United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
3040 Biddle Road
Medford, Oregon 97504
email address: Medford_Mail@blm.gov

IN REPLY REFER TO:

OCT 20 2011

1792(ORM060)

Dear Interested Public:

The enclosed *Environmental Assessment* (EA) for the Conde Forest Management Project is available for public review. The Bureau of Land Management (BLM) sent out letters on August 29, 2011 requesting public input on a subset of this project (about 70 acres), described in the scoping letter as the MC Thin Timber Sale. After further review of other forest management needs in the vicinity of the MC Thin project area, I requested that the Interdisciplinary Team include additional project acreage to be analyzed under one Environmental Assessment. The combined project has been renamed the Conde Forest Management Project; however, the project will still be implemented in two phases over the next one-to-three year period.

The BLM is proposing to selectively thin timber on approximately 281 acres on BLM-administered land located in the Conde Creek drainage in the South Fork of the Little Butte Creek Watershed. The public land survey system description is: T. 38 S., R. 2 E. Section 7 and T. 38 S., R. 3 E. Sections 9 and 15, Jackson County, Oregon. The proposal would be designed to improve tree vigor and growth, reduce the impacts of forest disease, and promote the maintenance of fire resilient species such as pine and incense cedar. Commercial timber harvesting would be accomplished by tractor from designated skid trails, or by mechanical harvester. Post-harvest fuels reduction (hand piling and burning) would occur following harvest operations, and pre-commercial thinning is identified for 266 of the 281 acres. No new permanent road construction is proposed, and log hauling would be on existing roads. Two temporary spur roads (about 0.2 miles) are identified; these temporary spur roads would be decommissioned following completion of harvest activities. Additionally, 1.3 miles of existing roads are proposed for decommissioning.

We welcome your comments on the content of the EA. We are particularly interested in comments that address one or more of the following: (1) new information that would affect the analysis, (2) information or evidence of flawed or incomplete analysis; (3) BLM's determination that there are no significant impacts associated with the proposed action, and (4) alternatives to the Proposed Action that would respond to purpose and need. Specific comments are the most useful. **Comments are due by 4:30 PM, November 16, 2011.**

Before including your address, telephone number, email address, or other personal identifying information in your comment, be advised that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

All comments should be made in writing and mailed or delivered to Kristi Mastrofini, Ashland Resource Area, 3040 Biddle Road, Medford, OR 97504. Further information on this proposed project is available at the Medford District Office, 3040 Biddle Road, Medford, Oregon 97504 or by calling Kristi Mastrofini, Ashland Resource Area Planning, at (541) 618-2384.

Sincerely,

John Gerritsma
Field Manager
Ashland Resource Area

Enclosure

ENVIRONMENTAL ASSESSMENT

for

CONDE FOREST MANAGEMENT PROJECT

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
ASHLAND RESOURCE AREA

DOI-BLM-OR-M060-2012-0002-EA

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: Ashland

ACTION/TITLE: Conde Forest Management Project

EA NUMBER: DOI-BLM-OR-M060-2012-0002-EA

LOCATION: Conde Creek drainage, Little Butte Creek Watershed

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CHAPTER 1 - PURPOSE AND NEED

A. INTRODUCTION

The Bureau of Land Management (BLM), Ashland Resource Area, proposes to implement the Conde Forest Management Project, designed to implement specific management objectives for lands allocated to the production of timber resources under the Bureau of Land Management-Medford District, 2008 Record of Decision and Resource Management Plan, and the 1995 Medford District Resource Management Plan (RMP). This Environmental Assessment (EA) documents the environmental analysis conducted to estimate the site-specific effects on the human environment that may result from the implementation of the Conde Forest Management Project. The analysis documented in this EA will provide the BLM responsible official, the Ashland Resource Area Field Manager, with current information to aid in the decision-making process. This EA complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's regulations on Implementation of the National Environmental Policy Act of 1969 (43 CFR part 46).

B. WHAT IS BLM PROPOSING & WHERE IS THE PROJECT LOCATED?

The BLM is proposing to selectively thin timber on approximately 281 acres of BLM-administered land designated as Timber Management Area. The units are located within the Conde Creek drainage, a tributary of Dead Indian Creek, which drains into the South Fork Little Butte Creek. The proposal would be designed to improve tree vigor and growth, reduce the impacts of forest disease, and promote the maintenance of fire resilient species such as pine and incense cedar. Commercial timber harvesting would be accomplished by tractor from designated skid trails, or by mechanical harvester, and post-harvest fuels reduction (hand piling and burning) would occur in the commercial harvest units following timber harvest. No new permanent road construction is proposed, and log hauling would be on existing roads. Approximately 1.3 miles of road is proposed for decommissioning.

C. WHY IS THE BLM PROPOSING THIS FOREST MANAGEMENT PROJECT?

The Conde Forest Management Project is designed to implement timber management objectives of the Medford District 2008 Record of Decision (ROD) and Resource Management Plan (RMP), which states "[m]anage forests to achieve continuous timber production that could be sustained through a balance of growth and harvest". As described above, this project proposal is also consistent with timber resource management objectives of the 1995 Record of Decision and Medford District Resource Management Plan, which incorporated 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 the *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (Northwest Forest Plan) (USDA and USDI 1994). Specifically, this forest management proposal is designed to:

- Ensure sustainable forest production, and the renewable resources they provide, by managing forests to improve conifer forest vigor and growth (2008 RMP, p. 40-41; 1995 RMP, p. 72-73);

- Provide timber products from Timber Management land allocations in accordance with the direction in the Medford District's Resource Management Plan (2008 RMP, p. 38-40;1995 RMP,
  p. 72-73)

D. DECISION FRAMEWORK

This Environmental Assessment will provide the information needed for the responsible official, the Ashland Resource Area Field Manager, to select a course of action to be implemented for the Conde Forest Management Project. The Ashland Resource Area Field Manager must decide whether to implement the Proposed Action as designed, or whether to select the No-Action Alternative.

The decision will also include a determination whether or not the impacts of the action are significant to the human environment. If the impacts are determined to be within the range analyzed in the Medford District Resource Management Plan Environmental Impact Statement, or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and the decision implemented. If this EA determines that the significance of impacts are unknown or greater than those previously analyzed and disclosed in the RMP/EIS, then a project specific EIS must be prepared.

The forthcoming decision record will document the authorized officer's rationale for selecting a course of action based on the needs/objectives described above, the effects documented in the EA, and the extent to which the decision:

Contributes toward the Districts Allowable Sale Quantity

The Conde Forest Management Project is located on BLM-administered lands allocated to produce a sustainable supply of timber. Timber products removed to meet Timber Resource Objectives would contribute toward the District's Allowable Sale Quantity.

Addresses habitat needs of the northern spotted owl, listed as Threatened under the Endangered Species Act.

To contribute to the recovery and survival of the northern spotted owl, the responsible official must consider the extent to which the Conde Forest Management Project affects the current acreage and distribution of northern spotted owl habitat within the analysis area. A description of northern spotted owl habitat follows:

Nesting, roosting, and foraging (NRF) habitat is characterized by forested stands with older forest structure, canopy closure of 60 percent or greater, trees with large crowns, multiple canopy layers, snags and down wood. However, southwest Oregon NRF habitat varies greatly and one or more of these habitat components might be lacking or even absent.

Dispersal habitat for spotted owls is defined as stands that typically have a canopy closure of 40 percent or greater, and are open enough for flight and predator avoidance,

but do not meet the habitat criteria of NRF habitat. Dispersal habitat is used throughout this document to refer to habitat that does not meet the criteria of NRF (nesting, roosting, or foraging) habitat, but has adequate cover to facilitate movement between blocks of suitable NRF habitat.

Meets the BLM's obligation to protect resources consistent with existing laws, policy, and the direction of the Medford District Resource Management Plan

The relevant issues listed below (Scoping and Issues) provide the necessary framework for assessing the merits and the consequences to the physical, biological, human environment of implementing the Conde Forest Management Project.

E. LAND USE CONFORMANCE& LEGAL REQUIREMENTS

The proposed Conde Forest Management Project is located on lands designated by the 2008 Medford District RMP to Timber Management land allocation (2008 RMP, p. 39). The 2008 Medford District ROD/RMP specifically states: "Manage forests to achieve continuous timber production that could be sustained through a balance of growth and harvest" (USDI 2008, p. 40). The BLM also designed this project to be consistent with the Medford District's 1995 Record of Decision (ROD) and Resource Management Plan (RMP), which incorporated 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 the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (Northwest Forest Plan).

The Conde Forest Management Project contains Project Design Features that apply Best Management Practices of the 1995 RMP (Appendix D), which are also consistent with Best Management Practices contained in the 2008 RMP (Appendix C). While this EA contains discussions of land allocations and components of the 1995 RMP (e.g., Riparian Reserves, Aquatic Conservation Strategy Objectives, etc.), which are not components of the 2008 ROD and RMP, the 2008 ROD and RMP do not preclude the application or discussion of these components. As designed, this project complies with Management Direction, Objectives, and Best Management Practices of the 2008 ROD and RMP, as well as the 1995 Medford District RMP.

The Conde Forest Management Project is also consistent with the Medford District Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD), as modified by the 2011 Settlement Agreement.

The Proposed Action is also designed in conformance with the direction given for the management of public lands in the Medford District by the Oregon and California Lands Act of 1937 (O&C Act), Federal Land Policy and Management Act of 1976 (FLPMA), the Endangered Species Act (ESA) of 1973, the Clean Water Act of 1987, Safe Drinking Water Act of 1974 (as amended 1986 and 1996), Clean Air Act, and the Archaeological Resources Protection Act of 1979.

F. RELEVANT ASSESSMENTS AND PLANS

1. Watershed Analysis (USDI 1997)

The Conde Forest Management Project Area falls within the Little Butte Creek Watershed Analysis Area. The Watershed Analysis focused on the use of existing information available at the time the analysis was conducted, and provides baseline information. Additional information, determined to be necessary for completing an analysis of the Conde Forest Management Project, has been collected and is considered along with existing information provided by the 1997 Little Butte Creek Watershed Analysis. Management Objectives and Recommendations provided by the Watershed Analysis were considered and addressed as they applied to the Conde proposal.

2. Water Quality Restoration Plan--- North and South Forks Little Butte Key Watershed

The BLM is recognized by Oregon Department of Environmental (DEQ) as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM has signed a Memorandum of Understanding (MOU) with the DEQ that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations.

To comply with the BLM-DEQ MOU, the BLM completed the *Water Quality Restoration Plan (WQRP) for the North and South Forks Little Butte Key Watershed* (USDI BLM 2006). This document describes how the Bureau of Land Management (BLM) will meet Oregon water quality standards for 303(d) listed streams and protect designated beneficial uses of waters of the state on BLM-administered lands within the North and South Forks Little Butte Creek Key Watershed. The WQRP complies with the Rogue Basin Total Maximum Daily Load (TMDL) (ODEQ 2008). A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated.

Through implementation of the RMP, Aquatic Conservation Strategy, and Best Management Practices, the proposed action is designed to attain the recovery goals for water quality limited streams on federal lands in the North and South Forks Little Butte Key Watershed. Recovery goals are identified in the WQRP for the North and South Forks Little Butte Key Watershed. The proposed action and alternatives draw upon the passive and active restoration management actions recommended for achieving federal recovery goals. Following the WQRP for the North Fork and South Forks Little Butte Creek Key Watershed assures that BLM's management will not violate the Clean Water Act.

3. U.S. Department of Interior, Bureau of Land Management, Western Oregon Districts, Transportation Management Plan (1996, updated 2002)

This transportation management plan, is not a decision document, rather it provides guidance for implementing applicable decisions of the Medford District Resource Management Plan.

4. Southwest Oregon Fire Management Plan

The Southwest Oregon Fire Management Plan (FMP) provides Southwest Oregon with an integrated concept in coordinated wildland fire planning and protection among Federal, State, local government entities and citizen initiatives.

The FMP introduces fire management concepts addressing fire management activities in relation to resource objectives stated in the current Land and Resource Plans (parent documents) of the Federal agencies, the laws and statutes that guide the state agencies and private protective associations, and serve as a vehicle for local agencies and cooperators to more fully coordinate their participation in relation to those activities.

G. SCOPING AND ISSUES

Scoping is the process the BLM uses to identify issues related to the proposal (40 CFR 1501.7) and determine the extent of environmental analysis necessary for an informed decision. It is used early in the NEPA process to identify (1) the issues to be addressed, (2) the depth of the analysis, and (3) potential environmental impacts of the Proposed Action.

Scoping was conducted for a subset of this project (about 70 acres), described as the MC Thin Timber Sale. A letter briefly describing the original proposed action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on August 29, 2011. After further review of other forest management needs in the vicinity of the MC Thin project area, additional acreage was included to be analyzed under one environmental assessment. The combined project was renamed the Conde Forest Management Project.

1. Relevant Issues

An interdisciplinary (ID) team of resource specialists reviewed the proposal and all pertinent information, including public input received, and identified relevant issues to be addressed during the environmental analysis. Some issues identified as relevant to this project proposal were analyzed in association with broader level environmental analyses. Substantive issues brought forward by interested publics are included in the list below and addressed throughout this document. Where appropriate, this EA will incorporate by reference the analysis from broader level NEPA documents (40 CFR §1508.28), to be considered along with project specific analysis. The following issues related to the Proposed Action were identified by the interdisciplinary team based on internal and external scoping.

- What is the potential for logging (particularly tractor yarding) to increase soil compaction, and alter hydrologic flow, including peak flow and low flow?

- What is the potential for adverse effects to water quality from increased sediment produced from disturbance associated with timber harvest activities, including timber hauling, and road maintenance?

- What is the potential for effects, beneficial or adverse, to water quality from road decommissioning?

- Will the Conde Forest Management Project increase the potential for off-highway vehicle (OHV) use in the project area?

- What is the potential for sediment to affect to fish and aquatic habitat in Conde Creek, a fish-bearing stream?

- Timber harvest activities have the potential to affect northern spotted owl nesting, roosting, and foraging (NRF), and dispersal habitats; the northern spotted owl is listed as a Threatened species under the Endangered Species Act.

- What is the potential for the Conde Forest Management Project to affect wildlife species, including Bureau Special Status species?

- What is the potential for the Conde Forest Management Project to contribute to adverse cumulative effects to soils, water quality, hydrologic function, late-successional forest ecosystems, and other terrestrial and aquatic habitats?

- What is the potential for adverse effects from timber harvest and road use activities on Bureau Special Status vascular plants, bryophytes, lichens, and fungi?

- What is the potential for forest management to increase the risk of introduction and spread of noxious weeds?

- What is the potential for timber harvesting to increase surface fuels and fire hazard?

- What is the potential for fuels management activities and associated prescribed fire to affect air quality within the project area and surrounding areas?

CHAPTER 2 - ALTERNATIVES

A. INTRODUCTION

This chapter describes the Proposed Action Alternative developed by the ID Team to achieve objectives identified in the Purpose and Need section in Chapter 1. A No-Action alternative, which assumes a continuance of the existing conditions, is presented to form a baseline for analysis.

B. ALTERNATIVES ANALYZED IN DETAIL

1. Alternative 1 – No Action

The No-Action Alternative describes a baseline against which the effects of the action alternative can be compared. This alternative describes the existing conditions and the continuing trends, given the effects of other present actions and reasonably foreseeable actions identified, for the time periods appropriate for the resource issues of concern. Under the No-Action Alternative, the Conde Forest Management Project would not be implemented; there would be no commercial thinning of forest stands, no improvement of tree vigor and growth, and no maintenance of fire resilient species such as ponderosa pine and incense cedar. The analysis of this No-Action Alternative answers the question: What would occur to the resources of concern, if the proposed action does not take place?

The decision maker does not need to make a specific decision to select the "No-Action" Alternative. If that is the choice, the proposed action would simply be dropped and the decision process aborted. Future resource management in this area would not be precluded and could be analyzed under a subsequent NEPA document.

2. Alternative 2 – Proposed Action

a. Objectives

The objectives of the proposed harvest treatment under Alternative 2, the Proposed Action, are to reduce stand densities, to improve tree vigor and growth, and to reduce the impacts of disease on forest stands. The proposed harvest would perpetuate a mixture of more fire resilient tree species (e.g., pine species, incense cedar), and would contribute to the BLM's commitment to provide timber/forest resources to the local economy.

b. Summary of the Proposed Action

An estimated 281acres of conifer forests would receive commercial harvest treatments according to prescriptions summarized below (Section c, Silvicultural Objectives and Prescriptions); forest stands would be harvested using tractor yarding or mechanized harvesters. Harvesting would primarily occur from existing roads; an estimated 0.2 mile of temporary spur roads would be constructed. Pre-commercial thinning (understory thinning) is also proposed on 266 of these 281 acres. An estimated 1.3 miles of existing roads are planned for decommissioning (Table 2-2).

Post-harvest fuels reduction would occur in harvest units, as identified in Table 2-1, to treat small diameter fuels generated from harvest and pre-commercial thinning activities. Small diameter trees (<7 inches diameter) and slash created from forest thinning (activity fuels) and pre-commercial thinning would be cut, handpiled, and covered with plastic following completion of

timber harvest operations. Pile burning is usually completed within 6 months to 2 years of timber harvesting, depending on the time of year the harvest occurred; slash needs a period of time to cure before burning can take place. Follow-up Maintenance Underburning would involve the controlled application of fire to understory vegetation and downed woody material when fuel moisture, soil moisture, and weather and atmospheric conditions allow for the fire to be confined to a predetermined area at a prescribed intensity to achieve the planned resource objectives. Maintenance burning usually occurs within 5 years of initial treatments. Prescribed underburning usually occurs during late winter to spring when soil and duff moisture conditions are sufficient to retain the required amounts of duff, large woody material, and to reduce soil heating. Occasionally, these conditions can be met during the fall season.

To meet State air quality requirements, prescribed underburning would be implemented during periods of atmospheric instability (when weather disturbances are moving into or through the area) and air is not trapped by inversions on the valley floor. This allows smoke to be lofted up and away from the Rogue Valley. Prescribed Fire Plans, also referred to as Burn Plans, must be completed prior to a planned fire ignition and approved by the Field Manager. Prescribed Fire Plans guide the implementation based on site-specific unit conditions (including fuel moisture and weather conditions) at the time of planned ignition, and provide for pre- and post-burn evaluation to monitor if the burn was carried out as planned and its effectiveness at meeting resource objectives.

Units proposed for commercial harvest are listed in Table 2-1, by unit number, unit acreage, harvest treatment, owl habitat type/northern spotted owl habitat prescription (maintain, downgrade, or remove), and logging system. No harvest would occur in riparian reserves.

Table 2-1. Project Harvest Treatment (by Unit)

Unit	Acres	Harvest Treatment	Owl Habitat Type/Rx	Fuels Treatment	Yarding Method
7-1	15	White-fir Thin & Heritage	NRF/R	Hand pile/burn	Tractor
7-2	22	Disease & Heritage	NRF/D	PCT, Hand pile/burn	Tractor
9-1	55	Mixed Conifer Thin	NRF/M	PCT, Hand pile/burn	Tractor
9-2	14	Mixed Conifer Thin	NRF/M	PCT, Hand pile/burn	Tractor
9-3	51	Disease & Heritage	NRF/D	PCT, Hand pile/burn	Tractor
9-4	68	Disease & Heritage	NRF/D	PCT, Hand pile/burn	Tractor
15-1	3	Disease & Heritage	NRF/R	PCT, Hand pile/burn	Tractor
15-2	17	Disease & Heritage	DSP/M	PCT, Hand pile/burn	Tractor
15-3	19	White-fir Thin & Heritage	DSP/M	PCT, Hand pile/burn	Tractor
15-4	17	White-fir Thin & Heritage	DSP/M	PCT, Hand pile/burn	Tractor
Total	**281**				

Owl Habitat Abbreviations:
NRF = nesting, roosting, and foraging habitat
DSP = dispersal habitat

Owl Habitat Rx Abbreviations
R= remove habitat
D = downgrade habitat
M = Maintain

c. Silvicultural Objectives and Prescriptions

The silvicultural objectives for harvest are as follows:

1) Reduce stand density to increase tree growth, quality, and vigor of the remaining trees while maintaining existing owl habitat in (units 9-1, 9-2, 15-2, 15-3, and 15-4);
2) Create diversified stand structure (height, age, and diameter classes);
3) Increase growing space and decrease competition for large or legacy pine, oak, and cedar. (preserve existing genotypes which are physiologically better adapted to fire disturbance);
4) removed diseased tree to encourage stand health.

Trees would be marked for removal within proposed treatment units by BLM personnel, with oversight from the Ashland Resource Area's silviculturist and wildlife biologist, to ensure that treatment units are marked according to the silvicultural prescriptions.

Maintain Northern Spotted Owl Nesting, Roosting, Foraging Habitat (NRF)

Most forest stands that are currently providing for northern spotted owl nesting, roosting, and foraging habitat would be thinned to maintain NRF habitat function (Units 9-1 and 9-2). The complex forest structure that forms NRF habitat consists of dead down wood, snags, dense canopy, multi-storied stands, or mid-canopy habitat. However, southwest Oregon NRF habitat varies greatly and one or more of these habitat components might be lacking or even absent. Vegetative features of NRF habitat in southwest Oregon are typified by mixed-conifer habitat, recurrent fire history, and patchy habitat components. The silvicultural strategy here includes the use of selective thinning.

Selective thinning in NRF habitat is designed to accelerate the growth of large trees while maintaining a minimum of 60 percent canopy cover at the stand level. Canopy cover is the proportion of the forest floor covered by the vertical projection of tree crowns. Canopy cover is usually estimated with devices like the moosehorn, aerial photography, or remote imagery. Spacing of the residual (leave) trees would involve crown spacing off the healthiest dominant and co-dominant trees to achieve an average crown spacing range of 1-6 feet (dripline to dripline) at the stand level. Trees targeted for removal should include those with crown ratios less than 30 percent, exhibit crown decline, narrow crown widths, and contribute least to the canopy layer. Trees would be individually selected for removal that demonstrate these characteristics, unless it compromises the required minimum canopy cover of 60 percent. Spacing of the residual trees would use the crown widths of the healthiest dominant and co-dominant trees to achieve approximately 160-200 sq. ft. BA/AC in NRF habitat at the stand level

Maintain Northern Spotted Owl Dispersal Habitat (DSP)

Forest stands that are currently providing dispersal-only (DSP) habitat for northern spotted owl would be thinned to retain 40 percent canopy cover (Units 15-2, 15-3, and 15-4). Dispersal habitat is described as forested habitat greater than 40 years old with an average tree diameter of 11 inches, a canopy cover of about 40 percent or more, and flying space for owls in the understory.

Stands in DSP habitat that meet the above criteria would be selectively thinned to accelerate the growth of large trees, while maintaining approximately 40 percent canopy cover at the stand level. Spacing of the residual (leave) trees would involve crown-spacing of the healthiest dominant and co-dominant trees to achieve an average crown-spacing range of 3-15 feet (dripline to dripline) at the stand level. Trees targeted for removal

should include those infected with Dwarf Mistletoe or Root Rot disease, or healthy trees with crown ratios less than 30 percent, exhibiting crown decline, narrow crown widths, and contributing least to the canopy layer. Trees would be individually selected for removal that demonstrate these characteristics, unless it compromises the required minimum canopy cover of 40 percent. Spacing of the residual trees would use the crown widths of the healthiest dominant and co-dominant trees to achieve an average relative density range of 0.25 to 0.45 (25 to 45 percent).

Figure 2-1. Photographs illustrating >60 percent canopy cover (left) and 40 percent canopy cover (right).

***Thin Mixed Conifer Stands*:** These stands are comprised of a mix of tree species including Douglas-fir, ponderosa pine, sugar pine, incense cedar, and white fir. Thinning objectives for mixed conifer stands are to improve tree vigor and growth, maintain a larger proportion of Douglas-fir species while maintaining the highest diversity of mixed conifer species for the stand. Species composition of the forest must be considered as well as individual tree physiology. A minimum of 20 percent early-seral species should be maintained in the mixed conifer forest stands as described by Franklin and Dyrness (1973). Therefore, selection of treatment trees would be based on 4 criteria: species, tree dominance, age class or diameter, and individual tree characteristics. Suitable sugar pine, Douglas-fir, incense cedar, and ponderosa pine (disease-free, non-chlorotic individual trees with crown ratios ≥ 30 percent) would be favored for leave over white fir. Leave approximately 100-140 sq. ft. basal area per acre (BA/AC)[1] in DSP habitat and NRF habitat downgrade/removal.

Thin White Fir Stands: Similar to mixed-conifer stands, these stands are comprised of a mix of tree species including white fir, Douglas fir, ponderosa pine, incense cedar, and sugar pine. Thinning objectives for white fir stands are to improve tree vigor and growth, increase the proportion of early seral species such as pine species and incense cedar. Stand density retention is relatively higher for white fir stands for several reasons: to prevent frost damage to conifer regeneration, to avoid basal scarring to residual white fir due to frost cracks, and to decrease the likelihood of gopher damage. Avoid mechanical damage to white fir crop trees. Consider potential tree wounding from mechanical damage from logging when selecting a leave tree, especially white fir (thin bark) leave

[1] Basal Area - a) Of a tree: the cross-sectional area, expressed in square feet, of a tree stem measured at breast height. b) Of a forest stand: the total cross-sectional area of all the trees in a stand, measured at breast height, expressed in square feet per acre. Measurement of how much of a site is occupied by trees; directly related to stand density.

trees. Strategically mark trees to limit basal scarring during commercial entry. Leave 100-140 sq. ft. BA/AC in DSP habitat and 120-160 sq. ft. BA/AC in NRF habitat downgrade or removal at the stand level. Species would be favored as leave trees in the following order: sugar pine, ponderosa pine, incense cedar, Douglas-fir, and white fir.

Disease Management: Trees infected with Douglas-fir dwarf mistletoe (*Arceuthobium douglasii)* or root rot (*Phellinus weirii)* would have a preference for removal to ensure the future health and growth of the existing regeneration. Not all trees infected with dwarf mistletoe would be removed in order to maintain structural and stand diversity, but most of the white fir trees infected with root rot would be targeted in order to stop the spread into uninfected areas.

Selective thinning and maintenance of heritage trees is typically prescribed for even-aged cohorts with little crown differentiation and declining growth rates. Thinning around older heritage trees such as large ponderosa pine, incense cedar and Douglas-fir would occur to maintain these large trees within stands. In cases where large ponderosa pines and incense cedars require release, Douglas-fir and white fir trees within twice the drip line diameter would be removed creating an area designed to release the trees and promote diversity. In some cases, co-dominant trees may be removed unless doing so would alter average canopy cover below required levels. Trees targeted for removal would generally have crown ratios less than 30 percent, and contribute least to the canopy layer. Any trees exhibiting old growth characteristics or other unique characteristics would be retained.

General Guidance Applicable to all Silvicultural Prescriptions

Strive to create diverse vertical and horizontal stand structure by leaving trees of all crown classes with crown ratios of $\geq$ 30 percent. Strive for stand diversity in regard to diameter classes, species compostion, tree heights (crown classes), trees per acre, and the vigor of individual trees. Some diseased, forked-top trees, and dying and dead trees should remain.

Avoid the harvest of old-growth trees. Old-growth trees are defined to have the following characteristics:

- Larger and older than the second growth trees in the current stand, an indication that the tree maybe one of the seed trees of the present day stand. These trees have a bottle-brush shape (non-symmetrical crown).
- Large-diameter limbs indicating that the tree was once open-grown and had a large crown. Limbs (live or dead) are usually heavy and gnarled, are covered with mosses and lichens, and are close to the ground.
- Douglas-fir will have thick bark with deep fissures and have a chocolate brown color. Second-growth trees have more gray color in the bark. Ponderosa pines will have thick bark that is plate-like and yellow orange in color.

To encourage the maintenance and establishment of fire resilient species, favor leaving sugar pine, ponderosa pine, incense cedar, Douglas-fir, and white fir, respectively.

Trees with bird nests, wildlife cavities, wide forks with flat nesting spots, or loose bark (bat roosts) would be not be removed.

Leave snags of various size and decay classes; safety hazard trees required to be felled would be left on the forest floor to provide coarse woody material. Favor large, deformed or unique green trees in the stand for future snag recruitment. When available, leave green trees (any diameter) immediately adjacent to snags that are greater than 20 inches DBH. These trees will provide additional structural and habitat diversity.

Leave all coarse woody debris of various size and decay classes. When available, leave green trees (any diameter) immediately surrounding large pieces of coarse woody debris (greater than 20 inches DBH and 8 feet in length). Retention of green trees would minimize coarse woody debris disturbance and maintain the functional integrity of the coarse woody debris.

Do not mark hardwoods >8 inches DBH for cut. Leave large hardwoods for stand diversity. Never mark a conifer with its crown entangled in a hardwood tree.

Thin around large (>20 inches DBH) or old-growth pine and cedar trees. Protect these tree species by increasing growing space and decreasing competition around these trees. Mark all competing conifers around the leave or center tree twice the distance of the trees drip line (distance from tree bole to drip line). Leave all trees in a group if they exhibit old-growth characteristics. Trees that exhibit old-growth characteristics should be preferred over tree size when selecting an individual or group to protect. Trees that are associated with old-growth trees and create a unique type of stand structure or wildlife habitat shall not be marked.

Where root disease is encountered, infection centers should be marked to favor resistant species. When infection centers are identified, mark all symptomatic trees within the infection area if prescribed canopy cover is not compromised at the stand level. Mark white fir trees found within infection centers and Douglas-fir trees found only in laminated root rot areas. Douglas-fir and white fir trees within these disease centers would be retained for wildlife habitat if they meet the description of old-growth trees. Identify all marked root disease infection centers on map for inventory and tree planting opportunities. Leave all non-symptomatic incense cedar, sugar pine, and ponderosa pine trees within infection centers.

Where mistletoe is encountered, target heavily infected trees for removal first, then focus on leaving resistant species (sugar pine, ponderosa pine, incense cedar, and white fir), followed by uninfected or the least-infected Douglas-fir trees with infections confined to the lower third of the tree (Douglas-fir Mistletoe Rating [DMR] Ratings 1-2, Figure 2-2). Dwarf mistletoe-infected trees may be marked for treatment if prescribed canopy cover retention for the stand is not compromised.

