

How the River Segment (and Outstandingly Remarkable Values) Would Be Managed If Not Designated

If the river segment were not added to the NWSRS, BLM could continue to manage and protect the Outstandingly Remarkable Values of fish and wildlife as well as riparian values along the river area. Public lands outside the riparian zone could be subject to timber harvest, excluding protective wildlife areas, and would be managed under VRM Class IV standards. BLM lands within a viewshed area of an existing or proposed recreational facility would be managed by Class II standards. BLM could trade or sell public land within the one-half mile river study corridor, if such actions were consistent with the Proposed Plan. However, BLM could acquire certain undeveloped private lands through exchange or other methods from willing owners.

Administering Agency

If the Siuslaw River, Segment B, were added to the National Wild and Scenic Rivers System, the BLM would manage the public land and resources within this boundary, unless Congress designates another agency.

Costs Shared

It is not anticipated that any costs would be shared among other government agencies for management of this river segment.

Cost to the United States

The estimated cost of preparing a required river management plan for this river segment is $61,000. Annual river management, and administration including resource protection of the Outstandingly Remarkable Values, are estimated to be $15,000. Cost estimates for developing and maintaining any necessary public use facilities would be determined through the river management planning process.

Finding and Rationale

Finding

The 46-mile segment of the Siuslaw River from Smith Creek to Esmond Creek is found suitable for Federal designation as a recreational river under the Wild and Scenic Rivers System.

Rationale, Characteristics That Make the Area a Worthy Addition to the System

The Outstandingly Remarkable Values of fish and wildlife, along with the opportunities of recreation, make this segment a worthy addition to the National Wild and Scenic Rivers System. The recognition of this river by various organizations and agencies offers strong support to this finding. The Eugene District currently manages 36 percent of the land base within the corridor and 34 percent along the river itself. Both historical and anticipated uses of private land would not materially affect BLM's ability to manage the river as a component of the National System.

Siuslaw River, Segment C

Summary

The 13-mile segment of Siuslaw River, Segment C, from the confluence with Esmond Creek to the confluence with Wildcat Creek, is found suitable for designation under the National Wild and Scenic Rivers System. The highest potential classification is recreational.

Background

Description of the River

The Eugene District identified as eligible a 13-river mile segment between the confluences of Esmond Creek and Wildcat Creek (see Map 2-8). The Siuslaw River, Segment C, originates within the Coast Range. The Siuslaw River itself is a major coastal river which flows into the Pacific Ocean at Florence. The river segment averages 30 to 70 feet in width. This segment has one BLM boat landing and several unimproved private landings along its banks. Whittaker Creek Recreation Site, an existing BLM campground, also is located along the riverbank. Within the one-half mile river corridor, there is one established hiking trail, Whittaker Creek Old Growth Ridge Trail, and one proposed potential trail, Big Canyon Trail. The river segment is within the proposed Siuslaw River Special Recreation Management Area (SRMA).

Much of the river corridor has been logged in the past, and there are some recent timber harvest units visible from the river. The riparian vegetation is variable but consists mostly of larger alder and bigleaf maple trees intermixed with some larger conifers.

BLM Road Number 18-8-34 (Siuslaw Access Road) parallels the river throughout this segment, providing paved public access to the river. There are other BLM managed and privately owned roads branching off from this mainline within the half-mile boundary. This segment is bridged at two places, at the confluences of Whittaker and Wildcat Creeks. A more detailed discussion of roads and bridges can be found in the Classification Determination section.

The Siuslaw River, Segment C, has good water quality and is rated "B" (moderate nonpoint source pollution problems) by the Statewide water assessment report. Limited monitoring has shown high summer water temperatures to be a concern and State water quality standards (Chapter 340) may not be met. Some turbidity and sediment problems have been noted. Many downstream water rights exist along the Siuslaw River for domestic and irrigation use. Summer flows are usually adequate to meet these allocations. The primary beneficial use of the Siuslaw River waters is salmonoid fish passage.

Eligibility

Siuslaw River, Segment C, is free-flowing within the 13-mile river segment. The three identified Outstandingly Remarkable Values are fish, recreation and wildlife. Recreational activities include fishing, watching wildlife, nature photography, drift boating, and some canoeing. Fishing for coho, chinook, steelhead, and cutthroat trout is very popular between Whittaker and Wildcat Creeks. Out-of-State tourists visit the campgrounds and fish the river. In 1991 a marbled murrelet nest site was discovered along this segment. The marbled murrelet is a threatened species. This segment is also identified as a recovery site for the bald eagle. The northern spotted owl, an endangered species, also inhabits the area.

Classification

The river's highest potential classification is recreational, as shown below. The river is free of any impoundments, diversions, or stream bank modifications. Water quality and quantity are relatively good, and support the river corridor's Outstandingly Remarkable Values.

The river is accessible by the Siuslaw Access Road (18-8-34). This road parallels the river for its entire length, and has numerous side roads branching from it within the one-half mile boundary. These side roads are usually not heavily traveled, and are used for recreational and logging activities. The road is visible some of the time from the river and traffic

noise can be heard from the river. Classification criteria can be found in Federal Register, Volume 174, September 7, 1982.

Siuslaw River, Segment C, Potential Classification Summary

Activity	Wild	Scenic	Recreational
Water resources development	M	M	M
Shoreline development	DNM	M	M
Water quality	DNM	M	M
Accessibility	DNM	DNM	M

M = Meets criteria
DNM = Does not meet criteria

Suitability Factors

Ranking of Outstandingly Remarkable Values

This river segment was not listed on the Outstandingly Remarkable Value rating Table 2-18 of the Introduction, yet it has outstanding values recognized by the Nationwide Rivers Inventory; American Rivers, Inc.; Oregon State Parks and Recreation 1987 Report; and Oregon's 1988 SCORP report. The Eugene District concurs that values of recreation, fish, and wildlife are outstanding and do make the area worthy of inclusion in the National System.

Current Land Ownership

The Eugene BLM District administers 3.5 stream frontage miles (both sides included), which represents 26 percent of the river segment and 33 percent of the land base within the corridor, as shown below. These acreages are calculated on GIS interim boundaries pending finalization through the development of a river management plan. Boundaries and subsequent acreages are subject to revision through that process and may change.

Siuslaw River, Segment C, Segment Ownership and Status Within the River Corridor

	Ownership	Acres	Percent	River Miles	Percent
BLM	Public Domain	62	2		
	O&C lands	1,089	31	3.5 (BLM)	26
International Paper Co.		2,218	63		
Private individual		160	4	9.9 (All Private)	74
	Total	**3,665**	**100**	**13.4**	**100**

Current Land Use

Current land use within the one-half mile wide river corridor includes dispersed and site-oriented recreation activities and timber harvests. Overall recreation use within the corridor is moderate and includes the site-specific BLM administered Whittaker Creek Recreation Site. Private land use within the river corridor is based primarily on timber management. On private land, within the last five years (1987-1991) approximately 265 acres have been clear cut. Timber harvesting on Federal lands in the last ten years within this corridor has been limited to the sale of one timber sale unit of 45 acres. The lower half of this segment is within a northern spotted owl designation of HCA 1 and 3, which has curtailed the sale of Federal timber.

There is one private individual ownership with no residential developments within the river corridor. Under the Lane County zoning code of F-1 for this segment, which is designed to conserve forest land for forest uses, residential construction is not allowed except for replacement of existing residences. Lane County zoning codes (16.210-16.231) can be referred to for further details.

There are currently no mining claims or mineral leases located within the river corridor.

Reasonable Foreseeable Uses of the Land and Water That Would be Affected By Designation

Appendix X of this PRMP/FEIS provides a general description of land uses and management practices appropriate for Wild, Scenic, and Recreational river areas.

Uses That Would Be Enhanced By Designation (including Outstandingly Remarkable Values)

The basic objectives designation is to maintain the river's existing condition and protect the identified Outstandingly Remarkable Values. With designation, BLM's management presence would increase. Since this segment is within the proposed Siuslaw River Special Recreation Management Area (SRMA), designation of the river segment would coincide with the intensity of recreational management already proposed for the area. Planning for trails, boat ramps, and other facilities would complement designation, and would ensure the continued availability of recreation opportunities occurring in this river segment, including swimming, fishing, drift

boating, and canoeing. Other recreation uses occurring in the area such as driving for pleasure, picnicking, hiking, wildlife observation, nature photography, and camping would also continue to be available. A Back Country Byway is also proposed along this segment. Designation would enhance wildlife populations by helping to preserve existing habitat. Bald Eagle and spotted owl habitat and nesting areas would continue to be protected under the Endangered Species Act and further enhanced by the National System (see Appendix X).

Uses That Would Be Foreclosed By Designation

Designation would prohibit development of hydroelectric power facilities. Currently, there is no Federal Energy Regulatory Commission (FERC) application, irrigation, or other proposal for dams or diversions on file for this river segment, so no conflict is foreseen regarding this potential use. The potential hydroelectric power available within this segment is:

	c	Q	H	e	
P =	(0.08475)	(922)	(50)	(1.0)	= 3909 kilowatts

All public lands within the authorized boundaries of a designated component of the national wild and scenic rivers system would be withdrawn from entry, sale, or disposition under the public and laws of the United States.

Uses That Would Be Curtailed By Designation

Designation could lead to the application of a higher water quality standard for timber harvesting upstream from the designated component of the NWSRS. New mining claims could be located; however, valid claims located after the designation date could be patented only as to the mineral estate.

Uses that would be Enhanced, Foreclosed or Curtailed by Non-Designation

There would be a greater potential for adverse affect upon this river's Outstandingly Remarkable Values if the river were not designated. There would also be the possibility of hydroelectric project development, including dams or impoundments.

How the River Segment (and Outstandingly Remarkable Values) Would Be Managed if it Were Not Designated

If the river were not added to the National Wild and Scenic Rivers System, BLM could continue to manage and protect land under its jurisdiction for the riparian values and Outstandingly Remarkable Values of recreation, fish and wildlife along the river area. The Outstandingly Remarkable Values of wildlife and recreation would not be diminished or lost by such management. Public lands outside the riparian zone could be subject to timber management, excluding protective wildlife areas, and would be managed under VRM Class IV standards. BLM lands within a viewshed area of an existing or proposed recreational facility would be managed under Class II standards. BLM could trade or sell public land within the one-half mile study corridor, if such action were consistent with the Proposed Plan. BLM could seek acquisition of certain undeveloped private lands from willing owners through exchange or other methods.

Administering Agency

If the Siuslaw River, Segment C, were added to the National Wild and Scenic Rivers System, the BLM would manage the land and resources within this boundary, unless Congress designates another agency.

Costs Shared

It is not anticipated that any costs would be shared among other government agencies for this river segment.

Costs to the United States

The estimated cost of preparing a required river management plan for this river segment is $57,400. Annual river management and administration, including resource protection of the Outstandingly Remarkable Values, are estimated to be $33,000. Cost estimates for developing and maintaining any necessary public use facilities would be determined through the river management planning process.

Finding and Rationale

Finding

The 13-mile segment of the Siuslaw River from Esmond Creek to the confluence with Wildcat Creek

is found suitable for Federal designation under the Wild and Scenic Rivers System. The highest classification would be recreational.

Rationale, Characteristics That Make the Area a Worthy Addition to the System

The Outstandingly Remarkable Values of recreation and wildlife make this segment a worthy addition to the Rivers System. The recognition of this river by various organizations and agencies offers strong support for this finding. The Eugene District currently manages 33 percent of the land base within the corridor and 26 percent along the river itself. The homogeneity of both Federal and private land uses along the river (primarily timber production), and existing protection of the riparian area provided under State law, combine to make this river segment readily manageable as a recreational component of the National Wild and Scenic River System.

Appendix Z
Dead and Down Woody Material Analysis Technique

Assumptions

1. Old growth natural stands (unlogged), on the average represent maximum potential for species using downed logs. The average amount of downed log habitat is 45 tons/acre (range from 35 to 85 tons/acre).

2. Areas logged (clear cut) during the 1970s and 1980s represent minimal habitat values due to history of gross yarding, growth of the chip market, and development of increased fire management expertise.

3. Areas logged (clear cut) prior to 1970 should generally have started with more habitat than post-1970 logging.

4. Mortality salvage, commercial thinning, and partial cutting have less impact than clear cutting. These impacts also may vary by alternative.

5. Other than from management activities, areas have the highest rate of loss of down material immediately after regeneration harvesting (rates as high as 3 percent per year).

Analytical Techniques

Data development

Step 1 - Tally all old growth (acres of natural stands), mature; late, mid, and early seral states (stands clear cut since the 1970s), and all commercially thinned/density managed acres. Enter tallies in Tables 4-10 and 4-11 (Column 3). Refer to Biological Diversity and Forest Health in Chapter 1.

Step 2 - Using the expertise of local reforestation, fire management, and cruising personnel, etc., estimate tonnage of residual downed logs for each of the categories listed in Step 1. Enter estimates in Column 2. Estimate for other then seral stages (commercial thinned/ density management) in is the form of value added.

Step 3 - Multiply acreage figures (Column 2) by factors (Column 3).

Step 4 - Sum results from Step 3 and divide by 300,524.

Appendix AA
Probable Sale Quantity

This appendix describes the information, models, and processes used to estimate the Probable Sale Quantity (PSQ) for each plan alternative, to portray implementation of that harvest for 10 years in the Geographic Information System (GIS), and to facilitate analysis of environmental impacts. It should be noted that all of the inventory and yield simulation data are estimates containing statistical errors; therefore, the resulting PSQ reflects a level of uncertainty. In Alternative C and the Proposed Resource Management Plan (PRMP), the use of nontraditional silviculture prescriptions and modeling techniques increased the uncertainty relative to the other alternatives.

Selection of the Harvest Scheduling Model

Early in the planning effort in 1986, BLM began to explore the timber harvest scheduling model options available. A timber harvest scheduling model combines forest inventory data with proposed timber management prescriptions to determine potential annual timber harvest levels and sustainability over the long-term. By early 1987, BLM tentatively identified a model called TRIM-PLUS as most suitable to meet BLM needs. In the spring of 1987, public workshops were held for interested parties in some of BLM's western Oregon offices. After considering the comments received and testing the model, BLM selected the TRIM-PLUS Model.

The features of TRIM-PLUS that identified it to be the optimum approach for BLM use were its ability to do the following:

1. Make nondeclining harvest level calculations based on different minimum harvest ages for different groups of acres
2. Calculate a harvest level including multiple land use classes simultaneously
3. Use at the District level by BLM personnel on personal computers
4. Provide report generating capabilities
5. Provide simplified input and output data
6. Provide relatively inexpensive computer runs

Although harvest scheduling models of various degrees of complexity were considered, it was our intent to identify a relatively simple and reliable state of the art system. We wanted to be able to interface the selected model with other specific resource analysis models and procedures that use automated resource databases and GIS. The RMP process identified different land use allocations and TRIM-PLUS reflected the resulting harvest impacts to each land use allocation.

Probable Sale Quantity Calculation Process

Probable Sale Quantity (PSQ) is an expression of the maximum nondeclining level of timber harvest sustainable over time. The PSQ was estimated using TRIM-PLUS, a binary search type model designed to operate on desktop PCs. TRIM-PLUS functions similarly to the SIMIX model used by the BLM to generate PSQs in the 1970s and 1980s. PSQ volumes from TRIM-PLUS were calculated in merchantable cubic feet. Equivalent estimates in board feet were provided to help interpret the information.

Within TRIM-PLUS, data was segregated by administrative unit, land use allocation, forest type, existing stand condition, or a variety of other factors. These groups of data are called Basic Resource Units (BRU). TRIM-PLUS required a variety of information in order to complete PSQ computations and harvest scheduling. The information included: (1) acreage, (2) existing stand conditions, (3) volumes, and (4) management assumptions and yields.

Acreage

Acreages for the harvest calculations were derived from digitized GIS maps of the forest inventories overlaid with land-use allocations for each alternative. This data is stored in a relational

database called MICRO*STORMS. Also included in this database are the results of the Timber Production Capability Classification, Operations Inventory, and Continuous Forest Inventory, including data about past management, current conditions, recommendations, site productivity and limitations, and volumes. Selected information from these or other data files has been linked to the GIS maps.

Existing Stand Condition

Existing Stand Condition (ESC) codes help to group, sort, and track similar kinds of stands, and help place units of land into the proper BRU. Each forest inventory stand was assigned a code from the following list that best describes that stand.

Existing Stand Condition Codes

Code	ESC Description
1	Well stocked managed stands
2	Minimum stocked managed stands
3	Below minimum stocked managed stands
4	Overstocked managed stands
5	Planted with genetically improved stock
6	Precommercial thinned and fertilized
10	Commercial thinned
11	Commercial thinned and fertilized
30	Mortality salvaged
40	Unmanaged stand 36-500 years old
50	Brushfield/Backlog/Hardwood conversion
60	Sold; uncut
61	Cut; site not prepared for planting
62	Site prepared; not planted
99	Nonforest (these are not included in BRUs or TRIM-PLUS)

Current Volumes

Tree volumes on present stands were derived from permanent inventory plots distributed throughout the District. Both conifers and hardwoods were cruised by certified BLM cruisers to the same standards used in timber sale preparation. Cubic foot volumes were computed from the inventory data using a BLM software program called UNIT1. Summary plot data was stored in the MICRO*STORMS database file called CFI. These data include general site descriptors, board foot and cubic volume, growth, basal area, trees per acre, and average diameter at breast height (DBH), and tree heights.

Management Assumptions and Yields

Assumptions about future management that affect PSQ levels from TRIM-PLUS include: minimum harvest age, regeneration lag, future stocking levels, anticipated gains for planting genetically improved stock, the frequency and acres of precommercial thinning, commercial thinning and fertilization, and the stand age when these treatments are applied. Details of these assumptions are available at the District Office.

TRIM-PLUS allows up to 8 separate management prescriptions within each BRU that can be used to simulate various management assumptions or intensity levels. Each of these prescriptions requires yields and acres by age class, and information about shifting acres from one prescription to another during growth or at harvest.

Empiric yields were estimated from the measured inventory plot volume. Empiric yields were preferred over published yield tables or yield simulations wherever sufficient plot data was available to build yield tables. See Appendix A of the Analysis of the Management Situation (AMS) for the Eugene District for the details about empiric yield estimation.

Yields were estimated using the Stand Projection System (SPS) when insufficient empiric data was available. SPS is a computer program written by Dr. James Arney to simulate the growth and development of forest stands. The model is primarily designed to simulate Douglas-fir or western hemlock stands, but would also handle hardwoods and other species. Site index, fertilization, thinning, stocking levels, stand clumpiness, and economics are some of the variables that SPS can use in making yield projections. The BLM version of SPS incorporates volume regressions and cruising standards from each western Oregon BLM District.

A series of SPS runs were made to determine what combinations of practices would result in the highest yields. For example, on average quality sites on the Eugene District, precommercial thinning at age 10 to 280 trees per acre, fertilizing (generally done twice between PCT and regeneration harvest), and first commercial thinning at age 40 or 50 produced the highest yields for even-aged clear cut management.

Yield gains from the genetic tree improvement program have been estimated by the District geneticist. To incorporate these gains into TRIM-PLUS, the site index input into SPS was raised to match the height gains from measured progeny test

plantation trees. Details of this procedure are also available at the District Office.

The Allowable Cut Effect (ACE)

Allowable Sale Quantity (ASQ) refers to a nondeclining sustainable even-flow timber harvest over a long period of time. ASQ simulations seek to find the highest sustainable harvest level consistent with the design of the Resource Management Plan (RMP) alternative. During the simulations, stands are scheduled for harvests and management actions that affect growth. Over time, a point is reached at which average annual harvest and growth are in equilibrium and a sustained yield for the prescription being explored is finally developed. The ASQ is sensitive to a number of factors that include: existing stand conditions, age-size class distributions, land use allocations, wildlife habitat needs, management rules on proximity of harvest units, minimum harvest age, harvest scheduling restrictions, and the extent of investments in growth enhancing practices. To compute an ASQ based solely on current growth would not permit either the accurate estimation of yield or the estimation of the effects of different silvicultural prescriptions or treatments. For that reason, BLM uses an approach that projects growth into the future for the silvicultural system being analyzed.

Allowable Cut Effect (ACE) is the immediate increase in the current ASQ justified by expected future increases in yields due to present or proposed management treatments. The ACE may be produced if future growth rates are expected to exceed current growth rates. As the long-term forests' average growth rate increases, volume produced between the current and average growth rate may be scheduled for harvest.

Many silvicultural practices, including harvest scheduling and intensive forest practices, such as thinnings, fertilization, and genetics, can increase the future growth rates. Combinations of these silvicultural practices may increase harvestable stand volumes by 5 to 20 percent (see Appendix MM for more details of yields due to Silvicultural practices). Silvicultural practices, such as precommercial and commercial thinning in combination with fertilization, attain and extend the period of the Culmination of Mean Annual Increment (CMAI) that extends the period of maximum growth to an older age class. These conditions may increase forest yields. Harvesting stands with a slow growth rate (usually stands that have matured and have a declining net growth rate compared to their potential) and replacing them with faster growing stands would, over a period of a few decades, increase the forests' average growth rate.

Management for values other than timber production has a wide range of effects on growth rates. Retention of late-successional stands, or conversion of fast growing stands to mature or late-successional stage stands, reduces current forest growth rates. High retention prescriptions, like those in connectivity areas with a green tree retention of 12 to 18 trees per acre, can reduce potential stand growth rates due to reduced light and moisture competition.

ASQ sensitivity tests were made to determine how much of the current ASQ might be attributed to various levels of growth enhancing practices, such as precommercial thinning, fertilization, and planting genetically selected seedlings (see the Sensitivity Analysis discussion in the "Effects on Timber Resources" section of Chapter 4). Current forest conditions and management constraints often limit ACE (see ASQ above) even though future average forest growth rates are increased. An ACE effect was generally found where there was a conversion of slower growing (mature) stands to faster growing stands. First or early decade harvesting of only stands growing at near maximum growth rates, as in the PRMP, does not produce a measurable ACE.

Investments in growth enhancement practices should not be determined by the current ACE alone. The determinate must also be based on sustaining the average forest growth rate, economic guidelines for returns on growth, and product quality. A recent Office of Inspector General Audit Report, No 94-I-359, found forest development growth enhancing practices very cost-effective in areas identified for traditional timber harvest, as well as in areas identified for habitat restoration where intermediate harvests, like commercial thinning and density management, are allowed. Under the current plan, increases in the ASQ level are projected in future decades as a result of using growth enhancement practices. In the first decade, however, the ACE effect would not contribute to the ASQ because of constraints and the nondeclining even flow principle. Combining past and present investments in growth enhancing practices, a more balanced better age-size class distribution is developing and future harvestable inventory would accumulate and fill potential harvest gaps. Additionally, the lengthening of rotations required for wildlife and other nontimber values would provide some increased production of larger stems of high value and may enhance long-term volume/value production.

Alternative D - Harvest Scheduling Model

In Alternative D, the spatial constraints of the 50-11-40 rule feature of the Interagency Scientific Committee Report on the Northern Spotted Owl precluded the use of TRIM-PLUS. The 50-11-40 rule requires that at least 50 percent of the forested acreage in a quarter township contain trees 11-inches in diameter or larger with a 40 percent or greater crown closure in perpetuity. The acreage available for possible timber harvest is equal to the number of BLM forest acres in excess of the 50-11-40 requirements within each quarter township that are outside Habitat Conservation Areas (HCA). As stands are harvested and grow over time, the 50-11-40 status of the forest inventory within a quarter township changes. TRIM-PLUS, under its current configuration, cannot track the decadal changes in acreage, which is over the 50 percent threshold by quarter township. The BLM developed a simple harvest scheduling model that can track the spatial constraint of 50-11-40. The harvest scheduling model was developed within the forest stand database MICRO*STORMS.

The MICRO*STORMS database contains the basic stand information needed to estimate the initial inventory status for every township quarter within a SYU. For each quarter township, the age class distributions were calculated for the areas available and unavailable for harvest. This age class distribution was further subdivided into acreage above and below 40 percent crown closure. Stands that are 40 years of age were assumed to meet the 11-inch portion of the rule. The acres in each quarter township that do not count in applying the 50-11-40 rule (i.e., nonforest and HCA 1 and HCA 2's) were identified. The number of acres over the 50-11-40 threshold were determined for each township quarter. A maximum limit of harvest was also applied to smooth large oscillations in the harvest level that resulted from application of the 50-11-40 constraint alone. This secondary constraint did not reduce the even flow harvest level for the simulation. The harvest level for a quarter township for any given harvest period was determined by the number of acres over the 50 percent threshold or the rotation constraint, whichever allows less harvest.