Figure 2-2. Douglas-fir Dwarf Mistletoe Rating (DMR) System (Source: *The American Phytopathological Society, 2006*)

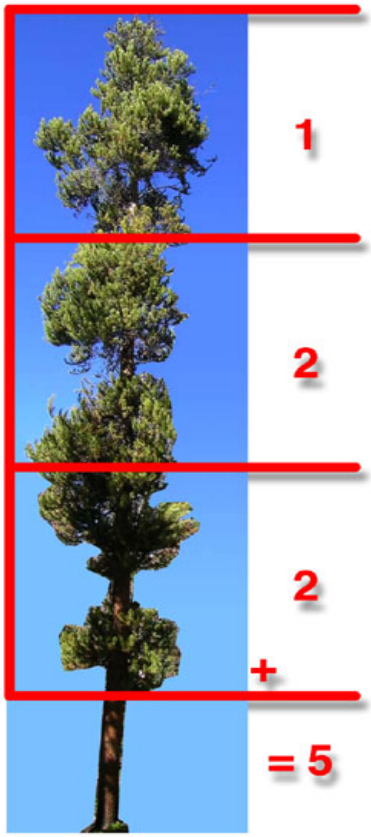
Divide the live crown into thirds and rate each third:

0 = no infection
1 = half or fewer branches infected
2 = over half of branches infected

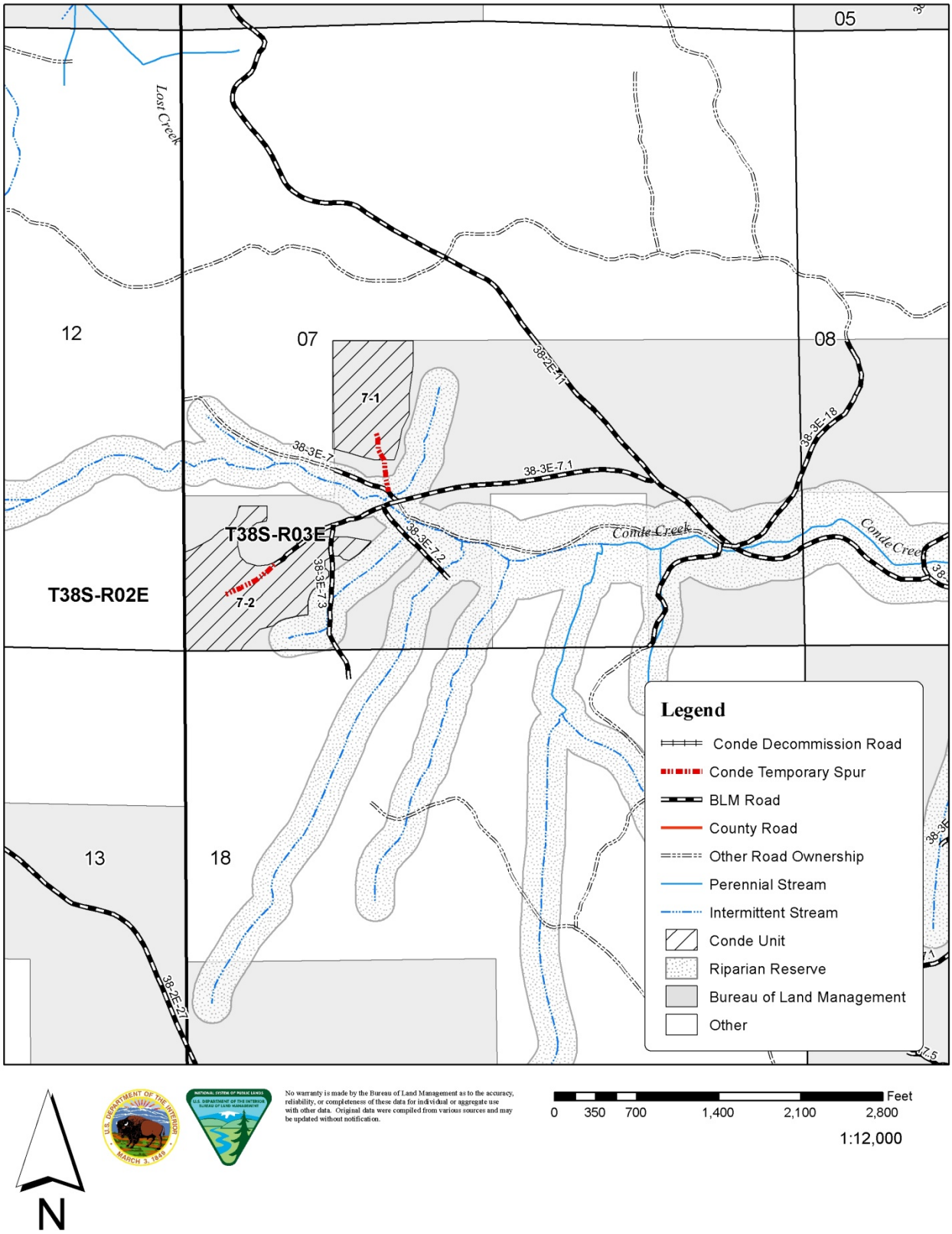
Sum the ratings to get tree DMR

Assign tree rating of 1 if stem infection and no branch infections

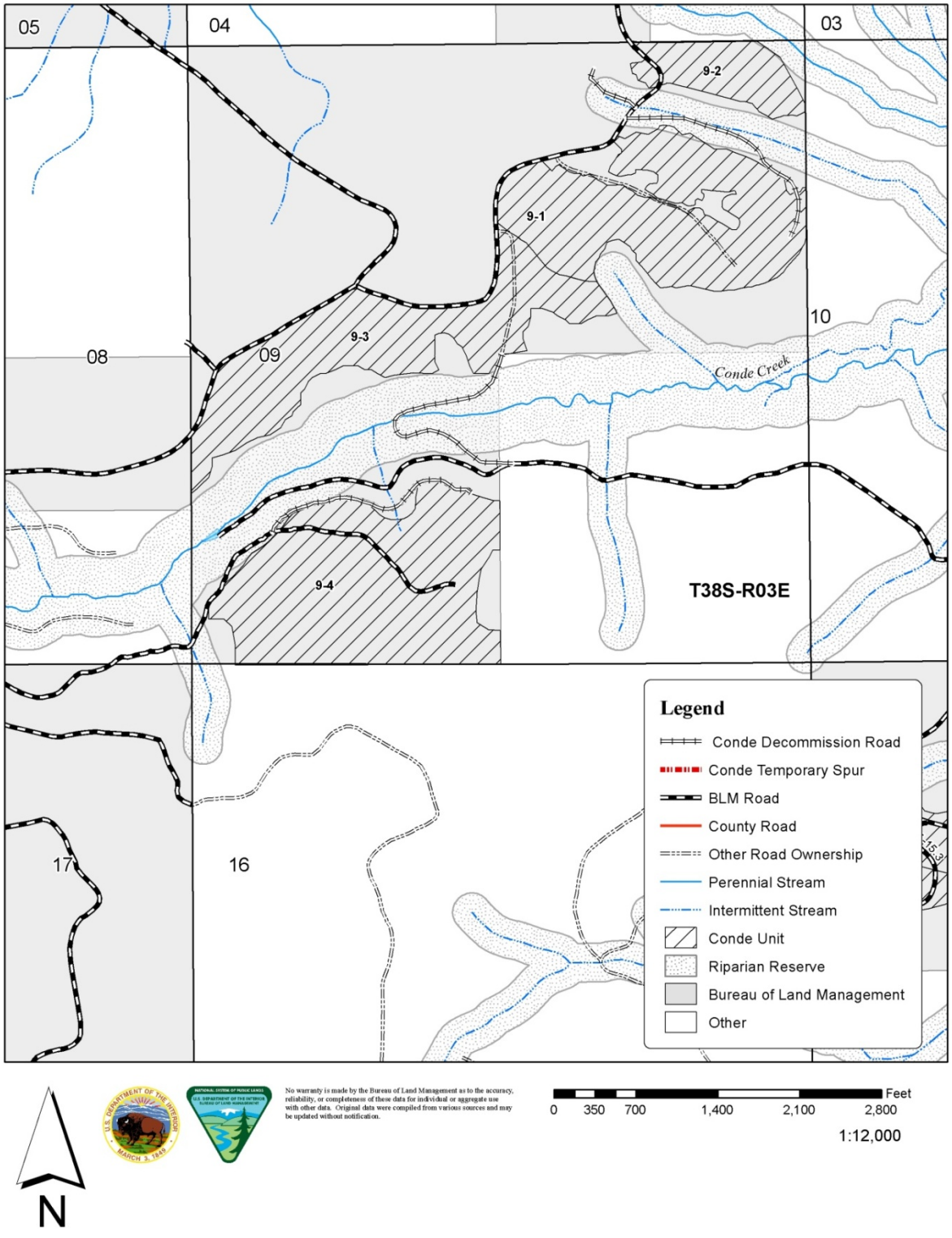
For stand DMR, average ratings of all trees of host species (including uninfected)



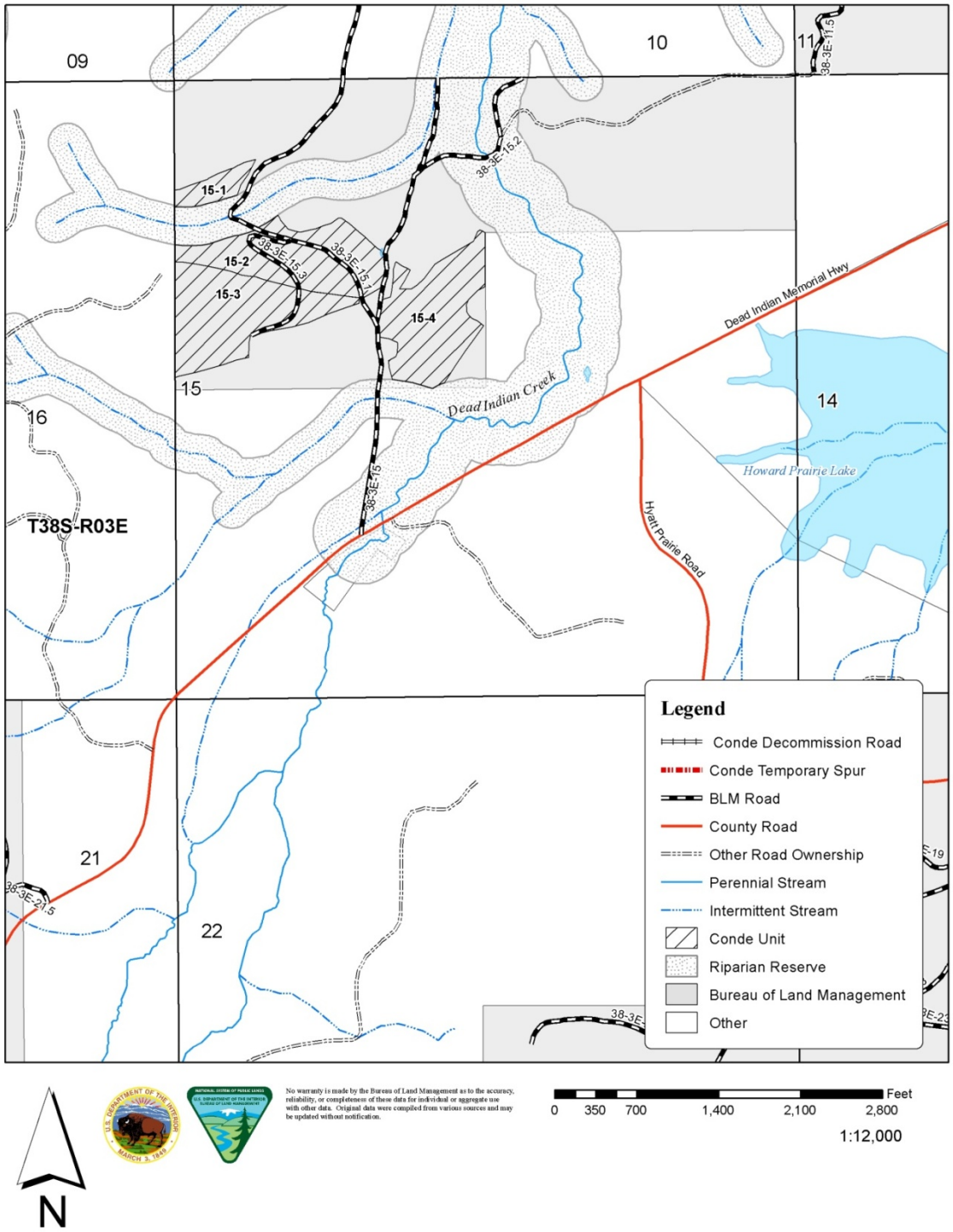
Map 2-1. Proposed Unit Map



Map 2-2. Proposed Unit Map



Map 2-3. Proposed Unit Map



3. Project Design Features

Project design features (PDFs) are included in Alternative 2-Proposed Action for the purpose of reducing anticipated adverse environmental impacts which might stem from project implementation.

a. Riparian Reserves

Riparian Reserves (RMAs), as designated by the 1995 Medford District RMP, are located on Federal lands within the project area. Riparian Reserves would be excluded from commercial harvest units by clearly marked unit boundaries on the ground.

Riparian Reserves in the Conde Forest Management Project area are as follows:

(1) Fish streams: 330-foot distance on each side of the stream.

(2) Perennial nonfish-bearing streams: 165 feet (slope-distance) on each side of the stream.

(3) Intermittent nonfish-bearing streams and wetlands greater than 1 acre in size: 165 feet (slope distance) on each side of the stream or outer margins of wetland. Intermittent streams have a defined channel, annual scour and deposition, and are further described as "short-duration" or "long-duration". (Upper portions of stream reaches that do not exhibit a defined channel or annual scour/deposition do not meet this definition.)

(4) Springs, seeps and other non-stream wetlands less than 1 acre in size: the wetland and the area from the edges of the wetland to the outer edges of the riparian vegetation. For the Conde Forest Management Project, a buffer of 100 feet is being implemented to meet this requirement.

(5) Dry draws and ditches would not have a designated riparian reserve, but trees would not be removed within 10 feet of either side of these waterways.

b. Water Resources

(1) Landings would be treated to reduce soil erosion. If the landing is located within a Riparian Reserve, treatment of the running surface would be dependent on site conditions and would include subsoiling, which would lift and fracture the compacted surface in place to a depth of 18 inches. Mulch and seed with native grasses or other approved material is required. All landings shall then be blocked sufficiently to preclude vehicular use.

(2) Temporary routes with lengths of 100 to 500 feet, also referred to as temporary spurs, are identified and analyzed for use. If opened/constructed these temporary spurs would be blocked and water-barred at the completion of log haul and within the same season as constructed/opened. Work would be done between June 1st to October 15th. Blockage shall consist of placing logs, slash, boulders, berms, and other material so the road is camouflaged and vehicle use is precluded throughout its length.

(3) No hauling would occur on natural-surface roads during the wet season (October 15th to June 1st). This would protect the road from damage and decrease the potential for off-site

sediment movement. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions of the roads.

c. Silviculture

After timber harvest, non-merchantable trees with undesirable silvicultural characteristics should be slashed. In areas where pre-commercial thinning is prescribed, all non-merchantable trees should be cut except the largest live conifer trees that meet the following criteria:

1) Minimum 4-inch terminal leader with at least the top 40 percent of the tree containing live limbs.
2) Non-chlorotic, light or dark green with very little or no yellowish tint.
3) Undamaged top.
4) Free of visible disease, cankers, fire damage, or blister rust.
5) Demonstrates good form and vigor.
6) No multiple tops or ramiforms.

In the absence of conifers that meet the above definition for an acceptable crop tree, include any live conifer seedling that is at least three (3) feet tall that falls within the spacing guidelines.

In the absence of conifer trees, hardwoods will be considered acceptable crop trees. The order of preference will be bigleaf maple, Oregon ash, willow species, any oak species, and Pacific madrone. Space the acceptable conifer and hardwood trees at a variable spacing (12 to 18 feet).

Throughout the entire project area, all saplings through pole (7 inch DBH and smaller trees) timber should be slashed within the double dripline of the old-growth trees that were released.

d. Harvest and Yarding

To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary, and would be equipped with a minimum of 100 feet of winch line and integral arches to obtain one-end log suspension. All tractor skid trail locations would be pre-approved by the BLM contract administrator prior to falling operations. Existing skid trails would be utilized when possible. Tractors would be restricted to slopes less than 35 percent, although operations on short pitches greater than 35 percent may be permitted. Mechanical harvester (feller-buncher equipment) could be used when soil moisture content at a 4-6 inch depth is less than 20 percent, or when there is a minimum 18-inch snowpack. Yarding tractors would not be restricted to designated skid trails if yarding is done in the winter on an adequate snowpack. Mechanical harvesters would be limited to the smallest size necessary, and would be equipped with a minimum 20-foot reach. Operations would generally occur between June 1 and October 15 or on top of a minimum 18-inch snowpack. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions.

Main skid roads would be water barred after use and blocked where they intersect haul roads.

e. Roads and Landings

Table 2-2 lists existing roads that would be used/maintained, decommissioned or closed. In addition to existing roads, 2 temporary spurs measuring a total length of approximately 1000 feet are proposed for construction. Approximately 1.3 miles of roads are proposed for

decommissioning. Log hauling on unpaved roads would be permitted between June 1 and October 15, except for the natural surface roads accessing units 7-1 and 7-2. These natural surface roads would be restricted until June 15, or in the winter months when yarding may be permitted on top of an adequate snow pack (minimum 18 inches). Roads would be plowed to maintain 4 inches of packed snow. The un-numbered existing spur into Unit 9-1would be waterbarred and blocked after use. Landings would be contoured to provide for adequate drainage, and would be seeded and straw mulched with native grasses and/or an approved seed mix following harvest according to prescribed BLM standards. The over-grown road located between Units 9-1 and 9-2 would not be opened or used. Temporary spur construction and road decommissioning would occur during the dry season, from June 16 to October 15. Cull logs, slash, and debris will be placed along the obliterated prism of the temporary spur roads to discourage use by OHVs, particularly where they intersect the existing roads.

Table 2-2. Conde Forest Management Project Roads Table

Road Number	Approximate Length (miles)	Existing Surface:	Control	Possible Improvements	Seasonal Restriction
		Depth (inches) and Type		Depth (inches)	(for log hauling)
38-2E-11.00 J2	0.17	ASC	BLM		1
38-2E-11.00 K	0.36	ASC	BLM		1
38-3E-07.00	0.12	NAT	BLM		2
38-3E-07.01 A	0.45	NAT	BLM		2
38-3E-07.01 B	0.26	NAT	BLM		2
38-3E-07.03	0.20	NAT	BLM		2
38-3E-09.00	0.66	ASC	BLM		1
38-3E-09.01	0.40	NAT	BLM		1
38-3E-15.00 A	0.35	PRR	BLM		1
38-3E-15.00 B	0.26	PRR	BLM		1
38-3E-15.01 A	0.53	NAT	BLM		1
38-3E-15.03	0.32	NAT	BLM		1
38-3E-17.00 A	2.47	BST	BLM		0
38-3E-15.40	0.25	ASC	BLM		1
38-3E-15.5	0.15	NAT	BLM		1
38-3E-17.00 B	1.27	BST	BLM		0
38-3E-17.00 C1	0.55	BST	BLM		0
38-3E-17.00 C2	1.05	BST	BLM		0
38-3E-17.00 D	2.22	BST	BLM		0
38-3E-17.00 E	1.11	BST	BLM		0
38-3E-17.00 F	2.67	BST	BLM		0
38-3E-17.02 A	0.81	ASC	BLM		1
38-3E-17.02 B	0.15	NAT	BLM		1
38-3E-17.02 C	0.58	NAT	BLM		1
Total mileage	**17.36**				

Table 2-2. Conde Forest Management Project Roads Table (continued)

Proposed Road Decommissioning in the Conde Forest Management Project Area				
Road Number	**Approximate Length (miles)**	**Existing Surface: Depth (inches) and Type**	**Control**	**Decommission Type**
38-3E-9.3	0.11	NAT	BLM	Mechanical
38-3E-9.6	0.40	NAT	BLM	Natural
38-3E-9.5B	0.45	NAT	BLM	Mechanical
38-3E-17.2	0.37	NAT	BLM	Natural
Total mileage:	**1.33**			

Road Number	**Approximate Length (miles)**	**Existing Surface: Depth (inches) and Type**	**Control**	**Closure Type**
38-3E-9.4	0.35	NAT	BLM	Barricade
38-3E-9.5A	0.22	NAT	BLM	Barricade
Total mileage:	**0.57**			

Notations:
NAT = natural, **GRR** = Grid Rolled Rock, **PRR** = Pit Run Rock, **ASC** = Aggregate Surface Course, **BST** = Bituminous Surface Treatment

BLM = Bureau of Land Management, **PVT** = Private

Possible Improvements:	0 = no road stabilization/drainage improvements (all BLM haul roads would be maintained as needed)
Seasonal Restrictions:	0 = no restrictions; 1 = hauling restricted between 10/15 and 6/1; 2 = hauling restricted between 10/15 and 6/15 If Purchaser furnishes and places additional rock. Seasonal restrictions could be modified as approved by the Authorized Officer.

f. Oil and Hazardous Materials & Emergency Response

During operations described in Alternative 2, the operator would be required to have a BLM-approved spill plan or other applicable contingency plan. In the event of any release of oil or hazardous substance, as defined in Oregon Administrative Rules (OAR) 340-142-0005 (9)(d) and (15), into the soil, water, or air, the operator would immediately implement the site's plan. As part of the plan, the operator would be required to have spill containment kits present on the site during operations. The operator would be required to be in compliance with OAR 629-605-0130 of the Forest Practices Act, Compliance with the Rules and Regulations of the Department of Environmental Quality. Notification, removal, transport, and disposal of oil, hazardous substances, and hazardous wastes would be accomplished in accordance with OAR 340-142, Oil and Hazardous Materials Emergency Response Requirements, contained in Oregon Department of Environmental Quality regulations.

g. Terrestrial Wildlife

Objective 1: Protect Northern Spotted Owl Nest Reserves

(1) Reserve from harvest the designated 100-acre core area for northern spotted owl sites designated as known sites on January 1, 1994.

Objective 2: Reduce Disturbance (noise & habitat) Impacts to Northern Spotted Owl

(1) Work activities that produce loud noises above ambient levels would not occur within specified distances (Table 2-3) of any documented or generated owl site during the critical early nesting period, March 1 and June 30, or until two weeks after the fledging period. This seasonal restriction may be waived if protocol surveys have determined the activity center is not occupied, owls are non-nesting, or owls failed in their nesting attempt. The distances listed in Table 2-3 may be shortened with Level 1 concurrence if substantial topographical breaks or blast blankets (or other devices) would muffle sound between the work location and nest sites.

(2) The Resource Area Biologist may extend the restricted season until September 30 during the year of harvest, based on site-specific knowledge (such as a late or 2nd nesting attempt).

(3) Burning would not take place within 0.25 miles of spotted owl sites (documented or projected) from March 1 through June 30, or until two weeks after the fledging period, unless substantial smoke would not drift into the nest patch.

Table 2-3. Mandatory Spotted Owl Restriction Distances

Activity	Zone of Restricted Operation
Heavy Equipment (including nonblasting quarry operations)	105 feet
Chain saws	195 feet
Impact pile driver, jackhammer, rock drill	195 feet
Small helicopter or plane	360 feet*
Type 1 or Type 2 helicopter	0.25 miles*
Blasting; 2 pounds of explosive or less	360 feet
Blasting; more than 2 pounds of explosives	1 mile
* If less than 1,500 feet above ground level.	

Objective 3: Provide Wildlife Trees & Habitat for Cavity Dependent Species

(1) Reserve from harvest a minimum of 3 snags per acre greater than 17 inches DBH, where available. Retention of snags greater than 17 inches DBH within the interior of the stands would mitigate impacts to cavity-dependent species.

(2) Retain and protect where possible (if not jeopardizing public or worker safety) large, broken-top trees and large snags with loose bark.

Objective 4: Protect Special Status Wildlife Species

(1) Northern Goshawks are known to inhabit forested habitat of the type found within the Conde Project area. No known nest sites occur within the Project Area. Any nest sites located prior to or during harvest activity would be protected with a 30-acre buffer.

(2) The Mardon skipper butterfly, a Federal Candidate for listing and a Bureau Sensitive species, may occur in meadow areas near the project area. Natural meadows are

identified as special habitats and receive protection from disturbance as directed in the RMP (p. 45).

(3) Golden Eagles are occasionally observed in the forested habitat within the Conde Project Area. Known nest locations would be protected with a 30-acre buffer.

(4) Bald Eagles are known to occur near the Conde Project Area. A one site tree buffer would be placed around known nest trees. Manage approximately 30-acre core area around nest sites. Retain older forests within ½ mile of nests. Large overstory trees and dominant trees along ridges in the vicinity of nests should be retained Develop HMP for sites. Avoid disturbance within ½ mile from February 1 through August 15. (RMP p.57)

Objective 5: Manage Wildlife Species Protected as Survey and Manage Species

(1) Known great gray owl nests would be protected with a ¼ mile protection buffer (approximately 100 acres).

(2) Known locations of Survey and Manage and Bureau Sensitive snails, *Monadenia chaceana and Helminthoglypta hertleini, Monadenia fidelis celeuthia, Vespericola sierranus* would be protected through the application of a no-treatment buffer.

(3) Suitable habitat for *Pristiloma arcticum crateris* snail species would be protected through no-treatment in Riparian Reserves (which includes suitable habitat within 30 feet on each side of the channel).

h. Botanical Resources/Weeds

For the protection of Special Status/Survey and Manage Plant and Fungi Species:

(1) All plant and fungi species will be protected by one or more of the following: no-treatment buffers of variable size depending on species, habitat and treatment; seasonal restriction; modification of treatment prescription.

To minimize the spread of noxious weeds:

(1) Pressure wash vehicles and equipment that will travel off system roads prior to entry onto BLM-managed lands.

(2) Seed or plant highly disturbed areas during project implementation with native plant materials.

(3) Mulch highly disturbed areas after treatment with weed-free straw or hay, per 63 FR 124:51102. Straw or hay must be obtained from the BLM or purchased from growers certified by Oregon Department of Agriculture's Weed Free Forage Program. If hay is used, it must be from native grasses only.

(4) Treat noxious weed infestations as resources allow, using the most effective methods to maintain or promote healthy native plant communities.

i. Fire & Fuels

(1) Underburns would be conducted only when a light-to-moderate burn can be achieved (i.e. spring-like conditions, when soil and duff are moist).

(2) Firelines for underburns would be constructed manually.

(3) Waterbars on hand firelines would be constructed according to District guidelines (USDI 1995:167).

(4) Piles would be dispersed across treatment areas. Piles would be burned when soil and duff moisture are high.

(5) Any containment lines constructed for fuels projects shall be sufficiently blocked to preclude use by OHVs. This would include such measures as placing logs and slash, falling trees less than 8 inches DBH (excluding riparian reserves) or other actions as necessary.

j. Range

Rangeland improvements in the project areas damaged by falling or removal of trees, skidding, yarding, or other equipment use shall be report to the BLM COR and immediate repairs shall be made by the contractor(s) to preclude livestock escape from assigned pastures. All repairs shall meet BLM standards. The project COR shall be responsible to ensure that damage to improvements is fully repaired and functional before harvesting or thinning activities are completed. Damage repair shall be the responsibility of the contractor(s), and fees for damage repair left incomplete shall be charged to the contractor. This provision shall include cleaning of cattle guards when tree harvest or thinning operations fill debris pits below cattle guards.

Where open gates, opening in fences or fence wire is down, the contractor(s) shall be responsible for reporting this to the BLM COR immediately and all gates shall be kept closed during daily operations, while livestock are present on the allotment (approximately June 1 through September 30, annually) unless designated by the COR otherwise.

In the event harvest or thinning operations allow livestock to move outside or through an existing fence or gate, the contractor(s) shall notify the BLM COR of numbers, brands and other identification information of the livestock to the COR. The COR will contact associated BLM personnel and the BLM lessees involved so livestock are returned to assigned areas.

If necessary, provision will be made by the COR with the Contractor to allow the Contractor to lower fence wire or install a passage through an existing fence, for a short period to conduct operations (e.g. Unit 9-1). The fence will be fully repaired by the Contractor and gates or openings will be kept closed when livestock are present as specified above, during and following work activities. If a wire gate or panel gate is allowed to be installed, it must meet BLM fencing standards, not negatively affect the existing fence and be taught and impenetrable by livestock in all its aspects during and at the conclusion of the timber harvest/thinning contract.

k. Cultural Resources

Cultural Resource Survey has been completed for the Conde Forest Management Project. No cultural resources were located in the units during this survey.

If during project implementation the contractor encounters or becomes aware of any objects or sites of cultural value on federal lands, such as historical or pre-historical ruins, graves, grave markers, or artifacts, the contractor shall immediately suspend all operations in the vicinity of the cultural value and notify the COR. The project may be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the resource area archaeologist and concurrence by the Ashland Field Manager and State Historic Preservation Office.

CHAPTER 3 - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

This chapter describes the present conditions of each affected resource, followed by a comparison of the estimated environmental effects of implementing Alternative 1-No Action and Alternative2-Proposed Action. The Environmental Effects portion of this chapter provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and the reasonably foreseeable environmental consequences to the human environment that each alternative would have on the relevant resources. Impacts can be beneficial, neutral or detrimental. The affected environment is described to the level of detail needed to determine the significance of impacts to the environment of implementing the Proposed Action. The analysis of the direct, indirect, and cumulative effects are organized by resource and the analysis areas for actions proposed under this EA vary by resource. For all resources it includes the project area, which encompasses the areas where actions are proposed for the Conde Forest Management Project.

1. Project Area and Analysis Area

The terms **project area** and **analysis areas** are used throughout this chapter. The following defines each term:

> The terms **project area,** or treatment area, are used interchangeably to describe where action is proposed, such as units where forest thinning is proposed.
>
> **Analysis areas** vary by resource and include those areas that could potentially be affected by the proposed action. In some cases the analysis area is confined to the project area and in others the analysis area extends beyond the project area.

2. Consideration of Past, Ongoing, & Reasonably Foreseeable Actions in Effects Analysis

The current condition of the lands affected by the proposed action is the result from a multitude of natural processes and human actions that have taken place over many decades. A catalogue and analysis, comparison, or description of all individual past actions and their effects which have contributed to the current environmental conditions would be practically impossible to compile and unduly costly to obtain. Ferreting out and cataloguing the effects of each of these individual past actions would be a time consuming and expensive task which will not add any clearer picture of the existing environmental conditions.

Instead of incurring these exorbitant costs in terms of time and money, it is possible to implement easier, more accurate, and less costly ways to obtain the information concerning the effects past actions, which is necessary for an analysis of the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."(See definition of "cumulative impact" in 40 CFR § 1508.7.)

Under 43 CFR § 46.115 it states that when considering cumulative effects analysis, it must analyze the effects in accordance with relevant guidance issued by the Council on Environmental Quality (CEQ). As the CEQ, in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review

informs agency decision-making regarding the proposed action." Use of information on the effects on past action may be useful in two ways according to the CEQ guidance. One is for consideration of the proposed action's cumulative effects, and secondly as a basis for identifying the proposed action's direct and indirect effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." The importance of "past actions" is to set the context for understanding the incremental effects of the proposed action. This context is determined by combining the current conditions with available information on the expected effects of other present and reasonably foreseeable future actions.

Effects analyses completed for resources potentially affected by the Conde Forest Management Project describe indicators of importance along with the spatial (analysis area) and temporal scale of importance for determining the effects of multiple actions (past, current, and reasonably foreseeable) on affected resources. As discussed above, the current condition assessed for each affected resource inherently includes the effects of past actions.

The analysis of the effects of other present and reasonably foreseeable actions relevant to the effects of the proposed action is necessary. How each resource analysis uses information concerning other ongoing or reasonably foreseeable activities is, however, dependent on the geographic scale of concern and attributes considered during each resource analysis.

B. SOIL RESOURCES

1. Affected Environment

The topography in the project area consists of slopes between 3 and 35 percent slope at elevations between 4,000 and 5,000 feet above mean sea level. The mean annual precipitation is 36 to 38 inches, the mean annual temperature is 40 to 45 degrees F, and the average frost-free period is less than 100 days. A table of the predominant soils identified in proposed harvest units is listed below (Table 3-1), followed by a general description of the soil series recognized by the Natural Resource Conservation Service. See the soils map (Map 3-1) for the location of the soils on the landscape. There may be minor amounts of other soil series included within the proposed units.

Table 3-1. Predominant Soils Associated With Harvest Units

Map Unit #	Soil Series Name	Depth (in.)	Soil Texture	Soil Sensitivity Category
57, 58	Farva	20 - 40	Very cobbly loam, cobbly loam	2
142, 144	Pinehurst	60+	Loam, clay loam	3
190	Tatouche	60+	Gravelly loam, gravelly clay loam, clay	2

a. Description of Soils Series

Farva Series

The Farva soil series is moderately deep, well-drained soil on hillslopes. It formed in colluvium derived from andesite, basalt, and volcanic ash. Typically, the surface is covered with a layer of needles, leaves, and twigs about a ½ inch thick. The surface layer is dark brown, very cobbly loam about 12 inches thick. The subsoil is brown, extremely cobbly loam about 15 inches thick. The substratum also is brown, extremely cobbly loam. It is about 8 inches thick. Weathered bedrock is at a depth of about 35 inches. The depth to bedrock ranges from 20 to 40 inches. In some areas the surface layer is stony. Permeability is moderately rapid in the Farva soil. Available water capacity is about 3 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

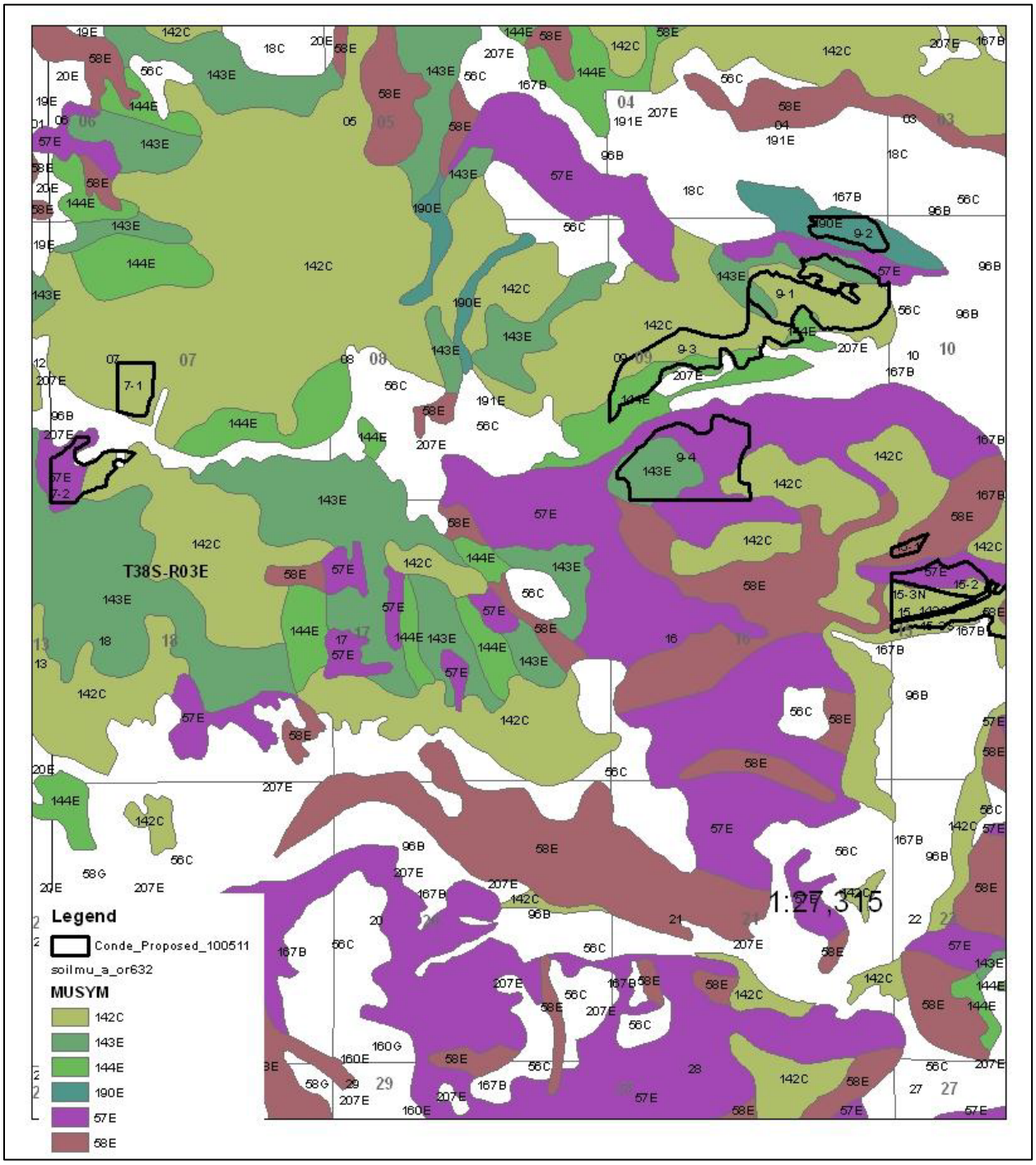
Pinehurst Series

This very deep, well-drained soil is on plateaus. It formed in colluvium derived from basalt and andesite. Typically, the surface is covered with a layer of needles and twigs about 1 inch thick. The surface layer is dark reddish brown loam about 15 inches thick. The subsoil to a depth of 60 inches is dark reddish brown clay loam. The depth to bedrock is 60 inches or more. In some areas the surface layer is stony. Permeability is moderately slow in the Pinehurst soil. Available water capacity is about 10 inches. The effective rooting depth is 60 inches or more. Runoff is low, and the hazard of water erosion is slight.

Tatouche Series

The Tatouche soil is very deep and well-drained. It formed in colluvium derived dominantly from andesite, tuff, and breccia. Typically, the surface is covered with a layer of needles and twigs about 2 inches thick. The surface layer is very dark brown gravelly loam about 11 inches thick. The upper 8 inches of the subsoil is dark brown gravelly clay loam. The lower 41 inches is dark brown clay. The substratum to a depth of 73 inches is strong brown clay loam. The depth to bedrock is 60 inches or more. In some areas the surface layer is stony or cobbly. Permeability is moderately slow in the Tatouche soil. Available water capacity is about 8 inches. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

Map 3-1. Conde Forest Management Project Area Soils



b. Roads

No new roads are proposed to be constructed under the proposed action. Approximately 1.3 miles of road in are to be decommissioned under this project. Approximately one mile would be decommissioned in Section 9 and about 0.3 mile in section 15. The information in table S-1 was taken from the Little Butte Creek Watershed Analysis and illustrates the road density in the sections where operational units are proposed. The proposed decommissioning will help reduce the road densities.

Table 3-2. Road Densities in Sections With Proposed Operational Units

Sections with Road Densities > 4.0 mi/mi^2					
Township	**Range**	**Section**	**Roads(mi/mi^2)**	**Ownership**	**Drainage Area**
38S	3E	7	5.9	⅓ BLM	Conde, Soda
38S	3E	9	7.1	BLM	Conde, Soda
38S	3E	15	6.4	⅓ BLM	U.D.I.

Analysis Areas: U. D. I. = Upper Dead Indian Creek; Conde = Conde Creek; Soda = Soda Creek

The project area gets significant snow fall amounts in the winter and a lot of the roads are closed due to snowpack. Most of the roads appear to have been built over ten years ago and, due to the gentle topography, are in stable condition. The surfacing on most roads are adequate except those that access units in section 7 and 15 that are below optimum levels to minimize road-related erosion, particularly during wet-season use. Soil loss from a lightly graveled roadbed is approximately equivalent to loss from an un-graveled one. In contrast, soil loss from fully graveled roadbeds (6 to 8 inches thick) was only 3 to 8 percent of that from the bare soil roadbed of otherwise similar construction (Swift 1988). In the Swift study, erosion rates from the natural surfaced and minimal surfaced roads were about 1.4 tons/acre/inch rain, while the adequately rocked roads yielded less than 0.1 ton/acre/inch rain. Although erosion rates vary depending on site hydrology, soil type, topography, climate, and engineering treatments, these figures provide an example of the relative amount of erosion that may occur.

c. Soil Productivity

Soil is a fundamental resource that controls the quantity and quality of such renewable forest resources as timber, wildlife habitat, forage, and water yield. Soil productivity is the inherent capacity or potential of a soil to produce vegetation and the fundamental measure of soil productivity is the site's carrying capacity for plant growth. The key properties directly affected by management are site organic matter (OM) and soil porosity. These two properties regulate critical site processes through their roles in microbial activity, soil aggregate stability, water and gas exchange, physical restrictions on rooting, and resource availability (Powers 2004, p.194). Although other factors such as water regimes, soil biological types and populations, and soil loss can also affect long-term soil productivity, site organic matter and soil porosity are most important when measuring the effects of management.

A sustained flow of organic matter from primary producers to the forest floor and into the soil is vital to sustained site productivity through its influence on soil protection, the activity of beneficial soil organisms, soil water holding capacity, soil structure and aggregate stability, and nutrient supply. Organic matter influences the interception and retention of solar heat by the soil. It dissipates the energy of falling water (rain). Organic matter is the ultimate source of substances that bind soil particles together into stable aggregates that resist erosion. Through its carbon compounds, organic matter constitutes the energy source for soil fauna and microbes and is a concentrated reservoir of plant nutrients supplied to the soil.

In the project area, organic matter is abundant on all sites that are planned for treatment. Most of the organic matter is in the form of down wood, leaf litter and needle cast and was produced from trees, shrubs, grasses, and moss. Soil organic matter appears typical for the region with most of the sites having about ½ inch or less of litter (leaf and needles). Some sites with a mature forest canopy in sections 7 and 9 have a litter layer about 1 inch thick. Except for areas disturbed by roads and trails and sites with gravels and cobbles surfaces, the most of the soil in the proposed project area had at least a thin ground cover of organic material. On most sites, soil organic matter consumption appears normal with a very thin layer of decomposing matter at the soil and litter layer interface.

The reduction in soil porosity (compaction) results in the loss of soil aeration, moisture availability and increases the resistance of soil particles to root growth. Reduced soil porosity also can reduce water infiltration rates, thereby accelerating surface runoff and soil erosion. The size distribution of soil pores is also important for maintaining a productive site. Large pores and cracks are important for soil drainage, aeration, and root access; smaller pores store soil water and are the sites of nutrient retention and microbial activity. Both kinds of pores are required for productive soils.

Rapid gas exchange in soils is required for optimum microbial activity and growth of plant roots. Adequate supply of oxygen for root growth can be assured if there is a network of continuous, air-filled pores present in a soil. Soil water storage is very important because total site water use is generally positively correlated with growth, factors that decrease soil water storage are detrimental to productivity and those that increase it are beneficial (Childs et al. 1989).

d. Past Actions

An inventory of past actions with harvest dates and units of treatments was made for the analysis area using past harvest records and photo interpretation. Timber harvest records in combination with the operations inventory data were used on land managed by the BLM. A nearly complete harvest data record was available from about 1975 to present. An inventory of harvest activities prior to 1975 on BLM-administered land was estimated using operation inventory records and aerial photo interpretation. The inventory of past harvest activities on private land was estimated using aerial photo interpretation. The aerial photos used were from 1966, 1975, 1980, 1985, 1991, 1996, 2001, and 2005. The past actions were digitized in Geographic Information Systems (GIS) layer and a corresponding database established.

The relevant part of analyzing past actions is determining what events or actions previously occurred, whether current proposals repeat those actions or events, and whether current proposals have similar or different anticipated effects. In addition, past events are manifested in current conditions, the starting point for the addition of cumulative effects. The lessons learned from past actions are that roads were historically poorly designed and located without regard to erosion and stream sedimentation impacts. Many of the roads have been poorly maintained and have been degraded as a result of use during the wet season. Clearcutting and broadcast burning in the 1980s created highly erosive conditions especially when ground-based yarding systems were used without much regard for the location and number of skid trails, and/or tractor-piling of slash was incorporated. These sites have been re-established with vegetation and, save for roads, erosion rates are near natural levels.

The analysis area consists of approximately 5,130 acres in three 7th field hydrologic units. It is estimated that about all of the 281acres proposed for harvest have had some type of timber harvest in the past. All past timber harvest in the proposed units were accomplished using tracked equipment. It is estimated that most of the units were select cut harvest which was completed around 1974 and 1976 except for units 9-1, 9-2, and 9-3 which was select cut around 1966. Previous harvest on the proposed units was did not implement designated skid roads. In the analysis area, most of the harvesting before the 1970s (approx. 2,600 acres) was in the form of single tree selection or group selection taking out the biggest and most

valuable trees. During the 1970s through the 1980s clearcutting was implemented which was often followed by broadcast burning of the logging slash on the site. During the 1980s on BLM managed land, tractor harvesting was restricted to designated skid trails that would impact about twelve percent of the harvest area. It is estimated that unrestricted tractor logging resulted in about twenty-five percent of the area being compacted. There have been approximately 1,115 acres harvested on BLM-administered land within the planning area since 1970 and approximately 522 acres on private land during that time period. Overall, it is estimated that about 80 percent of the land has had some sort of harvest entry in the past with most being partial cutting or single tree selection.

In the analysis area, it is estimated that approximately 326 acres of land have been compacted to some extent as a result of timber harvesting since 1970. Of these acres, about 195 acres have been compacted on BLM-administered land and about 131 on private land. It is difficult to predict compaction's effects on soil productivity because of all the variables, but McNabb and Froelich (1983) estimate that stand growth losses can range from 5 to 13 percent and compaction's effects can last 30 years. Lucklow and Gullen (2007), in a compaction study of Arkansas forest, found evidence that old disturbance areas have partially self-mitigated since the previous harvest entry. The old disturbance compaction observed in this study was caused from harvest equipment activities that occurred at least 15-20 years earlier. Old disturbance areas are composed of secondary or primary skid trails and areas that received 1-2 equipment passes. They estimate it would take from 50-80 years for skid trail soil density levels to recover to near natural density levels. This estimated recovery period is in line with other findings. Perry (1964) estimated a 40-year recovery period for reduced infiltration rates on old compacted woods roads to approach natural rates on a southern Arkansas soil.

2. Environmental Consequences

Because no new management is proposed under Alternative 1, the effects described reflect current conditions and trends that are shaped by ongoing management and events unrelated to the Conde project.

Discussions for Alternative 2 (Proposed Action) reflect the direct and indirect impacts of these alternatives. Effects discussion also includes cumulative impacts of those direct/indirect actions when added incrementally to actions past, present, and reasonably foreseeable. The environmental consequences on the soil resource will be described in terms of the effect that a particular action would have on the soil characteristics or soil erosion processes. It would be futile to try to predict specific quantitative values for erosion as there are too many variables to consider such as rainfall amount, duration and intensity during storm events. The effects of the proposed activities will be compared to natural rates.

The appropriate scale for measuring soil productivity criteria (compaction, erosion, etc.) is site specific or on a unit by unit basis. The appropriate scale for measuring erosion or compaction that may affect water resources would be the designated analysis area (see Water Resource section for analysis areas). Short-term impacts (or effects) are those being ten years or less and long-term more than ten years. Although studies (Rice et al. 1972) and local observations by BLM soil scientist reveal that vegetation recovery and erosion rates return to near normal levels within approximately 5 years, short-term effects of 10 years were used because broadcast burning within 5 years after harvest could occur.

a. Alternative 1

The effect of the No-Action Alternative on the soil resource would be the continuance of existing erosion rates coming from the current conditions throughout the analysis area. Erosion rates are near natural levels throughout the project area except for areas where roads and trails exists. The units that were harvested in the past have stabilized with vegetation and erosion rates back to near natural levels. There is no way to be certain that possible future actions will occur on private land but it is presumed that all private lands having timber of commercial value would be harvested in the near future (10 years). These actions would increase the amount of compacted acres in the drainages possibly affecting peak flows. A discussion of the effects that future harvest, compacted acres and roads has on sedimentation in local waterways is included in the Water Resources section.

The risk of catastrophic fire in the drainage is projected to increase (see Fire/Fuels Management section) if no action is taken to reduce the fuel loading. An active fuels management program over the past five years has offset some risk but almost a century of fire exclusion has occurred in this area and, consequently, "natural" fire conditions no longer exist. Fuel loadings in some areas are greater and duff/litter layers are often greater than would naturally occur. Given the natural fire frequency in this area, many low-severity fire events have likely been suppressed over the past century. Fire exclusion in mixed conifer forests has increased the risk of fire due to decades of fuel accumulation (Taylor 2003; p.704). Consequently, the inevitable but unpredictable, uncontrolled natural burn (wildfire) could be of such intensity as to severely increase erosion and sedimentation, and severely set back the community of microorganisms. Following wildfire, erosion susceptibility is increased in response to increased soil moisture from decreased evapotranspiration (Silva et al. 2006), increased displacement of soil particles from decreased vegetative interception of rain (Anderson and Brooks 1975), and formation of a hydrophobic soil layer in some instances that decreases water infiltration into soil (Brady 2001). When compared to the Proposed Action, there would be no increase in erosion rates short-term but long-term erosion from roads would increase due to lack of sufficient road maintenance and the risk of a catastrophic wildfire would increase as a result of the no action alternative.

b. Alternative 2

There is no permanent road construction and 0.2 miles of temporary spur road construction proposed under this alternative. Road construction would have the greatest impact on the soil resource as approximately 4 acres of land are disturbed and taken out of vegetation production for every one mile of road construction proposed. There would be a noticeable increase in soil erosion the first few substantial rain events after construction. Erosion rates from roads and landings on the Cascade geomorphological unit (similar to that of the analysis area) were reported to be about 9.36 $yd^3/ac/yr$ (Swanson and Dyrness [1975] in Amaranthus et al. 1985, p. 233). This total includes mass slope failures from roads and landings on unstable slopes in calculating the number. Because all of the newly proposed spur road construction would be located on gentle topography (<8%) it is anticipated that, under average rainfall conditions, the erosion rates would be less than one-quarter of those reported by Swanson (<2 $yd^3/ac/yr$) the first few substantial storm events after construction and decrease down to near natural rates after 5 years as the spurs roads will be decommissioned after use. Typically, newly constructed roads lose the most soil primarily during the short period before grass becomes established and the roadbed is graveled or compacted.

Approximately 1.3 miles of existing roads are proposed for decommissioning under the proposed action. The road decommissioning would consist of mechanical decommissioning approximately 0.6 mile with the remained being closed and allowed to naturally decommissioning. As mechanically decommissioning involves ripping the road surface and digging up existing culverts, there would be a moderate short-term increase in soil erosion the first several rain events after road decommissioning is completed. A long-

term decrease in sediment production associated with existing roads would result as erosion rates on decommissioned roads lower to near natural levels in five to ten years. Mechanically decommissioning roads should decrease erosion rates to near natural levels within ten years.

The road renovation that would occur consists of roads that have had little use and/or maintenance in the recent past and need more work than improvements. Renovation may include removing brush or grubbing out trees from the running surface of the road. Soft spots would be fixed with filter fabric in conjunction to the spot rocking to restore the road surface. Ditches could need continuous cleaning rather than just spots. A portion of the renovation has a grass surface and erosion rates are currently near normal. Road renovation would increase erosion in the local area but the topography of the proposed renovation is very gentle and no off-site erosion is anticipated.

There is about 281acres of land proposed for land management activities with some type of timber removal. Soil disturbance from timber harvesting may not be avoidable, but can be minimized. Preventative measures are more effective in minimizing impacts on soils than remedial mitigation because of the remedial expenses, loss of productivity until mitigation occurs, and the possibility that the original soil conditions may never be restored (Miller et al. 2004). The commercial timber harvest activities proposed in this alternative would disturb, on average, about 15 percent of the ground in the proposed harvest units. As a result of implementing designated skid trails, the units tractor logged would result in approximately twelve percent or less of the area compacted (USDI 1995, p.156). Designating skid trails would most likely minimize the area that would be deeply disturbed during tractor logging operations.

In a study on partially cutting using designated skid trails conducted by Oregon State University (Bradshaw 1979), designated skid trails occupied only four percent of the area compared to 22 percent for conventional logging. In a study of thinning and partial cutting by yarding systems, skidding logs caused soil disturbance on about 21 percent of the site resulting in 13 percent displacement and 8 percent compaction (Landsberg 2003, p.29).

Observations of the units proposed for harvest reveal very few old skid trails still apparent across the landscape. Tree and brush vegetation has re-established in most of the skid trails that were previously compaction from past harvesting.

The proposal to use a harvester/forwarder system is proposed in some units instead of tractor yarding using designated skid roads. Implementing such equipment would occur only during very dry soil conditions or on a minimum of 18 inches of snow pack and would result in minimal amount of detrimental compaction. Harvested trees would be processed in front of the harvester, so that the harvester trails are covered with slash. Slash is placed in front of the harvester to produce a slash mat for the harvester and forwarder to walk over. The forwarder, that carries the logs to the landing, should remain on trails approximately 150 ft. apart to avoid impacting more than 12 percent of the harvest area.

Short-term erosion rate potential would increase slightly (approximately 15 percent over undisturbed rates) in the tractor units as most slopes are less 20 percent. Most of the eroded particles would not reach waterways as a result of Riparian Reserves buffers, waterbars and the dispersal of yarding skid trails. The decrease in soil pore space, as a result of the compacted skid roads, causes a slower infiltration rate and larger amounts of sediment laden surface runoff. On slopes less than 20 percent and skid roads that follow the contour, runoff velocity tends to be reduced and soil particles transported only a short distance. Although erosion rates would increase in the harvested units, most soil particles would not reach local waterways under normal rainfall conditions and return to near normal rates usually within 5 years as vegetative cover is re-established. In most operations, a major portion of the harvest area would remain essentially undisturbed. Even logging systems that cause the most disturbances seldom bare more than 30

percent of the soil surface. Since surface erosion depends primarily on extent and continuity of bare areas, soil loss is usually slight (Rice 1972).

Geppert (1984) concluded that cumulative surface erosion should result from the construction and existence of road networks, but that forest harvest and site preparation should not result in cumulative erosion, except when poorly applied on poor or harsh sites (Beschta, http://www.cof.orst.edu) . There are no harsh or poor sites being treated in this alternative as such sites were screened through the Timber Productivity Capability Classification process (USDI 1994, page 3-85) and taken out of the timber harvest base.

Prescribed burning proposed under this alternative would be in the form of handpile burning or broadcast burning. As the broadcast burning planned in this project would be an underburn, the intensity of the burn would be light to moderate and have slight direct short-term effect on soil properties. A light surface fire would generally only char the litter, leaving most of the mineral soil at least partially covered. A moderate burn would result in the duff, rotten wood, or other woody debris partially consumed; mineral soil under the ash not appreciably changed in color. Most soil and ash movement occurs during the first rainy season after the slash is burned and quickly diminishes as vegetation cover re-establishes. A recent study concluded that prescribed restoration fires did not have a significant effect on soil solution and stream chemistry or stream sediment concentrations and that low-intensity, low-severity fires could be used effectively as a tool to restore vegetation structure and composition (Elliot 2005, p.5).

The increase in erosion rates over present levels would be less than 15 percent as a result of burning handpiles because the piles would be spaced throughout and occupy approximately 3 to 5 percent of the total area. The increased potential of soil particles reaching the local waterways as a result of the prescribed burning would be low because of prescribed riparian buffers, and handpiling of slash would not occur near waterways. High soil temperatures generated by burning piles would severely and adversely affect soil properties in 3 to 5 percent of the unit by physically changing soil structure and reducing nutrient content. In most pile burning operations, the duff and woody debris is completely consumed.

Duff and woody debris represent a storehouse of minerals and protection for the soil surface. Since Nitrogen losses are roughly proportional to the amount of duff consumed, burn prescriptions that allow greater retention of woody debris benefit long-term site productivity. Burning volatizes organic Nitrogen or changes it into a readily available form (for plant use). Large proportions of the total Nitrogen budget can be lost through volatilization in the sites where pile burning occurs. Total foliar Nitrogen content also is reduced (14% in moderate burns, 33% in intense burns), and the effects last at least 4 years (Atzet 1987, p.193). Overall, soil productivity would experience slight (<15%), adverse short-term effects but potential long-term beneficial effects would be realized from the proposed actions as the risk of catastrophic fire is diminished.

In summary, there would be a net increase in compacted area in the tractor harvest units averaging about 12 percent which would slightly decrease soil productivity long-term. Based on research and past monitoring of operational activities, it is assumed there would be a 5 percent loss of productivity on all lands that would be tractor harvested using designated skid trails. The loss is accounted for in the (Medford District) non-declining timber harvest calculations (PRMP/EIS 1994, p.4-13). Soil productivity would experience a slight (<15%), adverse short-term effect but potential long-term beneficial effects would be realized by thinning and prescribed fire. There would be a slight (≈15%) increase in erosion rates as a result of the combination of harvesting timber and fuel reduction activities (i.e., slashing, prescribed burning) which would last about three to five years. A slight cumulative long-term decrease in erosion rates would occur as a result of road decommissioning.

Cumulatively, there is currently little direct evidence to indicate that harvest removals in themselves lead to soil depletion over several succeeding rotations (Beschta, http://www.cof.orst.edu). A crucial aspect that affects soil productivity is cutting intensity. Cutting intensity means the proportion of standing trees harvested, i.e., clearcutting vs. shelterwood vs. selection cutting. The less intense the cutting intensity results in lower effect on the soil. Another critical aspect of a silvicultural regime is the rotation or cycle length. Rotation length determines the intervals at which the site is entered and disturbed and nutrients are removed, redistributed or lost. Rotation length is especially significant from the point of view of cumulative effects since it determines the time periods allowed for recovery between harvests. Soil productivity decline should be least likely when low silvicultural intensity is combined with high inherent productivity and favorable conditions. Soil erosion may prove cumulative through time if periodic disturbances occur (that result in soil leaving the site) at intervals too short for the site to stabilize to bring about recovery. This should not be the case as a result of the Conde Project as soil disturbance would not result in a significant amount of soil leaving the site and erosion rates would return to near normal within about five years. Most past harvest that had a substantial effect on soil erosion rates was over twenty years ago and the most sites has recovered from those events. Therefore, cumulative effects to the soil resource as a result of the timber harvest would be minimal if the soil resource is allowed enough time to recover from the disturbance of this project.

C. WATER RESOURCES

1. Affected Environment

The Conde project area is located in the western portion of the Little Butte Creek watershed, which is a tributary to the Rogue River. For purposes of analyzing the affected environment and the proposed project (specifically cumulative effects) the analysis area for water resources will consider portions of Conde and Dead Indian Creeks.

Dead Indian Creek is called a sub-watershed and represents a 6th field hydrologic unit code (HUC). Conde Creek is a tributary of Dead Indian Creek. This sub-watershed is further subdivided into 7th field HUCs called drainages, which range in size from 1,035 to 2,619 acres. The total size of the analysis area is 5,132 acres and consists of drainages where treatments are proposed. The size of the drainage is large enough to assess the cumulative effect of actions that, taken individually (site scale) may not be significant, but when combined with effects from everything else going on in the drainages, may have a potential impact ("cumulative effect"). The drainage areas are small enough to avoid "drowning out" evidence of adverse effects. As the size of the analysis area increases, there is an increasing possibility of the analysis indicating that there is "no problem," when in fact individual drainages may have issues of concern.

The analysis area is within Jackson County and is a mix of public and private land. Dead Indian Creek, of which Conde Creek is a tributary, flows into South Fork Little Butte Creek. The South Fork Little Butte Creek is designated as a tier 1 key watershed (USDI 1995). This designation places additional management requirements on activities in these areas, such as reducing system and non-system road mileages. In addition, Conde and Dead Indian Creeks are currently listed as water quality impaired (303d) for year round temperature.

The analysis area is within the extreme eastern portion of "interior southwest Oregon". The headwater areas where these drainages are located are relatively gentle and forested with interspersed large meadows. As they flow northeast, the topography steepens then gradually transitions where they eventually flow into Little Butte Creek. The climate is characterized by mild wet winters and hot dry summers and has the highest average summertime temperatures and the lowest average precipitation

within western Oregon and Washington. Average annual precipitation ranges from approximately 22 inches in the lower elevations to 44 inches along the watershed divide. Winter precipitation in the higher elevations usually occurs as snow, which ordinarily melts during the spring runoff season from April through June. Rain predominates in the lower elevations, with a mixture of rain and snow occurring between approximately 3,500 feet and 5,000 feet in what is referred to as the transient snow zone (TSZ). Rain on snow runoff events originate in this zone and when they occur, can trigger landscape altering responses such as floods, debris torrents and landslides. Summer rainstorms occur occasionally and are usually of short duration and high intensity. These types of events are usually limited in coverage, but can result in increased erosion and sediment deposition.

The topography where the harvest is proposed is gentle to moderate. This would include the proposed tractor harvest units where equipment would not be allowed on slopes greater than 35 percent. Areas of high groundwater exist within the analysis area and numerous springs and small meadows are present. These areas have been identified on the ground and equipment excluded from entering them. Depending on the feature, riparian reserves are established based on site potential tree height, which for Little Butte Creek is 165 feet. At the time of survey, all channels appeared stable and the harvest units were designed to buffer these features utilizing the specified distances.

Private lands within the analysis area are generally used for ranching and timber production. Public lands are almost entirely managed by the BLM and are primarily used for timber harvest, grazing and recreation. Regional public issues reflect the dominant uses of the analysis area and include concerns with recreational activities such as off-highway vehicle (OHV) use; concerns with timber harvest and grazing on private and public lands; concerns about fish and water quality; concerns over water rights and allocations; and concerns over general degradation of the natural environment.

As a result, the hydrology of the analysis area has been altered through irrigation withdrawals, roads, grazing, timber harvest, and other actions. There is one stream diversion canal within Conde Creek which has likely altered stream hydrology, primarily by reducing flows during the spring and early summer. Streams in this area are considered transport channels, wherein sediment is routed through these reaches only to be deposited in lower gradient depositional reaches. Therefore, stream morphology may be less affected, although as in the lower reaches impacts to water quality and aquatic ecosystems still occur.

The proposal is to thin approximately 281 acres using ground based harvest systems (tractor). The area is divided into 10 harvest units ranging in size between 3 and 68 acres. Also included is the construction and use of two temporary spurs, each approximately 500 feet in length. Since both these spurs are located on gentle topography (less than 8 percent) ground disturbance would be minimal and they would be blocked and camouflaged along their length to discourage use by off-highway vehicles (OHV's) following use. The proposal also includes 1.3 miles of road decommissioning, including approximately 0.7 miles located within riparian reserves.

Both road density and the number of stream crossings are gross indicators of the level of road impacts in watersheds. High road densities, greater than 4.0 miles per square mile (USDI and U.S. Deptartment of Commerce 2004) may indicate an increased potential for both elevated sediment production and peakflows. Although road density is a useful indicator, it should be noted that not all roads impart similar effects. For instance, the magnitude of impacts from roads on steep slopes is different than those from roads located on flat terrain. Roads located near streams and road stream crossings are responsible for the majority of sediment delivered to channels. In addition, some native surface roads are open during the winter season. This type of use can render drainage features ineffective and result in concentrated flow and increased erosion. Road densities with this proposal would be reduced below existing levels (Table 3-3).

Table 3-3. 7th Field Road Densities and Road Densities within Riparian Reserves.

Subwatershed	HUC 7 (drainage)	Road Density (miles/square mile) [1]	Road Density within Riparian Reserves (miles/square mile) [1]
Dead Indian Ck	0512	3.7	3.4
Dead Indian Ck	0515	4.5	7.2
Dead Indian Ck	0518	3.6	2.7
Total – all drainages		**4.0**	**4.6**

[1] Road densities were calculated using BLM corporate GIS data and includes only roads contained within the transportation layer representing numerous jurisdictions, including urban or otherwise developed areas within the HUCs.

Historically, geomorphic processes that shape landscape and channel geometry are triggered by large, infrequent storm events. In recent times, these events can be characterized by warm moist storms that result in high intensity, long duration rainfall. The results can be intensified when rainfall occurs on an established snowpack. The percent of a watershed in the transient snow zone (TSZ) (for Conde roughly an elevation band between 3,500 and 5,000 feet) can indicate elevated risk of adverse impacts. These impacts can be accelerated by modifications to forest canopy cover and as discussed, roads and other disturbance features. Drainages where TSZ compromises greater than 25 percent of the drainage area are of hydrologic concern, particularly where large openings such as clearcuts exist. The transient snow zone occupies 80 percent of the affected drainages (Table 3-4). Large areas of vegetation removal in the transient snow zone are of particular concern due to alterations of the streamflow regime and the potential for resultant increased peak flow magnitudes (Christner and Harr 1982).

Table 3-4. 7th Field HUCs and Percent within the TSZ.

Subwatershed	HUC 7 (drainage)	Percent Within The Transient Snow Zone
Dead Indian Ck	0512	94
Dead Indian Ck	0515	45
Dead Indian Ck	0518	100
Total – all drainages		**80**

Different levels of harvest in watersheds have demonstrated variable effects on peak flows (Wemple, Jones and Grant 1996; Harr 1979). When less than 25 percent of a watershed is harvested, no detectible change in peak flows have been observed (Stednick 1996). It should be noted the majority of literature available regarding the relationship between harvest and flow have focused on clearcut harvesting, many in areas that removed close to 100 percent of the overstory canopy.

Modifications of canopy cover that result in less-than-historic conditions, either through fire or timber harvest, also may affect the timing and volume of streamflow. An assessment of percent canopy cover is also useful in determining potential cumulative effects of the proposed activities. In the analysis area, the Ecoregion Description (WPN 1999: Appendix A) lists historic canopy closure as greater than 30 percent, with the exception of the oak woodland/lowest elevations, which historically had less than 30 percent canopy closure. This proposal would not reduce existing canopy cover below 30 percent.

Recent research indicates that effects from peak flows, although of concern, should be confined to a relatively discrete portion of the network where channel gradients are less than approximately 2.0 percent

and streambeds are composed of gravel and finer material. Furthermore, data supports the interpretation that if peak flow increases do occur, they can only be detected in flows of moderate frequency and magnitude. Beyond that, they are likely not detectable (Grant, et al 2008). What this suggests is that if increases in peak flows occur, they are unlikely to result in adverse effects to the higher gradient channels located within the analysis area. It is also suggested that peak flows are only detectable in smaller storm events with return periods of 6 years or less, where channel forming processes are minor in effect.

2. Environmental Consequences

Because no new management is proposed under Alternative 1, the effects described reflect current conditions and trends that are shaped by ongoing management and events unrelated to the Conde project. Discussion for Alternative 2 reflects the direct and indirect impacts of the proposed actions. Effects discussion also includes cumulative impacts of those direct/indirect actions when added incrementally to actions past, present, and reasonably foreseeable. Short-term effects are defined as those lasting ten years or less and long-term effects last more than ten years (USDI 1994:4-4).

a. Alternative 1

Direct and Indirect Effects

There are no actions proposed under Alternative 1 (the No Action Alternative); therefore, direct and indirect effects are the current conditions in the analysis area which are the result of past actions not related to the Conde project. All current conditions and trends will continue as specified in affected environment. Namely roads with poor drainage and lack of maintenance, or improper maintenance, would continue to deliver water and sediment to streams.

On BLM managed lands, over time, vegetation recovery within riparian reserves would moderate steam temperatures and provide for increased wood recruitment to stream channels. There would be no changes in percent of area in non-recovered (less than 30 percent canopy cover) openings, areas of compacted soil, road densities, percent of area in roads, or number of stream crossings. There would therefore be no changes to the magnitude and frequency of peak flows beyond those which may already be occurring.

In the long term, climate change projections indicate that the West and Pacific Northwest are likely to experience continued warming and increased precipitation along with more extreme wet and dry years (Furniss, et. al. 2010). As a result, hydrologic changes, particularly the changes in snowpacks and runoff patterns are among the most prominent and important consequences. Declines in snow water equivalent occurring in low and mid-elevation sites may result in earlier spring flows and lower late season flows. Changes in average annual streamflows are also expected to decrease. Flood severity is expected to increase because increased interannual precipitation variability will cause increased runoff in wet years and increased rain-on-snow probability in low elevation snowpacks.

Given these impacts, effective climate change adaptation strategies will need to focus on maintaining watershed resiliency. Under this alternative, given the right conditions, the lack of vegetation and fuels treatments may increase the likelihood a high intensity wildfire may occur over part or all of the area. Should this happen, it could alter the surface water and groundwater regime. Immediately after a severe fire, the loss of vegetation would make more groundwater available for streamflow and low summer flows would likely increase. However, the absence of vegetation may also result in an increased risk of higher peak flows and increased erosion.

b. Alternative 2

Direct and Indirect Effects

This alternative proposes various prescriptions of tractor, temporary spur road construction, and pre-haul road maintenance. In addition, depending on post-harvest conditions, activities would be followed up by fuels treatments that would entail hand thinning, piling and burning.

All vegetation treatments would maintain an overstory and mosaic of understory vegetation. At least 30-60 percent canopy cover would be maintained in harvest units. There would be no increase of percent canopy cover less than 30 percent within the analysis area, including the TSZ; therefore, there is no potential for this project to contribute to an increase in peak flows. Baseflows would likely remain unaffected as the magnitude of vegetation removal would not significantly reduce transpiration. Since there is no harvest proposed within riparian reserves, stream temperatures would not be affected by the proposal and the project is in compliance with the Aquatic Conservation Strategy (ACS).