Since the model allowed only a single yield function, the BLM normal empiric yield function was used. One average starting volume for each age class was assigned. As the model progresses through time, the volumes were recalculated based on approach to normality. The model harvested oldest age class first and assumed a three-year regeneration lag.

As the model progressed through each decade, the amount of acres in excess of the 50-11-40 threshold was recalculated to determine the harvest level for each township quarter. The estimated District PSQ was the sum of the harvests from each quarter township.

The Ten-Year Representative Timber Management Scenario Process

The purpose of the 10-year scenario was to allow analysis of environmental impacts within a Geographic Information System (GIS). All forest stands age class 40 or older were mapped into operational harvest units called Representative Timber Units (RTU) on a GIS theme called "potential harvest." In addition, roads called Representative Timber Roads (RTR) that would be constructed to harvest those units were mapped. For each alternative, except the PRMP, the maps of the RTUs and RTRs were overlayed in GIS with the harvestable land base. The harvestable acreage for each RTU and RTR was downloaded from GIS into the MICRO*STORMS PC database. After a PSQ was derived using TRIM-PLUS, sufficient RTUs and RTRs of the appropriate land use allocation and age were selected to match the harvest schedule as closely as possible. The initial selection of the individual RTUs was automated within MICRO*STORMS to distribute the units widely across the landscape. The initial solution was adjusted to add roads and account for the acreage and volume resulting from the roads. In Alternative D, the selected units were adjusted to reflect implementation of the 50-11-40 rule. In Alternative C and the draft Preferred Alternative, the number of units selected was inflated where patch cutting was expected to harvest only a portion of the available acreage. Only regeneration harvest RTUs were selected, but roads for both regeneration harvest and commercial thinning or density management were selected. The final selected units and roads were uploaded into GIS to create the map that was used for analysis of environmental impacts.

For the PRMP an alternative method was used to show the potential harvest units. The harvest acres from TRIM-PLUS were distributed evenly across all available acres in the MICRO*STORMS database until they were used up. The affected units were tagged and have harvest acres associated with them. The tagged units were then entered into GIS and a map of potential units was produced.

Appendix BB
Silvicultural Systems and Harvest Methods

A variety of general silvicultural systems are proposed for the major land use allocations under the proposed plan. The choice of silvicultural systems for management of forest stands would depend on three general factors:

(1) Resource management objectives

Silvicultural systems would be designed to meet a wide range of management objectives, including the Aquatic Conservation Strategy, development or maintenance of particular habitat types, restoration or maintenance of forest health, and production of merchantable forest products. These objectives vary by land use allocation.

(2) Ecological type and site conditions

Silvicultural systems would be selected to meet the ecological requirements of the communities of plants and animal species present. The silvicultural systems selected must also be compatible with soil conditions, slope, aspect, elevation, blowdown potential, and other physical characteristics of each site.

(3) Forest condition

The selection of silvicultural treatments would vary depending on the current condition of each stand. Factors considered include species mix, stand age and structure, density, vigor, previous management, damage or disturbance, and insect or disease problems.

Silvicultural systems would be adapted in some locations to meet the requirements of experimental designs. Many field trials and research studies will be needed to help explore the outcomes of the new management approaches being considered.

Livestock grazing can be utilized as a management tool only after a NEPA assessment and then only if it does not retard or prevent attainment of Aquatic Conservation Strategy Objectives. Where objectives cannot be met, eliminate the use of grazing.

Watershed analysis and interdisciplinary reviews would be used to help select and design silvicultural systems through better understanding of landscape-level patterns and ecological processes.

In the sections which follow, the selection of silvicultural systems is discussed for each of the major land use allocations.

General Forest Management Area

Silvicultural systems in the General Forest Management Area would be designed to promote production of merchantable timber, while retaining some larger trees and snags and maintaining forest health and productivity. All treatments would be compatible with the ecological requirements of the communities of native plant, fungi, and animal species present, and would be tailored to the condition of each stand. The results of watershed analysis would be used to help select and design silvicultural systems through better understanding of landscape-level patterns and ecological processes.

The quality of wood, value of logs ultimately produced, and economic efficiency would be important considerations for all planned treatments.

Lands available for harvest would be managed generally as even-aged stands with partial overstories of larger trees. Management actions would consist of six general types of treatments: regeneration harvest with partial retention; site preparation following harvest; reforestation treatments; management of young stands; commercial thinnings in mid-aged stands; and management of overstory trees, snags, and large woody debris. Each of these treatments is described below.

Silvicultural Treatments

Regeneration harvest: Regeneration harvests on available forest lands would generally occur in stands at or above the age of the Culmination of Mean

Annual Increment (CMAI) except during the first decade when stands as young as 56 years old would be cut. On the Eugene District, the CMAI varies from stand age 70 to 90 years. Regeneration harvest would not be planned for stands less than 56 years of age.

Site preparation: Following regeneration harvest, residual vegetation and logging debris would be treated if necessary to reduce fire hazard, improve access for planting of tree seedlings, lessen initial competition from other vegetation, and limit the cover for seedling-damaging rodents. Methods used would include prescribed fire, manual cutting and piling, and mechanical clearing.

Reforestation: Normally, all sites that receive regeneration harvest and do not require burning would be reforested within one year of cutting. If slashing and/or burning is required to prepare sites for planting, reforestation may be delayed beyond one year pending burn prescriptions and smoke management clearance. Most areas would be planted with seedlings grown from genetically-selected seed. The selection of tree species, planting density, and stock types would depend on site characteristics, the composition of the original stand, and projected future management of each stand. Areas having identified root disease would be planted with species resistant or immune to the disease or the areas would be treated in a manner that would reduce the likelihood of spreading the disease.

Management of young stands: During the first 10 to 15 years after planting, young stands would receive treatments as necessary and as funding allows to promote establishment, survival, and growth by managing competing vegetation, protecting seedlings from severe local site conditions, and preventing excessive animal damage. These treatments could include but not be limited to manual cutting of brush and seedling protection measures such as placement of plastic mesh tubes or nets on seedlings, installation of tree shades or mulches, and trapping of rodents.

Suitable stands aged 10 to 20 years would receive treatments designed to improve growth, value, and wood quality, when funding is available. These treatments include precommercial thinning, release, pruning, and fertilization.

Commercial thinnings: Stands approximately 30 to 70 years of age would be considered for commercial thinning potential. One or two thinnings may be scheduled over the life of an individual stand.

The objectives of commercial thinning may include one or more of the following: to increase the proportion of merchantable volume in the stand; to produce larger, more valuable logs; to harvest anticipated mortality of small trees as the stand develops; to maintain good crown ratios and stable, windfirm trees; to accelerate development of trees that can later provide large-diameter snags and down logs; to manage species composition; or to promote development of desired understory vegetation. Nitrogen fertilizer may be applied following completion of thinnings.

In any case, the decision to thin any given stand would depend on site-specific factors such as slope and topography, distance to roads, soil types, stand density, species composition, and average tree diameter.

Management of overstory trees, snags, and large woody debris: During partial cut or regeneration harvests, existing snags would be reserved from cutting whenever feasible. However, some snags may need to be removed for road construction, safety reasons, or to make way for log yarding in some situations.

The large trees reserved from regeneration harvest would normally not be considered available for future harvest. Some may be damaged or killed during slash burning, while others may blow down or break off during windstorms. Such trees would then become part of the supply of snags and large woody debris. Many of the reserved trees would be likely to survive and grow, providing additional structural and functional habitat diversity as younger stands develop beneath them.

Selection of Harvest Areas

Regeneration harvest: For available forest lands, treatment areas would be selected when feasible from the least productive stands first. Stands that appear to have low stocking, damage, disease, generally low growth rates, or a predominance of noncommercial species resulting from past management would receive higher priority for harvest.

Commercial thinning: Treatment areas would be selected from well-stocked or overstocked stands where density reduction is needed to maintain good diameter growth rates, live crown ratios, and stand stability. Selection of thinning areas may depend on access and logging feasibility.

Landscape Design

Harvest units, including regeneration harvest and commercial thinnings, would be placed where needed to meet management and landscape objectives on three levels of scale: the physiographic province, the landscape block or watershed, and the stand.

Regeneration Harvest Design

Silvicultural prescriptions for regeneration harvest would be based on knowledge of plant communities, successional relationships, and ecosystem functions. Knowledge of these relationships would be used to help prevent vegetation management problems before they occur. Harvest plans would provide for maintenance of long-term site productivity and forest health.

Regeneration harvest units would vary in size depending on factors such as ownership, topography, and road locations. Appropriate treatment areas would be determined through watershed analysis.

Harvest unit shapes would be irregular, conforming where possible to topographic features, but limited in many cases by logging feasibility, ownership boundaries, reserve boundaries, other land use allocations, etc. An average of 6 to 8 live trees per acre would be reserved from harvest as clumps, strips, and scattered individual trees. The distribution of reserved trees would be designed to help meet habitat goals and to minimize interference with log yarding.

In addition to the previous green tree retention management action/direction, green trees would be retained for snag recruitment in timber harvest units where there is an identified, near-term (less than 3 decades) snag deficit. These trees do not count toward green-tree retention requirements. Some of the trees reserved for snag recruitment may be topped, girdled, or felled over time to help meet long-range goals for snags and large woody debris.

Partial-cut Harvest Design

Commercial thinnings would generally be designed to maintain good volume productivity of the stand. Stand density after thinning would have a wide range of trees left per acre depending on stand age, tree size, the number of thinnings already completed, and the specific objectives of the thinning.

Commercial thinning treatment areas would vary in size, depending on factors such as operability and site conditions. Appropriate treatment areas would be determined through watershed analysis. A variety of thinning intensities may be designated within a treatment unit in order to reflect current within-stand spatial patterns or to meet stand development objectives.

In some portions of stands, thinning may consist only of removal of the smaller (intermediate and suppressed) trees in the stand. In other areas, the larger codominant and dominant trees may also be removed.

Where root diseases such as laminated root rot (*Phellinus weirii*), black stain (*Ceratocystis verticicladiella*), or Port Orford cedar root rot (*Phytophthora lateralis*) are present in stands to be thinned, the thinning will incorporate state-of-the-art recommendations for treatment. When consistent with management and landscape objectives, openings created would be planted with seedlings of species resistant or immune to the disease, or in a manner to reduce the rate of disease spread.

Connectivity/Diversity Blocks

Silvicultural systems in the Connectivity/Diversity blocks would be designed to promote development of late-successional forest structure within a longer rotation, while providing an output of merchantable timber and maintaining forest health and productivity. All treatments would be compatible with the ecological requirements of the communities of native plant, fungi and animal species present and would be tailored to the condition of each stand. The results of watershed analysis would be used to help select and design silvicultural systems through better understanding of landscape-level patterns and ecological processes.

The quality of wood, value of logs ultimately produced, and economic efficiency would be important considerations for all planned treatments.

Lands available for harvest would be managed generally as even-aged stands with substantial overstories of larger trees. Management would consist of six general types of treatments: regeneration harvest with partial retention; site preparation following harvest; reforestation treatments; management of young stands; density management thinning in mid-aged stands; and management of overstory trees, snags, and large

woody debris. Each of these treatments is described below.

Silvicultural Treatments

Regeneration harvest: Regeneration harvests on available forest land would be planned for a 150-year area control rotation. This means that approximately 1/15 of the available acres would receive regeneration harvest in any decade. On the Eugene District, portions of some stands would be cut at stand ages as low as 56 years during the first decade, where older stands are not available or to develop a better distribution of age classes over time. Regeneration harvest would not be planned for stands less than 56 years of age.

Site preparation: Following regeneration harvest, sites would receive treatment of understory vegetation and logging debris if necessary to reduce fire hazard, improve access for planting of tree seedlings, lessen initial competition from other vegetation, and limit the cover for seedling-damaging rodents. Methods used would include prescribed fire (underburning), manual cutting and piling, and mechanical clearing.

Reforestation: Normally, all sites that receive regeneration harvest and do not require burning would be reforested within one year of cutting. If slashing and/or burning is required to prepare sites for planting, reforestation may be delayed beyond one year pending smoke management clearance. The selection of tree species, planting density, and stock types would depend on site characteristics, the composition of the original stand and remaining overstory, projected future management of each stand, and distribution of root disease infection. Areas having identified root disease would be planted with species resistant or immune to the disease or the areas would be treated in a manner that would reduce the likelihood of spreading the disease.

Management of young stands: During the first 10 to 15 years after planting, young stands would receive treatments as necessary and as funding allows to promote establishment, survival, and growth by managing competing vegetation, preventing excessive animal damage, and managing overstory density. These treatments would include manual cutting of brush and seedling protection measures.

Suitable stands aged 10 to 20 years may receive treatments designed to improve growth, value, and wood quality when funding is available. These treatments may include release, precommercial thinning, and pruning.

Density management thinning: Stands approximately 30 to 110 years of age would be considered for density management thinning. An individual stand may be thinned 3 to 4 times at intervals of 20 to 30 years within one 150-year rotation.

The purposes of density management may include one or more of the following: to accelerate growth of trees that would later provide large-diameter snags and down logs; to promote development of understory vegetation and multiple canopy layers; to produce larger, more valuable logs; to harvest mortality of small trees as the stand develops; to maintain good crown ratios and stable, windfirm trees; and to manage species composition.

The decision to thin a particular stand would depend on site-specific factors such as slope and topography, distance to roads, soil types, stand density, species composition, average tree diameter, and degree of structural variability in the stand.

Management of overstory trees, snags, and large woody debris: During partial cut or regeneration harvests, existing snags would be reserved from cutting whenever feasible to the extent necessary to meet snag habitat objectives. However, some snags would need to be removed for safety reasons, road construction, or to make way for log yarding in some situations.

The large trees reserved from regeneration harvest would not normally be considered available for future harvest. Some may be damaged or killed during slash burning, while others may blow down or break off during windstorms. Such trees would become part of the supply of snags and large woody debris. Most of the reserved trees would likely survive and grow, providing substantial structural and functional habitat diversity as the canopies of younger stands develop beneath them.

Selection of Harvest Areas

Regeneration harvest: Treatment areas would be selected from mature stands having the least degree of late-successional forest structure. In addition, the more productive stands would be deferred so the less productive stands would be harvested first, when feasible. Stands that appear to have low stocking, damage, disease, generally low growth rates, or a predominance of noncommercial species resulting

from past management would receive higher priority for harvest.

Density management thinning: Treatment areas would be selected from well-stocked stands where density reduction is needed to promote development of Late-Successional forest structure. This would generally be stands that are predominantly even-aged, evenly spaced, and of a fairly uniform diameter and height. Selection of thinning areas would also depend on access and logging feasibility.

Landscape Design

Harvest units, including regeneration harvest and density management thinning, would be placed where needed to meet management and landscape objectives on three levels of scale: the physiographic province, the landscape block or subwatershed, and the stand.

Regeneration Harvest Design

Silvicultural prescriptions for regeneration harvest would be based on knowledge of plant communities, successional relationships, and ecosystem functions with consideration of forest health. Knowledge of these relationships would be used to help prevent vegetation management problems before they occur. Harvest plans would provide for maintenance of long-term site productivity and forest health.

Regeneration harvest units would vary in size depending on factors such as ownership, topography, and road locations. Appropriate treatment areas would be determined through watershed analysis. Harvest unit shapes would be irregular, conforming where possible to topographic features, but limited in many cases by logging feasibility and ownership boundaries. An average of 12 to 18 live trees per acre would be reserved from harvest as clumps, strips, and scattered individual trees. The distribution of reserved trees would be designed to help meet habitat goals and to minimize interference with log yarding.

In addition to the previous green tree retention management action/direction, green trees would be retained for snag recruitment in timber harvest units where there is an identified, near-term (less than 3 decades) snag deficit. These trees do not count toward green-tree retention requirements. Some of the trees reserved for snag recruitment may be topped, girdled, or felled over time to help meet long-range goals for snags and large woody debris.

Partial-cut Harvest Design

Density management thinning would generally be designed to encourage rapid development of vertical and horizontal stand diversity. Patches of denser forest would be retained in some places to meet particular wildlife habitat criteria. Stand density after thinning would have a wide range of trees left per acre depending on stand age, tree size, the number of thinning already completed, and the specific objectives of the thinning. Density management areas would vary in size depending on factors such as operability and site conditions. Appropriate treatment areas would be determined through watershed analysis. A variety of treatment intensities may be designated within a thinning unit in order to reflect current within-stand spatial patterns or to meet stand development objectives.

For example, some dense patches of perhaps 1/4-acre to several acres may be reserved from cutting. Other patches of 1/2 to 1 acre may be completely removed as group selections and those areas planted with tree seedlings after the thinning is completed. Group selection patches larger than one acre in size would contain reserved trees and snags as provided in regeneration harvest units.

In each density management thinning entry, some of the larger codominant and dominant trees would be removed.

Where root diseases such as laminated root rot (*Phellinus weirii*), black stain (*Ceratocystis verticicladiella*) or Port Orford cedar root rot (*Phytophthora lateralis*) are present in stands to be thinned, the thinning will incorporate state-of-the-art recommendations for treatment. When consistent with management and landscape objectives, openings created would be planted with seedlings of species resistant or immune to the disease, or in a manner to reduce the rate of disease spread.

Late-Successional Reserves

Forest stands less than 80 years of age within the Late-Successional Reserves would be considered for silvicultural treatments where stocking, structure, or composition are expected to prevent or significantly retard development of Late-Successional conditions. Such stands would generally be composed of trees less than 10 to 20 inches diameter at breast height, and would show no significant development of a multiple-canopy forest structure. Stands that have desired Late-Successional structure or that will soon

develop it would not be treated unless such treatment is necessary to accomplish risk reduction objectives (as described below).

Silvicultural Treatments

Density management: Density management prescriptions would be designed to produce stand structure and components associated with Late-Successional conditions including large trees, snags, logs, and variable-density, multistoried, multispecies stands. By removing a portion of the stand, the remaining trees would be provided room to maintain or increase diameter growth rates. In addition, openings in the canopy would permit development of an understory of seedlings, saplings, and other vegetation. Some of the overstory trees may be converted to snags over time to help meet snag habitat targets or felled to provide large woody debris. Trees cut but surplus to habitat needs would be removed for commercial use.
A wide variety of silvicultural practices would be employed, rather than relying on a limited variety of techniques. Silvicultural activities, when needed, would be conducted in suitable stands whether the action would generate a commercial return or not.

In general, manipulated acreage would be limited to 5 percent of the total area within Late-Successional Reserves in the initial 5-year period of implementation unless the need for larger-scale actions is explicitly justified.

Reduction of Large-scale Disturbance Risk

In some areas, stands would be made less susceptible to natural disturbances by focusing salvage activities on reduction of catastrophic insect, disease, and wildfire threats, and by designing treatments to provide effective fuel breaks wherever possible. These treatments would be designed so they would not result in degeneration of currently suitable spotted owl habitat or other Late-Successional conditions.

Risks would be reduced in older stands if the proposed management activity would clearly result in greater assurance of long-term maintenance of habitat, is clearly needed to reduce risks, and would not prevent Late-Successional Reserves from playing an effective role in attaining the objectives for which they were established.

Unless exempted from review, proposed risk reduction projects would be submitted to the Regional Ecosystem Office.

Riparian Reserves

Some stands within the Riparian Reserves would be considered for silvicultural treatments that could contribute to meeting objectives of the Aquatic Conservation Strategy.

Density Management: Where portions of young, even-aged conifer plantations are located within the Riparian Reserves, these stands would be considered for density management treatments. The objectives of such treatment would be to promote development of large conifers and to improve diversity of species composition and stand density. Merchantable logs would be removed only where such action would not be detrimental to the purposes for which the Riparian Reserves were established.

Conifer Underplanting: Where hardwood stands dominate streamside areas and there is a lack of large conifers to provide inputs of large wood for instream structure, efforts would be made to reestablish conifers within the Riparian Reserve. This would involve cutting or girdling some hardwoods to create openings in the canopy, followed by cutting of brush and planting of a variety of conifer seedlings in the openings created. In most cases, follow-up stand maintenance and protection treatments would be necessary to ensure successful establishment of an adequate number of conifers in the riparian area.

Appendix CC
BLM Eugene District Forest Genetics Program

Introduction

For thousands of years humans have selected and used the genetic variation that is naturally present in plants and animals. Genetic diversity is the foundation for plant and animal improvement programs. Modern crop and livestock improvement programs have substantially increased yields and productivity with selection and breeding. The need for food production and natural resources is increasing as the human population increases. Genetic improvement programs have and will continue to help meet these demands.

The genes in all organisms are the basis of their diversity. Ecosystems are dynamic communities that change over time and genetic diversity is a key component. Broad genetic diversity is considered to be an asset because variability is a buffer which allows a species to adjust to change. Problems can occur when genetic diversity is too narrow. Genetic uniformity decreases resilience to change and increases the potential for problems due to pests and diseases. Species with wide tolerances can adapt to changes, while those with narrow tolerances can be detrimentally impacted.

Environmental conditions influence the expression of the genetic code. The physical characteristics of an organism are dependent on the interaction of its genes with the environment. The amount and pattern of genetic diversity in a species develops in part as an organism responds to the environment. This adaptation occurs over a long period of time. Each species develops a unique genetic structure. Genetic studies are conducted to describe and quantify the amount of genetic variation within a species. This information is necessary to direct management and to help guide operational projects.

Genetic diversity can be described as a natural resource. Management and conservation of genetic resources is vital for many reasons. Genetic improvement programs are a great benefit to society and genetic materials have a large economic value. Genetic material from wild stock is an important source of variability that can be infused into existing improved varieties. Conserving genetic diversity maintains options for future needs i.e. many medicinal compounds are derived from plants and there is the potential for undiscovered uses. Conserving genetic diversity for a species allows evolutionary processes to continue within the conditions of the natural environment.

Tree improvement is the application of genetic principles and methods to forest trees. Many of the desirable traits in trees can be enhanced with tree improvement. The Bureau of Land Management has participated in cooperative tree improvement programs for forest trees in the Pacific Northwest since the mid 1950s. The emphasis to date has been in improvement of growth and disease resistance. Ecosystem management principles are changing the focus of the tree improvement program. The existing tree improvement and seed orchard programs will be integrated into a broader based forest genetics program. Genetic diversity issues for many organisms will likely become more important in the future. A forest genetics program is consistent with ecosystem management principles and can be expanded to cover the genetics of other plants and animals.

This appendix describes the objectives of the forest genetics program, the present status, and proposed direction. Readers who are interested in technical details of the tree improvement program are referred to the BLM Western Oregon Tree Improvement Plan (1987), and the BLM Eugene District Tree Improvement Plan (1994). Additional information on genetic resource issues can be found in *The Value of Genetic Resources* (Oldfield, 1984), and *Genetics and Conservation of Rare Plants* (Falk, Holsinger, 1991).

Program Objectives

The objectives of the forest genetics program underlay a broad spectrum of land management activities. The biological foundation of ecosystem management rests upon a clear understanding of the genetic diversity present within the system. The following objectives are broadly defined and include

tree improvement, gene management, and gene conservation activities.

Provide for seed production as needed for planting species on BLM lands. Develop seed collection and seed deployment guidelines as needed.

Develop genetically improved materials as needed to meet BLM's resource management objectives.

Maintain and restore the genetic diversity within managed forest stands.

Analyze needs and implement gene conservation strategies as appropriate.

Collect information on genetic variation from important species.

Contribute to the development of genetic information needed for landscape analysis, ecological assessments, research studies,and ecosystem management projects.

Maintain flexibility within the program so that information fulfills the current needs and anticipates future needs.

Status of the Existing Program

The BLM tree improvement program has generated a substantial and important genetic information base for several conifer species. The data is significant to ecosystem management because it describes the nature and extent of genetic variation present for traits of the species.

Tree improvement programs function at a landscape level. Genetic diversity is continuous across the landscape and tree improvement programs are implemented at this level. Each program is a small ecologically similar area called a breeding unit. Most tree improvement programs are cooperatives with BLM and adjacent land owners. A cooperative structure is beneficial because it greatly increases the number of trees in the genetic base and the trees are located across a broader geographic area. Program costs are shared among cooperators, which is more efficient. BLM is cooperating in more than 50 breeding units, which include several million acres of forest land in Western Oregon.

The following accomplishments summarize the status of the program.

Several conifer species (Douglas-fir, western white pine, sugar pine) have been selected for genetically controlled characteristics such as growth rate, tree form, and resistance to disease.

Field tests have been established using progeny of the selected trees. These progeny test sites have been measured at regular intervals.

Seed orchards have been established using parent trees. The orchards produce locally adapted seed for several major species (Douglas-fir, western hemlock, western red cedar, ponderosa pine, grand fir, incense cedar).

Each year improved seed is sown for replanting a portion of the harvested forest acres.