Where fuel treatments occur, pile burning would retain a mix of conifers, organic duff layer, leaf litter, and coarse wood debris. Collectively these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizae to maintain long term site productivity. Additionally, fuel treatments may occur over a period of years, distributing activity over time. These activities would not appreciably decrease canopy cover, as only small diameter vegetation would be cut and piled.

As described in the affected environment section, sediment levels due to roads, past harvest, grazing and other disturbances is the primary focus of concern. In addition to temporary spur construction, this proposal includes log hauling and associated road maintenance. This may include ditch cleaning, road blading, and maintenance of drainage features. Log truck traffic, especially on unsurfaced roads, loosens the road surface and makes that material available for transport to channels. When road maintenance is performed improperly, or best management practices (BMPs) are not implemented, the potential for sediment delivery to streams increases dramatically. Examples include sidecasting material, undercutting cutslopes, improper disposal of material, and unnecessary disturbance within riparian reserves. Luce and Black (1999) found no significant increase in erosion when only the road surface was treated; however, statistically significant erosion occurred when road ditches were bladed. Luce and Black (2001) observed an 87 percent decrease in erosion and sediment transport from roads in years one and two following road maintenance activities. With this proposal, hauling and road maintenance activities are expected to result in a short term increases in sediment and turbidity. If BMP's are implemented and maintenance activities are properly conducted, these increases are expected to be minor. If transport occurs during high flows, which is likely, the introduced sediment will become an immeasurable fraction of the total sediment load and would not be detectable at downstream locations.

Temporary spur construction and (to a lesser extent) decommissioning has the potential to increase sediment production as well; however, the topography is gentle and the spurs would be camouflaged and blocked following use. Any ground disturbance resulting from decommissioning within riparian reserves would be seeded and mulched. An indirect effect that is difficult to quantify is OHV use following harvest. In areas not already closed by gates or other measures, OHV use of skid trails and other features such as previously closed roads has been observed. The result is a potential increase of unmanaged OHV trails leading to elevated sediment rates and adverse impacts to soils and other resources. These effects may persist over time. Within the analysis area, light to moderate use is occurring and may increase if project design features (PDFs) specific to road closures are not adhered to.

If project design features (PDFs) and BMPs contained in Chapter 2 are implemented properly, there would be little to no increases of sediment routed to stream channels. Also, given the small amount of

additional compacted area and no increases in canopy cover less than 30 percent, there is little probability the proposal would modify the magnitude or timing of peak or base flows.

In the long term, climate change projections indicate that the West and Pacific Northwest are likely to experience continued warming and increased precipitation along with more extreme wet and dry years (Furniss, et. al. 2010). As a result, hydrologic changes, particularly the changes in snowpacks and runoff patterns are among the most prominent and important consequences. Declines in snow water equivalent occurring in low and mid-elevation sites may result in earlier spring flows and lower late season flows. Changes in average annual streamflows are also expected to decrease. Flood severity is expected to increase because increased interannual precipitation variability will cause increased runoff in wet years and increased rain-on-snow probability in low elevation snowpacks.

Given the uncertainty in climate models and predicted effects on a site specific scale, it is difficult to make accurate statements concerning climate change. However, given the changes described above, effective climate change adaptation strategies would need to focus on maintaining watershed resiliency. Under this alternative, vegetation and fuels treatments may decrease the likelihood a high intensity wildfire over part or all of the area may occur. This would maintain or slightly improve watershed resiliency.

Cumulative Effects

As described in the affected environment, impacts from roads, recreation, grazing, OHVs, logging and water diversions has altered watershed processes in the drainages. This mix of impacts is typical of many of the drainages that are tributary to Little Butte Creek.

It is expected that reasonably foreseeable future actions including rotational harvest on commercial timberlands that maintain forest conditions in an early to mid seral condition (USDI 1995) and land disturbance attributed to development of private lands will continue. Activities on BLM lands will likely continue to focus on commercial thinning for forest health and fuels reduction projects. Some recovery is expected to occur as previously harvested areas within riparian reserves improve shade and large wood recruitment. Grazing impacts on private lands will likely continue to occur at near present levels. On BLM managed lands, environmental analysis has recently occurred on the Conde allotment. It is expected that livestock numbers and/or season of use will be modified to reduce grazing impacts in the long term.

Overall, Alternative 2 does not reduce canopy cover below critical thresholds or result in appreciable increases in ground disturbance. These would be the primary catalysts that may trigger synergistic responses. The proposal does not appreciably decrease canopy cover within the TSZ that may result in peak flow increases. Road densities would actually decrease, including within riparian reserves.

Although recent management activity on both private and public lands is planned or has recently occurred, this alternative does not add to the potential for cumulative effects since the two primary metrics for assessing the potential for cumulative effects would remain unaffected. Canopy cover would not be reduced below 30 percent, and road densities would actually decrease slightly. Sediment production resulting from road use may increase in the short term. In many cases riparian vegetation vigor would improve over time, thus potentially decreasing stream temperatures. Although there are both natural and human induced risk factors for cumulative effects, the proposed action is not expected to significantly increase these within the project area drainages, or the larger subwatersheds.

Proposed Project Design Features (PDFs)

As a result of the concerns outlined above, implementation of PDFs (described in Chapter 2) is required to minimize adverse effects. Correct implementation of these recommendations would, under most

circumstances, minimize adverse effects, and ensure compliance with all applicable statutes and management direction, including cumulative impacts and impacts to wetlands, floodplains, and drinking water aquifers and not adversely affect the parameters listed as impaired.

D. FISHERIES AND AQUATIC HABITAT

1. Affected Environment

The proposed Conde Forest Management Project would be located in upper portions of the Conde and Dead Indian Creek catchments. Conde Creek is a tributary to Dead Indian Creek, which in turn is a tributary of the South Fork of Little Butte Creek. The South Fork of Little Butte Creek is a designated key watershed within the larger Little Butte Creek fifth field Watershed.

The project proposes harvest units in three small seventh field drainages (see hydrology analysis), two of which make up the Conde Creek catchment in its entirety. The third drainage includes the portion of Dead Indian Creek from the Conde Creek confluence up to the Dead Indian highway. These three drainages will be the focal point of the fish and aquatic habitat analysis, and hereafter are termed the analysis area. Both Conde and Dead Indian Creeks support populations of native trout within the analysis area.

2. Fish and Designated Habitat

a. Endangered Species Act, Critical and Essential Fish Habitat

Southern Oregon Northern California Coasts (SONCC) coho salmon are present in the Little Butte Creek Watershed downstream of the analysis area. There are no federally designated threatened or endangered species in the analysis area streams. Both streams drain the top of a high elevation plateau. Natural barriers preclude anadromous fishes from ascending much past the mouth of Dead Indian Creek. As such, there is no designated Coho Critical Habitat or Essential Fish Habitat in the analysis area.

b. Riparian Reserves

Under the Northwest Forest Plan, Riparian Reserves have been established on all stream channels displaying annual scour located on federal lands. Areas of unstable/potentially unstable ground and wetlands larger than 1 acre are also managed as Riparian Reserves. Riparian Reserve widths have been identified as 330 feet for fish bearing streams, and 165 feet for non-fish bearing perennial and intermittent streams. Widths are measured as slope distance from the edge of the stream, and are applied to both sides of the channel. These Riparian Reserve widths are in accordance with the 1995 Medford District Resource Management Plan (RMP). See Appendix A, pg. C-31 of the Medford District RMP, 1994. The primary function of Riparian Reserves is to provide shade and a source of large wood inputs to stream channels. Additionally, they are a source of nutrient inputs to the aquatic ecosystem, they provide bank stability, maintain undercut banks that offer prime fish habitat, help filter fine particulates which may be mobilized from upland areas, and provide habitat for a diverse range of other aquatic and terrestrial organisms (Meehan 1991). In the Conde Forest Management Project, construction, use, and obliteration of one short temporary spur, log hauling, and the decommissioning of several road segments are proposed within Riparian Reserves.

c. Aquatic Conservation Strategy

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain ecological health of watersheds and aquatic ecosystems on public lands. It includes 9 objectives, which guide BLM's management of Riparian Reserves and watersheds. These objectives are examined at the site (e.g. a single pool or stream reach), HUC 7 (drainage) and HUC 5 (large watershed) scale. The 9 objectives and

effects from implementation of the preferred alternative are presented in Appendix A of this document. In addition, the ACS identifies key watersheds, which contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. The Little Butte Creek Watershed, upstream of the North and South Fork confluence is a designated key watershed, due to its high rate of anadromous fish productivity. Of note and pertinent to this project, key watersheds include a special management mandate that no net-gain in area roaded occur as a result of any federal management action.

3. Foreseeable Future Actions

This section will present projects proposed in the foreseeable future that may add cumulative impacts to fisheries resources on top of anticipated impacts resulting from the Conde project. Anticipated direct and indirect affects to fisheries resources will be described from each action. For any foreseeable future action determined to have any anticipated effects to aquatic habitat, the cumulative effect of the action coupled with effects from the Conde project will be discussed at the end of this analysis.

a. Federal Timber Harvest

The Sampson Cove and Cottonwood Timber sales proposed on BLM lands include 28 acres of units which cross over the drainage divides from the Bear and Jenny Creek Watersheds into the Dead Indian Creek subwatershed. These units are located near ridge tops, do not include any stream channels or Riparian Reserves, and would leave a minimum of between 40 to 60percent canopy cover following harvest. Because they do not have any hydrological connectivity with aquatic habitat in the Dead Indian subwatershed, and because they would retain sufficient canopy cover to negate the possibility of altering peak or base flows, these units would have no causal mechanism to affect aquatic habitat in Dead Indian Creek. As such, harvest of these units would not have any direct or indirect effects, and would not add a cumulative effect to aquatic habitat.

Other federal timber sales are planned within the larger Little Butte Creek Watershed, but not within the analysis area. The Rio Climax Timber sale would occur in the Antelope and Lake Creek catchments, streams which outlet below the North and South Fork confluence. Anticipated effects to aquatic habitat resulting from this sale are disclosed in the Rio Climax EA and include small short-term inputs of sediment to Antelope and Lake Creeks, stemming primarily from new road construction and timber haul.

b. Private Timber Harvest

Future timber harvest on private lands would likely occur within the analysis area. The water resources analysis of this EA addresses future timber harvest on private lands, and assumes that it will continue to occur at a similar rate as has occurred in the past, with similar affects to aquatic habitats. Private lands are governed under state forestry regulations, and as such, receive a different level of protection than federal lands. Analysis of effects from private timber harvest generally considers the worst case scenario (i.e. all suitable forested lands would be logged at approximately 60-year tree-growing rotations). At this time, it is not known when or where private timber harvest will occur in the area. This analysis will assume that all suitable private lands will continue to be subject to timber harvest, and that the amount of disturbance to aquatic systems as a result of this harvest will continue similar to present rates, helping to maintain degraded aquatic habitats.

c. Grazing

Cattle grazing is widespread throughout the analysis area catchments, both on private and BLM-managed lands. Several allotments on BLM-managed lands are up for lease renewal, or have recently been renewed. The lease renewal process utilizes standards and guidelines which consider effects to aquatic habitat, so at a minimum, it is anticipated that no additional degradation to aquatic habitat would result from renewal of the allotments which overlap with the Conde project analysis catchments. A more likely

result of the renewal process would be a reduction of impacts, which could be accomplished by such measures as reducing the number of livestock or duration of grazing time, riparian exclusion, providing off-site water, etc. Specific management plans for area allotments have been implemented for the Conde Creek allotment at this time, with pertinent changes being the erection of riparian exclosures adjacent to Conde Creek, and the establishment of a 5-inch riparian stubble height threshold (if grasses are found to be grazed below this threshold, the cattle must be removed). These measures will reduce bank de-stabilization and riparian browse adjacent to a long reach of the main stem of Conde Creek, reducing sediment inputs and increasing shade to the stream.

Other area allotment plans have not been developed at this time, and it will be assumed that cattle grazing will continue across all ownerships in these areas as at present. Cattle grazing in sensitive riparian areas will continue to impact water quality, with chronic episodic inputs of sediment and turbidity occurring to stream reaches adjacent to destabilized and trampled banks. Small springs and seeps are particularly vulnerable to degradation, as these areas often contain suitable browse along with a reliable water source, which both attracts and concentrates cattle to these areas. In areas lacking a large overstory component, cattle browse of riparian vegetation could also add to stream temperature warming.

4. Current Watershed Conditions/Environmental Effects

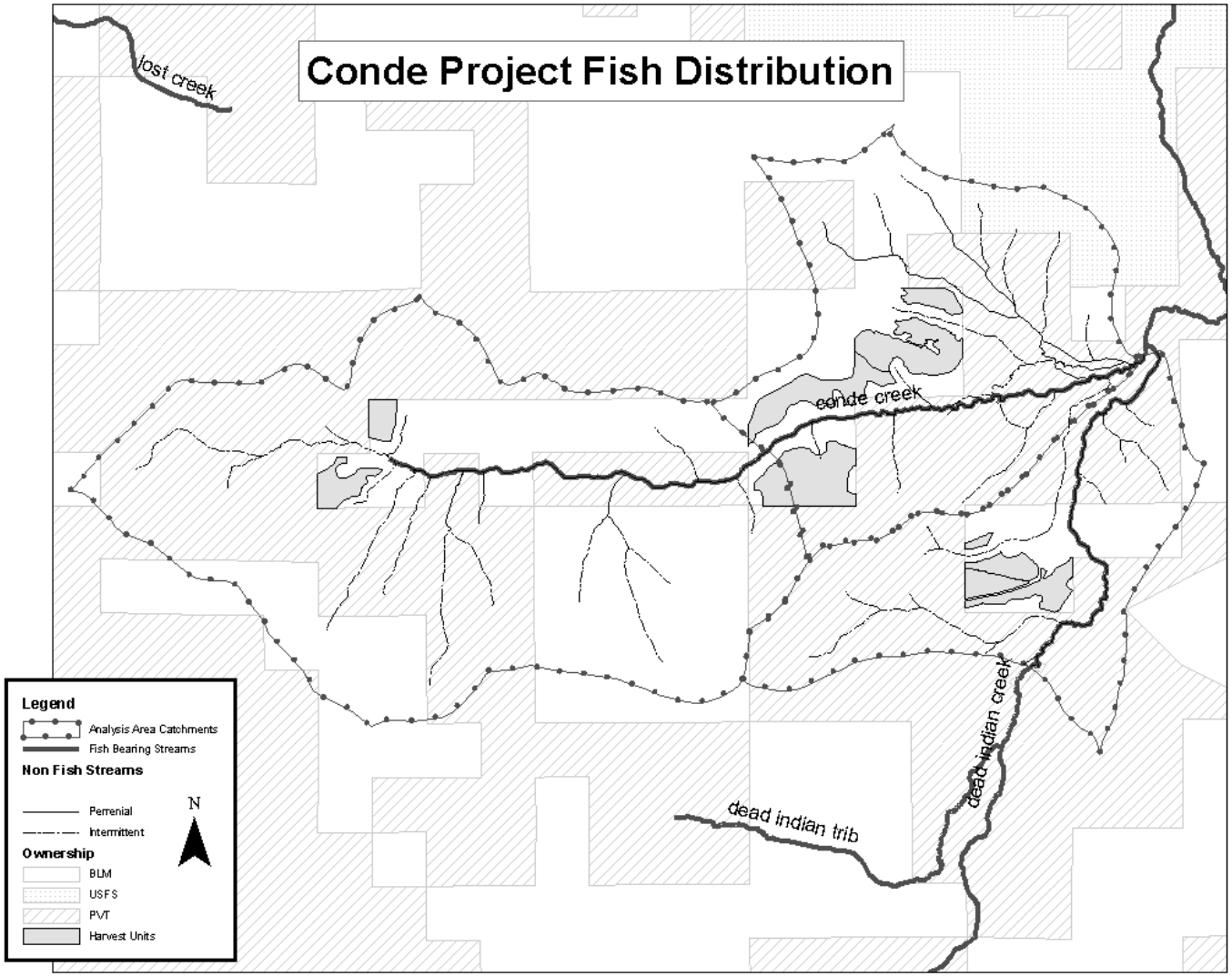
This section will present baseline aquatic habitat conditions within the analysis area streams, as well as anticipated effects resulting from this project. The effects of past actions manifest themselves in the current conditions. Effects added on top of these past actions as a result of the Conde Forest Management Project, coupled with foreseeable effects from future projects as described above, are the cumulative effects of this project to fisheries resources in the watershed and specific analysis catchments.

a. Fish Distribution

SONCC coho salmon, fall Chinook salmon (*O. tshawytscha)*, summer and winter steelhead (*O. mykiss*), and Pacific lamprey (*Lampetra tridentata)* are native migratory fish species present in the greater Little Butte Creek Watershed. Chinook distribution includes the main stem of Little Butte Creek from its mouth to the confluence of the South and North Forks of Little Butte Creek, at which point they begin to peter out. Coho and steelhead occur far up both forks, and are also present in lower portions of many of the larger tributary streams in the watershed.

Cutthroat trout (*O. clarkii*), sculpin (*Cottus spp.*), Klamath small-scale sucker (*Catostomus rimiculus*), and rainbow trout (*O. mykiss*) are native fish species present in the watershed that do not migrate to the ocean. Distribution of most of these species extends well upstream in both forks of Little Butte. Cutthroat and rainbow trout are typically found the farthest upstream, and are the native salmonids present in the analysis area streams, occupying the lower 4 miles (approximately) in Conde Creek, and most of the main stem channel of Dead Indian Creek (Map 3-2).

Map 3-2: Fish distribution in the Conde project analysis streams.



b. Aquatic Habitat Current Conditions

Aquatic habitat in the analysis area streams is typified by low gradient stream reaches which meander through wet, seasonally wet, and dry meadows, with sporadic stands of willow, aspen, and riparian brushy species present as the dominant shade providing vegetation adjacent to the channels. The quality of aquatic habitat within both Conde and Dead Indian Creeks has been reduced by several factors. Both systems suffer from excessive sediment input, primarily the result of widespread cattle grazing which occurs in many sensitive riparian areas in the analysis area. Stream surveys (BLM 1995 and 1998) found actively eroding streambanks along 55 percent of surveyed reaches in Conde Creek, and 46 percent in Dead Indian Creek. Streambank alteration (Cowley and Burton 2004) measurements of 33-49 percent were observed at two sites along Conde Creek. Repeated field observations show active erosion occurring along many of the perennial stream banks as a result of grazing (BLM 2003-2008). Focused cattle use along perennial seeps, springs, and channels in the late summer and early fall result in bank disturbance and streamside vegetation consumption leaving stream channels and banks vulnerable to seasonal high flow events and subsequent sediment increases and channel widening. While this sediment would be mobilized at a time when turbidities are naturally elevated, exposed and disturbed banks are susceptible to continued degradation throughout the winter months with no time for recovery post-grazing season.

The common observation of siltation in seeps, springs, streams and ponds on the Conde Creek Allotment indicates bank destabilization and sediment transport along watercourses. This has been observed repeatedly along most perennial water courses in the area over the last 10 years by BLM hydrology and fisheries staff. Grazing has also led to reductions in streamside shade in some areas, as riparian vegetation has been removed through browsing. Reduction in shade allows for increased penetration of sunlight, which facilitates warming of surface waters. Exacerbating this situation, the majority of the instream flows in Conde Creek, and much of those in Dead Indian Creek, are diverted out of channel for irrigation purposes in the summer months. This significantly reduces the quantity and quality of aquatic habitat in the creeks downstream of the diversions, as not only is there less stream flow and consequently less aquatic habitat for organisms, the smaller volume of water is able to be heated at an accelerated rate. Grazing and water withdrawls have contributed to both Dead Indian and Conde Creeks being listed as water quality limited for exceeding summer temperature criteria.

Beaver complexes exist in the analysis area catchments, and are particularly noticeable in Conde Creek, where recent beaver activity has created many large dam pools. These pools have both positive and negative implications to aquatic habitat. Detrimental to water quality, the creation of the pools was accomplished by the felling of many hardwoods and brushy species (primarily aspen and willow) adjacent to the stream. The species were the primary source of shade to Conde Creek in this reach, as the stream meanders through a natural meadow lacking a conifer overstory. This loss of shade further increases the rate at which the stream can be warmed by sunlight. Furthermore, the pools allow for additional heating of the water ponded behind the dams. On the positive side, the large and complex pools provide habitat for many aquatic organisms, and have captured large amounts of fine sediment, keeping it from impacting downstream habitats.

Recent restoration efforts in the area have been undertaken to alleviate the degradation to Conde Creek resulting from grazing, as several large stream adjacent meadows have been fenced off. Willows have also been planted to encourage new growth of bank stabilizing and shade producing vegetation. And though the recent beaver activity has resulted in the removal of large swaths of aspen and willow, the disturbance is natural, and should provide a long-term benefit to aquatic habitat, as it has created many large pools, allowed for the capture and retention of sediment, and raised the local water table and allowed several reaches of the stream to be reconnected with its flood plain. Aspen and willow are both notable vigorous re-sprouters, and should reestablish and spread relatively quickly.

High road densities found in the analysis area catchments (greater than 4 miles per square mile in the analysis area; see water resources analysis, this document) also contribute to elevated sediment levels. Roads with direct connectivity with stream channels pose the greatest risk for sediment transport off the roads and into aquatic habitat. Within the analysis area catchments, upper Conde Creek (HUC #515) has very high riparian road densities (over 7 miles of road per square mile of riparian areas), placing this drainage at an elevated risk for increased sediment input from roads. Largely as a result of grazing and high road densities, sediment levels exceed benchmark standards in both Conde and Dead Indian Creeks.

5. Environmental Consequences

a. Alternative 1

The No Action Alternative would have no direct or indirect effects, and hence would not add a cumulative effect to aquatic habitats, as no ground disturbing activities would occur. Aquatic habitats within the analysis area would continue to exist in their current altered state. As no new road construction or decommissioning would occur, road densities would remain at the current level within the analysis area. Fish habitat would continue to be impacted as a result of past and ongoing activities, as described in the current condition section.

b. Alternative 2

This alternative proposes commercial timber harvest, follow up PCT and/or activity fuels treatments, temporary spur road construction, road decommissioning, and log hauling, as described in Chapter 2 of this document. All harvest prescriptions would leave at least 30 percent canopy cover remaining after harvest. No harvest would occur within Riparian Reserves, or have direct hydrological connectivity with aquatic environments. Disturbances proposed in the Conde project with proximity and/or connectivity to aquatic habitats include decommissioning of over 1.3 miles of riparian roads, construction and obliteration of approximately 120 feet of a temporary spur road through the outer edge of a Riparian Reserve, and an estimated 5.7 miles of log haul over non-paved routes, which would include 10 stream crossings.

Ground disturbing activities in or near stream channels and roads have the greatest potential to impact fish habitat; it is these activities that could increase erosion and sediment transport to, and storage in, stream channels. The road decommissioning and log hauling are the project elements proposed under this alternative which have been identified as having the greatest potential to contribute sediment to streams.

Commercial Timber Harvest

There are three primary mechanisms by which timber harvest may influence aquatic habitat:

1) Removal of stream side vegetation reduces shade, which can increase water temperature, and reduce recruitment potential of large wood, a key habitat feature of aquatic systems.
2) Reduction of canopy (particularly in the transient snow and snow zones) if applied to large areas of watersheds has been shown to alter hydrological processes, such as increasing peak and base flows, or altering the timing of these flows, which in turn may impact channel and habitat features.
3) Ground disturbance and compaction from yarding corridors or skid trails can bare soils, reduce infiltration, channel overland flow, and route eroded particulates (fine sediment) to downslope stream channels.

In the Conde Forest Management Project, all harvest would occur outside of Riparian Reserves, at a minimum distance of 165 feet from the edge of the stream channel. Because existing large wood

densities and shade would be maintained within the Riparian Reserves, harvest and yarding operations would have no impact to stream temperatures, or future large wood recruitment potential. The Water Resources analysis documented that harvest operations would not reduce canopy cover within any of the analysis area catchments below a threshold to measurably affect or alter the timing of peak or base flows. Additionally, because harvest and yarding operations would not take place in Riparian Reserves, no hydrological connectivity would exist between harvest units and stream channels. Fine sediment mobilized from units or skid trails would be filtered by remaining vegetation within the Riparian Reserves, and deposited on the forest floor before reaching aquatic habitat. In sum, no connectivity, and hence no causal mechanism, would exist for commercial timber harvest to input sediment through the Riparian Reserve buffers and into stream channels.

Because harvest and yarding operations would not decrease stream shade, reduce future wood inputs, increase peak flows, negatively modify summer base flows or input sediment into aquatic habitats, they would not directly or indirectly affect the aquatic environment, and hence would not impact fisheries resources, and would not contribute to cumulative effects.

PCT/Fuels Treatments

Follow up PCT and/or activity fuel treatments are planned in the commercial harvest units. These treatments would occur to thin small diameter non-merchantable trees and clean up slash and debris left after harvest and yarding operations. Treatments would not occur in Riparian Reserves, and would not add additional ground disturbance within the harvest units. Because treatments would not occur in Riparian Reserves, they would have no mechanism to affect water temperature or input sediment to channels. Post-harvest canopy levels would not be reduced by treatments, nor would ground compaction increase; hence peak flows would not be affected. For these reasons, PCT and activity fuels treatments are not expected to impact fisheries resources, and therefore would not contribute to cumulative impacts.

Temporary Spur Roads

This project proposes to construct and use up to 2 temporary spur roads, both approximately 500 feet in length to facilitate access to unit edges by log trucks. The spurs would be constructed, used, and obliterated during the dry season. None would cross any stream channels. One spur would take off from an existing road which is within a Riparian Reserve of Conde Creek, and would be within the Reserve for approximately 120 feet. This area is an open dry meadow, dominated by upland grass species and dry during a site visit in the late summer of 2011. No riparian obligate species were noted. There are no tree species along the proposed right-of-way for this temporary spur. The other three spurs would be located in upland areas removed from any natural water courses.

None of the temporary spurs would have direct hydrological connectivity with aquatic habitat. For this reason, the construction, use, and decommissioning of the short spurs during a single dry season would have no causal mechanism to input sediment to aquatic habitat. The spur in the Riparian Reserve of Conde Creek would disturb vegetation within the Riparian Reserve, though as noted vegetation in this area is composed only of grasses and forbs, hence the disturbance would not reduce the function of the Reserve for providing shade or large wood. For these reasons, the temporary spur roads would not impact water quality or fish habitat, and would not contribute to cumulative impacts.

Road Decommissioning

Decommissioning of riparian roads which have direct connectivity with aquatic habitats has the potential to impact aquatic habitat in the short term primarily through the pulling of culverts and barring of soils adjacent to wetted channels. No culverts are present on any of the roads proposed for decommissioning, so the risk of sediment transport to streams resulting from road decommissioning is low in this particular project.

Road segments proposed for decommissioning in the Conde project total approximately 1.3 miles, of which roughly 1 mile would be located within Riparian Reserves. One road proposed for decommission is within the Riparian Reserve of Conde Creek, and would include a perennial crossing over the creek itself, though the culvert has been previously pulled from the crossing. Other proposed decommissioning segments are within Riparian Reserves of intermittent streams and do not involve any channel crossings. Decommissioning activities would include a mix of active and passive decommissioning, with active decommissioning occurring on those segments where re-contouring the road prism is feasible. Flat segments would be ripped, seeded, mulched, and barricaded. Segments which are already overgrown with established vegetation and have adequate drainage will only be barricaded. All decommissioning would occur during the dry season, and all disturbed surfaces would be stabilized prior to onset of fall precipitation.

Decommissioning activities are not expected to result in sediment transport to any stream channels, as no in-stream work would be required to accomplish the decommissioning. Stabilization of the approaches to Conde Creek on the one proposed decommissioning segment with connectivity with a stream, coupled with the gentle topography of the area, make the likelihood of disturbed soils migrating off site and into water courses extremely unlikely. Over time, the decommissioning of the riparian roads will allow for hydrological and vegetative recovery of these surfaces, which would ultimately benefit site level aquatic and riparian indicators in the Conde Creek drainage, as roughly 4 acres of ground would be allowed to revegetate.

Haul Routes

Repeated use of the unpaved haul roads may both directly and indirectly contribute fine sediment to streams as rocked surfaces become pulverized rock (i.e. dust, a form of fine sediment) surfaces after repeated heavy truck traffic. Direct contributions of fine sediment could occur if dust mobilized by haul should settle out in stream channels crossing or adjacent to the haul route. Indirectly, the fine sediment that remains on the road prism would be available to be transported off of the road during the first significant rain event following a season of haul. Properly engineered roads are capable of shedding the majority of mobilized sediment off of the road (or road ditch) downslope and into vegetation. However, the road/ditch distance from the last cross drain located on either side of a channel crossing would directly contribute captured water and mobilized sediment into the stream channel. Therefore, use of the roads for haul would increase the risk of road derived sediment transport to stream channels, particularly in the vicinity of road/stream crossings.

In the Conde project, log hauling would occur on 5.7 miles of unpaved roads within the analysis catchments. Of this, 2.7 miles would be gravel or rocked roads, and 3 miles would be natural surfaced roads. The unpaved routes would terminate at the paved Conde Creek Road and Dead Indian Memorial Highway. Unpaved haul routes in riparian areas include 1.4 miles on BLM and private lands. These routes would include 10 crossings over stream channels, of which one would be over a perennial stream. The remaining crossings would be intermittent streams. Less than 0.4 miles of the haul routes would parallel fish habitat; a rocked road which is adjacent to Conde Creek. Though this road does parallel the stream, it is well removed (more than 100 feet distant) from the channel everywhere except at the approaches to the crossing. This route includes the lone crossing (via culvert) over both a perennial stream and fish habitat (Conde Creek).

Potential sediment sources from log hauling are surface erosion from truck traffic and dust. Surface erosion would be minimized because PDFs would limit log hauling to during dry or frozen conditions and it would be restricted whenever soil moisture conditions or rainstorms could result in the transport of sediment to ditch lines and nearby stream channels. Dust abatement measures would help to reduce the probability of dust migrating from the road to the streams during dry season haul. Haul routes in this

particular project do not parallel streams for long stretches, but are primarily located in upland areas and cross channels perpendicularly. Given these reasons, the risk for road-born dust (derived from haul) to settle out in any stream channels is very low.

The potential for sediment inputs from haul induced surface erosion would be minimal because dry/frozen season haul restrictions would reduce impacts to the road surfaces, the haul routes would be spread over a relatively large spatial and temporal scale, and the volume of haul on any given non-paved route would be light. Furthermore, the haul routes are located on low gradient stable roads with limited connectivity to the aquatic system (only one perennial crossing). Roads such as these pose low risk for contributing sediment to streams. For these reasons, haul is not expected to contribute detectable amounts of fine sediment to aquatic habitat in the analysis area.

Aquatic Habitat Effects Summary

No adverse effects to aquatic habitat are likely to result from implementation of the Conde Forest Management Project. No shade producing riparian vegetation is proposed to be disturbed; hence, stream temperatures would not be affected by any project elements proposed under this sale. Temporary operator spurs proposed would not have any hydrological connectivity with the aquatic system, and would not reduce shade or future wood inputs. Upland ground disturbing activities such as harvest, yarding, and follow-up fuels treatments would be removed from channels by full-width Riparian Reserves, capable of filtering and storing any chance sediment mobilized out of harvested units. Harvest prescriptions have been developed to ensure that canopy cover after harvest remains above established thresholds which could impact peak flows. Haul routes involve less than 6 miles of unpaved roads, have very limited connectivity with the aquatic system, and are primarily located in flat stable areas, not adjacent to streams, and haul is not expected to contribute detectable amounts of sediment to the aquatic system. Proposed road decommissioning would not involve any channel crossings, and therefore is not anticipated to input sediment to any stream channels. Decommissioning would result in minor decreases in existing road densities, and allow for the recovery of approximately 4 acres of vegetation within Riparian Reserves.

To sum, no project elements as proposed in the Conde Forest Management Project are expected to contribute any negative effects to aquatic habitat, and would not add to cumulative effects. Future private timber harvest is assumed to continue at present levels, and cumulative effects to water resources have been assessed (see water resources, this document). Future private harvest coupled with ongoing erosion issues (stemming primarily from grazing) is expected to continue contributing to the declining trends in streambank stability, sedimentation potential, and health of riparian areas currently present in the analysis area. Because harvest would not open up riparian areas, increased use of these areas by cattle is not likely to occur as a result of the Conde project.

E. TERRESTRIAL WILDLIFE

The Conde Project Area falls within the Little Butte Creek Watershed Analysis Area. Watershed Analysis was conducted for the Little Butte Creek Watershed (1997) using the guidance of BLMs 1995 Record of Decision and Resource Management Plan.

1. Introduction

a. Vegetation Conditions & Terrestrial Wildlife Habitats (General)

The Conde Forest Management Project is located in the southern portion of the Little Butte Creek watershed, which is a tributary to the Rogue River. The Project Area consists of approximately 281 acres

of treatment units. For the purpose of analyzing the affected environment and the proposed project with regard to most terrestrial wildlife, the analysis area considers 3 (three) HUC 7s (called a sub-watersheds or 7th field hydrologic units). For a complete listing of these HUC 7s, see the Hydrology section of this document. The total size of the analysis area is 5,132 acres or approximately 8 square miles. BLM administered lands comprise approximately 27% of this area. The analysis area for fisher is a 2.76 mile radius circle centered on the project area (approximately 62 square kilometers). This approximates the average home range of an adult male fisher in the southern Oregon Cascade Range.

b. Threatened, Endangered, Survey and Manage, and Bureau Sensitive Terrestrial Wildlife

Special Status Species are those species that are federally listed as threatened or endangered; proposed or candidates for federal listing as threatened or endangered; or are BLM designated sensitive species. Survey and Manage species are listed for protection under the Northwest Forest Plan. The table below (Table 3-5) lists the special status and Survey and Manage species that are known or suspected to be present in the analysis area. Only those species that could reasonably be assumed present are included – not species that would be considered as "accidental" in the analysis area.

Table 3-5. Threatened, Endangered, Bureau Sensitive, and Survey and Manage Terrestrial Wildlife

Species	Scientific Name	Status
Bald Eagle	*Haliaeetus leucocephalus*	BS - Known
Chase Sideband Snail	*Monadenia chaceana*	BS and S&M- Suspected
Fisher	*Martes pennanti*	FC - Suspected
Foothill Yellow-legged Frog	*Rana boylii*	BS - Suspected
Fringed Myotis	*Myotis thysanodes*	BS - Suspected
Great Gray Owl	*Strix nebulosa*	S&M – Known
Johnson's Hairstreak Butterfly	*Callophrys johnsoni*	BS--Suspected
Mardon Skipper Butterfly	*Polites mardon*	FC - Known
Northern Spotted Owl	*Strix occidentalis caurina*	FT -Suspected
Northwestern Pond Turtle	*Actinemys marmorata marmorata*	BS - Suspected
Oregon Shoulderband Snail	*Helmithoglypta hertleini*	BS and S&M – Suspected
Oregon Spotted Frog	*Rana pretiosa*	FC – Suspected
Peregrine Falcon	*Falco peregrinus anatum*	BS - Suspected
Pallid Bat	*Antrozous pallidus*	BS - Suspected
Purple Martin	*Progne subis*	BS - Suspected
Siskiyou Hesperian Snail	*Vespericola sierranus*	BS - Suspected
Siskiyou Short-horned Grasshopper	*Chloealtis aspasma*	BS – Known
Travelling Sideband Snail	*Monadenia fidelis celeuthia*	BS - Suspected
White-headed Woodpecker	*Picoides albolarvatus*	BS - Suspected

FT - Federal Threatened
FC – Federal Candidate
BS - Bureau Sensitive
S&M - Northwest Forest Plan Survey and Manage

2. Affected Environment - Northern Spotted Owl (NSO)

The Northern spotted owl (*Strix occidentalis caurina*) is a federally listed threatened species. This species is closely associated with older forests for nesting, roosting, and foraging throughout most of their range (Forsman et al. 1984; Carey et al. 1990; and Solis and Gutierrez 1990). NSO habitat consists of large trees in the overstory, smaller trees of varying sizes and species in the lower and middle story, large standing and fallen dead trees, and patchy shrub and herb communities (Spies and Franklin,1991).

The Bureau of Land Management (BLM), Forest Service (FS), and US Fish and Wildlife Service (USFWS) have conducted a coordinated review of four recently completed reports containing information on the northern spotted owl. The reviewed reports include the following:

- Scientific Evaluation of the Status of the Northern Spotted Owl (Sustainable Ecosystems Institute, Courtney et al. 2004);
- Status and Trends in Demography of Northern Spotted Owls, 1985-2003 (Anthony et al. 2004);
- Northern Spotted Owl Five Year Review: Summary and Evaluation (USFWS 2004); and
- Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft (Lint 2005).

Anthony et al. (2004, 2006) is the most recent published meta-analysis of owl demographic data collected in 14 demographic study areas across the range of the northern spotted owl. Four of the study areas are in western Washington, six are in western Oregon, and four are in northwestern California. Although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, Anthony et al. identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California.

Summarizing Anthony et al., between 1985-2003:

- The northern spotted owl population declined over its entire range, and varied from the most pronounced decline in Washington (7.3% year per) to the least pronounced in California (2.2%)
- Within Oregon, the northern demographic study areas averaged 4.9% population decline, and in the southern study areas decline averaged less than 1% per year and were statistically stable, with a western Oregon average of 2.8% decline per year.
- Range-wide, adult survival rates declined in 5 of 14 study areas (western Washington and northwestern California) and western Oregon was stable in all six study areas.

The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Even though some risk factors had declined (such as habitat loss due to harvesting) other factors had continued such as habitat loss due to wildfire, potential competition with the barred owl, West Nile virus, and sudden oak death (USFWS 2004, Lint 2005). The barred owl is present throughout the range of the spotted owl, so the likelihood of competitive interactions between the species raises concerns as to the future of the spotted owl (Lint 2005). Lint (2005) also found that between 1994-2003, federal lands in the Rogue Province lost 6.6% of spotted owl nesting habitat to stand-replacement fire, mainly to the Biscuit Fire (almost 500,000 acres).

An updated draft meta-analysis (http://www.reo.gov/monitoring/reports/nso POPULATION DEMOGRAPHY OF NORTHERN SPOTTED OWLS, Forsman, et al) is projected to be published in July 2011. The conclusions reached in this draft are similar to those found in Anthony et al. Forsman et al detected a decline but lacked statistical precision to determine if it was real or an artifact of sampling.

There are no northern spotted owl sites with any portion of their provincial home range on BLM administered land within the analysis area.

a. Northern Spotted Owl Habitat

Within the Little Butte Creek Watershed, wildlife habitat was typed into habitat categories pertinent to the Northern Spotted Owl (NSO). These habitat types are used throughout this document to describe and quantify habitat conditions across the landscape. These habitat categories are:

- Nesting, Roosting and Foraging habitat (NRF),
- Dispersal-only habitat, and
- Unsuitable habitat.

Nesting, roosting and foraging (NRF) habitat is characterized by forested stands with older forest structure with characteristics such as canopy closure of approximately 60 percent or greater, trees with large crowns, multiple canopy layers, snags and down wood. The best quality NRF habitat has forest stands with large old trees with cavities, broken tops, mistletoe platforms, large branches, dead standing and fallen decayed trees, and multiple canopies of shade tolerant hardwoods and conifers that support prey base. NRF habitat also functions as dispersal habitat.

Dispersal-only habitat for spotted owls is defined as stands that typically have a canopy closure of approximately 40 percent or greater, and are open enough for flight and predator avoidance, but do not meet the habitat criteria of NRF habitat. Dispersal-only habitat is used throughout this document to refer to habitat that does not meet the criteria of NRF habitat, but has adequate cover to facilitate movement between blocks of suitable NRF habitat. Unsuitable habitat does not currently meet the NRF or dispersal-only habitat criteria.

Approximately 800 acres of the BLM lands within the Analysis Area are classified as NRF (late-successional) habitat, or approximately 57% of the BLM administered lands in the Analysis Area. Not all lands in the analysis area are capable of becoming NRF habitat due to the natural limitations of some soil types, and agricultural and rural development.

b. Northern Spotted Owl Critical Habitat

None of the proposed treatment units are located in designated Critical Habitat (2008 designated) (73 Federal Register 157:47326) for the northern spotted owl.

3. Affected Environment - Pacific Fisher

The Pacific fisher (*Martes pennanti*) was petitioned for listing as endangered or threatened under the Endangered Species Act on December 12, 2000. In 2003 the USFWS released their notice of 90-day petition finding and initiation of status review (68 Federal Register, No. 132, 41169-41174) and in 2004 published their Notice of 12-month petition finding, concluding that listing fishers as threatened was warranted, but was precluded by higher priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). The species remains a USFWS candidate species (USDI, USFWS 2004, 71 Fed. Reg. 53777, Sept. 12, 2006). In their 2006 update on the status of the Pacific fisher, the USFWS define the reasons for listing as: "Major threats that fragment or remove key elements of fisher habitat include various forest vegetation management practices such as timber harvest and fuels reduction treatments.

Other potential major threats include: Stand-replacing fire, Sudden Oak Death (*Phytophthora ramorum*), urban and rural development, recreation development, and highways." (71 Fed. Reg. 53777 (Sept. 12, 2006)). The USFWS also states that the three remaining fisher populations "appear to be stable or not rapidly declining based on recent survey and monitoring efforts." (Id.)

Fishers are closely associated with low-to-mid elevation (generally <4,000 feet) forests with a coniferous component, large snags, or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2003). Powell and Zielinski (1994) and Zielinski et al. (2004) suggest that habitat suitable for denning and resting sites may be more limiting for fishers than foraging habitat. The NRF habitat type described above for the NSO also adequately describes suitable fisher denning and resting habitat because there is a direct correlation of key habitat features used to assess NSO habitat and fisher habitat (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Using Northern Spotted Owl habitat as a surrogate for fisher habitat has been accepted by the courts as a reasonable practice (*KS Wild v. US BLM*, Case No. 06-3076-PA, Order and Judgment 9/10/2007).

Based on the NSO habitat analysis, approximately 4,000 acres of suitable fisher denning and resting habitat exist on BLM lands within the Fisher Analysis Area and 227 acres within the project area. The Fisher Analysis Area is a 2.76 mile radius circle centered on the Project Area. This approximates the mean home range of an adult male fisher in the southern Oregon Cascade Range (Aubry and Raley 2006). However, all of these acres may not provide optimal fisher habitat because past harvest practices and land ownership patterns have fragmented this habitat. BLM "checkerboard" ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b). This checkerboard ownership pattern was created by the Congressional acts that provided land grants, and is outside of BLM's control. The forested habitat within 1 mile of the project units is highly fragmented, decreasing the likelihood of use by fisher.

Fishers do not appear to occur as frequently in early-successional forests as they do in late-successional forests in the Pacific Northwest (Powell and Zielinski 1994). Buskirk and Powell (1994) hypothesized that the physical structure of the forest and prey associated with forest structures are the critical features that explain fisher habitat use, not specific forest types.

Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted in portions of the Ashland Resource Area and have detected fishers outside the analysis area in the vicinity of Howard Prairie Reservoir. The extent (dispersal, foraging, or breeding) to which the Conde Project Area is used by fisher is not known.

4. Affected Environment - Survey and Manage and Bureau Sensitive Species

a. Red Tree Vole

The red tree vole (RTV) is an arboreal rodent species with very low dispersal capabilities. Red tree voles depend on conifer tree canopies for nesting, foraging, travel routes, escape cover, and moisture (Carey 1991). Douglas-fir needles provide the primary food and building materials for nests (USDA, USDI 2000a). The broad management objective for this species under the Survey and Manage program is to retain sufficient habitat to maintain its potential for reproduction, dispersal, and genetic exchange. The Conde Project is outside the known range of this species. Surveys east of Interstate 5 in the Rogue Valley have never located RTVs. The nearest known location of RTVs is nearly 20 miles to the west in the Applegate River Drainage.

b. Great Gray Owl

The great gray owl is a NWFP Survey and Manage species. Great gray owls (*Strix nebulosa*) nest in a varied array of open forests associated with grassy areas suitable for their preferred prey species (e.g. voles, moles, gophers, etc.). Broken top trees, abandoned raptor nests, mistletoe clumps, and other platforms provide suitable nest structures (USDA USDI 2004b). Suitable nesting habitat is defined in the "Survey Protocol For The Great Gray Owl " (USDI, USDA 2004b) as large diameter trees with roosting cover within 200 meters of suitable foraging habitat. Foraging habitat is described as relatively open, grassy habitats, such as bogs, natural meadows, open forests and recent selective/regeneration harvest areas (USDA USDI 2004b). Approximately 1,400 acres of habitat suitable for great gray owl reproduction and foraging exist in the Conde analysis area on BLM administered land. A large, but un-quantified, portion of the private land in the Analysis Area is also suitable for use by great gray owls. Protocol surveys were conducted for great gray owls in the Conde analysis area in 1997 and 1998. Six (6) reproductive sites were located within one mile of project units.

c. Mollusks

Potential habitat exists throughout the Project Area for four Survey and Manage mollusks, *Helminthoglypta hertleini, Monadenia fidelis celeuthia, Monadenia chaceana,* and *Vespericola sierranus* (USDI USDA 2001 Survey and Manage ROD). *Helminthoglypta hertleini* (Bureau Sensitive species) utilizes down woody debris, rocky areas, including talus deposits and outcrops, which contain stable interstitial spaces large enough for snails to enter. Previous Medford District detections were found in rocky areas associated with damp grassy areas, oak woodlands, and shrub lands, or in conifer forests closely associated with these habitat types. *Monadenia chaceana* (Bureau Sensitive species) is associated with rocky areas, talus deposits, associated riparian areas, and coarse woody material (USDA, USDI 2003). *Vespericola sierranus* is primarily a riparian associate found in perennially moist habitat, including spring seeps and deep leaf litter along stream banks and under debris and rocks. *Monadenia fidelis celeuthia* is associated with deciduous, mixed or coniferous forests generally, but also sometimes in open woods and grassy places, such as Garry oak (*Quercus garryana*) meadows.

Protocol Surveys for terrestrial mollusks (*Helminthoglypta herleini, Monadenia fidelis celeuthia, Monadenia chaceana,* and *Vespericola sierranus*) were conducted throughout the Conde Project Area. These surveys did not detect any target species mollusc.

d. Golden Eagle

In Oregon, the Golden Eagle inhabits a wide range of habitats, including shrub steppe, grasslands, juniper, open ponderosa pine, and mixed conifer / deciduous habitats. The preferred foraging habitat is generally open areas with a shrub component that provides food and cover for prey (primarily black-tailed jackrabbit). Nests are typically large (3-10' tall and 3' wide), and often built in large live ponderosa pines (>30" dbh) or on ledges along rims and cliffs (Marshall et al. 2003).

Currently, the Golden Eagle is not recognized as a federally or state listed species (under the Endangered Species Act) or under the Bureau's Special Status Sensitive Species program. However, protection is afforded under the Bald and Golden Eagle Protection Act and under the Medford District RMP.

Suitable habitat exists in the analysis area and across the Little Butte Creek Watershed.

e. Bald Eagle

Bald Eagles are usually associated with large bodies of water. Nest trees are usually large and prominent. Nests are most commonly constructed in live trees. Fish are the most common prey species of Bald Eagle.

Currently, the Bald Eagle is not recognized as a federally or state listed species (under the Endangered Species Act) or under the Bureau's Special Status Sensitive Species program. However, protection is afforded under the Bald and Golden Eagle Protection Act and under the Medford District RMP.

Suitable nesting habitat exists in the analysis area and near lakes, reservoirs and rivers across the Little Butte Creek Watershed.

5. Affected Environment - Land Birds (Neotropical Migrants)

All Neotropical migrants go to Central or South America each year. They are addressed here due to widespread concern regarding downward population trends and habitat declines. BLM has interim guidance for meeting federal responsibilities under the Migratory Bird Treaty Act and Executive Order 13186 (EO). Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum No. 2008-050. The Instruction Memorandum relies on two lists prepared by the US Fish and Wildlife Service in determining which species are to receive special attention in land management activities; the lists are *Bird Species of Conservation Concern* (BCC) found in various Bird Conservation Regions (Project Area is in BCR 5) and *Game Birds Below Desired Condition* (GBBDC). The following table (Table 3-6) displays those species that are known or likely to be present in the analysis area.

Table 3-6. Land Bird Species Known or Likely to be Present – Conde Analysis Area

Species	Status
Band-tailed Pigeon (*Patagioenas fasciata*)	GBBDC
Flammulated Owl (*Otus flammeolus*)	BCC
Mallard (*Anas platyrhynchos*)	GBBDC
Mourning Dove (*Zenaida macroura*)	GBBDC
Olive-sided Flycatcher (*Contopus cooperi*)	BCC
Purple Finch (*Carpodocus purpureus*)	BCC
Rufous Hummingbird (*Selasphorus rufus*)	BCC
Wood Duck (*Aix sponsa*)	GBBDC

Status: BCC-Bird Species of Conservation Concern
GBBDC-Game Birds Below Desired Condition

Land birds use a wide variety of habitats, including late-successional forests, riparian areas, brush in recovering clearcuts, and small trees in developing stands. Some birds, such as the Olive-sided Flycatcher, use residual canopy trees for perching, and forage over adjacent clearcuts. Many land birds are associated with deciduous shrubs and trees in early successional habitats (e.g., Rufous Hummingbirds). Some of the recovering clearcuts and areas in the analysis area with lower tree and shrub heights would provide these optimal foraging conditions.

Resident birds remain in the same general area or migrate to lower elevations in the winter. Total numbers of late-successional dependent migratory or resident birds within the Conde analysis area are unknown. However, knowledge of specific numbers is not necessary to assess effects of land management activities on migratory or resident birds. Current research indicates the most appropriate

scale to study impacts to migratory birds is at the eco-regional scale (California Partners in Flight 2002). Breeding bird surveys in the Southern Pacific Rainforest Physiographic Region (which includes western Oregon) indicate that songbirds are declining. The exact cause of these declines is still unclear, but issues associated with their winter grounds (Central and South America) are suspected to be an important factor (Sauer et al., 2004).

6. Affected Environment - Deer and Elk

Deer Winter Range and Elk Management Area

None of the proposed treatment units and no portion of the analysis area are within designated Big Game Management or Winter Range Areas.

Within the analysis area, approximately 200 acres on federal ownership serve as foraging areas (grass, brush, woodland, and early seral vegetation condition classes). Generally, brushland/shrubland and mature conifer forest vegetation condition classes also provide hiding cover.

Management for deer and elk in these areas is focused primarily on improving forage and cover conditions and decreasing the density of roads that are open to vehicular traffic, particularly in the winter.

Deer and Elk are not anticipated to be affected by this project and will not be addressed in detail in the following sections.

Note: In the sections that follow regarding environmental consequences, only those wildlife species that are present within the analysis area and/or are anticipated to be affected by the Conde Proposed Action are discussed.

7. Environmental Consequences – Northern Spotted Owl

a. Alternative 1

The current habitat conditions within the Conde analysis area are a result of the complex interactions of the historic vegetative patterns and the changes to that historic vegetation from human activities and disturbance events.

Under Alternative 1, the No-Action alternative, none of the proposed BLM activities would occur. Forest stand conditions would continue to develop along the general current trends toward higher density stand conditions, especially in the understory, than what was historically present in the area. It is likely that many of the stands within the analysis area would eventually contain tree densities two to three times that of historic levels (Hardy and Arno, 1996). The majority of the lower elevation stand conditions reflect past fire exclusion efforts. As discussed in further detail in Sections F (Silviculture) and G (Fire and Fuels), high stocking levels, competition mortality, fuel loading and ladder fuel conditions work to increase the susceptibility of the existing late-successional and NRF habitat to high severity fire.

The No-Action Alternative would not alter the current habitat conditions across the analysis area, and the NSOs that inhabit and utilize the analysis area would not be impacted from any loss of habitat or project related disturbance. NSOs would be expected to behave and utilize the habitat within the Project Area in the same fashion as they have in the past.

Under the No-Action Alternative, no loss of NRF or dispersal habitat would be expected across the analysis area from active forest management on Federal lands. It is difficult to estimate the potential loss of NRF or dispersal habitat due to wildfire or other disturbance events and when such loss might occur.

Recent trends in Southwest Oregon illustrate that fire has been converting mature forest structure into earlier seral stages at a higher rate than harvest. For this reason, the retention of mature forest habitat is problematic in dry forested ecosystems (Courtney et al. 2004; Spies et al. 2006).

In general terms, wildfire would remain the most immediate hazard to late-successional forest habitat (NRF) and its associated species (Courtney et al. 2004), including the NSO. High severity fires could be expected to remove or downgrade habitat randomly across the landscape, setting back forest succession and development, and likely resulting in the loss of large tree structure critical to late-successional forest habitat dependent species. High severity fires resulting from these dense stand conditions would cause more severe impacts to soils, which may prolong the recovery and colonization of mycorizzal organisms, and macroinvertebrate and small mammalian prey food webs important to suitable foraging areas for spotted owls.

Under the No-Action Alternative, the development of future late-successional forest habitat within the Project Area would be delayed or potentially at risk. This process is discussed in further detail in the Silviculture section of this EA (Section J.).

This is because current stand conditions are too dense and trees are not developing the diameter to height ratio required to develop late-successional structure (Davis et al. 2007). This late successional structure was historically created through frequent fire events that reduced stem densities and competition that created open grown conditions. Under the No-Action Alternative, the current stand conditions would likely develop into less complex stand structures and species compositions than that of old-growth stands (Sensenig 2002), or at the very least, would require a much longer time scale to develop (Tappeiner et al. 1997).

b. Alternative 2

Forest management treatments result in one of the following categories: habitat removal, habitat downgrade, or a maintenance treatment (treat and maintain). Forest management treatments proposed in this Alternative include thinning but maintaining NSO nesting, roosting, foraging, and dispersal habitat, thinning in mixed conifer forests, and thinning in white-fir forests. Some thinning treatments would result in downgrading (141 acres) or removing (18 acres) of NSO nesting, roosting, and foraging habitat. A description of these silvicultural prescriptions is included in Chapter 2, Silvicultural Objectives and Descriptions.

The proposed units and the analysis area are all outside of provincial home ranges of northern spotted owl sites.

Harvest Treatments

There are approximately 800 acres of suitable spotted owl habitat, and 450 acres of dispersal-only habitat on BLM ownership in the analysis area. Alternative 2 would treat and maintain 69 acres of suitable spotted owl habitat and 53 acres of dispersal habitat; an estimated 141 acres of nesting, roosting, and foraging would be downgraded to dispersal habitat, and about 18 acres would be removed.

Across the analysis area, more than 70 percent of existing suitable northern spotted owl NRF habitat would remain untreated.

When examining the impacts to NSOs from timber harvest, the amount and intensity of harvest are not the only factors to consider. One critical factor to consider is the spatial arrangement of the habitat found across the landscape and where the proposed treatments would occur in relation to known NSO nest sites. Researchers have found that the habitat quality within 300 meters of a nest site (known as the nest patch)

is critically important to determining nest site positioning across the landscape (Perkins et al. 2000), and is further recognized as an important area under the Incidental Take Statement Methodology used to estimate the number of NSOs affected by federal actions (USDI 2008). Therefore, two similar treatments in very similar habitat types could have differing impacts to NSOs depending on if the treatment would occur within 300 meters of NSO nest locations (i.e., the nest patch).

The removal of selected dwarf mistletoe infected trees outside of NSO nest patches would remove some trees with potential nest structure formed by the mistletoe. Suitable nesting structure is retained within units through retention of large dominant trees and most trees infected with mistletoe.

The long term (>10 year) effects of the Proposed Action are anticipated to increase the health and vigor of the residual stands post treatment. It is likely that the treated stands would develop into more complex, structurally diverse forests in the long term in comparison to the No-Action Alternative. In fact, thinning dense stands may be necessary in order to achieve old-growth forest characteristics in the absence of natural disturbance events (Tappeiner et al. 1997). Thinning younger forest stands may provide growing conditions that more closely approximate those historically found in developing old growth stands (Hayes et al., 1997). Thus, the treatments as proposed under Alternative 2 would have long-term beneficial effects to NSOs by increasing growth rates of the residual stand and accelerating the development of late-successional old growth characteristics within the treated areas than would occur if left untreated.

Thinning around pines (by a distance of double the drip line of the pine to be buffered) will aid in recolonization of pines in stands that have experienced a loss of pine species due to competition from increasing densities of Douglas fir and white fir trees. Restoration of early seral species (pine and incense cedar) to project area forests will enhance habitat for a variety of native wildlife species and improve the fire resiliency of these forest stands.

Due to anticipated effects to northern spotted owls, the proposed treatments were presented to the US Fish and Wildlife Service through the consultation process. Some of the proposed treatment units were consulted on in MEDFORD Summer 2010 LAA BA, while other units were consulted on in Fall 09 FY 10-11 NLAA BA. The Biological Assessments, MEDFORD Summer 2010 LAA BA and Fall 09 FY 10-11 NLAA BA, and corresponding BO and LOC from the USFWS are available for review at the Medford District Office and are also posted on BLM's Medford District Website.

Effects to Spotted Owl Prey

Timber harvest and associated fuels reduction projects may impact foraging by changing habitat conditions for prey. Sakai and Noon (1993) stated that dusky-footed woodrats may benefit from some thinning or harvest which would increase shrub and pole stands. Bushy-tailed woodrat presence is more dependent on cover and food availability than on seral stage. This species often uses areas previously disturbed by fire (Carey 1991). Both of these NSO prey species are likely to be present in the analysis area.

Residual trees, snags, and down wood that are retained in the thinned stands would provide some cover for prey species, and would help minimize harvest impacts to some prey species. Lemkuhl et al. (2006) found that fuels projects in eastern Washington could have impacts on bushy-tailed woodrats, but confirmed the importance of maintaining snags, down wood, and mistletoe.

Some disturbance of habitat may improve forage conditions, provided understory structure and cover are retained. Removal of tree canopy would bring more light and resources into the stand, stimulating forbs, shrubs and other prey food. Once the initial impact of disturbance recovers (6 months to 2 years), the understory habitat conditions for prey forage would improve over the next few years, until shrubs and residual trees respond to again close in the stand.

Edges created from harvest can provide areas of good prey availability and potentially increased prey vulnerability (i.e., better hunting for owls) (Zabel 1995). Prey animals may be more exposed in the disturbed area or may move away from the disturbed area for the short-term. Changes in prey availability may occur as cover is disturbed and prey species move around in the understory. They may become more vulnerable and exposed. The disturbance might attract other predators such as hawks, other owls, and mammalian predators. This may increase foraging competition for owls in the treatment area, but the exposure of prey may also improve prey availability for northern spotted owls.

Bingham and Noon (1997) reported that a spotted owl core area is the area that provides the important habitat elements of nest sites, roost sites, and access to prey, benefiting spotted owl survival and reproduction. Rosenberg and McKelvey (1999) reported that spotted owls are "central place" animals with the core area (the area closest to the nest) being the focal area. Several studies (Wagner and Anthony 1998; Dugger et al. 2005; Zabel et al. 2003; Bingham and Noon 1997) indicate the core area size for the Rogue and South Cascades provinces is 0.5 miles (or 500 acres) around the nest site. Therefore, effects to prey species are most critical at the nest patch and core areas. Within the Conde Project, there would be no treatment within nest patches.

Overall, the spacing, timing and the retention of key habitat features as called for under the Proposed Action and PDFs for this project (EA Chapter 2) are likely to avoid adverse impacts to spotted owls with respect to prey availability, although localized, short-term changes in prey species distribution and abundance are likely to occur within a treated stand. The dispersed nature of treatment sites over a large area is especially important in maintaining spotted owl prey populations within the Project Area. Large dominant trees, moderate to high canopy cover residual trees, snags, and down wood retained in the treated stands would continue to provide cover and nest structure for prey species and would help reduce harvest impacts to some prey species, such as dusky-footed woodrats and northern flying squirrels. Treatment implementation would be spread out temporally and spatially within the analysis area, and greater than 70 percent of NSO habitat across the analysis area landscape would remain untreated, providing undisturbed areas for spotted owl foraging.

Additionally, research has indicated that thinning treatments are not necessarily detrimental to small mammal communities as a whole. In an experimental study, researchers found of 12 mammal species studied, the number of captures increased for four species and decreased for only one species two years after moderate to heavy thinning occurred in the Oregon coast range (Suzuki and Hayes 2003). This study also found the total number of small mammal captures was higher in previously thinned vs. unthinned stands. Gomez et al. (2005) noted that commercial thinning in young stands of coastal Oregon Douglas-fir (35-45 yr) did not have a measurable short-term effect on density, survival or body mass of northern flying squirrels, an important prey species for spotted owls.

PDFs and normal operating procedures applied by the Medford BLM reduce the impacts to the extent possible, while still facilitating tree harvest and other projects.

Effects of Disturbance to Northern Spotted Owls

None of the project units are located within the provincial home range of northern spotted owl sites. If breeding northern spotted owls are located prior to harvest activities within the disturbance distances established in Chapter 2, applicable restrictions will be placed in effect. Mandatory PDFs would be incorporated into all Proposed Action activities. Applying the Mandatory PDFs should avoid harm to nesting owls and their young that might occur from noise or activity. Nesting owls are confined to an area close to the nest, but once the young fledge, they can move away from noise and activities that might cause them harm. Since all projects would follow mandatory PDFs that restrict activities to outside of the

breeding season and beyond recommended disturbance distance thresholds, no harm to nesting owls, or their young, is expected from project related noise or activities.

Fuels Reduction Treatments

Alternative 2 proposes to treat slash created from forest thinning. The fuels reduction treatments as proposed in Chapter 2 would not alter the overstory forest structure or remove key habitat components related to spotted owl habitat. In very dense stands, these treatments reduce understory density and improve flight paths within stands, in turn, increasing the accessibility of owls to the forest floor and prey abundance or availability (Sakai and Noon 1993, 1997). In some instances, mechanical fuels treatments can reduce the habitat quality for owls because these treatments simplify the forest structure, which can in turn have negative effects to prey species. Conversely, results from other studies on small mammals and fuel reduction treatments have demonstrated that the total amount of small mammal biomass increases as a result of mechanical fuel reduction treatments (Converse et al. 2006).

Large down woody debris, patches of unburned vegetation in draws and cooler aspects, and some unburned slash piles would continue to provide ground cover habitat during and after treatments. These untreated areas and residual habitat features, along with the spatial and temporal staggering of treatments across the landscape should ameliorate the potential negative effects (e.g.: removal of cover; disruption of normal feeding, breeding, and sheltering activities) of these fuels treatments on prey species at the landscape level.

Underburning treatments have the greatest potential to impact spotted owl prey because these treatments can fully or partially consume the snags or coarse woody material (CWM) that many prey species are associated with during underburn operations (Stephens and Moghaddas 2005). However, these effects to prey species are expected to be highly limited and localized because very few acres would be underburned during a given year and not all the existing snags or CWM within an underburn is lost during underburn treatments (Mitchell 2009, personal communication). In addition, while some prey species may be adversely affected from mechanical and underburn treatments, some of the prey species are primarily arboreal in habit, and would remain largely unaffected by these treatments.

Road Construction

Under Alternative 2, the BLM proposes to maintain about 17 miles of roads (i.e., road grading, rock surfacing, and water drainage improvements). Approximately 1,000 feet of temporary spurs would be constructed under this alternative. Road decommissioning proposed for the Conde project would include approximately 1.3 miles of existing BLM roads. There are a number of ways roads affect wildlife in addition to habitat removal. Some of the more common ones are vehicular noise disturbance which affects behavior patterns, increased potential for poaching, increased potential for over hunting along roads due to easy access, and microclimatic changes to the habitat adjacent to roads. Road maintenance has the potential to influence wildlife species through noise, but would be of short duration and subject to wildlife seasonal PDFs.

In summary, the Proposed Action would have minimal impacts to the NSOs found within the analysis area given that:

- None of the proposed treatments would occur within a NSO home range,
- Negative impacts to NSO prey are anticipated to only occur in the short term (<5 years) and would be spatially separated and well distributed across the owl analysis area.

8. Environmental Consequences – Pacific Fisher

a. Alternative 1

Under Alternative 1, the No-Action Alternative, none of the proposed BLM activities would occur. Forest stand conditions would continue to develop along the general current trends toward higher density stand conditions, especially in the understory, than what was historically present in the area.

The No-Action Alternative would not alter the current habitat conditions across the analysis area. Fishers would be expected to behave and utilize the habitat in the same fashion as they have in the past.

Particularly to fishers, the greatest risk of No-Action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood important to fisher natal and denning habitat.

b. Alternative 2

Harvest Treatments

No known denning sites would be impacted and proposed activities would not be expected to cause direct mortality of any fishers. Disturbance from project activities would likely be the principal effect on any fisher within the analysis area. However, fishers are highly mobile and have large home ranges and would likely move to another part of their home range while the activity is ongoing.

Thinning treatments would have short term negative effects to habitat for some fisher prey species due to the reduced vegetation. These effects are relatively short term, as understory vegetation typically returns within 5 years. However, these short term effects to fisher prey species would be minimal, because the large amount of untreated areas within the analysis area would continue to provide forage habitat while canopy cover in the treated stands increases. Additionally, these treatments would retain key habitat characteristics such as large snags and coarse woody debris (CWD) to provide existing and future habitat for fishers.

Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987; Powell 1993). Disturbance from project activities would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range (approximately 62 sq. km for an adult male and approximately 25 sq. km for an adult female [Aubry and Raley 2006]). Seasonal restrictions listed as Project Design Features for other resources would also reduce the likelihood of impact to fishers by restricting project activities until young are approximately six weeks old, approximately the age when fisher move young from natal dens and become more mobile. Fishers have large home ranges and would be able to move away from the action area while the disturbance is occurring, without impacting their ability to forage and disperse within their home range.

Fuels Reduction Treatments

Under Alternative 2, 281 acres would be treated for fuels reduction following commercial harvest. Approximately 227 acres of fisher habitat would be treated. These proposed treatments would have minimal impacts to the habitat located across the analysis area, as the vast majority of the existing habitat would not be treated.

The fuels reduction treatments as proposed in Chapter 2 do not typically alter the overstory forest structure or remove key habitat components related to fisher habitat. In some instances, mechanical fuels treatments can reduce the habitat quality by simplifying the forest structure. The Project Design Features in Chapter 2 include the retention of snags and CWM, which are important habitat features for fisher. This provision, along with the spatial and temporal staggering of treatments across the landscape would

ameliorate the potential negative effects (e.g.: removal of cover; disruption of normal feeding, breeding, and sheltering activities) of these fuels treatments on prey species at the landscape level.