The seed orchards are managed for seed production. Stimulation techniques are part of the management to encourage cone production. Trees that have slow growth in field tests or show undesirable characteristics are removed from the orchard. This practice is known as "roguing".

Second generation programs to manage gene resources and increase improvement have been initiated in some breeding units. Selection and breeding work is underway.

Facilities for cone and seed processing and greenhouses for growing custom tailored lots of many species are located at the seed orchards.

Proposed Program Direction

The future forest genetics program will be more complex under ecosystem management than under the previous management plans. Improvement of growth and disease resistance will continue as an important component of the forest genetics program. Gene conservation and gene resources management issues will be emphasized to a greater degree. Gene conservation consists of specific actions to conserve the genetic variation of a species. The purpose is to maintain the range of natural diversity within the species. Gene management integrates genetic principals into resource management actions. Ecosystems are complex and genetic diversity is important for all organisms. Genetic principles should be considered when planning and

implementing resource management projects so that genetic diversity is maintained and enhanced.

The following is a summary of the direction for the forest genetics program.

Progeny test sites will be maintained and measurements of growth and other characteristics will continue. Long-term management plans for the sites will be developed.

Seed orchards will be maintained and managed to produce seed as needed for ecosystem management projects.

Improved stock will be planted on a portion of the harvested acres.

Tree improvement programs have emphasized cooperative efforts for operational programs and research studies with state, private, and other government agencies. These partnerships will continue.

Genetic expertise including genetically appropriate guidelines will be provided for ecosystem management implementation.

A forest genetics plan will be prepared. It will include a strategy for gene conservation, maintenance of genetic diversity, and definition of a monitoring baseline to quantify genetic variation.

Ecosystem management concepts have challenged the forest genetics program with more issues than was done by the previous forest management plans. The former program must be meshed with the additional needs defined by ecosystem management so previous gains are maintained and future needs are addressed. Policy and land use allocations will likely change over time. A flexible broad based forest genetics program is the best option to accommodate changing conditions. Tree improvement, gene management, and gene conservation objectives share a common genetic basis. Each aspect of the program can compliment the others. All aspects should include provisions for maintaining and enhancing genetic diversity. Tree improvement programs are intensive management practices that can achieve higher productivity and help meet the demand for wood products. Genetic information is needed to support and guide ecosystem management projects. Conservation of genetic diversity is vital to ecosystem health and stability.

Appendix DD
Timber Harvest and Management Details, PRMP

Table 4-56 - PRMP Harvest by Sustained Yield Unit (SYU) (mmcf/Decade and bd. ft./cu. ft. Ratio)

	Decade									
	1st		2nd		3rd		5th		10th	
SYU	MMCF[1]	BF/CF Ratio	MMCF	BF/CF Ratio	MMCF	BF/CF Ratio	MMCF	BF/CF Ratio	MMCF	BF/CF Ratio
Upper Willamette	48.5	5.92	48.5	5.74	48.5	5.84	48.5	5.98	48.5	6.14
Siuslaw	12.7	5.88	12.6	5.68	12.7	5.80	12.7	5.94	12.7	6.18

[1] MMCF is the same through all decades due to even flow management based on cubic feet.
Note: The board foot (BF) to cubic foot (CF) ratio is an indicator of average tree diameter being harvested during the decade. The larger the tree diameter, the more board foot measured per cubic foot and, therefore, the larger the BF/CF ratio.

Table 4-57 - Expected PRMP Harvest by Sustained Yield Unit (SYU) (Acres and mmcf/decade)

	Decade									
	1st.		2nd.		3rd.		5th.		10th.	
SYU	Acres	Vol.	Acres	Vol.	Acres	Vol.	Acres	Vol.	Acres	Vol.
Upper Willamette:										
Adaptive Management Area										
General Forest Mgmt. Areas										
Regeneration harvest [1]	611	6.4	289	2.3	106	0.9	42	0.4	145	2.1
Commercial thinning	323	0.7	33	0.1	217	0.3	363	0.7	564	1.1
Connectivity Areas										
Regeneration harvest [1]	77	0.6	300	3.5	174	2.3	51	0.6	44	0.6
Density management	16	0.1	4	0	16	0.1	20	0.1	21	0.1
General Forest Mgmt. Areas										
Regeneration harvest [1]	2,425	19.0	2,220	19.1	2,515	18.1	2,159	20.7	1,304	18.7
Commercial thinning	4,079	8.6	2,976	6.0	6,800	11.8	5,059	8.9	3,965	26.6
Rural Interface Areas										
Regeneration harvest [1]	100	1.0	76	0.5	72	0.4	121	1.1	97	1.2
Commercial thinning	86	0.2	224	0.4	317	0.6	375	0.6	409	1.8

Table 4-57 - Expected PRMP Harvest by Sustained Yield Unit (SYU) (Acres and mmcf/ decade) (continued)

SYU	Decade 1st. Acres	Vol.	2nd. Acres	Vol.	3rd. Acres	Vol.	5th. Acres	Vol.	10th. Acres	Vol.
Connectivity Areas										
Regeneration harvest [1]	1,317	9.1	1,484	11.5	854	6.6	893	7.7	1779	11.5
Density management	1,027	2.8	1,750	4.9	2,676	7.3	2,869	7.6	1,313	4.7
Siuslaw SYU:										
General Forest Mgmt. Areas										
Regeneration harvest [1]	880	7.0	902	7.9	632	5.8	621	6.7	498	6.6
Commercial thinning	1,208	2.8	715	1.5	2,139	4.0	1,415	2.8	1,142	8.9
Rural Interface Areas										
Regeneration harvest [1]	16	0.1	52	0.4	21	0.2	11	0.1	11	0.2
Commercial thinning	4	0	0	0	23	0.1	32	0.1	33	0.1
Connectivity Areas										
Regeneration harvest [1]	242	1.6	279	2.0	130	1.2	182	1.2	222	2.2
Density management	530	1.2	354	0.9	809	1.4	559	1.8	386	1.3

[1] Regeneration harvest includes hardwood conversion acres.

Table 4-58 - PRMP Assumed Stand Treatments by Decade (Acres[1])

Treatment	Decade 1st	2nd	3rd	5th	10th
Plant Genetic Stock	6,760	7,180	6,130	5,460	5,880
Competing Vegetation\ Control	3,450	3,670	3,120	2,820	2,880
Precommercial Thinning	5,930	6,840	2,160	3,320	3,440
Fertilization	16,720	13,360	11,120	6,810	6,760

[1] All acreage values are rounded to the nearest 10 acres.

Appendix EE
Forest Inventory

Before alternative land use plans can be properly developed and considered for forested public lands, information about the land must be available. Some of the most important information is related to the ability of the land to grow trees, the location and condition of the trees, and the growth rate and present volume of the trees. The BLM collects and manages this information primarily through three inventory systems:

1. **Timber Production Capability Classification (TPCC)**

   The Timber Production Capability Classification (TPCC) is an intensive inventory process initiated in 1972 to categorize all public land administered by BLM in western Oregon based upon the land's physical and biological capacity to produce timber. TPCC was conducted in accordance with Oregon Manual Supplement 5250.

   The 1977 TPCC identified commercial forest land that could be managed on a sustained yield basis. This land formed the potential timber production base for computation of the annual allowable harvest. Approximately 286,000 acres were identified in this category. About 22,000 acres of commercial forest land were determined to be incapable of undergoing harvest without significant site degradation. This land was left out of the potential timber production base. Sites were placed in this category only when it was judged that economically reasonable technology was not available to mitigate such degradation. The remainder of the District's 317,000 acres was determined to be nonforest or noncommercial forest.

   In 1986 the Oregon State Office issued *Handbook 5251-1 - Timber Production Capability Classification*, which replaced the 1972 Manual Supplement utilized in 1977.

   The land base used for computation of Probable Sale Quantities (PSQ) utilizing the two TPCC systems are not directly comparable. The 1986 system contains two woodland classifications, which did not exist in 1976. Each of the woodland categories could be components of the PSQ. By contrast, the 1977 system by definition withdrew from planned harvest lands classified as nonforest land, low site and noncommercial species. In addition to the changes in the two systems, the District land base changed as a result of land exchanges.

   The TPCC Handbook is available for inspection during normal working hours at the District Office, and provides a complete description of the classifications.

2. **Operations Inventory**

   For BLM to carry out the timber management program effectively, specific information as to the location and current condition (e.g., age, species composition, density, past management of the various forest types within the land base) must be available to the managers. This is accomplished through the Operations Inventory (OI) in accordance with procedures contained in the Operations Inventory Handbook.

   The OI is an intensive inventory that divides the forests into survey units sufficiently uniform in composition/structure, condition, operability, productivity, or other characteristics to distinguish them from adjacent units. Information on each unit is maintained in the MICRO*STORMS computer system. Each survey unit has information on location, acreage, stand condition, stand composition/structure, past management, silvicultural needs, and opportunities for application of intensive management practices. (Note: OI records carry existing unit information not the original stand condition and composition/ structure information.)

3. **Extensive Inventory (5-point)**

   The purpose of the extensive inventory is to determine the existing volume in the District. A reinventory of commercial forest land was completed in 1988 employing procedures jointly developed by the USFS and BLM. The reinventory used the same basic inventory design

used for preparation of the present management plan. The inventory is a stratified random sample of the commercial forest land base. Each plot is a cluster of five sample points. Each point is the center of both a fixed and variable radius plot.

The objective of the inventory is to estimate the total coniferous volume within plus or minus 10 percent (at two standard deviations). Statistical analysis indicates that the total conifer volume estimates for merchantable strata on the District is within 9.9 percent in the Upper Willamette Sustained Yield Unit (SYU) and 9.6 percent in the Siuslaw SYU, based on measurements of 220 plots.

The volume on present stands is derived from 233 permanent, continuous forest inventory plots. The majority of these plots were established in 1968 and were remeasured in 1978 and again in 1988. Additional plots were established in 1978 and 1988. Inventory plots are stratified based on site index, age, and major TPCC type (Suitable Commercial Forest Land, Suitable Woodland, Nonsuitable Woodland, and Nonforest and Recreation sites).

More detailed information about the forest inventory systems is available from the District office.

Appendix FF
Timber Tables

Table 4-36 - Average Age at Regeneration Harvest

Upper Willamette SYU, average Douglas-fir = 121
Age at CMAI = 80

Alternative	Decade 1st	2nd	3rd	5th	10th	20th
No Action	165	68	53	44	60	127
A	194	86	66	55	41	53
B	174	76	64	54	39	45
C	136	83	73	87	126	204
D	75	80	73	77	67	66
E	67	57	51	48	42	65
PRMP	84	63	73	95	110	157

Siuslaw SYU, average Douglas-fir = 121
Age at CMAI = 80

Alternative	Decade 1st	2nd	3rd	5th	10th	20th
No Action	204	70	52	42	60	130
A	286	119	70	57	40	42
B	255	77	67	57	42	41
C	216	128	88	87	123	194
D	85	76	83	67	63	65
E	65	57	53	53	43	46
PRMP	88	60	76	98	122	176

Table 4-37 - Volume (MMCF) Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise)

Alternative No Action		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	20.7	6.6	44.1	51.0	57.7
Age 36-45	Regeneration	0	0	23.8	191.5	0
	Thinning	17.4	22.6	7.4	6.3	69.0
Age 46-55	Regeneration	0	51.7	201.2	100.8	0
	Thinning	10.7	10.5	1.8	0	58.1
Age 56-65	Regeneration	0	122.6	71.4	0	139.2
	Thinning	4.5	0	0	0	25.7
Age 66-75	Regeneration	0	57.7	0	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0	24.5	0	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	17.5	33.9	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	137.2	19.7	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	144.5	2.7	2.7	2.7	2.7

Alternative A		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	6.1
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	257.3
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	0	0	0	195.5	261.1
	Thinning	21.4	29.0	29.8	37.9	3.6
Age 56-65	Regeneration	0	30.1	89.1	304.2	9.4
	Thinning	4.7	0	0	0	0
Age 66-75	Regeneration	0	117.4	417.0	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0	62.7	1.4	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	0	42.6	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	154.8	221.6	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	355.6	34.2	0	0	0

Alternative B		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	10.0
	Thinning	0	0	0	0	433.7
Age 36-45	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	51.7
Age 46-55	Regeneraion	0	0	0	216.2	2.1
	Thinning	21.2	23.3	24.7	30.7	0

Table 4-37 - Volume (MMCF) Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise) (continued)

Alternative B		Decade 1st	2nd	3rd	5th	10th
Age 56-65	Regeneration	0	167.4	195.6	250.8	0
	Thinning	4.8	0	0	0	0
Age 66-75	Regeneration	0	119.0	277.3	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0	62.0	0	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneraion	0	30.4	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	227.2	95.4	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	243.3	0	0	0	0

Alternative C		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	0	0	0	0	0
	Thinning	40.9	49.8	54.1	97.8	8.3
Age 56-65	Regeneration	18.1	38.1	23.2	1.0	1.3
	Thinning	0	3.8	7.5	17.9	0
Age 66-75	Regeneration	6.0	3.3	18.5	1.1	0.4
	Thinning	6.4	13.6	23.8	21.3	1.9
Age 76-85	Regeneration	3.5	5.5	5.4	3.9	0.8
	Thinning	0	0.2	0	0	7.6
Age 86-95	Regeneration	4.2	0.5	4.8	0.6	7.3
	Thinning	0	0	8.4	0	0
Age 96-195	Regeneration	23.5	18.2	6.4	5.0	105.4
	Thinning	11.6	9.2	2.4	8.8	17.3
Age 196+	Regeneration	39.2	13.1	0	0	4.4

Alternative D		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	7.9	4.1	16.4	16.6	16.8
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	49.0	25.1	34.1	31.3	31.8
	Thinning	10.7	0	0	0	0
Age 56-65	Regeneration	20.9	62.9	53.8	67.8	37.8
	Thinning	2.1	0	0	0	0
Age 66-75	Regeneration	2.9	15.8	64.6	34.0	38.8
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0.7	12.9	12.3	44.1	75.4
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	10.9	1.5	8.7	48.5	30.7
	Thinning	0	0	0	0	0

Table 4-37 - Volume (MMCF) Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise) (continued)

Alternative D		Decade 1st	2nd	3rd	5th	10th
Age 96-195	Regeneration	46.5	27.2	24.3	34.3	3.2
	Thinning	0	0	0	0	0
Age 196+	Regeneration	20.4	9.5	26.3	2.4	0.3

Acreage of thinning after first decade unavailable.

Alternative E		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	1.4	64.5
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	31.6	64.9	72.5
	Thinning	0	0	0	0	1.1
Age 46-55	Regeneration	66.1	73.9	76.2	69.9	0
	Thinning	12.4	14.0	13.4	9.4	0.2
Age 56-65	Regeneration	32.5	71.0	32.5	0	0
	Thinning	2.1	0	0	0	0
Age 66-75	Regeneration	15.2	2.6	9.9	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	4.9	1.5	7.9	5.8	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	11.3	0.8	0.1	20.9	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	27.7	8.5	1.0	0	34.2
	Thinning	0	0	0	0	0
Age 196+	Regeneration	0	0	0	0	0

Alternative PRMP	1st	Decade 2nd	3rd	5th	10th	
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	0
	Thinning	1.1	2.5	2.1	2.1	0.2
Age 46-55	Regeneration	0	0	0	0	0
	Thinning	12.5	11.3	11.5	7.5	5.8
Age 56-65	Regeneration	18.1	40.8	5.4	0	2.0
	Thinning	2.9	0	0.9	1.8	0
Age 66-75	Regeneration	8.0	0.8	17.7	0.5	0.6
	Thinning	0	0	9.1	10.0	0.4
Age 76-85	Regeneration	0.6	0.2	7.5	12.4	0.1
	Thinning	0	0	1.8	0.9	2.5
Age 86-95	Regeneration	3.3	0.1	0.2	13.0	1.1
	Thinning	0	0	0	0.3	3.8
Age 96-195	Regeneration	11.2	3.8	3.6	8.2	38.8
	Thinning	0	0	0	0	5.4
Age 196+	Regeneration	3.5	0.9	1.1	3.3	0

Table 4-38 - Acres Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise)

Alternative No Action		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	17,652	2,027	36,360	38,760	42,663
Age 36-45	Regeneration	0	0	5,111	33,457	0
	Thinning	16,171	8,513	5,482	4,377	46,713
Age 46-55	Regeneration	0	12,228	33,641	13,997	0
	Thinning	8,970	7,200	1,539	0	45,660
Age 56-65	Regeneration	0	12,876	21,176	0	15,964
	Thinning	5,621	0	0	0	25,117
Age 66-75	Regeneration	0	6,619	0	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0	1,173	0	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	3,026	4,074	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	19,320	164	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	15,181	315	298	281	280

Alternative A		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	1,193
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	24,883
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	0	0	0	18,686	23,106
	Thinning	12,363	16,430	16,993	22,418	2,479
Age 56-65	Regeneration	0	2,729	9,856	27,674	1,395
	Thinning	1,689	0	0	0	0
Age 66-75	Regeneration	0	11,426	33,198	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	0	5,524	113	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	0	4,074	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	11,396	17,234	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	32,718	2,360	0	0	0

Alternative B		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	1,695
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	40,647
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	0	0	0	19,706	4,273
	Thinning	12,902	13,378	14,002	17,768	1,197
Age 56-65	Regeneration	0	14,712	18,390	22,621	0
	Thinning	1,848	0	0	0	0
Age 66-75	Regeneration	0	11,361	19,691	0	0
	Thinning	0	0	0	0	0

Table 4-38 - Acres Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise) (continued)

Alternative B		Decade 1st	2nd	3rd	5th	10th
Age 76-85	Regeneration	0	5,313	0	0	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	0	2,844	0	0	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	16,827	7,796	0	0	0
	Thinning	0	0	0	0	0
Age 196+	Regeneration	22,048	0	0	0	0

Alternative C		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	0	0	0	0	0
	Thinning	19,923	17,970	18,270	26,086	3,690
Age 56-65	Regeneration	2,563	5,788	3,534	145	187
	Thinning	14	1,257	2,484	5,936	5
Age 66-75	Regeneration	726	376	2,960	223	73
	Thinning	2,784	5,795	9,652	9,393	776
Age 76-85	Regeneration	444	799	740	609	96
	Thinning	0	0	0	0	3,885
Age 86-95	Regeneration	461	79	626	70	773
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	2,223	1,878	973	719	13,064
	Thinning	3,731	2,977	2,090	4,114	10,919
Age 196+	Regeneration	4,777	1,505	271	0	443

Alternative D		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	1,304	748	2,435	3,066	3,090
	Thinning	0	0	0	0	0
Age 46-55	Regeneration	5,454	2,873	4,424	4,051	4,104
	Thinning	7,165	0	0	0	0
Age 56-65	Regeneration	2,343	6,034	5,195	6,259	3,876
	Thinning	851	0	0	0	0
Age 66-75	Regeneration	276	1,460	4,951	3,016	3,383
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	69	1,078	1,064	3,167	5,853
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	932	140	662	3,349	2,181
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	3,466	1,931	1,761	2,323	205
	Thinning	0	0	0	0	0
Age 196+	Regeneration	1,821	855	2,336	209	20

Table 4-38 - Acres Harvested by Age Class by Decade (Regeneration Harvest Unless Noted Otherwise) (continued)

Estimates of thinning volume and acreage unavailable beyond 1st decade.
Regeneration harvest level is nondeclining and total yield is assumed to be also.

Alternative E		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	281	10,718
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	3,623	6,868	7,044
	Thinning	0	0	0	0	527
Age 46-55	Regeneration	7,741	9,756	11,461	6,234	0
	Thinning	7,055	7,992	7,667	5,642	115
Age 56-65	Regeneration	3,914	6,385	2,791	0	0
	Thinning	821	0	0	0	0
Age 66-75	Regeneration	1,529	253	1,065	0	0
	Thinning	0	0	0	0	0
Age 76-85	Regeneration	535	131	575	546	0
	Thinning	0	0	0	0	0
Age 86-95	Regeneration	1,052	64	9	1,443	0
	Thinning	0	0	0	0	0
Age 96-195	Regeneration	2,183	600	59	0	1,990
	Thinning	0	0	0	0	0
Age 196+	Regeneration	0	0	0	0	0

Alternative PRMP		Decade 1st	2nd	3rd	5th	10th
Age 26-35	Regeneration	0	0	0	0	0
	Thinning	0	0	0	0	0
Age 36-45	Regeneration	0	0	0	0	0
	Thinning	585	1,252	1,059	1,098	90
Age 46-55	Regeneration	43	12	2	0	0
	Thinning	5,571	4,790	4,801	2,978	2,706
Age 56-65	Regeneration	2,698	5,008	877	0	296
	Thinning	1,119	0	585	1,061	4
Age 66-75	Regeneration	1,000	101	2,195	57	67
	Thinning	0	11	5,435	4,801	259
Age 76-85	Regeneration	89	23	1,061	1,636	67
	Thinning	0	0	1,117	585	1,302
Age 86-95	Regeneration	372	14	22	1,608	5
	Thinning	0	0	0	171	1,874
Age 96-195	Regeneration	984	298	274	574	3,654
	Thinning	0	0	0	0	2,520
Age 196+	Regeneration	488	61	73	203	0

Table 4-39 Average Annual Acres Treated by Alternative and Decade

Alternative No Action Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	3,750	7,260	6,020	4,770
Shelterwood Retention	0	0	0	0
Structural Retention	0	0	0	0
Commercial Thinning/ Density Management	4,840	3,930	4,340	4,310
Conversion	0	0	0	0
Site Preparation	2,950	5,690	4,720	3,740
Planting				
Regular Stock	2,130	6,250	2,220	0
Genetic Stock	2,580	3,720	6,050	6,550
Plantation Maintenance	1,390	2,960	2,460	1,950
Stand Protection	3,050	6,470	5,360	4,250
Stand Release	1,390	2,980	2,470	1,960
Precommercial Thinning	3,640	3,760	3,880	5,810
Fertilization	13,010	8,180	8,440	12,640

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Alternative A Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	4,410	4,340	4,320	4,640
Shelterwood Retention	0	0	0	0
Structural Retention	0	0	0	0
Commercial Thinning/ Density Management	1,410	1,640	1,700	2,240
Conversion	100	0	0	0
Site Preparation	3,160	3,110	3,100	3,320
Planting				
Regular Stock	2,960	1,730	0	0
Genetic Stock	2,580	3,720	5,430	5,830
Plantation Maintenance	1,640	1,610	1,610	1,730
Stand Protection	3,590	3,530	3,520	3,780
Stand Release	1,640	1,610	1,610	1,730
Precommercial Thinning	2,530	2,500	1,980	4,410
Fertilization	9,040	8,840	7,820	7,580

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Alternative B Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	3,890	4,200	3,810	4,230
Shelterwood Retention	0	0	0	0
Structural Retention	0	0	0	0

Table 4-39 Average Annual Acres Treated by Alternative and Decade (continued)

Alternative B Practices	Decade 1st	2nd	3rd	5th
Commercial Thinning/ Density Management	1,480	1,340	1,400	1,780
Conversion 90	0	0	0	
Site Preparation	2,800	3,020	2,740	3,040
Planting				
Regular Stock	2,310	1,560	0	0
Genetic Stock	2,580	3,720	4,790	5,320
Plantation Maintenance	1,430	1,540	1,400	1,550
Stand Protection	3,180	3,430	3,110	3,460
Stand Release	1,430	1,540	1,400	1,550
Precommercial Thinning	2,310	2,030	1,140	1,220
Fertilization	7,880	8,480	7,440	6,830

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Alternative C Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	0	0	0	0
Shelterwood Retention	0	0	0	0
Structural Retention	1,120	1,050	920	180
Commercial Thinning/ Density Managemet	2,640	2,720	2,670	4,080
Conversion 0	0	0	0	
Site Preparation	10	850	750	150
Planting				
Regular Stock	0	0	0	0
Genetic Stock	1,530	1,430	1,260	250
Plantation Maintenance	600	560	490	100
Stand Protection	880	830	720	140
Stand Release	260	240	210	40
Precommercial Thinning	2,170	2,230	400	670
Fertilization	4,160	4,410	1,830	2,630

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Alternative D Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	1,570	1,510	2,280	2,540
Shelterwood Retention	0	0	0	0
Structural Retention	0	0	0	0
Commercial Thinning/ Density Management	800	960	1,000	830
Conversion 60	0	0	0	
Site Preparation	1,170	1,130	1,700	1,890
Planting				
Regular Stock	0	0	0	0

Table 4-39 Average Annual Acres Treated by Alternative and Decade (continued)

Alternative D Practices	Decade 1st	2nd	3rd	5th
Genetic Stock	1,960	1,890	2,850	3,170
Plantation Maintenance	550	530	800	890
Stand Protection	1,320	1,270	1,920	2,140
Stand Release	530	510	770	860
Precommercial Thinning	1,580	1,520	2,290	2,560
Fertilization	3,030	2,910	4,400	4,900

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Alternative E Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest	0	0	0	0
Even Aged	1,490	1,540	1,790	1,380
Shelterwood Retention	200	180	170	200
Structural Retention	0	0	0	0
Commercial Thinning/ Density Management	790	800	770	560
Conversion 20	0	0	0	
Site Preparation	1,260	1,280	1,460	1,180
Planting				
Regular Stock	0	0	0	0
Genetic Stock	2,120	2,450	2,790	2,250
Plantation Maintenance	600	610	700	560
Stand Protection	1,420	1,450	1,650	1,330
Stand Release	580	590	670	540
Precommercial Thinning	960	770	490	710
Fertilization	2,650	2,810	1,980	2,580

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

PRMP Practices	Decade 1st	2nd	3rd	5th
Harvest				
Regeneration Harvest				
Even Aged	570	590	470	410
Shelterwood Retention	0	0	0	0
Structural Retention	0	0	0	0
Commercial Thinning/ Density Management	730	610	1,200	1,050
Conversion	10	10	0	0
Site Preparation	430	450	390	350
Planting				
Regular Stock	0	0	0	0
Genetic Stock	680	720	580	530
Plantation Maintenance	190	200	170	160
Stand Protection	600	620	560	460
Stand Release	150	160	140	130
Precommercial Thinning	590	680	220	380
Fertilization	1,670	1,340	1,110	640
Pruning	630	580	660	310

Conversion for 2nd, 3rd, and 5th decades included in regeneration harvest acres.

Appendix GG
Proposed Restrictions on Leasable Mineral Exploration and Development Activity

Introduction

This appendix discusses the leasing stipulations as they would be applied to BLM managed lands in the planning area under each alternative. Mineral leasing of lands managed by the U.S. Forest Service within the district boundary is not addressed in this document.

Oil and Gas

The Mineral Leasing Act of 1920 (as amended) provides that all publicly owned oil and gas resources be open to leasing, unless a specific land order has been issued to close the area. Through the land use planning process, the availability of these resources for leasing is analyzed, taking into consideration development potential and surface resources. Constraints on oil and gas operations are identified and placed in the leases as notices and stipulations. Oil and gas leases are then issued from the BLM Oregon State Office in Portland. Specific proposed notices and stipulations are listed by alternative later in this appendix.

The issuance of a lease conveys to the lessee an authorization to actively explore and/or develop the lease, in accordance with the attached stipulations and the standard terms outlined in the Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA). Restrictions on oil and gas activities in the planning area will take the form of timing limitations, controlled surface use, no surface occupancy and complying with the special status species stipulation, used at the discretion of the Authorized Officer to protect identified surface resources of special concern.

Stipulations will be attached to each lease before it is offered for bid by the field office, which reviews the lease tract. The review will be conducted by consulting the direction given in this Resource Management Plan. In addition, all lands administered by BLM within the planning area will be subject to the lease notices as shown on the following pages. All Federal lessees or operators are required to follow procedures set forth by: Onshore Oil and Gas Orders, Notices to Lessee (NTLs), The Federal Oil and Gas Royalty Management Act (as amended), The Federal Onshore Oil and Gas Leasing Reform Act, and Title 43 Code of Federal Regulations, Part 3100.

Geophysical Exploration - Oil and gas geophysical operations may be conducted regardless of whether or not the land is leased. Notices to conduct geophysical operations on BLM surface are received by the Resource Area. Administration and surface protection are accomplished through close cooperation of the operator and the BLM. Seasonal restrictions may be imposed to reduce fire hazards, conflicts with wildlife, watershed damage, etc. An operator is required to file a "Notice of Intent to Conduct Oil and Gas Exploration Operations" for all geophysical activities on public land administered by BLM. The notice should adequately show the location and access routes, anticipated surface damages, and time frame. The operator is required to comply with written instructions and orders given by the Authorized Officer, and must be bonded. Signing of the Notice of Intent by the operator signifies agreement to comply with the terms and conditions of the notice, regulations, and other requirements prescribed by the Authorized Officer. A prework conference and/or site inspection may be required. Periodic checks during and upon completion of the operations will be conducted to ensure compliance with the terms of Notice of Intent, including reclamation.

Drilling Permit Process - The Federal lessee or operating company selects a drill site based on spacing requirements, subsurface and surface geology, geophysics, topography, and economic considerations. Well spacing is determined by the Authorized Officer after considering topography, reservoir characteristics, protection of correlative rights, potential for well interference, interference with multiple use of lands, and protection of the surface and subsurface environments. Close coordination with the State would take place. Written field spacing orders are issued for each field. Exceptions to spacing requirements involving Federal lands may be granted after joint State and BLM review.

Notice of Staking - Once the company makes the decision to drill, it must decide whether to submit a Notice of Staking (NOS) or apply directly for a permit to drill. The NOS is an outline of what the company intends to do, including a location map and sketched site plan. The NOS is used to review any conflicts with known critical resource values and to identify the need for associated rights-of-way and special use permits. The BLM utilizes information contained in the NOS and obtained from the on-site inspection to develop conditions of approval to be incorporated into the application for permit to drill. Upon receipt of the NOS, the BLM posts the document and pertinent information about the proposed well in the District Office for a minimum of 30 days prior to approval, for review and comment by the public.

Application for Permit to Drill (APD) - The operator may or may not choose to submit a NOS; in either case, an Application for Permit to Drill (APD) must be submitted prior to drilling. An APD consists of two main parts: a 12-point surface plan that describes any surface disturbances and is reviewed by resource specialists for adequacy with regard to lease stipulations designed to mitigate impacts to identified resource conflicts with the specific proposal, and a 8-point subsurface plan that details the drilling program and is reviewed by the staff petroleum engineer and geologist. This plan includes provisions for casing, cementing, well control, and other safety requirements. For the APD option, the on-site inspection is used to assess possible impacts and develop provisions to minimize these impacts. If the NOS option is not utilized, the 30-day posting period begins with the filing of the APD. Private surface owner input is actively solicited during the APD stage.

Geothermal

The Geothermal Steam Act of 1970 (as amended) provides for the issuance of leases for the development and utilization of geothermal steam and associated geothermal resources. Geothermal leasing and operational regulations are contained in Title 43 Code of Federal Regulations, Part 3200. Through the land use planning process the availability of the geothermal resources for leasing is analyzed, taking into consideration development potential and surface and subsurface resources. Constraints on geothermal operations are identified and placed in the leases as stipulations. Geothermal leases are then issued by the BLM Oregon State Office in Portland.

Geothermal resources within a Known Geothermal Resource Area (KGRA) are offered by competitive sale. Outside of KGRAs, leases can be issued noncompetitively (over-the-counter). Prior to a competitive lease sale, or the issuance of a noncompetitive lease, each tract will be reviewed, and appropriate lease stipulations will be included. The review will be conducted by consulting the direction given in this Resource Management Plan. The issuance of a lease conveys to the lessee authorization to actively explore and/or develop the lease in accordance with regulations and lease terms and attached stipulations. The operator is required to file a "Notice of Intent to Conduct Geothermal Resource Exploration Operations" for any proposed geothermal exploration, including geophysical work. Subsequent lease operations must be conducted in accordance with the regulations, Geothermal Resources Operational Orders, and any Conditions of Approval developed as a result of site-specific NEPA analysis. In the planning area, restrictions in some areas will include timing limitations, controlled surface use, no surface occupancy, and a special status species stipulation, used at the discretion of the Authorized Officer to protect identified surface resources of special concern.

In addition to restrictions related to the protection of surface resources, the various stipulations and conditions could contain requirements related to protection of subsurface resources. These may involve drainage protection of geothermal zones, protection of aquifers from contamination, or assumption of responsibility for any unplugged wells on the lease.

Development of geothermal resources can be done only on approved leases. Orderly development of a geothermal resource, from exploration to production, involves several major phases that must be approved separately. Each phase must undergo the appropriate level of NEPA compliance before it is approved and subsequent authorization(s) is (are) issued.

Mineral Leasing Notice and Stipulation Summary

On the following pages, the mineral leasing notices and stipulations are shown by planning alternative. The tracts of land to which these apply will, in many cases, differ by alternative. Those notices and stipulations shown as common for all alternatives are considered to be the minimum necessary in order to issue oil and gas or geothermal leases in the operating area. Under all alternatives, the standard

lease terms (Form 3100-11 for oil and gas) (and Form 3200-24 for geothermal resources) would be utilized on all lands. On the Eugene District, the Special Status Species stipulation would be attached to every mineral lease. The powersite stipulation (Form 3730-1) would be utilized on lands within powersite reservations. Lands under the jurisdiction of the Department of the Army, Corps of Engineers, would be leased (for oil and gas,) subject to the stipulation on Form 3109-2. Prior to issuance of geothermal leases on lands under the jurisdiction of the Corps of Engineers, the Corps must approve the leasing activity and no special stipulation is attached to the lease.

Stipulations also include waiver, exception, and modification criteria defined below. If the Authorized Officer determines that a stipulation involves an issue of major concern, waivers, exceptions, or modifications of the stipulation will be subject to at least a 30-day advance public review (43 CFR 3101.1-4). Waiver, exception, and modification are defined as follows:

> **Waiver** - The lifting of a stipulation from a lease that constitutes a permanent revocation of the stipulation from that time forward. The stipulation no longer applies anywhere within the leasehold.
>
> **Exception** - This is a one-time lifting of the stipulation to allow an activity for a specific proposal. This is a case-by-case exemption. The stipulation continues to apply to all other sites within the leasehold to which the restrictive criteria apply. It has no permanent effect on the lease stipulation.
>
> **Modification** - This is a change to a stipulation that either temporarily suspends the stipulation requirement or permanently lifts the application of the stipulation on a given portion of the lease. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive criteria apply.

Throughout the alternatives, the No Surface Occupancy (NSO) stipulation is used rather than not leasing, because leasable minerals, if present, could be produced from most, if not all, of each of the parcels that are subject to this stipulation without impacting the value(s) needing protection.

Whenever a special stipulation, such as No Surface Occupancy, Timing, Controlled Surface Use (CSU), or Special Status Species is used, the need for the special stipulation is described in the "Objective" that follows the stipulation. By imposing these special stipulations, it has been concluded that less restrictive stipulations would not be adequate to meet the stated objective.

Standard Lease Terms

Standard lease terms for oil and gas are listed in Section 6 of "Offer to Lease and Lease for Oil and Gas" Form 3100-11. They are:

> Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air and water; to cultural, biological, visual and other resources; and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities; timing of operations; and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorized future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.
>
> Prior to disturbing the surface of the leased lands, lessee shall contact BLM to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short-term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects until appropriate steps have been taken to protect the site or recover the resources as determined by BLM in consultation with other appropriate agencies.

Standard lease terms for geothermal leasing can be found on Offer to Lease and Lease for Geothermal Resources (Form 3200-24), Section 6, and are very similar to those described above for oil and gas leasing.

Powersite Stipulation (Form No. 3730-1) (to be used on all lands within powersite reservations.)

Oil and Gas Stipulation for Lands Under Jurisdiction of Department of the Army, Corps of Engineers (Form No. 3109-2)

All areas within 2,000 feet of any major structure, including but not limited to dams, spillways, or embankments, are restricted areas. The lessee, his operators, agents, or employees shall not disturb the surface or subsurface estates of the restricted areas. If the Commander or the authorized representative discovers an imminent danger to safety or security that allows no time to consult the BLM, that person may order such activities stopped immediately. The Authorized Officer of the BLM shall review the order and determine the need for further remedial action. Platform drilling over water areas (flood pool/drawdown zone) is prohibited; the method of drilling shall be directional from an off-site base. This restriction is required because occupancy would negatively affect or interfere with authorized project purposes and/or operational needs as listed below:

Fish and Wildlife Habitat — Power Production
Flood Control — Recreation
Irrigation — Water Quality
Navigation — Water Supply
Other Legislative Authorities

Land surface occupancy may be permitted within lease area; however, directional drilling from on off-site base may be required. The Secretary of the Army or designee reserves the right to require cessation of operations, if a National emergency arises. Upon request of approval from higher authority, the Commander will give the lessee written notice or, if time permits, request the BLM to give notice of the required cessation.

Leasing Notice and Stipulations for the PRMP

Notice

Cultural Resources

Special Stipulations

NSO - Land Use Authorizations
NSO - Recreation Sites
NSO - Special Areas (ACEC (including RNA & ONA), EEA)
NSO - Tyrrell and Dorena Seed Orchards
NSO - Great Blue Heron Rookeries
NSO - Osprey Nest Sites
NSO - Riparian Reserves
Timing - Mineral Springs Utilized by the Band-tailed Pigeon
CSU - Soils
CSU - VRM Class II
CSU - Special Recreation Management Areas
CSU - Suitable or Eligible (But Not Assessed) Recreational Rivers
CSU - Late Successional Reserves
Special Status Species

Leasing Notice for the PRMP

The following Notice is to be included in each lease for all lands administered by BLM within the planning area where the pertinent resource potential exists. Lease notices are attached to leases in the same manner as stipulations; however, there is an important distinction between lease notices and stipulations. Lease notices do not involve new restrictions or requirements. Any requirements contained in a lease notice must be fully supported in either laws, regulations, policy, onshore oil and gas orders, or geothermal resources operational orders.

Notice

Cultural Resources: An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

1. Contact the Bureau of Land Management (BLM) to determine if a cultural resource inventory is required. If an inventory is required, then

2. The BLM will complete the required inventory; or the lessee or operator, at their option, may engage the services of a cultural resource consultant acceptable to the BLM to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the standard 10-acre minimum to cover possible site relocation, which may

result from environmental or other considerations. An acceptable inventory report is to be submitted to the BLM for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

3. Implement mitigation measures required by the BLM. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the BLM, surface occupancy on that area must be prohibited. The lessee or operator shall immediately bring to the attention of the BLM any cultural resources discovered as a result of approved operations under this lease, and shall not disturb such discoveries until directed to proceed by the BLM.

Authorities: Compliance with Section 106 of the National Historic Preservation Act is required for all actions that may affect cultural properties eligible to the National Register of Historic Places. Section 6 of the standard lease terms for geothermal and oil and gas require that operations be conducted in a manner that minimize adverse impacts to cultural and other resources.

Special Leasing Stipulations for the PRMP

The following special stipulations are to be utilized on specifically designated tracts of land.

No Surface Occupancy

Resource: Land Use Authorizations

Stipulation: Surface occupancy and use is prohibited on Recreation and Public Purposes (R&PP) and FLPMA leases.

Objective: To protect uses on existing R&PP and FLPMA leases.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if the land use authorization boundaries are modified.

Waiver: This stipulation may be waived by the Authorized Officer, if all land use authorizations within the leasehold have been terminated, canceled, or relinquished.

No Surface Occupancy

Resource: Recreation Sites

Stipulation: Surface occupancy and use are prohibited within developed recreation areas.

Objective: To protect developed recreation areas.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the recreation area boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains developed recreation areas.

No Surface Occupancy

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Special Areas

Stipulation: Surface occupancy and use are prohibited within Areas of Critical Environmental Concern (ACECs) and Environmental Education Areas (EEAs).

Objective: To protect important historic, cultural, scenic values, natural resources, natural systems or processes, threatened and endangered animal species, and/or natural hazard areas of the ACEC or EEA.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the ACEC or EEA boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains designated ACECs or EEAs.

No Surface Occupancy

Resource: Tyrrell and Dorena Seed Orchards.

Stipulation: Surface occupancy and use are prohibited within the Tyrrell and Dorena Seed Orchards.

Objective: To protect the Tyrrell and Dorena Seed Orchards.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the Tyrrell and Dorena Seed Orchard site boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains a developed seed orchard.

No Surface Occupancy

Resource: Wildlife - Great Blue Heron Rookery

Stipulation: Surface occupancy and use are prohibited within known great blue heron rookeries.

Objective: To protect great blue heron rookeries.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the great blue heron or its habitat. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the great blue heron or its habitat.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting great blue heron rookeries.

No Surface Occupancy

Resource: Wildlife - Osprey Nest Sites

Stipulation: Surface occupancy and use is prohibited within a quarter mile of known osprey nest sites, which have been active within the past seven years.

Objective: To protect osprey nest sites.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the osprey or its nest site. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the osprey or its nest site.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting osprey or osprey nest sites.

No Surface Occupancy

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Riparian Reserves

Stipulation: Surface occupancy and use are prohibited within Riparian Reserves

Objective: To meet the objectives of the Aquatic Conservation Strategy in order to protect the health of aquatic systems and their dependent species, including upland species that benefit from these areas.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be mitigated so that the objectives of the Aquatic Conservation Strategy can be met.

Modification: The boundaries of the stipulated area may be modified if the Riparian Reserve boundaries are modified.

Waiver: This stipulation may be waived if it is determined that the leasehold no longer contains land that meets Riparian Reserve criteria.

Timing Limitation

Resource: Wildlife - Mineral Springs Utilized by the Band-tailed Pigeon

Stipulation: Surface occupancy and use are prohibited between March 1 and August 1, within an area with mineral springs utilized by the band-tailed pigeon.

Objective: To protect lands utilized by the band-tailed pigeon.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the mineral springs or the band-tailed pigeon using those springs. If the Authorized Officer determines that the action may or will have an adverse effect on the species or habitat, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portions of the area can be occupied without adversely affecting the mineral springs or the band-tailed pigeon. The dates for the timing restriction may be modified, if new information indicates that the March 1 to August 1 dates are not valid for the leasehold.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting the mineral springs or the band-tailed pigeon.

Controlled Surface Use

Resource: Soils

Stipulation: Prior to disturbance of any suspected unstable slopes or slopes over 60 percent, an engineering/reclamation plan must be approved by the Authorized Officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated erosion, such as rilling, gullying, piping, and mass wasting.
- Water quality and quantity will be in conformance with State and Federal water quality laws.
- Surface-disturbing activities will not be conducted during extended wet periods.
- Construction will not be allowed when soils are frozen.

Objective: To maintain soil productivity, provide necessary protection to prevent excessive soil erosion on steep slopes, and to avoid areas subject to slope failure, mass wasting, piping, or having excessive reclamation problems.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan, which demonstrates that the impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include suspected unstable slopes or slopes over 60 percent.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold does not include any suspected unstable slopes or slopes over 60 percent.

Controlled Surface Use

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Visual Resource Management (VRM) Class II.

Stipulation: All surface-disturbing activities, semipermanent and permanent facilities in VRM Class II areas may require special design including location, painting, and camouflage to blend with the natural surroundings, and meet the visual quality objectives for the area.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None.

Modification: None.

Waiver: This stipulation may be waived, if the Authorized Officer determines that there are no longer any VRM Class II areas in the leasehold.

Controlled Surface Use

Resource: Special Recreation Management Area (SRMA).

Stipulation: Unless otherwise authorized, drill site construction and access through special recreation management areas within this leasehold will be limited to established roadways.

Objective: To protect recreational qualities of the lands involved and recreational facilities, as well as enhance recreational opportunities within the designated boundary of the SRMA.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized officer, if it is determined that portions of the area do not include Special Recreation Management Areas.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes Special Recreational Management Areas.

Controlled Surface Use

Resource: Suitable or Eligible Recreational Rivers

Stipulation: All surface-disturbing activities, semipermanent and permanent facilities within a quarter mile of suitable or eligible rivers may require special design including location, painting, and camouflage to blend with the natural surroundings, and meet the recreational quality objectives for the area.

Objective: To control the impacts of mineral leasing activities on the recreational values of the river.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates that the impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include suitable or eligible recreational rivers.

Waiver: This stipulation may be waived, if the Authorized Officer determines that there are no longer any suitable or eligible recreational rivers in the leasehold.

Controlled Surface Use

Resource: Late Successional Reserves

Stipulation: Unless otherwise authorized, drill site construction and access through late successional reserves within this leasehold will be limited to established roadways.

Objective: To protect vegetation, to retain and/or restore old growth forest.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include late successional reserves.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes late successional reserves.

Special Status Species Stipulation (to be attached to all leases)

Resources: Botany and Wildlife

Stipulation: Lands within this lease may be within the suitable habitat of the Federal Threatened (FT), Endangered (FE) or Proposed Threatened (PT) & Proposed Endangered (PE) species, either officially listed or proposed for listing as Threatened or Endangered species. These species are listed on Tables 3-30 and 3-31. If it is determined through an

environmental review process, that these species or their habitat exist within the lease then all future post-lease operations will be analyzed and subjected to a U.S. Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) Section 7 consultation or conference to ensure the action is not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of critical habitat.

Lands within this lease may bear some or all of the species listed on Tables 3-30 and 3-31 which have protected status as State Threatened (ST); State Endangered (SE); Federal Candidate (FC); Bureau Sensitive (BS) or are within the suitable habitat of these species. These species are protected by BLM policy as described in Manual 6840. All future post-lease operations must be analyzed, utilizing recent field data collected at the proper time of year, to identify the presence of such species. If the field examination indicates that the proposed activity may adversely impact FC species, technical assistance will be obtained from FWS to insure that actions will not contribute to the need to list a Federal Candidate as a Federal Threatened or endangered species. Technical assistance may be obtained from FWS or NMFS to ensure that actions will not contribute to the need to list a ST, SE, or BS species as a Federal Threatened or endangered species.

Therefore, prior to any surface disturbing activities or even the use of vehicles off existing roads on this lease, BLM approval is required. This restriction also applies to geophysical activities for which a permit is required. The approval is contingent upon the results of site-specific inventories for any of the above mentioned species. The timing of these inventories is critical. They must be conducted at a time of year appropriate to determine the presence of the species or its habitat. The lessee is hereby notified that the process may take longer than the normal 30 days and that surface activity approvals may be delayed.

If no FT, FE, PT, or PE species, or suitable habitat for such species, are found during the inventories, then no formal Section 7 consultation with the FWS or NMFS will be necessary, and the action will be processed using the procedures found in the applicable Oil and Gas Onshore Orders or Geothermal Resources Operational Orders. However, the lessee is hereby notified that, if any FT, FE, PT, PE, ST, SE, FC, or BS species are found during the inventories, or if the actions are proposed in designated or proposed critical habitat, then surface disturbing activities may be prohibited on portions of, or even all of the lease, unless an alternative is available that meets all of the following criteria: (a) The proposed action is not likely to jeopardize the continued existence of a threatened or endangered species; (b) The proposed action is not likely to destroy or adversely modify critical habitat for a threatened or endangered species; (c) The proposed action is consistent with the recovery needs in approved Fish and Wildlife Service or National Marine Fisheries Service recovery plans or BLM Habitat Management Plans for the threatened or endangered species; and (d) the proposed action will not contribute to the need to list species as Federal threatened or endangered.

Objective: To protect officially listed or proposed threatened or endangered plant or wildlife species; and to ensure that post leasing oil and gas or geothermal operations will not likely contribute to the need to list other special status species as threatened or endangered.

Exception: An exception may be granted by the Authorized Officer, if review of the proposed plan submitted by the operator indicates that the proposed action will have no effect on the species.

Modification: The boundaries of the stipulated area may be modified, by the Authorized Officer, if it is determined that portions of the area do not have any officially listed or proposed threatened or endangered species, Federal Candidate, State Threatened or Endangered species, or Bureau Sensitive species, or their habitat.

Waiver: This stipulation may be waived if the species is declared recovered and is no longer protected under the Endangered Species Act, or if other species found within the lease are no longer considered to be in the Federal Candidate, State Threatened or Endangered, or Bureau Sensitive categories.

Leasing Notices For Alternatives NA through E

The following Notices are to be included in each lease for all lands administered by BLM within the planning area where the pertinent resource potential exists. Lease notices are attached to leases in the same manner as stipulations; however, there is an important distinction between lease notices and stipulations. Lease notices do not involve new restrictions or requirements. Any requirements contained in a lease notice must be fully supported in either laws, regulations, policy, onshore oil and gas orders, or geothermal resources operational orders.

Notice

Cultural Resources: An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

1. Contact the Bureau of Land Management (BLM) to determine if a cultural resource inventory is required. If an inventory is required, then

2. The BLM will complete the required inventory; or the lessee or operator, at their option, may engage the services of a cultural resource consultant acceptable to the BLM to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the standard 10-acre minimum to cover possible site relocation, which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the BLM for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

3. Implement mitigation measures required by the BLM. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the BLM, surface occupancy on that area must be prohibited. The lessee or operator shall immediately bring to the attention of the BLM any cultural resources discovered as a result of approved operations under this lease, and shall not disturb such discoveries until directed to proceed by the BLM.