Underburning treatments have the greatest potential to impact fisher habitat because these underburning treatments can partially or fully consume the snags or coarse woody material (CWM) that fishers often utilize for denning or rest sites (Stephens and Moghaddas, 2005). However the potential loss of these snags or CWM is expected to be highly limited and localized because not all the existing snags or CWM within an underburn is lost during underburn treatments (Pers. Comm. Mitchell, 2009).

Road Construction
Under Alternative 2, the BLM proposes to maintain about 17 miles of roads (i.e., road grading, rock surfacing, and water drainage improvements). About 1,000 feet of temporary spurs would be constructed. Some of this road construction will remove existing forest and contribute to the fragmentation of habitat used by the fisher. Approximately 1.3 miles of existing roads would be decommissioned.

Effects Summary for Fisher Alternative 2
Alternative 2 would not contribute to the need to federally list the fisher as threatened or endangered because habitat features, such as large snags and coarse wood, would be retained throughout the Project Area, which would provide habitat for denning and resting. More than 90% of suitable habitat located within the Analysis Area would not receive any treatments.

9. Environmental Consequences – Great Gray Owl

a. Alternative 1

Under the No-Action Alternative, none of the proposed harvest activities would occur, and the forested stands in the analysis area would continue to develop along their current pathways. Therefore, none of the potential nesting habitat found within the analysis area would be altered. Great gray owls would continue to utilize the analysis area in more or less the same fashion as they have in past years.

Specific to great gray owls the No-Action Alternative would not affect use of the analysis area for nesting or foraging in the short term. At longer time scales, the open meadow habitats that provide foraging areas would continue to be encroached upon by fire intolerant plant species, thereby reducing the amount of potential foraging opportunities found within the analysis area. Some forest stands would grow too dense over time for great gray owls to fly through, thus further reducing nesting and foraging habitat. Stand replacement fire would remain the greatest risk to the nesting habitat found within the analysis area.

b. Alternative 2

Alternative 2 would treat 281 acres of forest habitat. While commercial thinning treatments may remove individual potential nest trees, the thinning treatments are not expected to affect the majority of the stands or individual potential nest trees found throughout the analysis area. Protocol surveys were conducted for great gray owls for the Conde analysis area in 1997 and 1998. Six (6) reproductive sites were located. Each reproductive site would be protected with a 30 acre management area and a ¼ mile radius (or equivalent area polygon) protection zone. Any additional reproductive sites located prior to harvest activities would also receive this protection.

Short term effects would include reduced canopy closure and structural complexity, and the loss of future potential nest trees. However, these habitat changes would also open stands for unobstructed flight and increased foraging opportunities. Long term beneficial effects include accelerated development of late-

successional forest habitat suitable for potential great gray owls nesting and improved potential foraging habitat as understories respond from increased light penetrating to the forest floor .

The fuels reduction treatments proposed under Alternative 2 would remove vegetation from the understory or the smaller components of the midstory. This would have minimal effects on great gray owl habitat, as the trees removed by this type of treatment do not provide nesting habitat. These treatments have the potential to improve foraging conditions in treated stands by opening the understory and increasing access to prey species. The road construction associated with Alternative 2 would not occur in suitable great gray owl habitat, and thus would not directly affect any nesting habitat.
Each reproductive site would be protected with a 30 acre management area and a ¼ mile radius (or equivalent area polygon) protection zone.

10. Environmental Consequences - Golden Eagle

a. Alternative 1

Under the No-Action Alternative, management activities would not remove or alter suitable habitat within the Project Area and habitat would continue to develop along current successional pathways. For Golden Eagles, the greatest risk of the No-Action Alternative is the potential wildfire related loss of large live remnant conifers needed to support Golden Eagle nesting structures, and the loss of suitable foraging habitat due to conifer encroachment.

b. Alternative 2

Because of the retention of more than 70 percent of nesting and foraging habitat suitable for use by Golden Eagles within this analysis area, any impact to the species from the Conde Project is expected to be slight. Most large suitable nest trees would be retained post-harvest. Grasslands suitable for foraging would not be treated and would remain usable by Golden Eagles to their present extent. Some encroachment into these grasslands will continue to occur and thus reduce golden eagle foraging habitat.

11. Environmental Consequences - Bald Eagle

a. Alternative 1

Under the No-Action Alternative, management activities would not remove or alter suitable habitat within the Project Area and habitat would continue to develop along current successional pathways. For Bald Eagles, the greatest risk of the No-Action Alternative is the potential wildfire related loss of large live remnant conifers needed to support Golden Eagle nesting structures.

b. Alternative 2

Because of the retention of more than 70% of NRF habitat and the retention of snags and large trees within treatment units suitable for use by Bald Eagles, any impact to the species from the Conde Project is expected to be slight. Most large suitable nest trees would be retained post-harvest. Reservoir centered foraging habitat would not be treated and would remain usable by Bald Eagles to their present extent.

12. Environmental Consequences - Bureau Special Status Species

The Bureau Special Status Species list, updated February 7, 2008, is divided into Sensitive and Strategic species (IM No. OR-2008-038). As mentioned above, only federally listed or Bureau Sensitive species known or suspected to be present within the analysis area and impacted by the proposed actions are

addressed in this EA. Table 3-7 below documents the basic conclusions of this assessment by species. A description of the table's headings and letter codes are located at the bottom of Table.

Table 3-7. Special Status Wildlife Species – Conde Analysis Area

SPECIES	7/7/10 STATUS	RANGE (Y/N)	PRESENCE	PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS
Birds				
Northern spotted owl	FT	Y	S	No known nest sites or home ranges are within the project or analysis area. Seasonal Restrictions would protect new sites from project activity disturbance.
Amphibians				
Foothill yellow-legged Frog	BSEN	Y	S	A slight increase in sedimentation from road maintenance and construction, and road use for timber harvest, could have negative short term impacts on foothill yellow-legged frog habitat. However, sediment delivery to streams due to project activities would be highly localized, immeasurable, and of short duration. Soil and hydrology PDFs would minimize potential impacts from sedimentation to water quality and no loss of frogs would be expected to occur.
Oregon Spotted frog	FC	Y	U	No known sites within the project area. Habitat will be protected by riparian buffers within the Conde project area.
Reptiles				
Northwestern pond turtle	BSEN	Y	S	Females lay eggs in upland areas up to ½ mile from the nearest water source. Riparian zone buffers will protect aquatic habitats used by this species. Upland sites utilized for nesting are not usually forested and would not likely be impacted by the proposed action. Some individual turtles may overwinter in duff in forested locations and could be subject to incidental impacts.
Mammals				
Fisher	FC	Y	S	Potential habitat exists within and adjacent to the project area. Temporary human disturbance, both temporally and spatially would be inconsequential. No known sites located within project units.
Fringed myotis	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Project activities would not adversely affect this species at the landscape scale as adequate levels of snags would be retained (PDF Ch. 2) post treatment.
Pacific pallid bat	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Project activities would not adversely affect this species at the landscape scale as adequate levels of snags would be retained (PDF Ch. 2) post treatment.
Invertebrates				
Chase sideband snail	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Protocol surveys have been completed. Known sites will be protected with a one (1) site tree buffer.
Evening fieldslug	BSEN	Y	U	No known sites in project area. Habitat will be protected by riparian buffers within the Conde project area.

SPECIES	7/7/10 STATUS	RANGE (Y/N)	PRESENCE	PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS
Johnson's Hairstreak	BSEN	Y	S	This butterfly species has not been documented in the project area. Surveys for the species have been determined to be impractical as it spends the majority of its lifecycle high in the canopy of older conifers with mistletoe infection. This butterfly is likely to be impacted through removal of conifer trees and the mistletoe which they host. As mistletoe will not be eradicated from the project area, this butterfly will likely continue to persist.
Mardon skipper butterfly	FC	Y	S	No known sites within the project area. This species is associated with wet meadows. There will be no treatment of this type of habitat under the provisions of this project.
Oregon shoulderband snail	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Protocol surveys have been completed. Known sites will be protected with a one (1) site tree buffer.
Siskiyou hesperian snail	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Protocol surveys have been completed. Known sites will be protected with a one (1) site tree buffer.
Siskiyou short-horned grasshopper	BSEN	Y	S	The Siskiyou short-horned grasshopper is associated with open grassland with an elderberry shrub component. No activities are proposed for this habitat type in the Conde project area. They are unlikely to be impacted by the proposed action.
Travelling sideband snail	BSEN	Y	S	Potential habitat exists within and adjacent to the project area. Protocol surveys have been completed. Known sites will be protected with a one (1) site tree buffer.

Table Headings and Letter Code Definitions

Species: Grouped alphabetically by taxon.
Status: lists the Oregon BLM Program codes as follows:
Oregon BLM Codes:

FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
BSEN - Bureau Sensitive (BLM) - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.
BSTR - Bureau Strategic Species (BLM) - not presently eligible for official federal or state status, but of concern which may at a minimum need protection or mitigation in BLM activities.

Range: indicates yes or no, if the breeding range overlaps with the Ashland Resource Area. If not within the range, both presence and basic conclusion are not applicable (N/A). For invertebrates in which there is inadequate data to determine ranges, 'U' is used for unknown.

Presence: indicates 'P' if a species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and/or no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.

Basic Conclusion: describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

13. Environmental Consequences - Land Birds (Neotropical Migrants)

a. Alternative 1

Neotropical birds that favor dense conditions may benefit for a time from the No-Action Alternative because the dense understories would continue to build within the Project Area. However, the increased chance of stand replacing fires that would eventually be a result of No-Action Alternative would also lead

to the loss and decline of a variety of habitat conditions, including the present dense conditions that benefit some species.

b. Alternative 2

Any action that changes or removes vegetation used by one species may benefit another. Species requiring dense cover that have benefited from the dense understories created by the lack of fire could be negatively affected by thinning treatments designed to reduce vegetation density. Due to habitat removal, songbird composition and abundance in treated stands could be reduced in the short term (Janes 2003; Hagar et al. 2001; and Siegel and DeSante 2003). Harvest treatments would remove hiding cover and nesting habitat for neotropical birds that use older forests. However, untreated riparian buffers, untreated late-successional forest habitat, and great gray owl protection zones would continue to provide hiding cover, foraging, and nesting habitat within the analysis area for birds that use older forests. Additionally, existing large diameter snags and down wood found in older seral stands would be retained in the Project Area, and would continue to provide nesting, roosting, or foraging opportunities for species dependent on these key habitat structures.

Some individual birds may be displaced and nests could be destroyed during project activities. However, untreated areas adjacent to the treatment areas would provide refuge and nesting habitat. Some nests may be lost from timber harvest and thinning occurring during active nesting periods. However, the failure or loss of a nest during one nesting season would not be expected to reduce the persistence of any bird species in the analysis area. That is because habitat of all types remains to support the wide diversity of bird species in the area. As >80 percent of BLM administered lands found within the analysis area would remain untreated, impacts to these species are anticipated to be negligible at the landscape scale. The loss would not be measurable at the regional scale; therefore, populations in the region would be unaffected; Partners in Flight support the eco-regional scale, as appropriate, for analyzing bird populations (California Partners in Flight, 2002).

14. Cumulative Effects

Cumulative effects analysis of foreseeable state and private actions provide the Service and the Medford BLM an accurate environmental baseline to assess impacts of Federal actions.

The land base in the action area has a checker board pattern of ownership of private land interspersed with BLM lands. A range of management practices occur on private lands from residential home site development to intensive industrial timber management.

In the Biological Opinion for the NWFP (USDA and USDI 1994b, Appendix G, 44-45), the Service concluded,

"Non-Federal landowner compliance with the take prohibition of the [Endangered Species] Act does not assure the maintenance of spotted owl dispersal habitat within Areas of Concern and checkerboard ownership nor provide for improvement of existing populations. Consequently, it is likely that a reduction in dispersal habitat would occur on non-Federal lands in certain areas."

The majority of state and private forests in Washington, Oregon, and Northern California are managed for timber production. Non-Federal lands are not expected to provide demographic support for spotted owls across and between physiographic provinces (Thomas et al. 1990; USDA and USDI 1994a). Historically, non-Federal landowners practiced even-aged management (clear-cutting) of timber over extensive acreages. Private industrial forest lands are managed for timber production and will typically be harvested between 40 and 60 years of age, in accordance with State Forest Practices Act standards. In 2008, during the development of the District Analysis and Biological Assessment of Forest Habitat, data

was requested from Oregon Department of Forestry and the Pacific Northwest Inventory and Analysis team to help determine harvest rates in the past decade on private lands within the Medford district. These records indicated private harvest rates in Jackson and Josephine Counties have never exceeded 1.08 percent of the total private lands per year since 1998. These records did not provide information of pre-treatment habitat conditions. We anticipate some loss of owl habitat on private lands, but cannot predict the rate of loss, or the specific location of harvest.

The Medford BLM assumes these past management practices will continue and reduce the amount of NRF habitat for spotted owl on non-Federal lands over time. Harvest activities on state and private lands can be expected to impact spotted owls located within adjacent Federal lands by removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods. Under Oregon Forest Practice Rules (629-665-0210), owl nest sites (70-acre core areas) are protected for at least three years following the last year of occupation.

Past harvest activities on Federal land are reflected in current condition discussions in this document. Acres of habitat have been adjusted to reflect these activities. The only planned activity on BLM land in the vicinity of the Conde project (though outside the analysis area) in the reasonably foreseeable future is the Swinning timber sale. This harvest action, treating 281 acres, would take place outside the home range of any known northern spotted owl sites.

F. SILVICULTURE

1. Affected Environment

The Conde project area is comprised of approximately 281 acres in sections 7, 9, 15 of Township 38 South, Range 3 East of the Willamette Meridian. The project area is approximately 16 miles east of Medford, Oregon. The project area is located north of Dead Indian Memorial road (State Highway 722).

The major drainage area is in the Conde Creek and Dead Indian Creek drainage area within the South Fork Little Butte Creek sub-watershed.

a. Geomorphology/Soil Type

Tree height growth and the quantity of wood grown on any site are determined by the soil characteristics and properties. The characteristics and properties of soils are determined by physical and chemical processes that result from the interaction of five factors: climate, plants and animals, parent material, topography, and time. Parent material, climate, and topography account for most of the differences among soils in our area.

The project area is on the western flanks of the Western Cascade Province. This physiographic province is made up of lava and pyroclastic rock ranging in age from the Oligocene to late Miocene period. During the Miocene period the rock was uplifted, folded, faulted, influenced by intruding shallow stocks, and then deeply eroded. As this rock dips to the east it is overlain by more recent flows from shield volcanoes of the Pliocene to recent age. Rock strata includes beds of volcanic ash (tuff), flows of andesite lava, and layers of andesitic breccia and agglomerate.

There are also 3 climatic zones within the analysis area. Zone 1 receives less than 35 inches of annual precipitation and is generally at elevations of about 4,000 feet. Most of the soils contain a moderate amount of bases because of the mixed parent material and the low rainfall is not high enough to leach the bases out of the soil profile. Zone 2 receives more than 35 inches of annual precipitation and is generally

at elevations of about 4,000 feet. The amount of precipitation is high enough to result in the leaching of bases and the illuviation of clay . Zone 3 receives 20 to 60 inches of annual precipitation and is generally at elevations of 3,500 to 6,000 feet. Bases are readily leached, decomposition of the organic matter is slow.

b. Precipitation/Snowfall/Temperature Extremes

The project area is characterized by mild, wet winters and hot, dry summers. Average annual precipitation ranges from approximately 22 inches near the confluence of Little Butte Creek and the Rogue River, to 66 inches at Mount McLoughlin. During the winter there are frequent storms of varied intensity. Winter precipitation in the higher elevations is usually snow which ordinarily melts from April through June. Rain predominates in the lower elevations with the majority occurring in late fall, winter, and early spring. The rain-on-snow zone or transient snow zone is approximately 3,500 to 5,000 feet in elevation. The 30-year average annual precipitation at Howard Prairie Dam is 32.78 inches, and has average daily temperatures ranging from about 25 degrees in January to 62 degrees in August.

Hydrology recommendation #4 in the Little Butte Creek Watershed Analysis (page 191) applies to management activities in the transient snow zone. The key elements in this recommendation are to minimize large openings within the transient snow zone and to analyze site-specific projects for cumulative watershed effects on a drainage area basis.

The crown closure percentages listed on page 192 of the Watershed Analysis approximate full hydrologic recovery by forest zone, tree species, and aspect. These canopy closure percentages reflect reference conditions when forest fires were more frequent and other biotic agents such as insects, disease, and wind-throw were not controlled. The range of natural variability for vegetation in the Little Butte Creek Watershed includes canopy closures that would be greater than and less than full hydrologic recovery. A range of percentages would be more accurate to represent changing forest conditions over time.

The reference condition canopy closures are used to calculate hydrologic recovery for cumulative watershed effects analysis. These canopy closure percentages should not be misinterpreted as the canopy closures that must be maintained by silvicultural prescriptions. Silvicultural prescriptions may result in some of these percentages being as much as 10 to 15 percent lower for short periods of time within a portion of a forest zone. Canopy closures resulting from proposed silvicultural treatments would be within the range of natural variability.

c. Tree Series/Plant Associations

This project area is diverse and the sale area on the Dead Indian Plateau has mostly white fir tree series stands with some moist mixed conifer sites.

There are four tree series in the analysis area: Douglas-fir (PSME), ponderosa pine (PIPO), white fir (ABCO), and white oak (QUGA4). Plant association descriptions within these series can be found in Preliminary Plant Associations of the Siskiyou Mountain Province (Atzet and Wheeler 1984) and Field Guide to the Forested Plant Associations of Southwestern Oregon (USDA 1996; see Table 3-8).
The Conde project area is predominantly within the white fir tree series with scattered Douglas-fir in the stands. These are high elevation stands with over 30 inches of rainfall annually.

Table 3-8. Tree Series/Plant Associations Common to the Conde Analysis Area.

Douglas-fir Series/Plant Associations	White Fir Series/Plant Associations
PSME (Douglas-fir)/BENE (dwarf Oregon grape)	ABCO (White fir) - PSME (Douglas-fir)
PSME/RHDI (Poison oak)-BEPI (Piper's Oregon grape)	ABCO - TABR (Pacific Yew)
PSME/RHDI	
PSME-PIPO (Ponderosa pine)	
PSME-ABCO (White fir)	
PSME/Depauperate	
PSME/ABCO-HODI (Creambrush oceanspray)	
PSME-QUGA4 (Oregon white oak)/RHDI6	

d. Stand History

The vegetation native to the watershed is a result of time, the unique geology of the area, and anthropogenic influences. Over the course of thousands of years, native inhabitants regularly used fire on the landscape for a wide variety of purposes. Natural disturbance such as lightning fires, windstorms and drought contributed to the variation. The lower elevation areas would have been dominated by grassland, oak savanna, and open oak/pine woodland. In the upper valley/canyon area prime black oak woodland probably existed. Many mixed-conifer stands of the canyon and high plateau sections were comparatively open, with a higher proportion of mature ponderosa and sugar pine than at present. Infrequent, stand-replacing natural fires on the high plateau may have played a dominant role overall.

After pioneer settlement, the density of endemic tree and shrub species was reduced as a result of anthropogenic disturbances (human-caused fires for land clearing, hunting, mining, grazing, protection and food; mining, logging, and other factors related to urbanization). Due to the frequent disturbance regime, historic forest lands were generally more open, had fewer trees per acre, trees of larger diameter, and a different species composition. These stands generally had more large-diameter ponderosa pine, oak species, incense cedar, and native grasses. In the moist micro sites where Douglas-fir is better adapted, it probably never reached the climax stage because of the frequent disturbance regime. Disturbances were probably as frequent as every 1 to 25 years. In the Butte Creek watershed, many of the commercial forest stands originated between 1854 and 1929. Most of the forest stands became established within 10 years after a fire although the harsher sites may have taken 30 to 40 years to become forested. Because the last fires were forest-replacing in nature, individual timber stands tend to be fine grained. This means that there are many trees of the same age class and almost equal in height with some older trees scattered throughout the stand. The majority of the trees in the project area are between 70 and 145 years old.

e. Structure Description

The next level of dichotomy from tree series/plant associations is vegetation condition class of the stands to be treated. The Medford District Watershed Analysis Committee (1994) has designated the following classes: Grass, Forbs, Herbaceous; Shrubs, Non-forest Land; Hardwood/Woodland; Early (0 to 5 years) and Seedlings/Saplings (0 to 4.9 inches DBH); Poles (5 to 11 inches DBH); Mid (11 to 21 inches DBH); and Mature/Old-growth (21 inches + DBH). The following is a description of the stand development and structure of each vegetation condition class:

Mid (11 to 21 inch DBH)
Douglas-fir and ponderosa pine are the most prevalent species, with sugar pine, incense cedar and white fir also present in the overstory. Pacific madrone and California black oak are often found in the understory. These stands became established over a 10 to 30 year period following a disturbance and most of the stands are now between 70 and 145 years of age. Many of these stands are beginning to enter the understory re-initiation stage. As mortality from wind damage, bark beetles, and pathogens create small openings in the crown canopy of the trees, regeneration begins to occur in the cleared area below. Although single story stands do exist, two to three canopy layers are present in most of the stands and four layers are present when old-growth trees are found in the overstory. Commonly found in these stands are suppressed and intermediate crown class conifers, suppressed hardwood trees, dominant and co-dominant crown class conifers, and old-growth trees. Douglas-fir dwarf mistletoe occurs in stands throughout the analysis and project areas. This pathogen reduces vigor and makes the trees susceptible to bark beetles and other pathogens. Although many of the heavily infested trees are still alive at this time, small patches of 100 percent mortality can be found and future mortality will probably increase. Douglas-fir that invaded the dry pine sites are experiencing moisture stress and are also being killed by Douglas-fir bark beetle. Pine series stands have experienced high levels of tree mortality due to stress caused by the competition from Douglas-fir trees and subsequent attacks by the western pine beetle.

Mature/Old-growth (21 inches + DBH)
In the analysis area, small timber stands in this condition class are usually found in cool, moist microenvironments at higher elevations. Most of these stands are south of the Dead Indian Memorial Road. The oldest trees are found along streams and in topographic areas with favorable north to east aspects where protected from fire. Most of these stands are in the mature seral stage with multiple canopy layers. Dominant crown class trees 361 years of age and younger, large diameter and large diameter limbed trees are present with a variety of other age class trees beneath (vertical structure, multi-cohort stand). A minimum of 4 canopy layers are present. Many of the mature stands in the project area have been infected by Douglas-fir dwarf mistletoe. In these stands, where many of the trees have a dwarf mistletoe rating (DMR) of 5 or 6, mortality is beginning to create openings in the canopy.

The ROD and RMP define the mature seral stage as the point when stand growth slows to the time when the forest develops structural diversity; approximately age 80 to 200. Old-growth is defined as the stage which constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. This stage exists from approximately age 200 until stand replacement occurs and secondary succession begins again. For purposes of inventory, old-growth stands on BLM-administered lands are identified if they are at least 10 percent stocked with trees of 200 years or older and are 10 acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions as provided by PNW publications 447 (USDA 1986) and GTR-285 (Spies and Franklin 1991). Franklin et.al. (1981) states that the size of old-growth units should be at least 300 acres in size to function as old-growth forests, and that the working definition emphasizes structural and compositional characteristics rather than the conceptually important functional features that are difficult to measure.

The landscape pattern of the analysis area can be considered "coarse-grained" because of the varying stand structure and species composition. This is a result of natural disturbances, timber harvesting and a highly dissected topography that creates diverse site conditions. However, at the stand level, the landscape pattern can be considered more fine-grained when compared to historic stands.

Subtle changes in species composition and stand structure are occurring over the landscape. Many trees with old-growth characteristics are dying as a result of increased competition with second growth trees for limited resources. Mortality is also occurring in mid to mature vegetation classes due to heavy Douglas-fir dwarf mistletoe infection. Douglas-fir, the climax species for the majority of the forested area, is replacing ponderosa pine, sugar pine and incense cedar because of its more shade-tolerant nature. In some areas white fir is migrating to lower elevations and encroaching upon the Douglas-fir tree series. Douglas-fir is also encroaching upon the edges of the oak woodlands, although mortality of Douglas-fir along these edges has been noticeable during the last few years.

It must be recognized that we are observing the landscape vegetation of today at one single point in time. Although current vegetation stem densities are high and are mostly in the late seral stage, the vegetation condition classes of today are atypical when compared to historic vegetation. This is due primarily to the effects of fire suppression on the landscape. It must also be recognized that with or without silvicultural management, the vegetation will be changing continuously because of natural succession. There is no single state of a forest that is the only natural state. The recommended prescriptions in this document will be cultivating late-successional characteristics such as variable stand structure and more vigorous growth within the stands. Ten to forty years from now most of the mature stands will be composed of trees larger than 20 inches DBH, although even-aged, mid-size stands without residual old-growth trees may still require an additional 150 years to develop mature/old-growth characteristics.

f. Coarse Woody Material

Many ecological processes have created the even and uneven-aged forest stand structure over the last century. These same processes are responsible for the variable amounts of coarse woody material (CWM) across the landscape. The Guidelines for Snag and Down Wood Prescriptions in Southwestern Oregon (White 2001) states that amounts of coarse woody material across landscapes are highly variable and should vary over time with stand development. Amounts of CWM are influenced by forest stand history, soils and respective plant associations, climate, and topography.

Bark beetles have killed large diameter pine trees in areas where tree stocking levels have been high. There have been patches of Douglas-fir mortality adjacent to oak woodlands and shrublands. Wind also blows down an occasional tree, or small groups of trees, when the shallow soil profile becomes saturated with water. In the dry Douglas-fir forests, overstocked stands have been subject to small scale bark beetle attack and suppression tree mortality in the understory. Large diameter pine and Douglas-fir trees have died also. On the moist Douglas-fir and mixed conifer forests, tree mortality has occurred because of wind, Douglas-fir dwarf mistletoe, and root rots. The Douglas-fir dwarf mistletoe has caused tree mortality on a larger scale. Patches of mature Douglas-fir that have been killed by dwarf mistletoe are approximately 1-acre in size. These pockets of mortality are scattered across the landscape. Dwarf mistletoe reduces tree vigor and bark beetles can be a secondary cause of mortality. Most of the tree mortality has occurred in the white fir tree series where stands are overstocked. Here root rots and bark beetles have killed trees throughout most of the forest stands. The root rots have also killed patches of trees approximately 1-acre in size. At the higher elevations snow damages some trees and adds dead wood to the soil.

There are abundant amounts of CWM in the Conde area where trees in the overstocked stands have died from bark beetles and root rots. The average amount of CWM is 18.48 tons per acre. Woody material ranges from 1.6 tons per acre in OI unit 123105 to 63.8 tons per acre in OI. unit 120542. According to White (2001) the Cool White Fir PAG has an average of 22.2 tons per acre of CWM. The Douglas-fir - White Fir PAG is also present in the area. Live damaged trees per acre ranges from 9.2 inches OI unit 120474 to 105.6 inches in OI unit 120482. Snags per acre ranges from 1.2 (38.1 to 59.2 inches DBH) in

OI unit 120542 to 102.3 (6.4 to 14.4 inches DBH) in OI unit 124121. The present amounts of CWM fall within the ranges discussed in White's (2001) publication for respective plant association groups (PAG).

g. Insects, Disease, Forest Health

Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*) is a significant pathogen throughout the project area with approximately 3,908 acres infected to some degree. The most heavily infected trees are found in the mature and mid vegetation classes but the smaller diameter classes are also becoming infected. Infections are sometimes systemic and form massive globose brooms. Heavy infections result in growth loss, wood quality reduction, top-killing and mortality. Although the spread of the infection is slow, as the trees lose vigor from the mistletoe infection, the susceptibility to attack from insects and pathogens increases. Mortality is evident in some stands.

Bark beetle infestations are occurring in the project area. Western pine beetles (*Dendroctonus brevicomis*) are attacking the large diameter pines while flatheaded fir borers (*Melanophila drummondi*) and Douglas-fir beetles (*Dendroctonus pseudotsugae*) are killing Douglas-fir. At the higher elevations the fir engraver beetle (*Scolytus ventralis*) is killing mistletoe and disease stressed true firs.

Forest pathogens are also changing the forest stand structure and forest development pattern. Laminated root rot (*Phellinus weirii*) is the most prevalent root disease. This is a disease of the site, and the fungus grows at a rate of about one foot per year. It can be identified by looking for rust colored mycelium between pitted layers of wood. Annosus root rot (*Fomes annosus*) is also found in the project area. Infection sites can be identified by pockets of dying trees. It looks much like laminated root rot but the wood laminations are only pitted on one side with no fungal material between layers. Conks are shelved, have a concentrically furrowed, dark-brown upper surface, an underside that is creamy white with minute pores, and a narrow poreless, outer margin. Old conks look black.

Forest health is quantified by assessing the physical environment itself, the forest's resistance to catastrophic change, tree mortality, changes in tree growth and vigor, changes in species composition, erosion, water drainage, stream flow, and nutrient cycling.

A healthy forest ecosystem has the physical environment, biotic resources, and trophic networks necessary to sustain processes and viable populations of indigenous species. When these criteria are met, the ecosystem is able to maintain its productivity and resilience over time when exposed to drought, wildfire, insect attack, or human-induced changes. The Conde project area may not be resilient to catastrophic change. As mentioned earlier, vegetation densities are very high and ladder fuels are abundant. Vegetation mortality is already occurring because of dwarf mistletoe infection, root rot diseases, plant competition and expanding bark beetle populations, so the stage is being set for catastrophic stand replacement fires. Stand species composition and structure shifts previously discussed in the vegetation class description sections could also be considered unhealthy. The replacement of ponderosa pine by Douglas-fir increases the percentage of drought-susceptible trees in a stand, therefore, the risk of beetle infestation and/or wildfire also increases. The high species composition of true fir species increases the chances of mortality by root rot diseases.

h. Specific Stand Data

ORGANON (1992) was used to analyze data from 127 plots distributed throughout the South Fork Little Butte Creek watershed area. For individual stands, trees per acre ranged from 39 to 1,196; basal area per acre (BA/AC), 159 to 443 ft^2; and relative density index 0.271 to 1.283.

Currently, the stocking levels of stands throughout the project area are high. This is primarily due to the lack of large-scale natural disturbance and fire suppression. The overall average for the project area is 279 trees per acre. Average radial growth for the past ten years is 0.76 inches. The average relative density for the area is 0.74 and indicates that physiologically the trees are at the point of suppression and mortality.

2. Environmental Consequences

a. Alternative 1

Alternative 1 (No-Action) would allow forest stands to remain at the overall average of 0.74 relative density index, allowing density dependent mortality to occur and leaving forested stands more susceptible to insect and disease agents. Stand densities would continue on their current trajectory of stand development and remain overpopulated. A relative density index rating of 0.55 for any given stand marks the point of imminent mortality and suppression (Drew and Flewelling 1979). The current average relative density for the area indicates that physiologically the trees have entered the zone of imminent suppression and mortality. No action would allow forest stands to remain overstocked and individual tree vigor and growth would remain poor. Tree mortality represents a reduction in stand volume production, a loss of revenue, and poor forest health.

No action would allow Armillaria (*Armillaria ostoyae*) and laminated root disease (*Phellinus weirii*) to persist on sites currently infected. Douglas-fir dwarf mistletoe and cases of true fir dwarf mistletoe, found primarily in the southern portion of the Analysis Area, would also persist and perpetuate the infection cycle on sites currently infected. These forest pathogens create openings of varied sizes allowing light to reach the forest floor and the understory re-initiation stage to begin. However, in the Analysis Area, disease-susceptible trees continue to recolonize these sites. The regeneration becomes infected and their likelihood of attaining large sizes will be low. The pathogen will survive on the site unless immune species occupy the gaps. No action would allow the unchecked spread of disease to continue on these sites.

Without action, forest structure and species composition could not be managed to meet the desired forest stand characteristics suitable for nesting, roosting, foraging, and dispersal habitat components within spotted owl habitat. On mixed conifer sites, white fir and Douglas-fir would remain the most prevalent species and stands would remain in the stem exclusion stage of development if mortality does not occur. Pine species that are found in mixed conifer stands in the analysis area are being crowded out by fir species. Out of all 27 ponderosa pine sampled in a nearby area, the current average ponderosa pine tree vigor rating is 20.45 grams of annual wood production per square meter of foliage. Trees with vigor ratings below 30 ($g/m^2/yr$) would succumb to attack from bark beetles of relatively low intensity (Christiansen et al. 1987; Waring and Pitman 1985). The 10-year incremental growth data for ponderosa pine reveals a current rate of 1.33 inches per decade. As a general rule, stands where growth rates are greater than or equal to 1.5 inches of diameter growth per decade are less prone to pine bark beetle attack (USDA 1998).

Because white fir is growing on sites better suited to early seral species (ponderosa pine, oaks), the more shade tolerant species (Douglas-fir) exhibit poor vigor and demand more moisture than the site can deliver, becoming easily stressed and succumbing to density mortality or beetle kill. Without management action, individual trees including old-growth ponderosa pine, old-growth sugar pine, and old-growth Douglas-fir trees, with seedlings through poles within their dripline, would continue to die from competition for resources. Thinning would bring stands out of the stem exclusion or closed-canopy stage and accelerate the development of conditions found in late seral forests (Hayes et al. 1997). Trees should develop large crowns, large diameter limbs, and deep fissures in the bark. Maguire et al. (1991)

found that large branches develop only on widely spaced trees or on trees adjacent to gaps or openings. Deep fissures in the bark are characteristic of large diameter Douglas-fir trees in old growth stands.