Authorities: Compliance with Section 106 of the National Historic Preservation Act is required for all actions that may affect cultural properties eligible to the National Register of Historic Places. Section 6 of the standard lease terms for geothermal and oil and gas require that operations be conducted in a manner that minimize adverse impacts to cultural and other resources.

Notice

Wildlife - Northern Spotted Owl Nest and Roost Sites and Associated Habitat

The leased lands are in an area suitable for the habitat of the Northern Spotted Owl, (Strix occidentalis caurina), an animal species that is officially listed (Federal) as a Threatened species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then consultation will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The consultation will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973.

Notice

Wildlife - American Peregrine Falcon Nest Sites and Nesting Habitat

The leased lands are in a area suitable for the habitat of the American Peregrine Falcon (Falco peregrinus anatum), an animal species that is officially listed as an Endangered Species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then consultation will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The consultation will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973, Peregrine Falcon Recovery Plan.

Notice

Wildlife - Bald Eagle Nest Sites and Roost Sites and Associated Habitat

The leased lands are in a area suitable for the habitat of the Bald Eagle (Haliaeetus leucocephalus), an animal species that is officially listed (Federal) as a Threatened species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then consultation will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The consultation will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973, Pacific Bald Eagle Recovery Plan.

Notice

Wildlife - Marbled Murrelet Nest Sites and Nesting Habitat

The leased lands are in a area suitable for the habitat of the Marbled Murrelet (Brachyramphus marmoratus), an animal species that is officially listed (Federal) as a Threatened species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then consultation will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The consultation will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973.

Notice

Wildlife - Other Threatened and Endangered Animal Species

The leased lands are in a area suitable for the habitat of the (common name), (scientific name), an animal species that is (officially listed/proposed for listing) as a (Threatened/Endangered) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then (consultation/conferencing) will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The (consultation/conference) will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973.

Notice

Threatened and Endangered Plant Species
The leased lands are in a area suitable for the habitat of the (common name), (scientific name), a plant species that is (officially listed/proposed for listing) as a(n) (Threatened/Endangered) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then (consultation/conferencing) will be conducted with the U.S. Fish & Wildlife Service pursuant to Sec. 7 of the Endangered Species Act of 1973, as amended. The (consultation/conference) will determine whether or not the proposed activity would jeopardize the continued existence of the species and, if so, the extent, if any, the proposed activity will be allowed.

Authority: The Endangered Species Act of 1973.

Notice

Wildlife - Special Status Fish Species on All BLM Administered Lands in Planning Area

The leased lands are in an area suitable for the habitat of the (common name), (scientific name), a fish species that is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicates that the proposed activity may affect the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to

ensure that actions will not increase the need to list the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Additional Leasing Notices Under the No Action Alternative

Notice

Special Status Plant Species on All BLM Administered Lands in Planning Area

The leased lands are in an area suitable for the habitat of (common name), (scientific name) plant species, which is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to ensure that actions will not increase the need to leis the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Notice

Special Status Animal Species on All BLM Administered Lands in Planning Area
The leased lands are in an area suitable for the habitat of (common name), (scientific name) animal species, which is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to ensure that actions will not increase the need to leis the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Additional Leasing Notices Under Alternative B

Notice

Special Status Plant Species on Public Domain Lands

The leased lands are in an area suitable for the habitat of (common name), (scientific name) plant species, which is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to ensure that actions will not increase the need to list the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Notice

Special Status Animal Species on Public Domain Lands

The leased lands are in an area suitable for the habitat of (common name), (scientific name) animal species, which is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to ensure that actions will not increase the need to list the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Additional Leasing Notices Under Alternatives C, D, and E

Notice

Special Status Plant Species on All BLM Administered Lands in Planning Area

The leased lands are in an area suitable for the habitat of (common name), (scientific name) plant

species, which is considered as a (Federal candidate/ Bureau sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to insure that actions will not increase the need to list the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Notice

Special Status Animal Species on All BLM Administered Lands in Planning Area

The leased lands are in an area suitable for the habitat of (common name), (scientific name) animal species, which is considered as a (Federal Candidate/Bureau Sensitive) species.

All viable habitat will be identified for the lessee/ operator by the Authorized Officer of the BLM during the preliminary environmental review of the proposed surface use plan. If the field examination indicated that the proposed activity may adversely impact the species, then BLM policy directs that Technical Assistance be obtained from the U.S. Fish & Wildlife Service to ensure that actions will not increase the need to list the species as threatened or endangered species.

Authority: BLM Manual 6840; I.M. No. OR-91-57

Special Leasing Stipulations

The following special stipulations are to be utilized on specifically designated tracts of land as described under the various alternatives.

Leasing Stipulations for Alternatives NA - E

No Surface Occupancy

Resource: Land Use Authorizations

Stipulation: Surface occupancy and use is prohibited on Recreation and Public Purposes (R&PP) and FLPMA leases.

Objective: To protect uses on existing R&PP and FLPMA leases.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if the land use authorization boundaries are modified.

Waiver: This stipulation may be waived by the Authorized Officer, if all land use authorizations within the leasehold have been terminated, canceled, or relinquished.

No Surface Occupancy

Resource: Recreation Sites

Stipulation: Surface occupancy and use are prohibited within developed recreation areas.

Objective: To protect developed recreation areas.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the recreation area boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains developed recreation areas.

No Surface Occupancy

Resource: Regional Forest Nutritional Research Study Installations

Stipulation: Surface occupancy and use is prohibited within regional forest nutritional research study installations.

Objective: To protect regional forest nutritional research study installations.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator

submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the regional forest nutritional research study installation boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains regional forest nutritional research study installations.

No Surface Occupancy

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Special Areas

Stipulation: Surface occupancy and use are prohibited within Areas of Critical Environmental Concern (ACECs) and Environmental Education Areas (EEAs).

Objective: To protect important historic, cultural, scenic values, natural resources, natural systems or processes, threatened and endangered animal species, and/or natural hazard areas of the ACEC or EEA.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the ACEC or EEA boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains designated ACECs or EEAs.

No Surface Occupancy

Resource: Progeny Test Sites

Stipulation: Surface occupancy and use are prohibited within progeny test sites.

Objective: To protect progeny test sites.

Exception: None.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the progeny test site boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains progeny test sites.

No Surface Occupancy

Resource: Tyrrell and Dorena Seed Orchards.

Stipulation: Surface occupancy and use are prohibited within the Tyrrell and Dorena Seed Orchards.

Objective: To protect the Tyrrell and Dorena Seed Orchards.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the Tyrrell and Dorena Seed Orchard site boundaries are changed.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold no longer contains a developed seed orchard.

No Surface Occupancy

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Visual Resource Management (VRM) Class I

Stipulation: Surface occupancy and use are prohibited in VRM Class I areas.

Objective: To preserve the existing character of the landscape.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified by the Authorized Officer, if the boundaries of the VRM Class I area are changed.

Waiver: This stipulation may be waived by the Authorized Officer, if all VRM Class I areas within the leasehold are reduced to a lower VRM class. Areas reduced to VRM Class II will be subject to the Controlled Surface Use stipulation for visual resources, and areas reduced to VRM Class III will be subject to standard lease terms.

No Surface Occupancy

Resource: Wildlife - Bald Eagle Nest and Roost Sites and Associated Habitat

Stipulation: Surface occupancy and use are prohibited within a quarter mile of known bald eagle nest and roost sites, which have been active within the past seven years and within associated habitat.

Objective: To protect bald eagle nesting and roost sites and/or associated habitat in accordance with the Endangered Species Act (ESA), and the Pacific Bald Eagle Recovery Plan.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the bald eagle or its habitat. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the U.S. Fish and Wildlife Service (USFWS).

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer, in consultation with USFWS, determines that portions of the area can be occupied without adversely affecting bald eagle nest and roost sites or associated habitat.

Waiver: This stipulation may be waived if the Authorized Officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest or roost sites, associated habitat, or if the bald eagle is declared recovered and is no longer protected under the ESA.

No Surface Occupancy

Resource: Wildlife - Marbled Murrelet Nest Sites
Stipulation: Surface occupancy and use are prohibited within a quarter mile of known marbled murrelet nest sites, which have been active within the past seven years.

Objective: To protect marbled murrelet nesting sites.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the marbled murrelet or its nest site. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified if the Authorized Officer, in consultation with USFWS, determines that portions of the area can be occupied without adversely affecting marbled murrelet nest sites.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting marbled murrelet nest sites.

Controlled Surface Use

Resource: Soils

Stipulation: Prior to disturbance of any suspected unstable slopes or slopes over 60 percent, an engineering/reclamation plan must be approved by the Authorized Officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated erosion, such as rilling, gullying, piping, and mass wasting.
- Water quality and quantity will be in conformance with state and federal water quality laws.
- Surface-disturbing activities will not be conducted during extended wet periods.
- Construction will not be allowed when soils are frozen.

Objective: To maintain soil productivity, provide necessary protection to prevent excessive soil erosion on steep slopes, and to avoid areas subject to slope failure, mass wasting, piping, or having excessive reclamation problems.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator

submits a plan that demonstrates that the impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include suspected unstable slopes or slopes over 60 percent.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold does not include any suspected unstable slopes or slopes over 60 percent.

Controlled Surface Use

A 30-day public notice period will be required prior to modification or waiver of this stipulation.

Resource: Visual Resource Management (VRM) Class II.

Stipulation: All surface-disturbing activities, semipermanent and permanent facilities in VRM Class II areas may require special design including location, painting and camouflage to blend with the natural surroundings, and meet the visual quality objectives for the area.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None.

Modification: None.

Waiver: This stipulation may be waived, if the Authorized Officer determines that there are no longer any VRM Class II areas in the leasehold.

Additional Leasing Stipulations for the No Action Alternative

No Surface Occupancy

Resource: Wildlife - Great Blue Heron Rookery

Stipulation: Surface occupancy and use are prohibited within known great blue heron rookeries.

Objective: To protect great blue heron rookeries.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the great blue heron or its habitat. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the great blue heron or its habitat.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting great blue heron rookeries.

No Surface Occupancy

Resource: Wildlife - Osprey Nest Sites

Stipulation: Surface occupancy and use is prohibited within a quarter mile of known osprey nest sites, which have been active within the past seven years.

Objective: To protect osprey nest sites.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the osprey or its nest site. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the osprey or its nest site.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting osprey or osprey nest sites.

Timing Limitation

Resource: Wildlife - Elk Concentration Area

Stipulation: Surface occupancy and use are prohibited between March 1 and June 30, within designated elk concentration areas.

Objective: To protect designated elk concentration areas.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the elk concentration areas. If the Authorized Officer determines that the action may or will have an adverse effect on the species or habitat, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portions of the area can be occupied without adversely affecting the elk or the elk concentration area. The dates for the timing restriction may be modified if new information indicates that the March 1 to June 30 dates are not valid for the leasehold.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting the elk concentration area.

Timing Limitation

Resource: Wildlife - Mineral Springs Utilized by the Band-tailed Pigeon

Stipulation: Surface occupancy and use are prohibited between March 1 and August 1, within an area with mineral springs utilized by the band-tailed pigeon.

Objective: To protect lands utilized by the band-tailed pigeon.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the mineral springs or the band-tailed pigeon using those springs. If the Authorized Officer determines that the action may or will have an adverse effect on the species or habitat, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portions of the area can be occupied without adversely affecting the mineral springs or the band-tailed pigeon. The dates for the timing restriction may be modified, if new information indicates that the March 1 to August 1 dates are not valid for the leasehold.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting the mineral springs or the band-tailed pigeon.

Controlled Surface Use

Resource: Special Recreation Management Area (SRMA).

Stipulation: Unless otherwise authorized, drill site construction and access through special recreation management areas within this leasehold will be limited to established roadways.

Objective: To protect recreational qualities of the lands involved and recreational facilities, as well as enhance recreational opportunities within the designated boundary of the SRMA.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized officer, if it is determined that portions of the area do not include Special Recreation Management Areas.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes Special Recreational Management Areas.

Additional Leasing Stipulation for Alternative A

Controlled Surface Use

Resource: Riparian Management Areas.

Stipulation: Unless otherwise authorized, drill site construction and access through riparian management areas within this leasehold will be limited to established roadways.

Objective: To protect riparian vegetation and reduce sedimentation.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include riparian areas, flood plains, or water bodies.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes riparian management areas.

Additional Leasing Stipulations for Alternative B

Controlled Surface Use

Resource: Designated Mature and Old Growth Forest Blocks

Stipulation: Unless otherwise authorized, drill site construction and access through designated mature and old growth forest blocks within this leasehold will be limited to established roadways.

Objective: To protect vegetation to retain and/or restore older forests for seral stage diversity.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include designated mature and old growth forest blocks.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes designated mature and old growth forest blocks.

Controlled Surface Use

Resource: Riparian Management Areas.

Stipulation: Unless otherwise authorized, drill site construction and access through riparian management areas within this leasehold will be limited to established roadways.

Objective: To protect riparian vegetation and reduce sedimentation.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include riparian areas, flood plains, or water bodies.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes riparian management areas.

Additional Leasing Stipulations for Alternatives C, D and E

No Surface Occupancy

Resource: Wildlife - Great Blue Heron Rookery

Stipulation: Surface occupancy and use is prohibited within known great blue heron rookeries.

Objective: To protect great blue heron rookeries.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the great blue heron or its habitat. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the great blue heron or its habitat.
Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting great blue heron rookeries.

No Surface Occupancy

Resource: Wildlife - Osprey Nest Sites

Stipulation: Surface occupancy and use is prohibited within a quarter mile of known osprey nest sites, which have been active within the past seven years.

Objective: To protect osprey nest sites.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the osprey or its nest site. If the Authorized Officer determines that the action may or will have an adverse effect on the species, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portion of the area can be occupied without adversely affecting the osprey or its nest site.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting osprey or osprey nest sites.

Timing Limitation

Resource: Wildlife - Mineral Springs Utilized by the Band-tailed Pigeon

Stipulation: Surface occupancy and use are prohibited between March 1 and August 1, within an area with mineral springs utilized by the band-tailed pigeon.

Objective: To protect lands utilized by the band-tailed pigeon.

Exception: An exception may be granted by the Authorized Officer, if the operator submits a plan that demonstrates the proposed action will not affect the mineral springs or the band-tailed pigeon using those springs. If the Authorized Officer determines that the action may or will have an adverse effect on the species or habitat, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM.

Modification: The boundaries of the stipulated area may be modified, if the Authorized Officer determines that portions of the area can be occupied without adversely affecting the mineral springs or the band-tailed pigeon. The dates for the timing restriction may be modified, if new information indicates that the March 1 to August 1 dates are not valid for the leasehold.

Waiver: This stipulation may be waived, if the Authorized Officer determines that the entire leasehold can be occupied without adversely affecting the mineral springs or the band-tailed pigeon.

Controlled Surface Use

Resource: Riparian Management Areas.

Stipulation: Unless otherwise authorized, drill site construction and access through riparian management areas within this leasehold will be limited to established roadways.

Objective: To protect riparian vegetation and reduce sedimentation.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include riparian areas, flood plains, or water bodies.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes riparian management areas.

Controlled Surface Use

Resource: Special Recreation Management Area (SRMA).

Stipulation: Unless otherwise authorized, drill site construction and access through special recreation management areas within this leasehold will be limited to established roadways.

Objective: To protect recreational qualities of the lands involved and recreational facilities, as well as enhance recreational opportunities within the designated boundary of the SRMA.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized officer, if it is determined that portions of the area do not include Special Recreation Management Areas.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire

leasehold no longer includes Special Recreational Management Areas.

Additional Leasing Stipulation for Alternative C

Controlled Surface Use

Resource: Old Growth Restoration and Retention Blocks

Stipulation: Unless otherwise authorized, drill site construction and access through old growth restoration and retention blocks within this leasehold will be limited to established roadways.

Objective: To protect vegetation, to retain and/or restore old growth forest.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include old growth restoration and retention blocks.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes old growth restoration and retention blocks.

Additional Leasing Stipulation for Alternative D

Controlled Surface Use

Resource: Habitat Conservation Areas for the Northern Spotted Owl.

Stipulation: Unless otherwise authorized, drill site construction and access through habitat conservation areas within this leasehold will be limited to established roadways.

Objective: To protect habitat of the northern spotted owl.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan which demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do not include habitat conservation areas.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes habitat conservation areas, after consultation with the U.S. Fish and Wildlife Service.

Additional Leasing Stipulation for Alternative E

Controlled Surface Use

Resource: Forest stands older than 150 years.

Stipulation: Unless otherwise authorized, drill site construction and access through forest stands older than 150 years within this leasehold will be limited to established roadways.

Objective: To protect older forest stands.

Exception: An exception to this stipulation may be granted by the Authorized Officer, if the operator submits a plan that demonstrates impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the Authorized Officer, if it is determined that portions of the area do no include old forest stands.

Waiver: This stipulation may be waived by the Authorized Officer, if it is determined that the entire leasehold no longer includes old forest stands.

Appendix HH
Locatable Minerals Surface Management Standards for Exploration, Mining, and Reclamation on the Eugene District

The following operational guidelines for mining activities have been compiled to facilitate compliance with the 43 CFR 3809 surface management regulations, which apply to all mining operations on BLM administered lands in the Eugene District. All of the following standards may not apply to every mining operation. The BLM will provide site specific standards for some mining proposals. It is the mining claimant's and/or operator's responsibility to avoid "unnecessary or undue degradation," and to promptly perform all necessary reclamation work. Refer to the regulations at 43 CFR 3809 for general requirements. BLM's Solid Mineral Reclamation Handbook (H-3042-1) provides guidance for the reclamation of mining and exploration sites that will be followed on the Eugene District.

There is an intergovernmental agreement between BLM and the Oregon Department of Geology and Mineral Industries designed to avoid duplication of regulations, inspections, and approval of reclamation plans as well as minimize repetitive costs to mining operators. The following guidelines include some but not all of the requirements of the various State agencies overseeing mining operations. BLM does not enforce State requirements and they are included here as information. State requirements could change during the plan period.

Prospecting, Exploration, and Mining

BLM Requirements - Operations ordinarily resulting in only negligible disturbance as defined in 43 CFR 3809.0-5(b) are considered to be "casual use" and no notification to or approval by the BLM is required. Casual use activities include staking mining claims, prospecting or sampling or mining with hand tools, gold panning, and use of suction dredges with a suction hose equal to or less than 4 inches in diameter where no structures or occupancy beyond 14 calendar days per year is involved.

At the existing Sharps Creek Recreation Site, which is withdrawn from mining claim location, the use of hand tools (including shovels, gold pans, and sluice boxes), and suction dredges with a suction hose equal to or less than 4 inches in diameter, is allowed with the required permits in compliance with Department of Environmental Quality (DEQ) requirements. Suction dredges with suction hoses having an inside diameter greater than 4 inches are not allowed at this recreation site. Additional information on recreational mining at this site is available from the reception desk at the BLM District Office.

All operators proposing occupancy for more than 14 calendar days per year, timber removal, road or trail construction, installation of structures of any kind, suction dredges with suction hoses having an inside diameter of greater than 4 inches, multiple suction dredges regardless of size, or the use of other mechanized earth moving equipment which would cause a surface disturbance of 5 acres or less during any calendar year, must provide written notice to the District Office at least 15 days prior to the commencement of any surface mining disturbance. For operations that will cause greater than 5 acres of cumulative surface disturbance, the operator is required to submit a Plan of Operations pursuant to the regulations in 43 CFR 3809.1-4. A Plan of Operations will be required to use motorized vehicles in areas designated as closed to off-highway vehicles. Notices properly filed under the regulations in 43 CFR Subpart 3809 constitute authorization to operate vehicles in areas not designated as closed to off-highway vehicle use. Generally, the need for a Notice or Plan of Operations is determined on a case by case basis.

State of Oregon Requirements - Out-of-stream mining, which disposes of all waste water by evaporation and/or seepage with no readily-traceable discharge to ground water or

surface water, and involves processing of up to 10,000 cubic yards of material per year, must be authorized under General Permit #0600 issued by the Department of Environmental Quality (DEQ).

In-stream use of suction dredges must be authorized by Permit #0700-J issued by the DEQ. This permit is issued free of charge for dredges having hoses with an inside diameter of 4 inches or less. Registration and a filing fee of $50.00 is required for suction dredges having hoses with an inside diameter greater than 4 inches. Suction dredge operators should contact the Department of Environmental Quality, 750 Front St. N.E., Suite 120, Salem, Oregon 97310, phone: 378-8240 ext. 238, for further information.

Suction dredging outside the "permitted work period" established for certain waterways by the Oregon Department of Fish and Wildlife (ODFW) will require written permission by an appropriate ODFW District Biologist.

The river beds of navigable waterways are controlled by the Oregon Division of State Lands. Removal or alteration of over 50 cubic yards of material in any waters of the State requires a Removal-Fill permit from the Division of State Lands. This permit is required for any relocation of flowing streams in conjunction with mining.

Any person engaging in onshore mineral exploration, which disturbs more than one surface acre or involves drilling to greater than 50 feet, must obtain an exploration permit from the Oregon Department of Geology and Mineral Industries (DOGAMI). Mining operations involving 5,000 or more cubic yards of material per year or disturbance of one or more acres of land will require an operating permit from DOGAMI.

Timber Removal - The operator may cut and use timber that is in the way of mining activities. An application must be submitted to the Authorized Officer pursuant to 43 CFR 3821.4 describing the proposed use of merchantable timber from O&C lands for mining purposes. No merchantable trees may be cut until the application is approved and the trees are marked.

The Eugene BLM office recommends that small trees less than 7 inches in diameter at breast height (dbh) and shrubs be lopped and scattered, or shredded for use as mulch. Trees greater than or equal to 7 inches (dbh) are to be bucked and stacked in an accessible location unless they are needed for the mining operation.

Firewood - Merchantable conifer timber may not be used for firewood. Firewood permits may be issued to the operator for use in conjunction with the mining operation, but no wood may be used until a permit is obtained from BLM. Permits will be limited to hardwoods or salvage timber that is not considered merchantable. Firewood authorized for use in conjunction with a mining operation **is not to be removed from the mining claim**.

Topsoil - Topsoil and usable subsoil (usually the top 12 to 18 inches) should be carefully removed from all areas in advance of excavation or establishment of mine waste dumps and tailings dams. This material should be stockpiled and protected from erosion for use in future reclamation.

Roads - Existing roads and trails should be used as much as possible. Temporary roads are to be constructed to a minimum width and with minimum cuts and fills. All roads shall be constructed so as not to negatively impact slope stability. Roads will be promptly reclaimed when no longer needed.

Wetlands - When proposed mining activities will fill or alter wetland areas, the operator must contact the Department of the Army, Corps of Engineers, for the appropriate permit. A copy of the permit must be submitted to the Authorized Officer in conjunction with a Notice or Plan of Operations.

Water Quality - All operators shall comply with Federal and State water quality standards including the Federal Water Pollution Control Act. When mining will be in or near bodies of water, or sediment will be discharged, the State Department of Environmental Quality should be consulted. A discharge permit is required when mining operations discharge turbid water. In some cases, a settling pond may be necessary. It is the operator's responsibility to obtain any needed suction dredging, stream bed alteration, or water discharge permits required by the State DEQ or other State agencies. Copies of such permits shall be provided to the BLM Authorized Officer when a Notice or Plan of Operations is filed. All operations, including casual use, shall be conducted in a manner so as to prevent unnecessary or undue degradation of surface and subsurface water resources and shall comply with all pertinent Federal and State water quality laws.

Claim Monuments - State law prohibited the use of plastic pipe for lode claim staking in Oregon after House Bill 2077 was implemented on March 28, 1991. BLM policy requires that existing plastic pipe monuments should have all openings (ends and slots) permanently closed. Upon loss or abandonment of the claim, all plastic pipe must be removed from the public lands. When old markers are replaced during normal claim maintenance, they are to be either wood posts or stone and/or earth mounds, constructed in accordance with State law.

Drill Sites - Whenever possible, exploratory drill sites should be located next to or on existing roads without blocking public access. When drill sites must be constructed, the size of the disturbance shall be as small as possible. Any operator engaging in mineral exploration that involves drilling to greater than 50 feet must obtain an exploration permit from the Oregon Department of Geology and Mineral Industries (ORS 517.962).

Dust and Erosion Control - While in operation, and during periods of shut-down, exposed ground surfaces susceptible to erosion will need to be protected. This can be accomplished with seeding, mulching, installation of water diversions, and routine watering of dust producing surfaces.

Fire Safety - All State fire regulations must be followed, including obtaining a campfire permit or blasting permit, if needed. All internal gas combustion engines must be equipped with approved spark arresters and exhaust systems.

Safety and Public Access - Under Public Law 167, the Government has the right to dispose and manage surface resources (including timber) on mining claims located after July 23, 1955. These rights are limited to the extent that they do not endanger or materially interfere with any phase of an ongoing mining operation or uses reasonably incident thereto. Claims located prior to July 23, 1955 may have surface rights, if such claims were verified as being valid under Sections 5 and 6 of the Act.

Mining claimants shall not exclude the public from mining claims with force, intimidation, or no trespassing signs. It is the operator's responsibility to protect the public from mining hazards. The general public can be restricted only from specific dangerous areas (e.g., underground mines, open pits, or equipment storage sites) by erecting fences, gates and warning signs. Gates or road blocks may be installed on existing or proposed roads only with BLM approval. Gates restricting public access onto a mine site will only be considered in cases where there is a large area safety hazard created by the mining activity. The determination as to whether a safety hazard is large enough to warrant a gate will be determined on a case-by-case basis. Fences (rather than gates) or other approved barriers shall be utilized to protect the public from hazards related to small excavations, tunnels, and shafts.

Some roads that cross private land to reach BLM administered lands are controlled by private parties. Some of these roads have been assigned BLM road numbers, which can give the impression that they are BLM roads. These roads may grant administrative use to the BLM and its licensees and permittees under a nonexclusive easement. Mining claimants are not considered licensees or permittees and, therefore, they must make their own arrangements with the private party in order to use such a road. No automatic right is granted under any of the mining laws to use a road involved in a nonexclusive easement.

Sewage - Self-contained or chemical toilets are to be used at exploration or mining operations and their contents disposed of at approved dump stations. Outhouses and uncontained pit toilets are considered unnecessary and undue degradation and are not allowed. County sanitation permits are required for all other types of proposed sanitation facilities.

Structures - It is District policy that permanent structures will not be allowed for exploration or prospecting operations. Permanent structures are those fixed to the ground by any of the various types of foundations, slabs, piers, poles, or other means allowed by State or County building codes. The term shall also include structures placed on the ground that lack foundations, slabs, piers or poles, and that can only be moved through disassembly into component parts or by techniques commonly used in house moving. Permanent structures include trailers, mobile homes, motor homes, campers, house-cars, and the like when fixed to the ground by any method.

Any temporary structures placed on public lands in conjunction with prospecting or exploration are allowed only for the duration of such activities, unless expressly allowed in writing by the Authorized Officer to remain on the public lands. Temporary structures are defined as structures not fixed to the ground by a foundation or piers (cinder blocks or posts) and that can be moved without disassembly into its component parts. Vans, pickup campers, motor homes, and trailers that have not been piered are considered to be temporary structures.

Permanent structures (as described above) may be allowed for mining operations if they are deemed reasonably incident to conducting the operation. Mining operations are defined as all functions, work, facilities, and activities in connection with development, mining, or processing mineral deposits.

All permanent or temporary structures placed on public lands shall conform with the appropriate State or local building, fire, and electrical codes, and occupational safety and health and mine safety standards. This requirement for existing or future structures on BLM lands in Oregon was published in the Federal Register on July 1, 1992. BLM may require operators to remove such structures if a period of non-operation exceeds 24 consecutive months, and reclamation of the building site(s) must be conducted at that time.

Equipment - Only equipment and supplies that are appropriate, reasonable, and in regular use for exploration and mining operations will be allowed on the mining claim. Equipment used only infrequently (including parts and scrap metal) should be stored off site. That which can be readily removed in a small truck and/or trailer at the end of the work day should not be left on site. Storage of unused or infrequently used equipment will not serve to justify occupancy of a mining claim. Accumulation of unused and/or derelict equipment and other unused materials, including trash, may be in violation of Federal and State ordinances regarding offensive littering, and will be considered undue and unnecessary degradation of the public lands. BLM may require the operator to remove equipment after an extended period (defined as 24 consecutive months) of non-operation and to reclaim the site. In such cases, the claimant will be required to take immediate mitigative action.

Animals - If dogs or cats are to be present at the work site, the operator is required to keep them under control at all times so that they do not chase wildlife, or threaten other people, including government employees conducting site inspections on the public lands. Unless otherwise permitted, animals such as cows, chickens, goats, pigs or horses are not considered necessary to conduct mining operations and are not allowed on mining claims.

Tailings Ponds - Settling ponds must be used to contain sediment, and any discharge must meet the standards of the Oregon Department of Environmental Quality.

Solid and Hazardous Waste - Trash, garbage, used oil, etc. must be removed from public land and disposed of properly. Trash, garbage or hazardous wastes must not be buried on public lands. Accumulations of trash, debris, or inoperable equipment on public lands is viewed as unnecessary degradation and will not be tolerated. Operators conducting illegal disposals shall be held financially responsible for the clean-up of such disposals.

Cultural and Paleontological Resources - Operators shall not knowingly alter, injure, or destroy any scientifically important paleontological (fossil) remains or any historical or archaeological site, structure, or object on Federal lands. The operator shall immediately bring to the attention of the BLM, any paleontological (fossil) remains or any historical or archaeological site, structure, or object that might be altered or destroyed by exploration or mining operations, and shall leave such discovery intact until told to proceed by the Authorized Officer. The Authorized Officer shall evaluate the discovery, take action to protect or remove the resource, and allow operations to proceed within 10 working days.

Threatened and Endangered Species of Plants and Animals - Operators shall take such action as may be needed to prevent adverse impacts to threatened or endangered species of plants and animals and their habitat that may be affected by operations, as stipulated in guidelines developed through consultation with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. Under Notice-level operations, if the review of the notice by BLM reveals that a potential conflict with a threatened or endangered species exists, the operator will be advised not to proceed and informed that a knowing violation of the taking provision of the Endangered Species Act (for wildlife or fish) will result in a notice of noncompliance and may result in criminal penalties. Although the takings provision of the Act does not extend to plants, willful acts of vandalism to endangered plants is illegal. If the operator wishes to develop measures that will eliminate the conflict, then the Authorized Officer will arrange for the participation of BLM resource specialists and the U.S. Fish and Wildlife Service or the National Marine Fisheries Service in reviewing the proposed revision to the Notice.

If processing a proposed Plan of Operations indicates that a potential conflict exists with a threatened or endangered species or its habitat, the Authorized Officer shall notify the operator that the plan cannot be approved until BLM has complied with Section 7 of the Endangered Species Act. Special status species (Federal Candidate/Bureau Sensitive) plants and animals, and their habitat will be identified by the Authorized Officer, and shall be avoided wherever possible.

Occupancy at Mining Sites

Living on public land in excess of 14 days per calendar year must be reasonably incident to and required for actual continuous mining or diligent exploration operations and will require either a Notice or Plan of Operations. In general, operations at the casual use level are not sufficient to warrant occupancy on a mining claim. The following discussion of occupancy only applies to those operators wishing to assert their right to live full-time on public lands pursuant to privileges granted under the mining laws. It does not apply to operators proposing to camp at prospecting or mining sites on weekends or one to two days during the week.

> Any claimant and/or operator who will occupy a claim will identify in the Notice or Plan of Operations, immediate family members (spouse, minor children/stepchildren) who will be living on the mining claim. The claimant and/or operator will be required to be engaged in a good faith, diligent effort in prospecting, exploration, mining, or processing operations to warrant occupancy. The immediate family members, as defined above, will be allowed to occupy the site without engaging in the mining-related work which is being conducted by the claimant or operator.
>
> The claimant and/or operator will be required to notify the District Office in writing if any additional individuals not identified in the original Notice or Plan of Operations propose to stay on the claim longer than 14 calendar days. Based on a case-by-case review, occupancy by such individuals will be allowed if it is reasonably incident to conducting diligent mining-related activities. In such instances, the Notice or Plan of Operations would be amended to note additional workers allowed to live on the site.

Security Guard - In some cases, it may be reasonably incident for a security guard to live on-site in order to protect valuable property, equipment, and/or safeguard the public from workings that are necessary for the mining operation. The need for a security guard shall be such that the person with those duties is required to be present at the site whenever the operation is shut down temporarily or at the end of the workday, or whenever the mining claimant, operator, or workers are not present on the site. The proposed occupancy by a security guard must be described in the Notice or Plan of Operations. If a guard animal is kept at the site, it must be kept under control at all times, or could be considered a public safety hazard.

Reclamation

Reclamation of all disturbed areas must be performed concurrently or as soon as possible after exploration or mining permanently ceases and shall conform to guidelines described in BLM Handbook H-3042-1. Reclamation shall include, but shall not be limited to 1) saving topsoil for final application after reshaping disturbed areas; 2) measures to control erosion, landslides, and water runoff; 3) measures to isolate, remove or control toxic materials; 4) reshaping the area disturbed, applying topsoil, and revegetating disturbed areas where reasonably practicable; and 5) rehabilitation of fisheries and wildlife habitat. When reclamation of the disturbed area has been completed, except to the extent necessary to preserve evidence of mineralization, the BLM must be notified so that an inspection of the area can be made.

Equipment and Debris - All mining equipment, vehicles, and structures must be removed from the public lands during periods of nonoperation in excess of 24 consecutive months and/or at the conclusion of mining, unless authorization from BLM is given to the operator or claimant in writing. Accumulations of debris and trash on mining claims is considered unnecessary and undue degradation and must be removed immediately regardless of the status of the operation. Failure to do so will result in the issuance of a notice of noncompliance.

Backfilling and Recontouring - The first steps in reclaiming a disturbed site are backfilling excavations and reducing high walls, if feasible. Coarse rock material should be replaced first, followed by medium sized material, with fine materials to be placed on top. Recontouring means shaping the disturbed area so that it will blend in with the surrounding lands, minimize the possibility of erosion, and facilitate revegetation.

Seedbed Preparation - Recontouring should include preparation of an adequate seedbed. This is accomplished by ripping or disking compacted soils to a depth of at least 6 inches in rocky areas and at least 18 inches in less rocky areas. This should be done following the contour of the land to limit erosion. All stockpiled settling pond fines, and then topsoil, shall be spread evenly over the disturbed areas.

Fertilizer - Due to the generally poor nutrient value of mined soils, it may be necessary to use fertilizer to

ensure maximum yield from the seeding mixture. For example, a fertilizer with analysis of (16-16-16, or other approved mix) should be spread at the rate of 200 lbs/acre, but not allowed to enter streams or bodies of water.

Seeding - BLM approved seeding prescription must be used to provide adequate revegetation for erosion control, restoration of wildlife habitat, and achieve productive secondary uses of public lands. Seeding should be done in September or October in the Eugene District to ensure that seed is in the ground prior to the first significant winter rains. If seeding fails, or is done at the wrong time, the operator may be asked to reseed the area at the appropriate time, as determined by the Authorized Officer.

Broadcast seeding is preferable on smaller sites. When using a whirlybird type seed spreader, it is important to keep the different seeds well mixed to achieve even seed distribution. For the best results, a drag harrow should be pulled over the seeded area to cover the seed before mulching. The Authorized Officer may recommend hydroseeding on critical sites for rapid coverage and erosion control on cut banks, fill slopes, and any other disturbed areas.

Tree Replacement - Replacement of destroyed trees may be necessary with the planting of seedlings or container stock.

Mulch - As directed by the BLM, during review of the Notice or Plan of Operations, the disturbed area may require mulching during interim or final reclamation procedures. Depending on site conditions, the mulch may need to be punched, netted, or blown on with a tackifier to hold it in place. In some cases, erosion control blankets may be cost effective for use.

Roads - After mining is completed, all new roads shall be reclaimed, unless otherwise specified by the BLM. High walls and cutbanks are to be knocked down or backfilled to blend with the surrounding landscape. Remove all culverts from drainage crossings and cut back the fill to the original channel. The roadbed should be ripped to a minimum depth of 18 inches to reduce compaction and provide a good seedbed. The road must then be fertilized, seeded and mulched if necessary. When necessary, water bars are to be used to block access and provide drainage.

Tailings Ponds - The ponds should be allowed to dry out and the sediments removed and spread with the topsoil, unless the sediments contain toxic materials. If the ponds contain toxic materials, a plan will be developed to identify, dispose, and mitigate effects of the toxic materials. If necessary, a monitoring plan will also be implemented. The ponds should then be backfilled and reclaimed.

Visual Resources - To the extent practicable, the reclaimed landscape should have characteristics that approximate or are compatible with the visual quality of the original area.

Appendix II
Ten-Year Mineral Development Scenarios

Introduction

This appendix describes the Reasonably Foreseeable Development (RFD) scenarios for development of leasable, locatable, and salable mineral commodities. The purpose of the RFD scenario is to provide models that anticipate the level and type of future mineral activity in the planning area, and these scenarios would serve as a basis for cumulative impact analysis. The RFD first describes the steps involved in developing a mineral deposit, with presentation of hypothetical exploration and mining operations. The current activity levels are discussed in Chapter 3 of this document. Future trends and assumptions affecting mineral activity are discussed here, followed by the prediction of the surface impacts of the anticipated mineral exploration and development.

Scope

The development scenario is limited in scope to BLM administered lands in the planning area. The RFD is based on the known or inferred mineral resource capabilities of the lands involved and applies the conditions and assumptions discussed under Future Trends and Assumptions. Changes in available geologic data and/or economic conditions would alter the RFD, and some deviation is to be expected over time.

Leasable Minerals

Reasonably Foreseeable Development (RFD) of Oil and Gas Resources (Common to All Alternatives)

Future Trends and Assumptions

Based on the history of past drilling and foreseeable development potential in the operating area, activity over the next decade would continue to be sporadic. It is not anticipated that there would be a discovery of economically feasible oil and gas fields in the Eugene District during the plan period. However, to comply with the Supplemental Program Guidance for Fluid Minerals (Manual Section 1624.2), the potential surface impacts associated with the discovery and development of a small gas field are outlined below. It is anticipated that oil and gas activity would consist of the issuance of competitive and over-the-counter leases, a few geophysical surveys, and perhaps the drilling of three exploratory wells.

The supply of natural gas in the Pacific Northwest has been plentiful and is forecasted to remain that way in the future. The price of natural gas has gone down recently, and it is predicted that future prices may stay at or close to the current price. Recent economic conditions within the oil industry resulted in a decline in the number of active exploratory wells being drilled in other parts of the nation. Continued low prices and depressed economic conditions would result in a nationwide decrease in domestic exploration and development. A turn-around in the oil industry or an increase in the price of oil and gas purchased from other countries would spur an increase in demand for domestic production, increasing the number of wells drilled.

Exploration and Development of Oil and Gas Resources

Geophysical Exploration

Geophysical exploration is conducted to determine the subsurface structure of an area. Three geophysical survey techniques are generally used to define subsurface characteristics through measurements of the gravitational field, magnetic field, and seismic reflections. A Notice of Intent authorizes geophysical exploration when there is no mineral lease on the tract.

Gravity and magnetic field surveys involve small portable measuring units that are easily transported via light Off- Highway Vehicles (OHV), such as 4-wheel drive vehicles, or aircraft. Both off-road and on-road travel may be necessary in these 2 types of surveys. Usually a 3-man crew transported by 1 or 2 vehicles is required. Sometimes small holes (approximately 1 inch x 2 inches x 2 inches) are hand dug for instrument placement at the survey

measurement points. These 2 survey methods can make measurements along defined lines, but it is more common to have a grid of discrete measurement stations.

Seismic reflection surveys are the most common of the geophysical methods and produce the most detailed subsurface information. Seismic surveys are conducted by sending shock waves through the earth's surface by generating a small explosion or through mechanically beating the ground surface with a thumping or vibrating platform. Usually 4 large trucks use the thumper and vibrator methods, each equipped with pads about 4-foot square. The pads are lowered to the ground, and the vibrators are electronically triggered from the recording truck. Once information is recorded, the trucks move forward a short distance and the process is repeated. Less than 50 square feet of surface area is required to operate the equipment at each recording site.

The small explosive method requires that charges be detonated on the surface or in a drill hole. Holes for the charges are drilled using truck-mounted or portable drills to drill small-diameter (2 to 6 inches) holes to depths of 100 to 200 feet. Generally 4 to 12 holes are drilled per mile of line and a 5 to 50-pound charge of explosives is placed in the hole, covered, and detonated. The reflected shock wave is recorded by geophones placed in a linear fashion on the surface. In rugged terrain, a portable drill carried by helicopter can sometimes be used. A typical drilling seismic operation may use 10 to 15 men operating 5 to 7 trucks. Under normal conditions, 3 to 5 miles of line can be surveyed daily using this method. The vehicles used for a drilling program may include heavy truck-mounted drill rigs, track-mounted air rigs, water trucks, a computer recording truck, and several light pickups for the surveyors, shot hole crew, geophone crew, permit expert, and party chief. The surface charge method uses 1 to 5 pound charges attached to wooden laths 3 to 8 feet above the ground. Placing the charges lower than 6 feet usually results in the destruction of vegetation, while placing the charges higher, or on the surface of deep snow, results in little visible surface disturbance.

Public and private roads and trails are used wherever possible. However, off-road cross-country travel is also necessary in some cases. Graders and bulldozers may be required to provide access to remote areas. Several trips a day are made along a seismograph line, usually resulting in a well defined two-track trail. Drilling water, when needed, is usually obtained from private landowners.

It is anticipated that one Notice of Intent, involving seismic reflection surveys, would be filed during the life of this plan.

Surface Impacts of Geophysical Exploration: It is anticipated that the foreseeable geophysical explorations for oil and gas on the Eugene District would consist of seismic reflection surveys, using approximately 10 miles of existing roads. Surface impacts would involve temporary blockage of the roads by the 4 large trucks for the vibrating platforms, but no damage to the roads is expected using this type of equipment.

The small explosive method is also anticipated to be used on an additional 10 miles of line. Surface disturbance for this type of geophysical exploration is expected to consist of drilling 4 holes per mile of line, totalling 40 drill holes. Each drill hole would impact about 200 square feet, but 36 of these holes would be drilled on existing landings, spur roads, or timber haul roads. Therefore, 7,200 square feet (approx. 0.2 acre) of existing road surface would temporarily be impacted by drilling activities and low power blasting. Blasting would not be powerful enough to impact any surface resources or improvements. It is anticipated that 4 drill holes would be made on areas currently undeveloped. The drill pads would impact approximately 200 square feet each with short spur roads (100 feet long and 25 feet wide) constructed to each drill hole location. Surface disturbance of these 4 drill holes would affect approximately 0.25 acre. The total surface disturbance using the drilling, blasting method is expected to impact 0.5 acre.

Drilling Phase

Three Notices of Staking are anticipated during the plan period. It is anticipated that companies would then also submit Applications to Drill (APD) after the Notices of Staking are accepted. Private surface owner input would be actively solicited during this stage. Once an APD is approved, the operator may begin construction activities, in accordance with stipulations and conditions. When a site is chosen that necessitates the construction of an access road, the length of road may vary, but usually the shortest feasible route is selected to reduce the haul distance and construction costs. Environmental factors or a landowner's wishes may dictate a longer route in some cases. Drilling activity in the planning area is predicted to be done using existing roads with

constructed short (approximately one-quarter mile) roads to access each drill site location.

In addition to the drill pad, a reserve pit is constructed. The reserve pit is used to contain the drilling fluids and drill hole cuttings. It is usually square or oblong, but is sometimes constructed in other shapes to accommodate topography. Generally, the reserve pit is 6 to 12 feet deep, but may be deeper to compensate for smaller length or width dimensions. In some instances steel mud tanks are used, which reduce the need for large reserve pits.

Based on past oil and gas drilling in Oregon, it is projected that 3 exploratory "wildcat" wells would be drilled on BLM administered land in the planning area. The estimated success rate of finding hydrocarbons is predicted to be no greater than 10 percent, based on the average U.S. wildcat well success rate. Drilling is expected to be in an area of "moderate" oil and gas potential, which is the highest level of potential for oil and gas on this District. There is approximately a 1 in 50 chance of new field discovery during the life of the plan, with a strong likelihood that any such discovery would be natural gas, since current western Oregon production to date has been natural gas.

Surface Impacts of Drilling: During the first phase of drilling, the operator would move construction equipment over existing maintained roads to the point where the new access road begins. No more than one-quarter mile of moderate duty access road per well site is anticipated to be constructed. The surface disturbance for new road building would average 40 feet wide with ditches, cuts, and fills for one-quarter mile in length; therefore, the acreage impacted by road building would approximately 1.25 acres for each well. For the 3 anticipated wells, a total of 3.75 acres would be needed for new road construction.

The second part of the drilling phase is the construction of the drilling pad and reserve (mud) pits, which is anticipated to involve approximately 2 acres per well site. Support facilities are anticipated to disturb about 2 acres per well site. The likely duration of well development, testing, and abandonment is predicted to be approximately 6 to 9 months for each drill site. Therefore, the total disturbance for the 3 exploratory wells, reserve pits, support services, and new road construction is expected to total no more than approximately 16 acres.

Producing Phase

One gas field of 50 to 60 Bcf could be discovered on BLM administered lands at a depth of 2,000 to 3,000 feet during the plan period. It is estimated that the productive life span of this field would be about 10 years. The size of the field would be approximately 200 acres, and the well spacing would be about 160 acres (1 well per quarter section). It is anticipated that the field would require 4 development wells in addition to the discovery well. All gas production would be carried by pipelines for a distance of approximately 40 miles. All well service requirements would be provided by established service companies.

Surface Impacts of Field Development and Production: Each development well pad would be approximately 2 acres in size and, as a result, a total of 8 acres would be involved in drill pad construction. New roads leading to each of these drill pads would have to be constructed, and it is estimated that each of the new roads would be about 0.25 mile in length with a right-of-way width of 40 feet. Therefore, approximately 1.25 acres would be involved for each newly constructed road, and the total surface disturbance attributed to new road construction would be 5 acres. A pipeline 40 miles long with a right-of-way of 30 feet would disturb about 145 acres. Due to the checkerboard public land ownership in this area, it is estimated that only about one-half of that acreage would be on public lands administered by the BLM. Therefore, it is estimated that about 73 acres would be impacted from pipeline construction. The total surface disturbance of field development and production would be approximately 86 acres.

Plugging and Abandonment

Wells are plugged according to a plan designed specifically for the down hole conditions of each well. Plugging is accomplished by the placing of cement plugs at strategic locations downhole and up to the surface. Drilling mud is used as a spacer between plugs to prevent communication between fluid bearing zones. The casing is cut off at least 3 feet below ground level and capped by welding a steel plate on the casing stub. It is predicted that the gas wells would be plugged prior to abandonment. A hole marker would be placed at the surface or buried to identify each well location.

Surface Impacts of Plugging and Abandonment: After plugging, all equipment

and debris would be removed, and the drill site would be restored as near as reasonably possible to its original condition. If the new roads constructed for drilling are not needed for future access to the area, the roads would be reclaimed as required by the Authorized Officer.

Reasonably Foreseeable Development of Geothermal Resources (Common to All Alternatives)

Future Trends and Assumptions

With environmental protection and enhancement being a major consideration in the Pacific Northwest, clean, low-impacting energy sources are becoming more important. The energy surplus in the region is expected to be gone near the end of the decade. The abundant geothermal resources thought to be present in the Northwest are essentially undeveloped. To encourage resource development, the Bonneville Power Administration (BPA) is participating in two geothermal pilot projects. The projects selected are in the Vale Geothermal Project near Vale, Oregon, and the Newberry Geothermal Pilot Project south of Bend, Oregon. In addition to the commitment by the BPA to purchase power generated by these projects, 2 local utility companies have also agreed to participate. The Springfield Utility Board (SUB) would purchase power from the Vale project, and the Eugene Water and Electric Board would purchase power from the Newberry project. With this renewed interest in geothermal energy, it is anticipated that other areas in the State exhibiting geothermal potential would experience an increase in geothermal exploration and possibly development.

Exploration and Development of Geothermal Resources

Geophysical/Geochemical Exploration

As with oil and gas, geothermal geophysical operations can take place on leased or unleased public land. Depending upon the status of the land (leased/unleased), the status of the applicant (lessee/nonlessee), and the type of geophysical operation proposed, (drilling/non-drilling), several types of authorizations can be used if the proposed exploration exceeds "casual use," as defined in 43 CFR 3209.0-5(c). In all cases, the authorizations require compliance with the National Environmental Policy Act and approval by the Authorized Officer. As with oil and gas, the operator is required to comply with all terms and conditions of the permits, regulations, and other requirements, including reclamation, prescribed by the Authorized Officer. Monitoring for compliance with these requirements would take place during the execution of the operations and upon completion.

In addition to the geophysical methods discussed in the Oil and Gas section, the following exploration techniques are often employed in geothermal prospecting:

Microseismic: Small seismometers are buried at a shallow depth (hand-dug holes) and transmit signals from naturally occurring, extremely minor seismic activity (micro-earthquakes) to an amplifier on the surface. Stations are located away from roads to avoid traffic "noise." These units are often backpacked into areas inaccessible to vehicles.