Shade intolerant pine and oak species would continue to decline in number from competition with encroaching shade-tolerant white fir. Leaf area index would decline as live tree crowns decrease in size from tree competition. With large tree mortality, forest stand structure would gradually shift to the understory re-initiation stage. This is a transition phase when trees in the main canopy layer start to die, either singly or in small groups, from root diseases, lightning, wind-throw, and insects. This is ecologically significant in that resources previously used by the dead tree are reallocated to the surviving vegetation. These small diameter trees, instead of dying out, would continue developing into a dense unhealthy forest structure prone to a perpetual cycle of root disease infection, wildfire, and eventual dieback from intense competition.

The accumulation of insect and disease infected trees and relative densities present a high fuel hazard across the landscape. The Medford District RMP describes the Forest Condition (Forest Health) Restoration Objective that requires management emphasis on treatments and harvests that restore stand condition and ecosystem productivity. It directs management actions to include density management and understory reduction operations that reduce competition, increased use of understory prescribed fire, and fertilization (USDI 1995). No action contradicts the Medford District Resource Management Plan forest condition objectives in regard to forest health.

Disease and fire suppression have primarily altered forest stand densities and species composition in the Analysis Area. Without any form of density control, including the crown bulk density of older stands that contribute to stand replacing fires, slow tree growth and poor vigor would result in individual tree and stand mortality. A decrease in stand vigor is expected with continued overstocking and increasing stand age. In regard to species and biological diversity, forested stands in the Analysis Area have become predisposed to stand replacing fires and insect and disease mortality. When left undisturbed, stands continue to grow and produce new seedlings, although in unhealthy and dense conditions. White fir, a shade tolerant species, continues to occupy densely populated and shaded stand conditions, even stands that historically had far fewer numbers of white fir. The increase of white fir in the analysis area, especially in the mixed conifer zone, coincides with the amount of fire cycles missed in these stands.

Wildfires have functioned as a natural tool for thinning out the understories and removing dense pockets of forest. Without this tool, white fir has seen a sharp increase in numbers. Without the cleansing effect of fire to densities of white fir seedlings, insects and pathogens associated with white fir are consequently perpetuating on infected stands and spreading into previously uninfected stands. Growing conditions become so stagnant (at or above stand density index of 0.55) that intense competition follows and the stand begins excluding the weakest trees. During competition, trees commit their energy sources for survival above their competing neighbors. This exhaustive effort predisposes a tree to damage or mortality by incoming insects and diseases. In severe cases, entire stands are completely decimated by insects, disease and/or fire. Future silvicultural options diminish when severe stand mortality results. Sugar pine and ponderosa pine species would continue to decrease in number if openings are not created for these shade intolerant species. Shade tolerant white fir would continue to persist at high numbers in mixed conifer stands and species diversity would decline. Where dense forest stands persist over time, canopy cover would remain at 61 to 100 percent. When tree mortality is singular or in small patches, canopy cover may approach 40 to 70 percent. In pockets of mortality, canopy cover would range from 0 to 40 percent. Without controlling the relative densities, some forest stands would naturally fall below 60 percent canopy cover. Fire hazard would increase with the abundance of dead vegetation and ladder fuels, and would be at maximum levels.

b. Alternative 2

A "coarse grained" landscape pattern should be the broad goal of forest management. Over time a wide range of stand densities, stand structural characteristics, age classes, species composition, and arrangement of stand components should be developed to create stands with late-successional characteristics (this implies uneven-aged management). A variety of species in various seral stages of development is important. The landscape must be managed so that connectivity of Mature/Old-growth stands is maintained where possible after considering anthropogenic influences. Ten to forty years from now, most of the thinned stands will be composed of trees greater than 20 inches DBH. It must be reemphasized that the present-day, even-aged, single-storied stands without residual mature/old-growth trees may still require an extended period of time to develop the desired characteristics. These stands must be shifted from the stem exclusion stage, to the understory re-initiation stage, and finally to the old-growth stage.

Due to the past drought conditions, cavitation of the tree sapwood may have occurred in the co-dominant and dominant tree classes. This, in combination with overstocked stand conditions, has resulted in severely stressed trees with small live crown ratios. Therefore, more tree mortality may occur before these trees can be released and some stand mortality may occur after timber harvesting. Some of the treated timber stands may only experience improved tree vigor with increased precipitation and time.

Stand densities should not be allowed to reach the point of imminent mortality and suppression. This point is reached when the relative density index is 0.55 or greater. The relative density index of Douglas-fir stands should range between 0.35 and 0.55. Harvesting greater amounts of basal area per acre would result in the removal of more growing stock than necessary.

Higher elevation mixed conifer stands should not have more than 10 percent true fir species. These sites are best suited for Douglas-fir and pine species. At the highest elevations northeast of Table Mountain, the predominantly white fir stands will remain at high stocking levels of white fir. Over time more Douglas-fir should be favored in natural and man-made openings.

Diverse stand structure (horizontal and vertical) is also necessary to support a wide variety of species. Wildlife species respond to ecological characteristics of trees regardless of forest age. Future stands should be multi-cohort stands with as many vertical layers of vegetation as the endemic species permits. Trees should develop large crowns, large diameter limbs, and deep fissures in the bark. A variety of seral stages will also add to the diversity. The end result should be a healthy forest ecosystem that has the physical environment, biotic resources, and trophic networks capable of sustaining processes and viable populations of indigenous species, i.e. an ecosystem that, when exposed to drought, wildlife, insect attack, and human-induced changes, remains productive and resilient over time.

Recommended Treatment or Action

In order to reduce the density of all vegetation over the landscape, reduce fuel loading, support ecosystem based management, and create structurally diverse forest stands, Alternative 2 of this Environmental Assessment is recommended to be the proposed action. All of the recommended prescriptions are designed to retain most of the largest tree DBH classes, restore the vigor of the forest lands, and keep silviculture options open for the future. The selection harvest treatments will help to promote vertical stand structure and encourage diversity in species.

Commercial Thinning of the Pole, Mid, and Mature/Old-growth Condition Classes

Mixed Conifer Stands: These stands are comprised of a mix of tree species including Douglas fir, ponderosa pine, sugar pine, incense cedar, and white fir. Thinning objectives for mixed conifer

stands are to improve tree vigor and growth, maintain a larger proportion of Douglas-fir species while maintaining the highest diversity of mixed conifer species for the stand. Species composition of the forest must be considered, as well as individual tree physiology. A minimum of 20 percent early seral species should be maintained in the mixed conifer forest stands as described by Franklin and Dyrness (1973). Therefore, selection of treatment trees would be based on 1) species; 2) tree dominance; 3) age class or diameter; and 4) individual tree characteristics. Suitable sugar pine, Douglas-fir, incense cedar, and ponderosa pine (disease free, non-chlorotic, sugar pine, Douglas-fir, incense cedar, and ponderosa pine with crown ratios ≥ 30 percent) would be favored for leave over white fir. Leave approximately 100-140 sq. ft. basal area per acre (BA/AC)[1] in DSP habitat and NRF habitat downgrade/removal. Approximately 160-200 sq. ft. BA/AC in NRF habitat at the stand level would be maintained in units 9-1 and 9-2.

White Fir Stands: Stand density retention is relatively higher for white fir stands for several reasons:

1.) to prevent frost damage to conifer regeneration;
2.) to avoid basal scarring to residual white fir due to frost cracks;
3.) and to decrease the likelihood of gopher damage.

Avoid mechanical damage to white fir crop trees. The most susceptible trees occur after mechanical or fire injury. Consider potential tree wounding from mechanical damage from logging when selecting a leave tree, especially white fir (thin bark) leave trees. Strategically mark trees to limit basal scarring during commercial entry. Leave 100-140 sq. ft. BA/AC in DSP habitat and 120-160 sq. ft. BA/AC in NRF habitat downgrade or removal at the stand level.

Selection Harvesting of Dwarf Mistletoe Trees

The stands that will be treated with the Dwarf-Mistletoe prescription are single and multi-storied natural stands consisting of large poles (11 to 21 inches DBH) and/or mature/late-successional trees. Stand structure is mostly in the stem exclusion stage but some areas of understory re-initiation stage will be encountered. Basal area and species composition are variable. A large percentage of the trees are infected with dwarf mistletoe and have DMR ratings of 2-6 (Figure 1). There are dead and dying trees in the stand with evidence of bark beetles attacking the less vigorous trees.

The objective of treating these stands is twofold. One objective is to insure the future health and growth of the existing regeneration and to prevent the spread of dwarf mistletoe to uninfected mature trees. The second objective is to increase the species composition of early seral species such as pine and incense cedar, thus enhancing species diversity and species resistance to mistletoe.

These areas will be divided into three zones with different treatments in each. The first zone is within 150 feet of a ridge top. All trees with visible dwarf mistletoe shall be removed with the largest openings being created no greater than 1 acre. If areas of 100 percent infection greater than 1 acre in size are found, infected trees with the lowest DMR ratings, or trees with broom types 2 and 3, will have to be left. ZONE 2 prescriptions will then apply. Openings shall not exceed one-third of this zone. For example, there should be at least 360 feet of timber between 1-acre openings.

Zone 2 starts past 150 feet from the ridge top and extends to the draw bottom. In this zone the mistletoe will be managed in clumps. All trees with visible mistletoe shall be removed without creating openings

[1] Basal Area - a) Of a tree: the cross-sectional area, expressed in square feet, of a tree stem measured at breast height. b) Of a forest stand: the total cross-sectional area of all the trees in a stand, measured at breast height, expressed in square feet per acre. Measurement of how much of a site is occupied by trees; directly related to stand density.

larger than 1 acre. Uniform patches of mistletoe-infected trees will be removed by the group selection method. Where possible, group selection areas up to 1 acre in size will be created by marking infected trees around or adjacent to resistant species. If resistant species are not present, the group selection areas will be created where the highest concentrations of dwarf mistletoe are found. Openings shall not exceed one-fifth of this zone. The remaining patches of uninfected trees will be thinned to no more than a15-foot crown spacing.

In areas of 100 percent infection greater than 1 acre, infected trees with the lowest DMR ratings will be left, or trees with broom types 2 and 3. **One ½-acre patch of infected trees will remain for every 20 acres.** A 30-foot crown spacing shall be created around remaining infected patches removing all susceptible species. If there is more than one patch in the 40 acres, the remaining infected trees will be thinned to a crown-spacing of 15 feet. Uniform patches of dwarf mistletoe trees up to ½-acre in size will be left every 660 feet. An effort will be made to create the leave patches around infected old-growth trees.

The third zone is in the riparian areas. If possible, infected areas adjacent to riparian zones (ZONE 3) will be left. **Between all infected areas, a 30-foot crown spacing will be created with adjacent uninfected forest stands.** Resistant species will not be removed in this canopy opening area and throughout all zones.

In all zones, all infected old-growth trees, and all trees 34 inches DBH and larger with a DMR rating of 1 and 2, shall remain. A 30-foot crown spacing will be created around these trees, by removing susceptible species. **One ½-acre patch of infected trees will remain for every 20 acres.** When infected trees remain, trees with broom types 2 or 3 will be favored. .

It is recognized that Douglas-fir dwarf mistletoe is a necessary and often beneficial part of a healthy landscape. Mistletoe brooms provide a unique microenvironment and tree mortality resulting from infection creates natural openings in the stands. These prescriptions are an effort to confine the mistletoe to the areas where it is most desirable for silviculture and wildlife.

Individual, merchantable Douglas-fir trees can be harvested if ponderosa pine trees are also present; this saves the possible habitat and woody debris component of the ecosystem. Strips or patches of merchantable conifers and hardwoods within the woodlands, where favorable aspects and microenvironments exist, should be thinned to approximately 36 trees per acre (1 to 10 of these trees being conifers). Douglas-fir seedlings through the pole timber size classes should be cut. An occasional Douglas-fir tree may be left if no pine or incense cedars are available to leave. All trees with old-growth characteristics should remain and all the vegetation beneath these trees should be cut to ensure their survival.

Figure 3-1. Douglas-fir Dwarf Mistletoe Rating (DMR) System

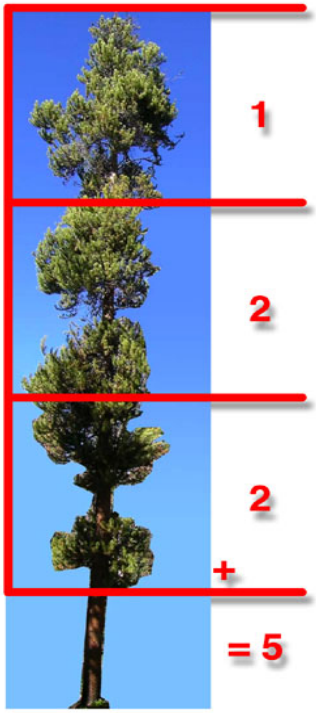
Divide the live crown into thirds and rate each third:

0 = no infection
1 = half or fewer branches infected
2 = over half of branches infected

Sum the ratings to get tree DMR

Assign tree rating of 1 if stem infection and no branch infections

For stand DMR, average ratings of all trees of host species (including uninfected)



Prevention/Avoidance Strategies

Competing vegetation can be shrub, tree, or herbaceous species. When the land management objective is timber production, shrub and herbaceous species are considered as "competing" for the available growing space. When the land management objective is forage production, tree species may be considered the undesirable species. Because of the large area and the variable site conditions of the proposed project area, a variety of competing plant species are likely in all of the vegetation condition classes.

Competing vegetation may become a problem in the areas harvested by the single tree selection method. Here large openings in the crown canopy layer will be created. Openings as large as 20 to 35 feet between tree crowns may be created and slash accumulations are anticipated. In the PSME/BENE plant association, California hazel, dwarf Oregon grape, thimbleberry, and creambrush oceanspray may become established, or resprout, at the same time as the conifer regeneration. Gravelly soils can compound this problem. It is recommended that prescribed fire (cool, fall underburning) be used in these areas to alleviate the fire hazard and for establishing Douglas-fir regeneration. As an alternative, slash could be handpiled on top of existing patches of shrubs and burned.

In the PSME/RHDI6-BEPI or PSME/RHDI6 plant associations, poison oak, deerbrush ceanothus, whiteleaf manzanita and grass species are likely to colonize. Prescribed burning may suppress these species long enough for conifers to become established, but fire will stimulate the growth of grass and ceanothus species. Fire may also kill desired tree species if their roots are too close to the soil surface (this may occur where the organic matter on the soil surface is 2 inches deep or greater). Prescribed underburning is appropriate for reducing areas of dense grass, shrubs, and herbaceous species for the purpose of reducing competition for available soil water.

After timber harvesting in the commercial thinning areas, shrub and grass species may become established after harvest, but this vegetation will again become suppressed when the crown canopy layer begins to close. Pacific madrone and oak tree species should not be a problem with regard to competing for available growing space in the thinned areas. The majority of these species are suppressed, well below the height of the co-dominant and dominant conifer trees and will probably not release. The number of these small diameter trees in the understory (4 trees per acre) is not perceived to be a problem. Prescribed underburning would be appropriate where dense mats of grass and other herbaceous vegetation will compete for soil water with the tree species.

Commercial Timber Harvest Units – Coarse Woody Material (CWM)

The majority of the prescription areas will have intermediate (commercial thinning) or selection silviculture methods applied to them. Information Bulletin No. OR-97-064 for the implementation of coarse woody debris standards and guidelines (1996) states that, "prescriptions should account for current habitat conditions and the timing and development of subsequent snags and coarse woody material (CWM) until the next stand once again begins to contribute CWM". All of the intermediate harvest method forest stands will have no less than 30 live trees (largest diameter trees available) per acre remaining. Many of these trees will be available to supply future CWM or snags to the sites. With the present amounts of dead CWM and the high number of green trees remaining in the intermediate and selection harvest areas, there are sufficient amounts of CWM. The present amounts of CWM fall within the ranges discussed in White's (2001) publication for respective plant association groups (PAG). Harvesting trees will also provide additional organic matter to the soil in the form of leaves, branches, and cull logs. The information bulletin also states that 15 to 20 percent groundcover of downed woody debris, or 4.5 to 10 tons of fresh downed woody debris, is adequate for site productivity after timber harvest. (6,500-feet of post-harvest CWM transects has shown an average of 5.21 tons per acre; 2.2 to 8.1 tons per acre range of CWM [BLM 2002, unpublished data]). Therefore, the debris created by partial harvesting in combination with existing CWM and the green trees retained is sufficient to maintain CWM levels as described in the bulletin.

Some group selection areas were created in the past and these openings are now fully stocked with conifer regeneration. Harvesting some white fir overstory trees surrounding this regeneration will allow the shade-intolerant Douglas-fir seedlings to grow. Some areas in between the group selection areas will be commercially thinned only. Leave trees will be marked in clumps and will number from 16 to over 30 trees per acre. To reduce damage to the understory conifer regeneration and the Pacific yew understory, it is recommended that no additional trees be felled for CWM. With the existing CWM, the cull logs to be left on site during harvesting, and the high number of green trees retained, there are sufficient organic material reserves to maintain site productivity into the future.

The lowest quantities of dead CWM are found in forest stands less than 100 years of age, especially homogeneous forests created by stand replacing fire. Quantities may also be low where previous tree salvage operations occurred. When considered on the landscape scale these sites tend to be small in size and add to the natural variability pattern of the ecosystem.

Data also indicates that there are abundant damaged live trees well distributed across the landscape that will be available for future CWM supplies. Dead standing snags are also abundant. The majority of the snags are small diameter trees that have died in the forest understory from suppression.

Additional measures for maintaining CWM are recommended in the Marking Guidelines as follows:

Because of the unique habitat created by the large coarse wood and the surrounding vegetation, it is recommended that the existing microenvironment remain intact. Where coarse woody material is found that is 20 inches in diameter at the small end, and a minimum of 8 feet long, all trees immediately surrounding this wood shall be left standing to provide shade. This recommendation will apply to all prescription areas.

The majority of the project area will receive intermediate type harvest methods (commercial thinning, disease management). It is suggested that all Stage 1 snags be left in the interior of homogeneous conifer stands. The Marking Guidelines also recommend leaving damaged trees and trees infected with fungi for wildlife.

The proposed silvicultural methods of Alternative 2 suggests uneven-aged management over very long periods of time (over 100 years) to create structurally diverse, multi-cohort mixed species timber stands as proposed in the Medford District RMP.

Animal Damage and Forest Health

At this time no serious problems with animals are anticipated. After performing density management, more early seral stage vegetation will become established and blacktail deer populations may increase. Unburned slash piles may create habitat for rabbit species and isolated pockets of seedling damage may result. Tree tubing may be required at a later date.

After the trees respond to release, they should be more resilient to pathogens and insects. Density control of the forest stands is essential to prevent the occurrence of these biotic agents. Any heavily infected dwarf mistletoe stands should be managed over time to lower the rate of infection. In the group selection areas seedlings and saplings with mistletoe should be thinned out.

G. FIRE & FUELS

1. Affected Environment

The landscapes that comprise the project area evolved with frequent fires affecting the vegetation and other key components of the ecosystem. Since the establishment of Euro-settlement in this area, human relations and interactions with these landscapes have affected many of the processes that had previously played a large part in the evolution of the site. Of these interactions, one management decision that has affected one of the evolutionary processes has been that of fire exclusion.

a. Background

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1996). Early settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes.

Historically, frequent, low intensity fires maintained dry Douglas-fir and pine forest types in more open conditions than exist today (Agee 1993). Frequent, low intensity fires served as a thinning mechanism, thereby naturally regulating the density of the forests. A more open crown structure would have allowed fire to travel more rapidly across the site with intensities that were short-lived. The light flashy surface fuels (grasses, shrubs, and conifer/hardwood litter), the repeated reduction of conifer reproduction underneath the overstory, and the repeated consumption of large fuels and duff build-up, would have reduced the post-fire effects (also described as fire severity) found on these sites historically. The qualities of the open crown structure would also provide better avenues for the heat intensity to vent out of the site without scorching the crowns to the lethal limit. However, there is evidence that stand replacement fires did occur historically, but they likely affected a smaller proportion of the landscape in comparison to wildfire incidents experienced across the Pacific Northwest over the last two decades.

b. Fire Regimes

Climate and topography combine to create the fire regime found throughout the project area. Fire regime refers to the frequency, severity and extent of fires occurring in an area. Agee suggests that variable fire history, complex geology, land use history and steep environmental gradients of Douglas-fir hardwood forests of southwest Oregon and Northern California Siskiyous prevents generalizations about fire and its ecological effects (Agee 1993 p. 283-284). This is also true for the planning area, which is characterized by Douglas-fir/ White fir mix with a pine component and a history of anthropogenic fire use. However, plant association groups are a credible link to historic ecological process, including fire regimes that occurred on sites in the past (Franklin and Agee 2003). Historic fire regimes and the departure from them correlate to the change from historical to current vegetative structure. The change in vegetation also helps to describe the difference in fuel loading (dead fuels and live in the form of increased vegetation) from historical to current conditions.

These changes in vegetation and fuel conditions help to determine the expected change in fire behavior and its effects. This difference in many respects is attributed to fire exclusion, but also includes all human practices that would affect the extent, severity, or frequency of fire events compared to historical accounts. These practices include road building, livestock grazing, and some logging practices (clearcutting), as well as fire suppression.

One historic fire regime is found within the analysis area (Schmidt et al. In press):

> Fire Regime 3: < 50 years fire return interval, Mixed Severity
> Typical plant communities include mixed conifer and dry Douglas-fir forests. Lower severity fire tends to predominate in many events. This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events.

Mixed-severity fire regimes are characterized by mosaics of frequent, low severity and infrequent but high-severity fires, and therefore are more difficult to describe due to complexities that result in a mosaic of fire effects.

c. Condition Class

The process for making an assessment on how much fire exclusion (along with other management activities) has affected an ecosystem is through classifying the current condition of the site based on a reference usually pre-dating when fire exclusion became an influence. Condition class descriptions are used to describe these affected ecosystems. Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of components such as species composition, structural stage, stand age, and canopy closure. There are three condition classes:

> Condition Class 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.
>
> Condition Class 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.
>
> Condition Class 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

The forest stands proposed for treatment, which are primarily mixed conifer stands (Fire Regime 3), are in condition class 2 and 3. Stand densities are very dense (especially with white fir) in most areas due to the absence of fire.

d. Fire Risk

Fire risk is the probability of when a fire will occur within a given area. Historical records show that lightning and human caused fires are common in the project area. The time frame most conducive for fires to occur in the project area is from July through September.

Information from the Oregon Department of Forestry database from 1960 to 2009 show a total of 22 fires occurred throughout the project area, which is 5,134 acres in size. Lightning accounted for 36% of the total fires and human caused fires accounted for 64%. Of the total fires, only three were larger than 1 acre, with the largest being 10 acres in size.

e. Fire Hazard

Fire hazard assesses vegetation by type, arrangement, volume, condition and location. These characteristics combine to determine the threat of fire ignition, the spread of a fire and the difficulty of fire control. Fire hazard is a useful tool in the planning process because it helps in the identification of broad areas within a watershed that could benefit from fuels management treatment. Hazard ratings were developed for the project area and reflect the results of past human and natural disturbances. In general, the existing fuel profile within the project area represents a moderate-to-high resistance to control under average climatic conditions. Table 3-9 summarizes the percent acres in each fire hazard rating category for the entire project area. This data is from the Jackson County Fire Risk Analysis.

Table 3-9. Fire Hazard Rating Category For The Analysis Area.

Fire Hazard Rating	Percentage by Hazard Category
Low hazard	56%
Moderate hazard	44%
High hazard	< 1%

2. Environmental Consequences

a. Alternative 1

Because no new management is proposed under this alternative, the effects described reflect current conditions and trends that are shaped by ongoing management and events unrelated to the proposed project described under the Affected Environment. This section will highlight key findings related to the question, "What would it mean to not meet the objective of fire hazard reduction?"

The current trend of increasing stand density, which results in increased mortality to the timbered stands, would continue. The 281 acres of forest thinning units, which are in condition classes 2 and 3, would not be treated and fuels reduction objectives for these areas would not be accomplished. Without treatment, the condition class of these stands would continue to deteriorate to a condition class 3.

With no forest management actions, there would be no temporary increase in surface fuels from timber harvest activities. Although there would be no harvest-created slash, the existing surface, ladder, and canopy fuels would remain untreated. The mixed-conifer stands in the project area would have a higher potential for large-scale stand-replacing fires in comparison to the proposed action. These forest types are experiencing fires today that are uncharacteristic of historic fires (Agee and Skinner 2005).

With no forest management, changes in canopy closure would occur only as a result of natural events such as insect infestation, windstorms, mortality from competition/drought, and wildfire. Where natural disturbances create more open stand conditions, there would be more wind and solar radiation that would result in a drier microclimate compared to closed canopy stands. A drier microclimate generally contributes to more severe fire behavior. Under the No Action alternative, there would be no treatment of existing surface, ladder or crown fuels to help mitigate the effects of microclimate changes caused by natural disturbances. Ladder, surface and aerial fuels (crown density) would also increase within these stands. Increasing stand densities and fuel loadings would increase the chance that more acres would burn in high intensity fires within the project area. Fire fighter safety would continue to be an issue, as well as the potential of resource damage.

b. Alternative 2

Discussions for the proposed action reflect the direct and indirect impacts of the activities associated with the Proposed Action. Effects discussion also includes cumulative impacts of those direct/indirect actions when added incrementally to actions past, present, and reasonably foreseeable.

Fire Severity

The current science in determining extent and severity of wildland fire is based on three environmental variables: weather, topography and fuels (Rothermel 1972, Albini 1976). Management activities on landscapes and within ecosystems seeking to affect wildland fire extent and severity have focused on treating of fuels, for obvious reasons. Forest fuels (including live and dead material) can be changed in terms of fire behavior and fire effects characteristics by silvicultural and fuels treatments (Agee 1996; Weatherspoon 1996), fire exclusion practices, and natural events.

Weather and topographic effects on fire behavior and severity are interrelated with the amount and distribution of fuels on a site with respect to the aspect, steepness of slope, and position on slope, along with atmospheric elements of temperature, relative humidity (in relation to fuel moisture), and wind speed and direction. When the environmental and atmospheric conditions are conducive to drying fuels and/or heating them to the ignition-point during a fire, we refer to them as "available fuels". The interrelationship between slope and wind in relation to the amount and arrangement of available fuel is critical in terms of allowing a fire to spread and increase in intensity. Without fuel loading becoming available to burn in a fire due to the effects of extreme weather, there are no adverse effects to the vegetation or other site qualities. For example, in some desert areas where vegetation is sparse and extreme fire weather is the norm (high temps, low RH, windy unstable atmospheric conditions), fires often don't spread (except under unusual wind conditions) due to the lack of continuous fuels. Thinning treatments (both commercial and non-commercial) proposed under this proposed action are based not on restoring historic conditions, but on meeting the objectives of matrix land allocation.

Activity Fuels / Surface Fuels

Timber harvest can increase fire severity, if not accompanied by adequate reduction of fuels, by increasing dead surface fuels (SNEP, pp 61-72). Treatments designed to reduce canopy fuels through density management increase and decrease fire hazard simultaneously. Slash generated from the commercial thinning of the proposed timber stands, if not treated, would create surface fuels that would be greater than current levels. The existing surface fire behavior fuel model in the majority of stands proposed for commercial thinning are represented by a Timber Group fire behavior fuel model. Fuel amounts are measured in tons per acre for different size material. Material up to 3 inches in diameter has the greatest influence on the rate of spread and flame length of a fire, which has direct impacts on fire suppression efforts.

It is anticipated that fuel loadings (material 3 inches and less) after thinning of commercial and non-commercial material would be temporarily increased by approximately 5-13 tons to the acre prior to the scheduled fuel disposal activities to be completed. This would change the existing fuel model of most of the timbered stands to a Logging Slash Group which, in turn, would create higher rates of spread and greater flame lengths in the event of a wildfire. However, despite the temporary increase in ground fuels, research indicates that a reduction in crown fuels outweighs any increase in surface fire hazard (Omi and Martinson 2002). This temporary increase in surface fuels is usually less than one year (but can be up to 2 years), for that is the time period that it takes to implement the fuel treatments to dispose of the surface and ladder fuels in these stands.

Utilizing the modeling tool BEHAVE, with the parameters of a 6 mph wind speed and one hour fuels moisture of 6%, flame lengths in a slash fuel model are 4 feet, compared to 1 foot in a timber litter model.

Direct attack can be used under both of these scenarios. Rate of spread of a fire increases by 5 chains per hour in a slash fuel model. The size of a fire in a one hour period for a fire that is not suppressed would be 0.3 acres in a timber fuel type, versus 2 acres in a slash fuel model.

Fuels treatments for stands that are commercially harvested are proposed for treatment within the first year the unit is harvested. Treatments would take place on all units proposed for thinning. The treatments proposed would be to handpile and burn all the slash that remains after the commercial harvest and the handpiling and burning of all the material that is pre-commercially thinned. Treatments should ensure that under most climate conditions, flame lengths would be less than three feet, allowing for direct attack of a wildfire. The reduction of this material, along with reduced fire ladders and canopy fuels from forest thinning, would reduce fire behavior such as flame length, rate of spread and fire duration. With the reduction of flame length and fire duration the chance of a crown fire initiating in treated stands would be greatly reduced. Also, mortality of the smaller diameter conifers would be reduced.

In a study on the effects of thinning on fire behavior, Graham and others (1999) concluded that "depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species." Thinning, accompanied by removal of thinning residues and slash and followed by periodic prescribed burning, is effective (Omi and Martinson 2002; Pollet and Omi 2002; Agee 1993; Graham 1999; VanWagtendonk 1996). Treatments that result in forests with a lower density and larger trees show lower potential for crown fire initiation and propagation and for less-severe fire effects (Pollet and Omi 2002).

Anecdotal observations should not be applied the same as rigorously tested scientific study, but they can be used to report and interpret trends. Anecdotal evidence on the Squires fire in Southern Oregon shows that treatments to reduce fire behavior may have merit. Fire weather conditions during the Squires Peak Fire, as measured by the Energy Release Component Indices, was in the 89th to 90th percentile during the Squires fire event as measured by the Star and Provolt RAWS stations. This percentile is recognized as high but not extreme fire weather conditions. Even though winds were reported the evening the fire reached the treated area in the Kin's Wood project area, fire behavior decreased when it reached the treated area.

Fire resiliency

A forest that is fire-resilient has characteristics that allow it to readily recover from a fire event. A forest's resiliency to fire can be increased by applying fire safe principles. This means managing surface fuels to limit the flame length, removing ladder fuels to keep flames from transcending to tree crowns where trees have no defense against fire; decreasing crown density making less probable for a crown fire to move from tree-tree; and keeping large diameter trees that are more fire resistant (Agee and Skinner 2005 In Press; Agee 1996; Agee 1993).

The implementation of this alternative would promote fire resilient forest stands by thinning, removing suppressed, diseased, dying and/or over crowded intermediate and co-dominant trees while retaining the larger co-dominant and dominant trees within treated stands. This alternative would conduct forest management on approximately 281 acres of timbered stands that are in condition class 2 and 3. Forest thinning prescriptions would result in a reduction in ladder fuels, an increase in the height to the base of tree crowns, and the reduction of crown bulk density (canopy fuels). All of these are important factors in reducing the potential for initiating and sustaining a crown fire in these stands (Omi and Martinson 2002; Agee 1996; Agee and Skinner 2005; Agee et al 2000).

Thinning from below, removing the smaller diameter trees within a stand, would increase the average tree diameters as soon as treatments are completed. Over time, tree diameters would continue to increase with the growth of the residual stand. Larger diameter trees are more tolerant to surface fires so there would be less tree mortality in the event of a surface fire. Commercial thinning would also favor more fire tolerant species such as pine. Lowering basal area through thinning and prescribed fire can increase the long term vigor in the residual trees within a stand (Huff and Agee 2000).

In the study Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California, Odion et al. (2004) found closed canopy forests had less high-severity fire than open canopy forests and non-forest vegetation types. Based on this finding, they also concluded that a long absence of fire is also a predictor of low severity fire effects. However, this study used no local and specific weather data except for an acknowledgement that a multi-year drought preceded the 1987 wildfires. The well-known inversion conditions during these fires may have had a distinctive effect on the way these landscapes burned (Martin 2005, personal communication).

Weatherspoon and Skinner (1995), who studied the same fires and area, also reported lower fire severity in uncut forests, and stated their finding was likely attributable to the absence of activity fuels and the relatively closed canopy conditions which reduces wind speeds and fuels drying of fuels. They admitted some findings to be less than conclusive due to the lack of local weather information from the time of the fires, reporting that the reconstruction of the highly variable weather conditions was not possible due to the smoky inversions and shortages of people during the first few days of the fire when much of the area burned. However, their findings emphasized the need for effective fuels treatments after management actions. They found partial cut stands with some fuels treatment suffered less damage than partial cut stands with no treatment.

Changes in micro-climate and effectiveness of fuels treatments

Management of forest stands can result in altered micro climates (Agee 1996). Increasing spacing between the canopies of trees can contribute to increased wind speeds, increased temperatures, drying of topsoil and vegetation (Countryman 1955; Countryman 1972), and increased shrub and forb growth (Agee 1996). A more open stand allows more wind and solar radiation resulting in a drier microclimate compared to a closed stand. A drier microclimate generally contributes to more severe fire behavior.