Resistivity: Induced Polarization (IP) techniques are used to measure the resistance of subsurface rocks to the passage of an electric current. A vehicle-mounted transmitter sends pulses of electrical current into the ground through 2 widely spaced electrodes (usually about 2 miles apart). The behavior of these electrical pulses, as they travel through underlying rocks, is recorded by "pots" (potential electrodes), small ceramic devices that receive the current at different locations. The electrodes are either short (2 to 3 feet) rods driven into the ground, or aluminum foil shallowly buried over an area of several square feet. Two or 3 small trucks transport the crew of 3 to 5 people to transmitting and receiving sites.

Telluric: A string of "pots" record the variations in the natural or induced electrical currents in the earth. Passive techniques require transmitters. Active methods use a vehicle mounted transmitter similar to that used for resistivity surveys. Small trucks are used to transport the crew and equipment.

Radiometric: Radioactive emissions (generally radon gas) associated with geothermal resources are usually measured using a hand-held scintillometer, often at hot spring locations. Another method used involves placing plastic cups containing small detector strips sensitive to alpha radiation either on the surface or in

shallow hand-dug holes. If holes are dug, they are covered, and the cups left in place for 3 to 4 weeks. At the end of the sampling period, the cups are retrieved and all holes are backfilled. These surveys can be conducted on foot or with the aid of light vehicles.

Geochemical Surveys: Geochemical surveys are usually conducted at hot springs by taking water samples directly from the spring. Sampling for mercury associated with geothermal resources is often done by taking soil samples using hand tools. These surveys can be conducted on foot or with the aid of light vehicles.

Temperature Gradient Drill Hole Surveys: Temperature gradient holes are used to determine the rate of change of temperature with respect to depth. Temperature gradient holes usually vary in diameter from about 3.5 to 4.5 inches, and from a few hundred feet to about 5,000 feet in depth. They are drilled using rotary or coring methods. Drilling mud and fluids would be contained in earthen pits or steel tanks. Water for drilling would be hauled in water trucks or, if suitable water sources are nearby, could be piped directly to the site. Water consumption could range from about 2,000 to 6,000 gallons per day, with as much as 20,000 gallons per day under extreme lost circulation conditions.

Depending upon the location and proposed depth of the drill hole, detailed plans of operation that cover drilling methods, casing and cementing programs, well control, and plugging and abandonment may be required.

Based upon past geothermal exploration in Oregon, and a projected increase in power demand in the Northwest by the end of the decade, it is anticipated that during the 10-year life of this plan, 2 Notices of Intent for surface geophysical surveys, and one Notice of Intent to drill 2 temperature gradient holes would be filed for lands in the operating area.

Surface Impacts of Geophysical/ Geochemical Exploration: The surface impacts of geophysical surveys (microseismic, resistivity, telluric, radiometric and geochemical) are anticipated to be negligible, and would use existing roads for vehicle access to or near the exploration area. Exploration areas for the small seismometers, electrodes, and geochemical sampling areas are not anticipated to exceed a total 0.1 acre.

The surface disturbance anticipated from 2 temperature gradient holes is anticipated to involve 0.2 acre per drill site, or 0.4 acre total. Each drill site could contain the drill rig, most likely truck mounted, water truck(s), fuel tank, supply trailer, and a small trailer for the workers. Drilling mud and fluids would be contained in earthen pits or steel tanks. Water for drilling would be hauled in water trucks, or if suitable water sources are nearby, could be piped directly to the site. Water consumption could range from about 2,000 to 6,000 gallons per day, with as much as 20,000 gallons per day under extreme lost circulation conditions. Existing roads would be used, but short spur trails (probably less than 500 feet long and 20 feet wide) would be constructed for both of these holes, affecting approximately 0.5 acre. Drill holes would be plugged and abandoned to protect both surface and subsurface resources, including aquifers. Reclamation of disturbed areas would be required, unless some benefit to the public could be gained by continued use of the area, such as a water well or camping area.

Drilling and Testing

Drilling to determine the presence of geothermal resources or to test, develop, produce, or inject fluids can be done only on land covered by a geothermal lease. Close coordination with the State would occur. It is anticipated that the duration of well development, testing and, if dry, abandonment, would be 4 months.

Prior to abandonment, the operator would be required to plug the hole to prevent contamination of aquifers and any impacts to subsurface and surface resources. Plugging is accomplished by the placing of cement plugs at strategic locations downhole and up to the surface. Depending upon the formations encountered, drilling mud could be used as a spacer between plugs to prevent communication between fluid bearing zones. The casing is cut off at least 6 feet below ground level and capped by welding a steel plate on the casing stub.

It is estimated that 1 exploratory flow test well would be drilled during the 10-year life of this plan.

Surface Impacts of Drilling: The geothermal well drilling operation would require approximately 3 to 4 acres for a well pad, including reserve pit. It is expected that existing roads would be used to access the drill site but about one-half mile of moderate duty access road up to 40 feet wide with ditches, cuts, and

fills, would also be necessary. Approximately 2.5 acres would be disturbed by this new road construction. Total surface disturbance for the well and new road construction is expected to be about 5.5 acres.

After plugging, all equipment and debris would be removed, and the site would be restored, as near as reasonably possible, to its original condition. A dry hole marker would be placed at the surface or buried to identify the well location. If the new road is not needed for other purposes, it would be reclaimed as directed by the Authorized Officer.

Geothermal Power Plant Development

It is projected that no power plants would be constructed on BLM lands in the operating area during the life of this plan.

Direct Use of Geothermal Energy

It is projected that no direct use of geothermal energy would occur on BLM lands in the operating area during the life of this plan.

Locatable Minerals

Reasonably Foreseeable Development of Locatable Mineral Resources (Common to All Alternatives)

Future Trends and Assumptions

The major mineral commodities of interest would continue to be the precious metals, gold and silver. This assumption is based on a combination of price (especially gold) and favorable geological conditions for mineral occurrences. Reclamation methods would continue to advance due to experience, research, and new technology. The economics of mining in the planning area would be driven by the relationship between production costs and the market price of the commodity. While production costs can be controlled or anticipated through management and technology, the price of the mineral commodities, especially gold, would be unknown. The overall profitability of an operation, and hence the level of activity at the prospecting, exploration, and mining phases, for development of ore bodies would be closely related to the price of the mineral commodity.

During 1989 a mining claim patent was issued on lands considered to be valuable for uncommon variety silica sand; these lands are located along the Oregon Coast, south of the operating area. Actual mining of silica sand has been conducted in the Coos Bay area for many years. Certain public lands on the Eugene District are considered to have potential for such minerals and some of these lands would be available for exploration and development. It is anticipated that there would be interest by industry or the public in conducting these activities.

No chemical heap leaching operations are forecasted during the plan period. If such an operation is proposed during the life of the plan, it would be subjected to environmental review under a Plan of Operations pursuant to regulations found in 43 CFR 3809. All locatable mineral operations would be monitored pursuant to these regulations and the policies shown in Appendix HH.

Exploration and Development of Locatable Mineral Resources

Exploration Phase

Reconnaissance

Reconnaissance level activity generally constitutes the first stage in exploring for a mineral deposit. This involves the initial literature search of an area of interest, using available references such as publications, reports, maps, aerial photos, etc. The area of study can vary from hundreds to thousands of square miles. Activity that would normally take place includes large scale mapping, regional geochemical and geophysical studies, and remote sensing with aerial photography or satellite imagery. The type of surface disturbing activity associated with reconnaissance level mineral inventory is usually no more than occasional stream sediment, soil, or rock sampling.

Prospecting

As the result of anomalous geochemical or geophysical readings, discovery of a unique geologic structure or feature, occurrence of typical mineral bearing formations, or a historical reference to past mineral occurrence, the prospecting area of interest is identified. This area may range from a square mile or less to several hundred square miles.

Activities that would take place in an effort to locate a mineral prospect includes more detailed mapping, sampling, and geochemical and geophysical study programs. Also, this is the time when property acquisition efforts usually begin and most mining claims are located, in order to secure ground while trying to make a mineral discovery.

Surface Impacts of Reconnaissance and Prospecting: Types of surface disturbing activity associated with prospecting generally involve soil and rock chip sampling using mostly hand tools, possibly off-road vehicle use, and the placement and maintenance of mining claim monuments. This activity is normally considered "casual use" (43 CFR 3809.1-2) and does not require BLM notification or approval. Surface disturbances by these activities are anticipated to be less than 0.01 acre for each prospecting venture.

Exploration

Following the location of a sufficiently anomalous mineral occurrence, or favorable occurrence indicator, a mineral prospect is established and is subjected to more detailed evaluation through exploration techniques. Activities that take place during exploration include those used during prospecting but at a more detailed level in a smaller area. In addition, activities such as road building, trenching, and drilling are conducted. In later stages of exploration, an exploratory adit, shaft, or test pit may be excavated. Exploratory drilling may be conducted on a planned grid system layout. If the mineral prospect already has underground workings these may be sampled, drilled, or extended. Exploration activities might utilize mechanized earth moving equipment and/or explosives.

Surface Impacts of Placer Gold Exploration: Many in-stream suction dredge operations could be classified as placer gold exploration activities; however, it was decided to break them out separately. In the context of this section, placer exploration is predicted to consist of the excavation of test pits either by hand or with a backhoe or hydraulic excavator. It is predicted that 6 Notices would be filed during the plan period pertaining to test pit excavation. A typical Notice could describe minor road construction necessary for accessing test pit locations. The size of each test pit is predicted to be about 5 feet x 5 feet and 10 to 15 feet deep. It is anticipated that 3 temporary access roads approximately 200 feet long and 25 feet wide would be necessary to reach the various test pit locations with the equipment, affecting roughly a total of 0.3 acre for new roads. The area disturbed by the test pits is expected to be contained within the road prism. Support facilities would use approximately 1 acre. Therefore, each Notice-level operation would utilize approximately 1.3 acres of land, and during the plan period the expected 6 operations would disturb a total of 8 acres of land.

If low mineral values are discovered, then the pits would be backfilled and the area replanted and fertilized. It is anticipated that 1 notice-level operation may find mineral values significant enough to warrant a plan-level of operation, described as a bench placer mine development later in this Appendix.

Surface Impacts of In-stream Suction Dredging: In-stream dredging is usually a 1-2 person operation using a floating suction dredge with a 5-7 horsepower engine. The dredge pulls up gravels from the stream bottom that are then passed over a sluice box and are returned to the stream without the heavy sands and gold particles. This process does not require any chemicals. Most of the dredges have an intake hose diameter of less than a 5 inches. The average stream area disturbed in any year is less than 1,000 square feet per dredge operation, based on operations monitored in the past. Other activities associated with dredging include temporary occupancy and minor road and trail construction. It is predicted that 30 Notices would be filed for this type of mining activity.

It is anticipated that approximately 0.15 acre would be disturbed by each in-stream suction dredging operation, and for each operation a camping area approximately 0.10 acre in size would probably be used. As a result, it is anticipated that these operations would affect a total of 7.5 acres of land.

Surface Impacts of Lode Exploration: It is anticipated that 4 Notices would be filed during the plan period, pertaining to vein lode exploration. Exploratory work including drilling, blasting, and bulk sampling would be the emphasis of these projected notice-level operations. Some road and trail construction is anticipated for the operator to access the exploration sites for sample collection. For each Notice, it is anticipated that 3 temporary access roads, roughly 200 feet long by 40 feet

wide (including cuts, fills, and ditches), would be necessary for equipment to reach the exploration sites. Surface disturbance for roads, therefore, would be approximately 0.5 acre per notice. Support facilities would most likely be needed and would involve the use of about 1 acre per notice. The mineral sample sites (including 3 drill sites and 2 bulk sample sites) would probably disturb about 0.5 acre. Therefore, for each notice, approximately 2 acres would be affected by exploration of lode mineral deposits, and for the 4 Notices, a total of approximately 8 acres would be affected.

It is anticipated that one Plan of Operation would be filed during the plan period pursuant to the regulations in 43 CFR 3809.1-4. The Plan of Operation is predicted to pertain to a disseminated gold exploration project, and in the first phase of exploration, approximately 10 holes would be drilled using truck mounted drill rigs. Each drill site would disturb less than one-tenth of an acre. Temporary access roads would be constructed for about 3 of the drill holes, but in most cases existing roads would be used. Each of these temporary access roads would be approximately 300 feet long and 40 feet wide, including roadcuts, ditches, and fill slopes involving approximately 0.25 acre for each road (0.75 acre total). Support facilities may be necessary, affecting approximately 1 acre. Therefore, during the first phase of exploration, it is anticipated that 2.75 acres would be disturbed. In the second phase of exploration, it is predicted that the operator would conduct drilling and sampling on a defined grid in order to better evaluate the amount of ore reserves within the proposed project area. Additional equipment access roads would be necessary to complete this exploratory drilling and it is estimated that 10 temporary access roads (of the length and width mentioned above) would be necessary in order to conduct this drilling, affecting about 2.5 acres. The 10 new drill holes would disturb about a total of 1 acre. Therefore, the second phase of exploration would disturb an additional 3.5 acres. The total anticipated surface acreage involved in the plan-level lode exploration project would be approximately 6.25 acres.

Surface Impacts of Silica Sand Exploration: Exploration for silica sand would involve construction of approximately 3 miles of roads on dunal areas to provide access to the sample test sites by a truck mounted auger or drill. It is assumed that the width of the roads would be about 20 feet. Sampling would be conducted along the center line of the roads, so no additional site disturbance would be necessary in the construction of a drill pad. Therefore, it is anticipated that temporary road construction to conduct exploration activities would impact approximately 7 acres of land, authorized under an approved Plan of Operation.

Mining Phase

Mine Development

If exploration results show that an economically viable mineral deposit is present, activity intensifies to obtain detailed knowledge regarding reserves, possible mining methods, and mineral processing requirements. This involves applying all the previously used exploration tools in a more concentrated effort. Once enough information is acquired, a feasibility study is made to decide whether to proceed with mine development and which mining and ore processing methods would be used. It is anticipated that 1 bench placer gold deposit and 1 silica sand deposit would be developed during the next decade. Both operations would be monitored under approved Plans of Operation filed pursuant to the regulations in 43 CFR 3809.1-4.

Once the decision to develop the property is made, the mine permitting process begins. Upon approval, work begins on development of the mine infrastructure. This includes construction of the mill, offices and laboratory; prestripping overburden in preparation for open pit mining; building of access roads or haulage routes, and placement of utility services. During this time, additional refinement of ore reserves is made.

Once enough facilities are in place, actual mine production begins. Concurrent with production there often are "satellite" exploration efforts to expand the mine's reserve base and extend the project life. Reclamation of the property is conducted concurrently with, or upon completion of, the mining operation. Often subeconomic resources remain unmined and the property is dormant, waiting for changes in commodity price or production technology that would make these resources economic.

Activities that could occur on these lands include: actual mining, ore processing, tailings disposal,

waste rock placement, solution processing, metal refining, and placement of support facilities such as repair shops, labs, and offices. Such activities involve the use of heavy earthmoving equipment and explosives for mining and materials handling, exploration equipment for refinement of the ore reserve base, hazardous or dangerous reagents for processing requirements, and general construction activities. The size of mining operations can vary greatly and not all of them would require all the previously mentioned facilities and equipment. Acreage involved can range from several acres to several hundred, with most projects disturbing 10 acres or less.

Bench Placer Gold Mine

Small bench placer operations can involve 1-6 people operating excavators, backhoes, loaders, larger bulldozers, trommels, vibratory wash plants, draglines, and sluice boxes. Other associated equipment includes water pumps, generators, and conveyors. These operations vary in scope, processing between 10-500 loose cubic yards of gravel per day. The average operation of this type processes 50 cubic yards per day, operating 90 days per year.

The mining process could be generalized as follows: clearing vegetation and overburden; the excavation of bench gravels; hauling mineral bearing gravels to a processing plant; washing gravel at the processing plant with water; concentrating the heavy metals in a sluice box; and placing tailings back into the excavated area as part of the reclamation plan.

Surface Impacts of Bench Placer Gold Development: It is anticipated that the excavation area for mineral extraction would disturb approximately 5 acres. The finer material that washes over the sluice box would be allowed to settle out in settling ponds to prevent unnecessary siltation of adjacent streams. The water in the pond can be recycled through the wash plant to conserve water, and after the tailings are contoured for reclamation, the fine sediments can be spread those tailings and reseeded. Other associated activities may include the need for support facilities (0.75 acre), road construction for access and ore haul routes (approximately 0.75 acre), construction of settling ponds approximately 200' x 60' x 15' deep each (0.5 acre total), water diversion for a wash plant and, in extreme cases, the streams might be diverted into alternate channels so that the stream channel can be mined following issuance of the necessary State permits. Approximately 0.5 acre would be needed for stockpiling overburden and topsoil to be used during site reclamation. Therefore, it is anticipated that the total disturbed area would involve approximately 7.5 acres for a bench placer mining operation.

Open Pit Silica Sand Mine

Mining operations would utilize excavators, backhoes, bulldozers, draglines, and magnetic separators in the excavation and processing of uncommonly pure silica dunal sands. Trucks or trains would be used to transport processed high grade silica to glass production facilities. Other associated equipment could also include conveyors and administrative facilities. These operations could process up to 1,000 cubic yards of sand per day, operating all year. The mining process in a sand dune area could be generalized as follows: vegetation removal if necessary, excavation of dunal sands, transportation of the sand to the magnetic separator, placement of heavy minerals at a waste stockpile site nearby, and the transportation of refined silica to the processing plant. Controlling the seepage of groundwater into the mine site would also possibly be necessary.

Surface Impacts of Silica Sand Mine Development: The silica sand mine site is anticipated to involve the disturbance of about 23 acres. Approximately 1 acre would be needed to stockpile heavy minerals extracted from the deposit, and about 1 acre of land would be used for the disposal of any vegetation removed from within the mine development area. One acre would probably be used for the office site and magnetic separation facility. In total, it is predicted that approximately 26 acres would be impacted by the development of an open pit silica mine.

Upon completion of the mining operation, all roads would be reclaimed, improvements removed, and heavy minerals disposed of, in accordance with provisions of the Plan of Operation and State requirements. Due to the proximity of the groundwater table to the surface, site reclamation could possibly result in the establishment of a lake or large pond, and be revegetated to benefit wildlife or enhance recreation opportunities in the area.

Recreational Mining

Most recreational mining operators on BLM lands in the planning area would probably use hand tools or, in some cases, portable suction dredges. The predicted surface impacts of suction dredging are described in the Exploration section of this appendix. It is anticipated that hobby mineral collecting and rockhounding would take place on the BLM lands in the operating area. The surface impacts of those operations are presumed to be negligible since the mineral collectors most often use existing roads and look for surface geologic exposures. Any excavation of specimens is generally conducted with hand tools and is considered casual use. Situations where either a Notice or Plan of Operations is required are described in Appendix HH, or in the regulations found in 43 CFR 3809.

Salable Minerals

Reasonably Foreseeable Development of Salable Mineral Resources (Alternatives NA, A, B, C, and PRMP)

Future Trends and Assumptions

In the past, the primary demand for salable minerals has been directly related to road construction activities in the area. Under these alternatives, it is anticipated that the public and government agencies (including BLM) would continue to use salable minerals from quarry sites located throughout the operating area. Where possible, existing sources would be used; however, new site development is not precluded under these alternatives. It is predicted that a quarry site located closest to a project area would be used, in order to minimize truck haul costs.

Exploration and Development of Salable Mineral Resources

Exploration

It is anticipated that under these alternatives, 2 new prospective rock quarry sites would be evaluated to determine the feasibility of new development. A reconnaissance of the surface geology and sampling of rock outcroppings would occur during the preliminary site investigation. Depending on site conditions, subsurface sampling may be necessary and could be conducted with drilling equipment. In some cases, portable drills could be used, which would eliminate the need for equipment access roads, but most of the time vehicle access roads would be necessary to adequately evaluate the salable mineral prospect.

Subsurface exploration might also be conducted before enlarging an existing quarry site. In some cases, there may be indications of complex geologic structures that could warrant subsurface investigation(s) prior to expanding rock quarry development limits. It is anticipated that there would be 4 subsurface investigations pertaining to proposed quarry site expansions during the plan period.

Surface Impacts of Salable Mineral Exploration: It is anticipated that the preliminary site investigations, consisting of mapping the surface geology and collecting rock samples for quality testing, would cause negligible surface disturbance. Rock samples would be collected by hand and taken to a testing laboratory. It is predicted that a total of about 4 acres would be impacted by salable mineral exploration activities during the plan period, and a description of the nature of the exploration work is as follows:

Prospective Quarry Sites: During a more detailed subsurface investigation, it is predicted that at a quarry site prospect, a series of bulldozer trails would be constructed to provide equipment access to each drill site. In some cases, the equipment might cross an area without completely removing all vegetation along its path. The equipment trails would be approximately 1,000 feet long and 20 feet wide for each site. As a result, approximately 0.5 acre would be impacted by vehicle access construction at each prospective site. Exploratory drilling would be conducted along these trails, so no additional surface disturbance would be anticipated from the actual drilling. The total surface disturbance at the 2 prospective quarry sites is expected to be approximately 1 acre.

Existing Quarry Sites: Geotechnical investigations to expand existing quarry sites would probably impact the surface due to construction of vehicle access so that exploratory drilling could be conducted. At each of the 4 anticipated quarries, bulldozer roads roughly 1,500 feet long by 20 feet wide would be constructed in order to drill the core holes for sampling and geotechnical evaluation. Exploratory drilling would be conducted along these trails, so no additional surface

disturbance would be anticipated from the actual drilling. Consequently, the new surface disturbance at these quarries would total about 3 acres.

Development

It is anticipated that some of the 75 existing rock quarry sites in the operating area would be used to produce crushed or "pit run" aggregate. Pit run aggregate is either naturally fractured or has been broken as a result of blasting. It is not crushed to a uniform size. Most of the time, salable minerals would probably be removed from within the current development areas at these quarries, and those excavations would be based on a site specific mining and reclamation plan. Some quarries may not be used at all during the plan period.

Surface Impacts of Existing Quarry Site Use: The surface impacts of rock excavation at existing quarry sites would consist of altering the topography within the planned development limits, in order to extract rock materials for construction purposes. Topsoil and overburden would be stockpiled near the sites for use in site reclamation, and rock would be excavated according to an operating plan.

New Quarry Development, Expansion of Existing Quarries, and Reclamation of Existing Quarries: It is forecast that 2 new quarries would be developed and 8 of the existing quarries would be expanded to provide for the excavation of additional reserves of salable minerals. At 4 of the existing sites, exploratory drilling would be conducted prior to development as described in the previous section. To expand the quarry development limits, topsoil and overburden from the new development area would be removed and stockpiled for eventual use in site reclamation, or used concurrently to reclaim other portions of the site. Most likely, equipment access roads would also be developed into the new development area. Vegetation from the excavation area would be removed, as directed by the Authorized Officer. One quarry site would probably become depleted of all good quality salable minerals during the plan period. Reclamation of this site would be conducted to return the acreage to a beneficial use.

Surface Impacts of New Quarry Development: It is projected that the 2 new quarries would be developed. Each of these sites is expected to involve about 2 acres of land. In addition to the mining area for the rock, the acreage would be developed to provide space for a rock crushing plant site, truck turnaround, access trails for bulldozers and drills, overburden and topsoil stockpile sites, and aggregate stockpile areas. To access each new quarry development, approximately 0.5 acre of land would be disturbed by new road construction. Therefore, it is anticipated that approximately 5 acres would be impacted by new quarry site development.

Surface Impacts of Expansion of Existing Quarries: The surface impacts of rock excavation at existing quarry sites consist of altering the topography within the planned development limits. Expanding some quarries would most likely impact less than 2 acres per site; so, it is expected that about 16 acres would be affected by enlarging existing quarries.

Surface Impacts of Reclamation of Depleted Quarries: Reclamation of depleted rock quarries would be evaluated in an interdisciplinary approach. In some cases, portions of an excavated area could be backfilled with soil and overburden that had been stockpiled nearby during the ongoing development and use of the site. In cases where there are insufficient amounts of backfill material, soil and rock taken from nearby construction projects could be used. Once the disturbed area was backfilled or shaped to an acceptable contour, topsoil (if available) could be spread as a planting medium. The area could then be revegetated with the appropriate plant species. In other cases, backfilling a large excavation may not be economically feasible, and the reclamation plan would address viable alternatives whereby the site could be returned to a beneficial use.

Reasonably Foreseeable Development of Salable Mineral Resources (Alternatives D and E)

Future Trends and Assumptions

Under these alternatives, there would be a reduction in new road construction within the operating area. It is anticipated that the public and government agencies (including BLM) would use salable minerals from existing quarry sites located throughout the District. It is forecast that no new quarry sites or the expansion of existing quarry sites would occur due to the decreased demand for rock aggregate.

Therefore, it is predicted that the supply of salable minerals at existing quarry sites would be sufficient to meet the demand. In the event that quarries are depleted of all usable minerals, they would be reclaimed.

Development of Salable Mineral Resources

Development

It is anticipated that some of the 75 existing rock quarry sites in the operating area would be used to produce crushed or "pit run" aggregate. It is anticipated that salable minerals could be removed from within the current development areas at these quarries and that excavations could be based on a site specific mining and reclamation plan. Some of the sites may not be used during the plan period, if the demand is low for salable minerals in the vicinity of those quarries.

Surface Impacts of Existing Quarry Site Use: The surface impacts of rock excavation at existing quarry sites would consist of altering the topography within the planned development limits in order to extract rock materials for construction purposes. Topsoil and overburden would be stockpiled near the sites for use in site reclamation, and rock would be excavated according to an operating plan.

Surface Impacts of Reclamation of Depleted Quarries: Reclamation of depleted rock quarries would be evaluated in an interdisciplinary approach. In some cases, portions of an excavated area could be backfilled with soil and overburden which had been stockpiled nearby during the ongoing development and use of the site. In cases where there are insufficient amounts of backfill material, soil, and rock taken from nearby construction projects could be used. Once the disturbed area was backfilled or shaped to an acceptable contour, topsoil (if available) could be spread as a planting medium. The area could then be revegetated with the appropriate plant species. In other cases, backfilling a large excavation may not be economically feasible, and the reclamation plan would address viable alternatives whereby the site could be returned to a beneficial use.

Appendix JJ
Summary of Scoping

Scoping of the Eugene District Resource Management Plan/Environmental Impact Statement (RMP/EIS) began in September 1986, when a mailer was sent to a list of 400 inviting them to identify issues and concerns for BLM to consider in the planning process. Two open houses were held by BLM's Eugene District during the comment period to help those interested parties to focus on the question.

With the comments received, the District's planning team and managers distilled and developed a list of issues and concerns. BLM distinguished an issue as a matter of controversy or dispute over resource management activities or land use that is well defined or topically discrete and can be addressed in the formulation of planning alternatives. In practice, issues are resolved by resource allocations and restrictions. Concerns, on the other hand, are generally not so well defined, or do not directly involve controversy or disputes over resource management activities or land use allocations, and do not lend themselves to formulating land use alternatives. Concerns are usually addressed by analysis and documentation in the RMP/EIS. Some concerns are not addressed by the RMP/EIS, as they are beyond the control of the State Director, are unrelated administrative problems, or are not within the legal jurisdiction of BLM.

The issues and concerns identified are described in Chapter 1. This list of issues and concerns was sent to interested parties in March 1987. Subsequent scoping was related to refinement of the issues, and determination of a reasonable range of alternatives to address in the RMP/EIS. This latter facet of scoping was handled through the development of State Director guidance for formulation of alternatives. The development of State Director guidance for the RMP process is discussed in Appendix B. This guidance also directed a number of sensitivity analyses of the primary alternatives to address relevant management options that could not be effectively addressed in a manageable array of fully analyzed alternatives.

In public comments and internal discussions there were a number of alternatives, or potential elements of alternatives, considered but eliminated from detailed analysis. These are summarized in the following:

- Alternatives that would meet specified timber production target levels (e.g., one identified in a regional supply analysis or one that would maintain the level in existing plans). Such alternatives could be explicitly designed only with an optimization model. Early in the planning process, BLM chose not to invest the many millions of dollars that would have been necessary to adopt and use an optimization model in its western Oregon planning effort.

- Alternatives that explicitly reflect the policies and programs of the O&C Counties, and of the State. Until opportunities and tradeoffs are fully analyzed, such alternatives could not be formulated. At that point in the process, it was BLM's intent to develop a Preferred Alternative and subsequent Proposed Plan (PRMP) consistent with those policies and programs to the extent they are consistent with each other and also consistent with Federal laws and regulations.

- An alternative based on the assumption that Federal Land Policy and Management Act (FLPMA), rather than the O&C Act, is the predominant statutory mandate for management of the O&C and Coos Bay Wagon Road (CBWR) lands. None of the initial set of alternatives was based on a specific real or assumed statutory mandate. BLM believes that management under FLPMA falls within the range established by the initial set of alternatives.

- A "no planned timber harvest" alternative. BLM considers such an alternative for all BLM administered lands in western Oregon outside the reasonable range of alternatives. The counterpart of a "no planned timber harvest" alternative would be an alternative that would remove all merchantable timber over the life of the plan. Such a radical departure from sustained yield principles on either end is clearly outside the reasonable range of alternatives.

- Alternatives considering neither intensive management practices nor the "allowable cut effect" in setting an Allowable Sale Quantity (ASQ). The impact of foregoing these can be identified from the Sensitivity Analysis of the Preferred Alternative in the Draft RMP/EIS.

- An alternative that would forego slash burning; one that would forego use of herbicides. These activities and the options of foregoing them were addressed in BLM's EIS, *Western Oregon Program Management of Competing Vegetation*, 1989. This PRMP/FEIS is tiered to that EIS.

- An alternative that uses uneven-aged management as the predominant silvicultural system. In many locations that prescription would fail to meet reforestation standards, a violation of the sustained yield mandate. Uneven-aged management is considered for use in stands where it would be economically and environmentally feasible and reforestation standards could be met.

- An alternative that excludes Site IV lands from timber harvest. Such an alternative would not address any important environmental or resource management objectives better than options already being addressed.

- An alternative that maximizes timber production subject to the constraint of economic feasibility. Analysis of the economic feasibility of Alternative A showed that such a constraint would negligibly affect the Allowable Sale Quantity (ASQ) of that alternative.

- Alternatives that vary in size of spotted owl habitat protected for each nest site. In light of the Interagency Scientific Committee report and subsequent proposals by the Fish and Wildlife Service, BLM concluded that such variation had little relevance.

- An alternative that would protect 110 spotted owl areas, as provided for in the 1987 revised BLM-ODFW agreement, was originally proposed by BLM. After the Interagency Scientific Committee report was released in 1990, this alternative no longer seemed relevant.

- An alternative that manages as VRM Class II all lands inventoried as VRM Classes III and IV. Such an alternative would only be logical if matched with the other goals of an alternative with a very constrained timber harvest base. This management option, intended to optimize protection of scenic values even on areas identified in inventories as low in scenic value, was felt to be too arbitrary to warrant its application as an additional constraint to alternatives that severely restrict timber production to emphasize more meaningful objectives.

- An alternative protecting a minimum of a quarter-mile wide Riparian Management Area (RMA) along 3rd order and higher streams; Class I streams and other water; and maintaining and enhancing water quality at the highest level of water quality required for municipal use. Such an alternative would exclude almost all commercial forest lands from timber management. Such extensive RMA would be far in excess of what is needed to protect water quality and riparian values. Thus, it was considered outside the range of reasonable alternatives.

Appendix KK
Response to Public Comments
See Volume III

Appendix LL
Record of Decision

Appendix LL consists of the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its Appendix A* published in April 1994. This ROD includes *Standards and Guidelines for Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl.* It is referred to in this PRMP/FEIS as the SEIS/ROD.

The SEIS/ROD is bound separately from the PRMP/FEIS and is incorporated by reference. The Draft and Final SEIS and the SEIS/ROD were mailed to those who received copies of the Draft Eugene District Resource Management Plan and Environmental Impact Statement (DRMP/EIS). It was also sent to agencies, libraries, and others who requested it and is available on request.

To obtain a copy of the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* send a request in writing to Regional Ecosystem Office, P. O. Box 3623, Portland, Oregon 97208-3623.

Appendix MM
Effects of Silvicultural Practices and Silvicultural Systems on Wood Quality, Timber Yields, and Economic Value

This appendix describes the effects of intensive silvicultural practices on wood quality, timber yield, and economic value, alone and sequenced together in silvicultural systems.

A variety of silvicultural practices are employed in the management of forest stands. The Bureau of Land Management (BLM) in western Oregon classifies precommercial thinning, commercial thinning, forest fertilization, and pruning as *intensive* silvicultural practices. These practices are applied to forest stands to meet management objectives such as controlling species composition, controlling stand density, and promoting growth and/or quality characteristics of selected trees. Intensive practices are usually scheduled in a sequence (i.e., a *silvicultural system or prescription* over the course of a planned rotation).

Wood quality is defined as the suitability of the material for a particular use and is determined from both the characteristics of trees (tree form, ring width, limbiness, and percent of juvenile wood) and from the physical properties of wood (specific gravity, fibril angle, and permeability). Log or tree size alone does not affect quality, but larger trees generally have more clear (knot free) wood and a smaller portion of the tree in juvenile wood.

Timber yield is defined as the total amount of merchantable wood produced over a rotation that is actually harvested. It is usually measured in cubic feet or board feet. Yields in this appendix are expressed in net cubic foot volume or change in cubic volume.

Economic value is defined as the monetary worth of individual timber products or the net return on investment for individual practices or sequence of practices. The quantity and quality of timber harvested and the timing of costs and revenues affect economic value.

Effects of Individual Silvicultural Practices

This section describes the effects of forest management actions on timber yields, wood quality, and value in the case of pruning.

Uniformity and rate of growth affect the machinability and appearance of lumber. Rate of growth is a limiting factor in high-quality structural grades of lumber. Wood must have no less than 4 rings per inch to meet the criteria for select structural lumber. Specialty items such as scaffolds, joints, and beams must average more than 6 rings per inch. However, analysis of past problems with the strength of wood from managed stands has indicated that the problems were caused by the percent of juvenile wood, rather than growth rate. In Douglas-fir, juvenile wood occupies the first 15 to 25 rings. A higher proportion of juvenile wood could be expected for stands managed on short rotations. Effects on timber yield from individual silvicultural practices vary depending on the timing and intensity of treatment whether treatment is solitary or in combination with other practices.

Thinning

Thinning is a silvicultural practice used to achieve stand density, species composition,and stand diversity objectives. Thinnings conducted prior to the time when trees are considered to be of nominal merchantable size are called precommercial thinnings. Thinnings that remove merchantable products are designated commercial thinnings.

Precommercial thinning permits earlier harvest through development of larger log sizes, increases the percent of stand volume on desired species, and creates stand densities and size distributions conducive to commercial thinning or other objectives. Precommercial thinning can permit greater realization of yield benefits from genetic improvement and forest fertilization by redirecting growth potential to crop trees only. To be fully effective, precommercial

thinning must be scheduled at the correct time in a stands development (Reukema, 1975), usually before growth retardation or stand differentiation occur.

Commercial thinnings are timber harvests scheduled any time after a stand reaches a combination of stem diameter and surplus volume, which permit an economical harvest. Commercial thinning can be effective in increasing recoverable timber yields by harvesting trees that would otherwise die prior to the final regeneration harvest in stands as old as 150 years (Williamson and Price, 1971; Williamson, 1982). Heavy commercial thinning shows the ability to accelerate the development of old growth stand characteristics in current even-aged stands (Newton and Cole, 1987).

For both types of thinning, very low post-thinning densities can negatively affect wood quality through excessive taper and slope of wood grain and through production of wide growth rings. The primary effect of thinning on wood quality is changes in the limb characteristics of trees. Thinning increases limbiness and lengthens the time that dead limbs adhere to the tree. Knots and the distorted wood around them reduce wood strength significantly and the yield of wood graded for appearance (selects and shop grades). Thinning also increases the proportion of younger stems that are in juvenile wood. These effects were described in Maguire et al., 1991. Low post thinning densities can negatively affect timber yield by not maintaining enough trees to take advantage of full site growth capacity in the short-term (Curtis and Marshall, 1986).

Fertilization

Fertilizer is applied to forest stands to offset limiting supplies of nutrients in the soil, particularly nitrogen. Fertilization treatments are usually scheduled with thinning treatments and are spaced 10 to 15 years apart.

Fertilization has the effect of accelerating stand development and increasing timber yields (Miller, Clendenen, and Bruce, 1988). Since fertilizer increases individual tree vigor and the rate tree crowns expand, it has been observed to reduce thinning shock, accelerate release, and overcome damage from insects and drought.

Fertilization tends to increase ring width and decrease wood specific gravity by an average of 5 percent (Megraw, 1986). However, this is not thought to have a significant effect on wood quality. Fertilization increases piece size significantly. Treatment can be timed to improve the ratio of mature wood to juvenile wood and after pruning to improve the production of clear wood core.

Pruning

Pruning is carried out to improve wood quality through the production of clear wood on rotations shorter than what would be required without the action. Pruning helps to avoid the production of wood with loose knots. Pruning is mandatory to ensure the production of significant amounts of clear wood in intensively managed stands of Douglas-fir under normal even-aged management and short rotations (Cahill et al., 1988; Fight et al., 1988). Pruning may also have benefits in meeting structural diversity objectives and decreasing fire hazard in areas with short natural fire return intervals. Pruning appears to be necessary to produce significant wood of acceptable quality from lower density stands (Briggs and Fight, 1992).

Results of an analysis by the Medford BLM District on product value increase from pruning Douglas-fir is shown below:

A financial analysis of pruning Douglas-fir and ponderosa pine was done by Fight, Bolon, and Cahill

Table 1 - Effect of Pruning on Douglas-fir Wood Quality

Harvest Age	Percent Select Lumber		Value of Logs		Gain in NPV
	Unpruned	Pruned	Unpruned	Pruned	per tree
60	0%	35%	$82	$110	$4.25
100	0%	51%	$130	$188	$0.36

NPV = net present value using a 4% discount rate.

(1993). Their results showed that pruning for both species would show positive economic returns where and when properly implemented. Future real increases in higher quality product grades were not necessary to achieve positive economic returns.

Pruning can decrease timber yields if a significant portion of the live tree crown is removed (O'Hara, 1991). BLM does not propose levels of live crown removal that are likely to impact timber yields. BLM pruning operations are expected to have a neutral effect on timber yields.

Effects of Silvicultural Systems

This section summarizes the results of an analysis of timber yield and wood quality effects on economic return for selected silvicultural systems proposed for the PRMP. Silvicultural systems affect wood quality, timber yields, and economic return by changing tree and stand growth patterns and the magnitude of discounted costs and benefits. The silvicultural systems analyzed are representative of management proposed for the next decade on BLM lands classified as Northern General Forest Management Areas (NGFMA). This single analysis is intended to portray results that reflect average stand conditions and average response to treatments on a Statewide basis for BLM managed lands in western Oregon. These silvicultural systems would vary somewhat within and between Districts, but are representative enough to display relative effects of similar silvicultural systems.

Effects of the different management practices and combinations are depicted as percent change in timber yield, percent change in Net Present Value (NPV), NPV, benefit cost ratios, and value per cunit (100 cubic feet) of timber yield.

Silvicultural Systems Analyzed

Table 2 describes the various silvicultural systems analyzed. Analysis was limited to silvicultural systems incorporating precommercial thinning, commercial thinning, forest fertilization, and pruning compared to a base prescription that represents an overstocked stand with no treatments until a final regeneration harvest.

Table 2 - Summary of Silvicultural Prescriptions Analyzed

Silvicultural System	Description
BASE	Overstocked (overdense) stand averaging 680 trees per acre at age of establishment. Final regeneration harvest at age 60 or 100.
PCT	Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Final regeneration harvest at age 60 or 100.
PCT/FERT	Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Fertilizer applied at ages 30 and 45. Final regeneration harvest at age 60 or 100.
PCT/CT[1]	Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Commercial thinning at age 45. Final regeneration harvest at age 60. Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Commercial thinning at ages 45 and 65. Final regeneration harvest at age 100.
PCT/FERT/CT[1]	Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Fertilizer applied at ages 30 and 45. Commercial thinning at age 45. Final regeneration harvest at age 60.
PCT/PRUNE	Overstocked stand; precommercially thinned at age 12 to 250 trees per acre. Pruned 80 trees/acre at age 25. Final regeneration harvest at age 60 or 100.

[1] Silvicultural systems with 2 descriptive approaches are dependent on assumed rotation lengths. Variations in exact timing of practices would vary by District.

Analytical Assumptions

The following are specific assumptions made in the analysis:

1. Difference in site productivity can significantly affect yields and financial returns (Koss and Scott, 1978). BLM in western Oregon manages 12 planning units designated as Sustained Yield Units (SYU). Site quality is variable both within and between SYUs. Due to the complexity of trying to analyze each SYU separately, the Douglas SYU of the Roseburg District was selected as representative for BLM administered lands in western Oregon. Average productivity expressed as site index for this SYU is 100 using Hann-Scrivani site index curves (Hann and Scrivani, 1987). Site Index 100 is the approximate mid-point of average site indexes used by the westside BLM Districts for decadal planning purposes in estimating timber yields. (*Economic Efficiency of Intensive Management Practices for the Douglas SYU*, 1991; unpublished report on file at Roseburg BLM.)

2. The costs for stand establishment treatments were derived from 1989 Roseburg BLM District contract cost data sources weighted by the percent of acres receiving the treatment. Logging and hauling costs were derived from tabular information compiled by the Medford BLM District for general westside BLM use in feasibility analysis for resource management planning.

3. An inflation rate of zero (0) and no future real increase in wood value were assumed. A discount rate of 4 percent was used.

4. The costs of establishing the current stand were not included in this analysis. However, the costs of establishing the next stand were included at the end of the assumed rotations. This convention is consistent with economic analyses done previously for BLM planning purposes in western Oregon[2].

5. Comparisons of effects were made at rotation (regeneration harvest) ages of 60 and 100 years depending on silvicultural system; 60 years represents probable average Statewide minimum rotation ages for BLM; 100 years represents the probable average BLM rotation age if Culmination of Mean Annual Increment (CMAI) is used as the rotation age criteria. (Curtis, 1992; Curtis and Marshall, 1993).

6. Intangible or intrinsic values (Smith, 1987) such as the potential value of practices for meeting nontimber objectives were considered beyond the scope of the analysis.

7. Pruning analysis was performed using the addition of select pricing for lumber grades and the veneer market. Pruning of the first 17.5' (16' merchantable log) is assumed to occur at age 25.

8. All gross yield outputs from SWO-Organon were reduced for stocking irregularity, insects and disease, defect and breakage, and effects of green-tree retention at a level of 7 large conifers per acre.

9. Timber products harvested were assumed to be a mixture of lumber and veneer. Lumber prices used in TreeVal+ were derived by taking 1989 Table 9 figures shown in Warren (1993). TreeVal+ veneer prices were derived from reviewing *Random Lengths* publications (Nov. 1992 - Aug. 1993). The use of 1993 veneer pricing instead of associated 1989 values was required due to the lack of readily available data sources.

Analytical Models

Future timber yields and wood quality tree characteristic outputs for managed stands were obtained from simulations using the Systum-1 young stand model, Version 1.8 (Ritchie et al., 1991) and the SWO-Organon growth and yield model Version 4.0 (Hann et al., 1992) .

Systum-1 is an individual tree, distance-independent growth model. It is suitable for growing trees from a minimum of 3 years of age up to an age (15-20+ years) compatible with entry into growth models suitable for older stands such as SWO-Organon.

SWO-Organon is an individual tree, distance-independent growth and yield model. It was developed from sampling plots located in the mixed conifer zone of southwestern Oregon. The model was developed primarily to simulate the growth and timber yield of Douglas-fir and mixed conifer stands. The model was designed to allow projections of both even-aged and uneven-aged stand conditions under different silvicultural systems.

Wood value and economic analysis were analyzed using the TreeVal+ (Sachet et al., 1989), DF Prune (Fight et al., 1992), and Forestry Investment Program (FIP) (Ikaheimo, 1990) models. The first two

programs provide product recovery plus value data and partial cost data to the third model for an integrated economic analysis.

TreeVal+ is an analysis program that calculates tree or stand values based on predicted product recovery. TreeVal+ is appropriate for natural or managed stands. Values of products harvested under the different prescriptions simulated were obtained from the TreeVal+ program.

DF Prune is a spreadsheet program designed to estimate the financial return from pruning coast Douglas-fir. Values of products harvested under systems where pruning is simulated were obtained from the DF Prune program.

The Forestry Investment Program is a financial analysis program specifically developed for the economic evaluation analysis of silvicultural prescriptions. FIP utilizes data inputs from SWO-Organon, TreeVal, DF Prune, and other sources in calculations of Net Present Values (NPV). The analysis can be structured to account for inflation, cost changes, and product value changes over time.

Results of Silvicultural Systems Analysis

Tables 3 and 4 show the effects on timber yield and economic returns for the different silvicultural systems for rotation ages of 60 and 100 years after stand initiation. Wood quality change is not directly displayed, but is expressed in the economic measures.

Percent change in cubic volume is the net timber yield increase above that of the base silvicultural system expressed as percent of net conifer cubic volume. Net Present Value (NPV) is calculated by subtracting discounted costs of producing timber from the discounted revenues from harvest. Percent change in NPV is the change in NPV relative to the NPV of the base silvicultural system. The benefit cost ratio depicts total discounted revenues divided by total discounted costs.

Value per cunit (100 cubic feet) is a simple relationship between total net revenues gained from a set of practices and the total net timber yield. The ratio allows interpretation of how each silvicultural practice functions to positively or negatively affect quantity (volume production) and/or quality (additions to value) of products produced.

Table 3 - Comparison of Yield Changes and Economic Returns for a 60-Year Rotation

Silvicultural System	% Change in Cubic Volume	Net Present Value (NPV	% Change in NPV	Benefit/Cost Ratio	Value per Cunit
BASE	*	$301	*	1.38	$3.78
PCT	+7%	$530	+76%	1.68	$6.21
PCT/FERT	+13%	$611	+103%	1.72	$6.78
PCT/CT	+15%	$497	+65%	1.49	$5.43
PCT/FERT/CT	+21%	$677	+125%	1.62	$7.04
PCT/PRUNE	+7%	$713	+137%	1.71	$8.35

Notes: % change in cubic volume is the increase in volume above that produced by base prescription (overstocked stand condition).
Net Present Value (NPV) is calculated by subtracting discounted costs from discounted benefits.
% change NPV is the percentage of NPV increase or decrease compared to the NPV of the base prescription.
Benefit cost ratio is calculated by dividing discounted benefits by discounted costs.
Value per cubic foot = Total NPV divided by total yield of all harvests in cunits (100 cubic feet).

Table 4 - Comparison of Yield Changes and Economic Returns for a 100-Year Rotation

Silvicultural System	% Change in Cubic Volume	Net Present Value (NPV	% Change in NPV	Benefit/Cost Ratio	Value per Cunit
BASE	*	$470	*	3.04	$3.47
PCT	+2%	$526	+11%	2.74	$3.80
PCT/FERT	+5%	$532	+13%	2.57	$3.75
PCT/CT	+17%	$625	+32%	1.86	$3.84
PCT/FERT/CT	+20%	$716	+52%	1.88	$4.39
PCT/PRUNE	+2%	$539	+15%	2.37	$3.90

Notes: % change in cubic volume is the increase in volume above that produced by base prescription (overstocked stand condition).
Net Present Value (NPV) is calculated by subtracting discounted costs from discounted benefits.
% change NPV is the percentage of NPV increase or decrease compared to the NPV of the base prescription.
Benefit cost ratio is calculated by dividing discounted benefits by discounted costs.
Value per cubic foot = Total NPV divided by total yield of all harvests in cunits (100 cubic feet).

Table 5 shows a comparison of 2 qualities influencing wood quality: average diameter at final harvest and average rings per inch.

Table 5 - Selected Tree Characteristics That Affect Wood Quality

	60 Years		100 Years	
Silvicultural System	Average DBH	Rings per Inch	Average DBH	Rings per Inch
BASE	11"	11	16"	13
PCT	15"	8	20"	10
PCT/FERT	16"	8	21"	10
PCT/CT	17"	7	23"	9
PCT/FERT/CT	18"	7	24"	8
PCT/PRUNE	15"	8	20"	10

All silvicultural systems showed an increase in timber yield above the base at both rotation ages analyzed. Gains were similar at both ages for silvicultural systems that included commercial thinning. Otherwise most commercial thinning harvest trees would otherwise die before final harvest and would not be recoverable as a usable product (Smith, 1962; Reukema and Bruce, 1977). Those silvicultural systems that did not include commercial thinning did not recover this mortality and, therefore, showed a decline in percent yield increase at 100 years.

All silvicultural systems showed a positive economic return at both simulated rotation ages. All tested combinations of practices produced higher levels of economic return than the base level alone. Economic returns are greater in all systems for the 60-year rotations.

Note: More details of the unpublished analyses described in this appendix are available from the Medford and Roseburg BLM Districts.

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