The degree of effects of microclimate change on fire behavior is highly dependent on stand conditions after treatment, mitigation to offset the effects of microclimate change, and the degree of openness. For example, Pollet and Omi (2002) found that more open stands had significantly less fire severity, while Weatherspoon and Skinner (1995) found greater fire severity. In Pollet and Omi's study, more open stands had significantly less fire severity compared to the more densely stocked untreated stands. The degree of openness in the studied treated stands may not have been sufficient to increase fire activity. Weatherspoon and Skinner found commercially thinned stands in a mixed-conifer forest in the South Fork Trinity River watershed of the Klamath NF in northwest CA burned more intensely and suffered higher levels of tree mortality than unlogged areas (Weatherspoon and Skinner 1995). The partial cuts they examined were typically overstory removals, where large (mature and old growth) trees were removed leaving smaller trees. The study simply validates that smaller trees, due to thinner bark and crowns closer to the ground, will suffer more damage than large trees. Logging slash was not treated in the study areas. The proposed action for this project proposes to treat slash generated by the treatments and forest thinning would harvest some commercial sized ladder fuels.

Moisture content of live vegetation is an important consideration. The moisture content of live fuels compared to fine dead and down fuels is generally much greater. Where overstory canopy reduction results in the growth of live understory vegetation could contribute to reduced or increased surface fire behavior. Live fuels with higher moisture content can have a dampening effect on fire behavior

compared to dead fine fuels (Agee et al. 2002; Agee 1996). Cured grasses and forbs can increase fire line intensity (Agee 1996); however, due to project design where ladder fuels have been removed and crown base heights increased, the risk of crown fire initiation and fire severity is reduced (Agee 1996; Omi and Martinson 2002; VanWagtendonk 1996; Agee et al.2000).

Effects of canopy reduction on fuel moistures

Silvicultural prescriptions proposed for the stands to be thinned would retain average canopy closures greater than 30 percent. Estimates of fuel moisture can be made from the measured ambient air temperatures and relative humidity. The following example is used to demonstrate the effects of canopy fuels reduction on fuel moistures. An ambient air temperature of 90 to 109 degrees and a relative humidity of 15 to 19% would result in a 3% fuel moisture for 1-hour time lag fuels: the fuel moisture of 10-hour fuels would be 5%; and the 100-hour fuel moisture would be 7%.

Corrections to fuel moistures are then needed to account for slope, aspect, time of day, month, and percent shading. Percent shading is calculated by using greater than 50% shading (shaded) or less than 50% shading (exposed). Cloud cover as well as timber overstory (canopy closure) is utilized in calculating percent shading.

Utilizing the example from above (1 hour time lag with fuels at 3%) to correct fuel moisture on a site that has the following attributes, you would add 3% to the fuel moisture for a total of 6%:

-north slope
-slope greater than 31%
-12:00 pm in August
- shading greater than 50%

Utilizing the same parameters but for an area that has shading that is less than 50% you would add 4% for a fine fuel moisture of 7%. The difference between the two sites is 1%, which would have minimal impacts to fire behavior.

H. BOTANY

This section discloses the impacts to Threatened, Endangered, Special Status, Survey and Manage (including fungi) and invasive plant species.

1. Affected Environment

The Conde Forest Management Project is located in the southern portion of the Little Butte Creek watershed, which is a tributary to the Rogue River. The Project Area consists of 281 acres of treatment units. For the purpose of analyzing the affected environment and the proposed project with regard to botanical resources, the analysis area considers 3 (three) HUC 7s (sub-watersheds, or 7th field hydrologic units). For a complete listing of these HUC 7s, see the Hydrology section of this document. The total size of the analysis area is 5,132 acres, or approximately 8 square miles. BLM-administered lands comprise approximately 27% of this area. The proposed project area is 5.5% of the analysis area.

The primary plant series in the project area is White fir, with smaller inclusions of the Douglas fir series. Small openings are scattered throughout the project area, providing habitat for patchy and moderately dense shrub, forb and graminoid cover while these species become sparse under denser canopy cover. For a more detailed stand description, see the Silviculture section.

a. Bureau Special Status and Survey and Manage Plant (Vascular, Non-vascular) Species

Special Status species are officially designated by the State director. The most recent Special Status Species list went into effect on February 7, 2008 (IM OR 2008-038). This list has two categories, Sensitive and Strategic. The special status plant list for which surveys are conducted includes Federally-listed species, Bureau Sensitive and Strategic species (USDI 2008), and Survey and Manage (S&M) Category A and C species (USDA and USDI 2001). Incidental detection of S&M category B, D, and E species have been documented and are protected according to management recommendations. Bureau Strategic species do not require protection or effects analysis and therefore will not be addressed further in this document. The BLM collects population and habitat data on these species to ascertain if a status upgrade to Sensitive or removal as a common species is warranted.

All of the proposed treatment areas were surveyed for Bureau Special Status and Survey and Manage vascular and nonvascular (lichens and bryophytes) plants during the summer of 2010. The temporary spur location into unit 7-1 and mechanical road decommissioning will be surveyed prior to authorization of activities. Any Special Status or Survey and Manage species found will be protected.

Surveys are conducted by professional botanists using an intuitive controlled survey method. Those areas supporting high potential habitat for target species were surveyed more intensively. The project area is not within the range of any Federally-listed plant species, including *Fritillaria gentneri*. No new sites of Federally-listed plants (*Arabis macdonaldiana*, *Fritillaria gentneri*, *Limnanthes floccosa* ssp. *grandiflora*, *Lomatium cookii*) were located. There will be no effect on Federally-listed species known to occur on the Medford District.

Surveys documented three occurrences of a Bureau Sensitive/S&M category E lichen, and one occurrence of a S&M category B lichen within the project area (Table 3-10). No other occurrences of Bureau Special Status or Survey and Manage plant species have been detected within the project area.

Table 3-10. Bureau Special Status and Survey and Manage Plant Species within the Analysis Area

Lifeform	Species name	Status	Occurrences in analysis area	Occurrences in Proposed Treatment Areas	Occurrences in NWFP area
Lichen	*Chaenotheca subroscida*	BSO, S&M E	3	0	126
Lichen	*Chaenotheca ferruginea*	S&M B	1	1	307
	Status definitions: BSO=Bureau Sensitive Oregon – manage so activities do not trend species towards listing under ESA (BLM Manual 6840); **STR**= Bureau Strategic Oregon – collect and document population and habitat data; **S&M B:**. Rare, pre-disturbance surveys not practical - manage all known sites and minimize inadvertent loss of undiscovered species; **S&M E:** Rare, status undetermined – manage all known sites while determining if the taxon meets the basic criteria for Survey and Manage (FS, BLM , 2001).				

Chaenotheca ferruginea: Rusty Pin Lichen grows on 100+ year old Douglas-fir or Incense Cedar tree trunks in later successional coniferous forests, including dry and moist uplands and riparian areas, closed to partially open canopy cover. In the project area, CHFE7 occurs in the ABCO/BENE2 plant association. It grows in old coniferous forests globally.

Chaenotheca subroscida: Pin Lichen grows on bark of old conifers in humid inter-montane old-growth forests at lower and mid-elevations. Conde populations grow on large (> 30") White fir boles under approximately 75% canopy cover. In the project area, CHSU14 occurs in ABCO/BENE2 and

ABCO/SYMO plant associations. It grows in temperate forests in western Eurasia, and in North America from British Columbia to California, and into the Rocky Mountains.

b. Fungi

The BLM is not required to survey for Sensitive fungi or S&M B fungi in stands younger than 180 years old. However, for decisions signed in fiscal year 2011 and later for timber harvest in old growth stands, if strategic fungi surveys have not been completed in the province where the project is located, equivalent effort surveys are required.

Equivalent-effort surveys are defined in the Survey and Manage standards and guidelines as:

> pre-disturbance surveys conducted similarly to practical surveys (to the same intensity and effort—usually one field season and no more than two), according to written Survey Protocols, and during the times when the likelihood of detecting the species is highest…[t]he survey is an 'equivalent effort' to practical surveys, with protocol adjusted to deal with the one or more of the factors...that make determining presence of the species unlikely. (USDA and USDI 2001)

For the Category B macrofungi, these factors include:

1. The taxon does not appear annually or predictably, producing identifying structures that are visible for a predictable and reasonably long time,
2. The taxon cannot be authoritatively identified by more than a few experts,
3. The taxon cannot be readily distinguished in the field and needs more than simple laboratory or office examination to confirm its identification.

In addition, the standards and guidelines state that

> there are only two differences between equivalent-effort surveys and practical surveys. One difference is that equivalent-effort surveys may need to accommodate one or more of the practicality factors listed above. The other difference is that equivalent-effort surveys are not expected to meet the description of 'likely to determine the presence' of a species because the characteristics of these species make finding sites less certain. (USDA and USDI 2011)

Prior to the removal of pre-disturbance survey requirements for fungi, some of the project areas were surveyed for Special Status and Survey and Manage fungi in spring and fall of 2000. All of the fungal species found during those surveys no longer have Special Status or Survey and Manage status.

Three of the proposed units are stands over 180 years old: units 7-1, 7-2 and 9-4. Equivalent effort surveys in these units began during spring of 2011. Three category B species were detected and documented at this time (Table 3-11). Forthcoming surveys for two consecutive seasons of fall fungi and one more season of spring fungi will occur prior to authorization of treatment activities in these units. All Special Status and Survey and Manage fungi found in these units will be protected according to existing management recommendations and the latest scientific information regarding habitat requirements for these species. In general, management recommendations for fungi include maintaining microsite conditions and avoiding mechanical disturbance to the soil and duff layer.

Table 3-11. Bureau Special Status and Survey and Manage Fungi Species

Lifeform	Species Name	Ecological Function	Status	Occurrences in Proposed Treatment Areas	es
Fungus	*Gautieria otthii*	Ectomycorrhizal	S&M B STR	2	2
Fungus	*Helvella elastica*	Saprobic	S&M B	1	35
Fungus	*Ramaria rubella* var. *blanda*	Ectomycorrhizal	S&M B	1	3

Status definitions: BSO=Bureau Sensitive Oregon – manage so activities do not trend species towards listing under ESA (BLM Manual 6840); **S&M B:**. Rare, pre-disturbance surveys not practical - manage all known sites and minimize inadvertent loss of undiscovered species; **S&M E:** Rare, status undetermined – manage all known sites while determining if the taxon meets the basic criteria for Survey and Manage (FS, BLM , 2001).
Ecological Function definitions: saprobic - any organism that lives on (breaks down and digests) dead organic matter, such as certain fungi and bacteria; **ectomycorrhizal** – a fungal hyphae-root association that forms a mantle around the root facilitating water and nutrient uptake into the host plant, often a tree.

Gautieria otthii: A sequestrate (holds spores until decayed or eaten), ectomycorrhizal fungi that forms sporocarps (fruiting bodies) beneath the soil surface. It is associated with Ponderosa Pine and other conifers. It is presumed to be dependent upon consumption by animals for spore dispersal. It is known from two sites from Siskiyou Mountains in southern Oregon and Klamath Mountains in northern California.

Helvella elastica: Elfin Saddle is a cup fungi that acts as a decomposer and grows on soil under conifers from low to high elevations. It occurs in old-growth and younger forests, occasionally on trails or other moderately disturbed areas. It is known to occur from the Washington and Oregon Cascades to the Oregon Coastal Range.

***Ramaria rubella* var. *blanda*:** This coral fungi forms above ground sporocarps from a wood substrate and is presumably ectomycorrhizal with Doug-fir and other conifers. It is know from three sites from northern Washington to northwestern California. It also occurs in the Appalachian Mountains.

There are 20 Bureau Sensitive fungi and 82 S&M fungi documented or suspected of occurring on the Medford District BLM administered lands (Table 3-12). Most Bureau Sensitive and S&M fungi grow in later successional forested stands. Some are associated with moister conifer stands, while others grow in the drier hardwood-conifer plant associations.

Table 3-12. Medford District Sensitive and Survey and Manage Fungi Species (ORBIC 2010)

Scientific Name	Status*	2007 Heritage Rank**	ORBIC List***	NWFP Sites
Boletus pulcherrimus	BSO, S&M B	G2G3/S2	1	23
Dermocybe humboldtensis	BSO, S&M B	G1G2/S1	1	4
Gastroboletus vividus	BSO, S&M B	G2?/S1	1	5
Gomphus kauffmanii	BSO, S&M B	G2G4/S3?	1	74
Gymnomyces fragrans	BSO, S&M B	G2G3/S1S3	3	2
Helvella crassitunicata	BSO, S&M B	G3/S2	1	29
Leucogaster citrinus	BSO, S&M B	G3G4/S3S4	2	48

Scientific Name	Status*	2007 Heritage Rank**	ORBIC List***	NWFP Sites
Otidea smithii	BSO, S&M B	G2/S2	3	10
Phaeocollybia californica	BSO, S&M B	G2?/S2?	3	44
Phaeocollybia olivacea	BSO, S&M D	n/a	1	115
Phaeocollybia oregonensis	BSO, S&M B	G2?/S2?	n/a	15
Phaeocollybia pseudofestiva	BSO, S&M B	G3/S3?	1	49
Pseudorhizina californica	BSO, S&M B	G4/S2	3	42
Ramaria largentii	BSO, S&M B	G3/S2?	2	20
Ramaria spinulosa var. *diminutiva*	BSO, S&M B	GUT2/S1?	3	1
Rhizopogon chamaleontinus	BSO, S&M B	G2G3/S1S2	1	1
Rhizopogon clavitisporus	BSO	G2G3/S1S2	2	3
Rhizopogon ellipsosporus	BSO, S&M B	G2G3/S1S2	2	5
Rhizopogon exiguus	BSO, S&M B	G2G3/S1S2	2	3
Sowerbyella rhenana	BSO, S&M B	G3G4/S3	2	66

***Status definitions: BSO**=Bureau Sensitive Oregon – manage so activities do not trend species towards listing under ESA (BLM Manual 6840); **S&M B:**. Survey and Manage Category B – manage all known sites and minimize inadvertent loss of undiscovered species; **S&M D:** Survey and Manage Category D - Identify and manage high priority sites to provide for a reasonable assurance of the taxon's persistence. Until high priority sites can be determined, manage all known sites (FS, BLM , 2001).

****Heritage Rank: an international system for ranking rare, threatened, and endangered species:**
G = Global Rank; S = State Rank
1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrence.
2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.
3 = Rare, uncommon, or threatened but not immediately imperiled, typically with 21-100 occurrences.
4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.
5 = Demonstrably widespread, abundant and secure.
? = Not yet ranked or assigned rank is uncertain.

*****ORBIC List: Oregon Biodiversity Information Center maintains extensive databases of Oregon biodiversity, concentrating on rare and endangered plants, animals, and ecosystems.**
1=taxa which are threatened or endangered throughout their range or which are presumed extinct.
2=taxa which are threatened, endangered, or possibly extirpated from Oregon but are stable or more common elsewhere.
3=taxa for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
4=taxa which are very rare but are currently secure, as well as taxa which are declining in numbers or habitat but are still too common to be proposed as threatened or endangered.

c. Noxious Weeds

Noxious weeds are plants growing outside their native lands or habitats that are injurious to public health, agriculture, recreation, wildlife, or public or private property (Oregon Department of Agriculture 2011). The Medford District ROD/RMP states the objectives for noxious weeds are to continue to survey for, avoid introducing or spreading, and contain or reduce infestations on BLM-administered land (USDI 1995).

The Oregon Department of Agriculture (ODA) designates and classifies noxious weeds according to their detrimental effects, reproductive strategies, distribution, and difficulty of control (Table 3-13).

Table 3-13. ODA Noxious Weed Control Rating System

Category	Criteria	Recommended Action
A	Weeds that occur in the state in small enough infestations to make eradication or containment possible; or are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.	Infestations subject to eradication or intensive control when and where found.
B	Regionally abundant weed, but which may have limited distribution in some counties.	Limited to intensive control at the state, county, or regional level as determined on a case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the main control approach.
T	A select group of A or B designated weeds.	Identified by the Oregon State Weed Board as a priority target on which the Oregon Department of Agriculture will develop and implement a statewide management plan.

Weeds spread via seeds, which are carried from one location to another by air, water, animals, humans, or vehicles. Some weeds also spread when roots or other plant parts break off and resprout to create new plants. Most weeds have reproductive and life cycle characteristics that give them an advantage over native plants in establishing quickly. These characteristics include high seed production, good dispersal mechanisms, fall germination and rosette development, production of long or extensive taproots that capture water at different levels in the soil profile, and early- or late-season growth and bloom times to avoid competition with native species. Noxious weeds also have an advantage over natives because they occupy hostile sites with exposed, bare ground, tolerate drought, and form persistent seedbanks that lie dormant until the next disturbance event provides new openings in which to become established. Because they originated from other countries, noxious weeds lack the predators that keep them under control in their native habitats and ecological areas.

Newly disturbed areas are most vulnerable to noxious weed establishment. Soil disturbance creates favorable conditions for the establishment of noxious weeds by removing competing vegetation. Weed seeds that have been suppressed in the soil have an opportunity to germinate and develop before native species are able to become reestablished. The disturbed soil is also a ready seed bed if weed seeds or other plant parts are transported or blow into the area by natural processes.

Roads are common avenues of invasion, as seeds lodge in tire treads or undercarriages and can be carried from infested areas into newly disturbed unoccupied areas. Activities that introduce or spread noxious weeds include road construction, timber harvest, farming, grazing, recreation, and residential development. Natural processes, such as wind, seasonal flooding, and migration patterns of birds or animals also contribute to the spread of noxious weeds (Table 3-14).

Table 3-14. Factors Affecting Noxious Weed Spread

Activity	Role in Dispersing Noxious Weed Seed
Private Lands	Private lands host a perpetual source for noxious weed seed, which can be dispersed when seeds attach to tires, feet, fur, feathers, or feces, or when natural processes such as wind and/or flooding events transport the seed from its source to other geographical vicinities.
Farming and Grazing	Farming creates soil disturbance and openings that noxious weeds can occupy. Farming equipment may move noxious weed seed from one area to another. Agricultural seed may be contaminated with noxious weed seed and spread during farming activities. Overgrazing of pastures or rangelands removes vegetation leaving bare, open spaces that noxious weeds may invade. If livestock are fed grain or hay containing noxious weed seed or parts, or consume noxious weeds, they may disperse them when they move to non-infested pastures or range.
Logging on Private Lands	Logging activity presents a key dispersal opportunity for noxious weed seeds. They may attach to tires or tracks of mechanized logging equipment, tires of log trucks, and various other logging-related substrates and be subsequently transported from their source to another geographic vicinity. Logging creates openings during ground disturbance and canopy removal which noxious weeds may colonize. Not using Project Design Features, such as equipment/vehicle washing, etc., also increases the risk of introducing or spreading noxious weed seed during logging operations.
Motor Vehicle Traffic (including Log Trucks)	Roads on public land are for public use, which results in a plethora of seed-dispersal activities occurring on a daily basis. Private landowners use public roads to haul logs, undertake recreational pursuits, and/or access their properties. This transportation often occurs along BLM-administered roads, which are situated within a checkerboard ownership arrangement. How or when seed detachment occurs is a random event and could take place within feet or miles from the work site/seed source, presenting a high likelihood of detachment on public lands.
Recreational Use	The public often recreates on BLM-managed lands and can spread seed from their residences or other areas to public lands in a variety of ways, including attachment to vehicle tires; recreational equipment; hikers' socks, shoes, or other clothing; fur of domestic animals, etc.
Rural and Urban Development	Because of BLM's checkerboard land ownership, BLM parcels are generally interspersed with private lands, many of which are used for homesites, businesses, or agricultural endeavors. Rural and Urban Development often involves ground disturbance during building or road construction which creates openings for noxious weeds to occupy. See "Motor Vehicle Traffic" and "Private Land" for additional information about how this affects the spread of noxious weeds from private to public lands.
Natural Processes	Wind, seasonal flooding, fire, and migration patterns of birds or animals are a few of the natural processes that contribute to the spread of noxious weeds. Wind, water, or wildlife carry seeds or other plant parts and deposit them at new locations at random intervals. Wildfire removes ground cover and leaves areas open to invasion by noxious weeds if a seed source is nearby.

The BLM treats noxious weed populations on their lands under the *Medford District Integrated Weed Management Plan and Environmental Assessment* (EA #OR-110-98-14) (USDI 1998). The Medford District BLM Noxious Weed list is a subset of the ODA State list. It contains category A, B and T species that occur in the District and are targeted for detection and control (USDI 1998). The BLM also treats all categories of weed species at high priority sites such as Special Status plant sites, special areas (Area of Critical Environmental Concern (ACECs), contiguous blocks of BLM land and within project areas that pose a risk of spreading weeds during project implementation. The BLM treats weeds by manual, chemical, mechanical or biological means.

All of the proposed treatment areas were surveyed for noxious weeds by qualified botanists over a time period extending from 2000 through 2010. The temporary spur road proposed into unit 7-1 will be surveyed and any weeds found will be treated.

One occurrence of Canada thistle occupying a 300 foot x10 foot area was detected during 2010 surveys along an irrigation canal in unit 15-2. It was treated by herbicide spray in September 2011. Treatments will continue until the weeds are no longer extant at the site.

Table 3-15. Noxious Weeds Located in the Conde Forest Management Project Area

Name	Status	Number of Sites or Frequency	Ecology and Habitat	Ashland Resource Area Management Strategy
Cirsium arvense Canada thistle	B	1	Perennial herbaceous plant. Reproduces from rhizomes and seeds. Common along roadsides, ditches, streams and wetlands.	Treat specific populations in sensitive areas (Special Status plant sites, CSNM, ACECs)
Cirsium vulgare Bull Thistle	B	uncommon, scattered roadside	Biennial herbaceous plant. Reproduces from seeds. Common along roadsides where soil is disturbed and canopy cover absent.	Treat specific populations in high risk/consequence areas (rare plant sites, special areas)
Hypericum perforatum Klamath Weed	B	uncommon, scattered roadside	Perennial herbaceous plant. Reproduces vegetatively via rhizomes. Invades roadsides and disturbed areas.	Treat populations in quarries, near rare plant sites, special areas. A beetle introduced as a biocontrol has been somewhat effective at lower to mid elevations.

2. Environmental Consequences

This section discusses the direct and indirect effects of implementing each of the alternatives and the impacts it would have on botanical resources. This section also discusses any cumulative effects considering the range of alternatives plus the effects of other actions that are currently happening or will be happening in the foreseeable future.

a. Alternative 1

Special Status and Survey and Manage Plant and Fungi Species
Under the No Action Alternative, the BLM would not implement any new management actions. Because no ground disturbance or changes in canopy cover or environmental conditions would occur, implementing Alternative 1 would not result in negative direct impacts to Special Status or S&M vascular or nonvascular plants or fungi. There would be no effect to T&E plants; Sensitive plants would not trend toward listing, and S&M species persistence would not be affected.

Forest stands with diverse species composition that are structurally complex and resilient to severe fire behavior, insect or disease outbreaks provide the most favorable habitat for rare forest-associated plants and fungi. Different species have different habitat requirements, but the presence of large conifers, large and small woody debris, and an intact layer of organic duff are common requirements for many rare species, especially fungi. Under Alternative 1, overstocked forested stands would not be thinned. Trees in these stands have reduced vigor, higher mortality of suppressed trees, and higher susceptibility to insects, disease, and severe fire behavior than untreated stands. Reducing tree densities in overstocked stands would allow the remaining trees to grow with more vigor and to be more resilient to environmental stresses, which would reduce the risk of damage to rare plants and fungi, or loss of habitat.

Noxious Weeds
Under the No Action Alternative, the BLM would not implement new management actions that could result in ground disturbance, changes in canopy cover, or importation of noxious weed seeds or plant parts into the project area. Implementing Alternative 1 would result in no direct or indirect impacts to known noxious weed sites. The project area would be a relatively lower priority for weed control than rare plant sites, contiguous blocks of BLM land, or special areas such as ACECs or the Cascade Siskiyou National Monument (CSNM). When the BLM proposes a project in a specific area, it raises the priority level for treating infestations in the surrounding area.

Without treatment, the Canada thistle infestation would increase in size and numbers over time to create a monoculture devoid of native plants. It would likely increase due to natural processes, inherent competitiveness and other potential disturbances (see Table 3-14).

Cumulative Effects

Special Status and Survey and Manage Plant and Fungi Species
Data are not available for the presence or abundance of rare plants or fungi in the project area before BLM surveys began. While surveys have identified locations of rare plants on BLM-managed lands, they are not sufficient to show trends over time or quantify impacts to these species' populations from specific activities or events. It is not known if the rare vascular and nonvascular species or fungi that occur in the Conde Forest Management Project area are more or less rare now than in the past. Plant species may be naturally rare, or may become rare over time due to loss of populations, changes to their habitats or environmental conditions, over-collection, or direct impacts to plants resulting in extirpation of populations.

Past ground-disturbing activities on both private and public lands in the Conde Forest Management Project area include road building, timber harvest, livestock grazing, wildfire, fire suppression, diversion dams and other changes to hydrological processes, and recreational activities. These activities may have affected rare plants or fungi by altering habitat conditions.

Present and foreseeable future actions in the analysis area under the No Action Alternative include continued forest management (especially on private lands), grazing, and off-road OHV (Off-Highway

Vehicle) use. Some late-successional stands on BLM-managed lands in the project area would continue to provide suitable habitat for species associated with that habitat. Some mid-seral stands would continue developing toward later seral stages. Some of these late/mid-seral stands would continue to decline as competition for limited resources stress the stands and associated native vegetation. Hazardous fuels would increase in overstocked stands, rendering them less resilient to high severity fire and with less understory diversity. However, the BLM would continue some silvicultural treatments in the watershed in old plantations and historic wildfire areas. Fuels reduction treatments would likely occur near private property and strategic ridges and road systems. Implementing the No Action Alternative and not harvesting timber would not add cumulative effects to Special Status or S&M vascular or nonvascular plants or fungi.

Cattle grazing will continue on the Conde Creek allotment by 268 animals from June 16 – September 30, for a total of 943 animal unit months (AUMs). Cattle primarily utilize the open meadows for foraging. During the heat of mid to late summer, they tend to disperse into the forested areas under shaded canopy, i.e. where the project units are located. The lease renewal process takes into account rangeland health and impacts to special status plants and weeds. Although impacts from cattle could occur, it is unlikely that the light use of forested areas would trend any special status plants towards listing or threaten the persistence of survey and manage species (USDI 2011). Because no activities are planned under this alternative, there will be no cumulative impacts to Special Status or Survey and Manage plants.

Current trends in OHV use would continue in the project area unaffected by the Conde Project.

Noxious Weeds

Past activities in the analysis area that have likely contributed to the introduction and spread of noxious weeds on both private and public lands include: road building and vehicular traffic, timber harvest, livestock grazing, wildfire, agriculture, rural land development, and recreational activities including OHV use. In addition, weeds spread through natural processes such as transportation by wind, water, birds, or animals.

These human-caused activities and natural processes will continue to present risks of introducing new and spreading of existing noxious weed populations in the watershed. While there is a potential for continuous influx of noxious weeds due to those activities, the BLM has an ongoing program of inventory and treatment of noxious weeds in the Conde Forest Management Project planning area. Treatments in the past few years have focused on quarries and road systems in the project area. Treatments in those areas and new areas discovered in 2011 are being treated. Future funding for treatments is uncertain.

Implementing Alternative 1 would not contribute additional cumulative effects to noxious weeds in the Conde Forest Management Project area beyond existing conditions because no new activities would occur that create risks of introducing or spreading them.

b. Alternative 2

<u>Special Status and Survey and Manage Plant and Fungi Species</u>

On BLM-administered lands, the BLM shall:

- manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat (BLM Manual 6840, 2008).
- manage known sites of survey and manage species to provide reasonable assurance of taxon's persistence and/or minimize inadvertent loss of undiscovered sites (USDA, USDI 2001).

Potential impacts to rare vascular or nonvascular plants from the proposed 281 acres of thinning, silvicultural and fuels reduction activities include:

- damage to or mortality of plants from logging equipment during timber harvest activities or road construction or creation of landings
- mortality of plants or reduced plant vigor or reproductive success from changes in environmental conditions when overstory trees are removed, resulting in increased light or temperature and reduced relative humidity
- mortality of plants or reduced plant vigor or reproductive success as a result of disturbing mycorrhizal connections and food cycling between conifers or hardwoods and rare plants when overstory trees are removed
- damage to or mortality of plants from heat or flames during post-harvest slash pile burning
- reduced plant vigor as a result of damaging associated mycorrhizal fungi during timber harvest or handpile burning
- removal of late successional forest that provides habitat for expansion of existing Special Status or S&M vascular plant populations or occupation by new populations
- competition to Special Status or S&M vascular plants from noxious weeds introduced or spread during timber harvest, road work, or post-harvest slash pile burning

Protection measures are designed to prevent or reduce these direct or indirect effects that could occur during forest management activities. No-treatment buffers would protect rare plant populations from timber harvest, silvicultural or fuels treatments, and post-harvest slash treatments. Buffer sizes would vary depending on the type of treatment proposed, the species affected, and current environmental and ecological conditions at the site.

Eight occurrences of one Bureau special status/S&M E and four S&M B plant/fungi species are present within units proposed for treatment under the Action alternative. It is expected that the protection measures described in Table 3-16 will protect special status plants by not trending them towards listing, and will assure local persistence of survey and manage species and their habitat.

Table 3-16. Special Status and Survey and Manage Plant and Fungi Species Protection

Species name	Status	Occurrences in Proposed Treatment Areas	Protection
Chaenotheca ferruginea	S&M B	1	50-foot no-treatment buffer to maintain microsite conditions.
Chaenotheca subroscida	BSO S&M E	3	50-foot no-treatment buffer to maintain microsite conditions.
Gautieria otthii	S&M B	2	25-100 foot no-treatment buffer depending on site conditions. Maintain microsite conditions and duff layer. No mechanical disturbance and no pile burning.
Helvella elastica	S&M B	1	25-100 foot no-treatment buffer depending on site conditions. Maintain microsite conditions and duff layer. No mechanical disturbance and no pile burning.
Ramaria rubella var. *blanda*	S&M B	1	25-100 foot no-treatment buffer depending on site conditions. Maintain microsite conditions and duff layer. No mechanical disturbance and no pile burning.

The roads proposed for mechanical decommissioning will be surveyed for Special Status or S&M vascular or nonvascular populations and noxious weeds prior to the authorization of activities. There would be some risk that noxious weeds could be introduced or spread during road decommissioning that could impact Special Status plant species; project design features are included to mitigate the potential for introduction and spread of noxious weeds. Special Status or S&M plant sites adjacent to roads would be protected during decommissioning. These measures prevent potential impacts to Special Status or S&M vascular or nonvascular plants, prevent Sensitive vascular or nonvascular species from trending toward listing, and ensure S&M plant species persistence.

Fungi

Timber harvest can have varying degrees of adverse effects on fungi, depending on the level of tree removal and ground disturbance. Activities that remove, disturb, or compact the top layer of organic material and mineral soil negatively impact fungi. The main and most extensive part of a fungus consists of a mycelial network that resides in the top few inches of mineral soil. In one study, mycelial networks ranged in size from 1.5 to 27 square meters (16 to 291 square feet) (Dahlberg and Stenlid 1995). During timber harvest, tractors and yarding equipment disturb and compact soil, which could damage fungal mycelia.

Removing conifers during timber harvest could indirectly affect fungi over the short term because it could break mycorrhizal connections between the trees and fungal mycelia. Removing host trees halts the transfer of nutrients produced during photosynthesis to the fungi. Mycorrhizal associations could reestablish as new conifers grow if the fungal hyphae persists through the period of stress caused from disruption of the mycorrhizal connections and changes in environmental conditions, and if large enough conifers remain in the vicinity for mycelia to form connections with their root systems.

Removal of the overstory canopy during timber harvest changes environmental conditions which indirectly affects fungi. Relative humidity drops, light exposure increases, and air and soil temperatures rise. Hotter, drier conditions inhibit sporocarp production, reproductive success, and fungal persistence.

Burning post-treatment slash piles also poses potential impacts to rare fungi. After timber harvest, the remaining slash is piled and eventually burned. If rare fungi are present beneath the slash piles, the mycelia and spores would be damaged or destroyed by the intense heat generated during burning. Other detrimental effects to fungi from slash burning include loss of litter and organic matter, resulting in reduced moisture retention capability and a loss of nutrient sources. The effect of these activities on fungi is a loss of species diversity and abundance (Amaranthus, et al. 1996). In Alternative 2, the BLM could pile and burn or underburn post-treatment slash on up to 281 acres. The total area potentially impacted by burn piles would be up to 5 percent of the units for a total of 14 acres impacted within the project area.

Underburning could also negatively impact fungi. Mycelia could be damaged or destroyed if the fire burned at a higher intensity. Burning the duff layer or understory vegetation could also change environmental conditions and leave mycelia exposed and vulnerable to desiccation and mortality. Understory vegetation provides shade for terrestrial species, retains moisture that contributes to relative humidity, and cools air temperatures.

Thinning forested stands presents some risks of impacting Sensitive and S&M species as described above, but it would ultimately create more fire-resilient conditions, where a fire could burn through without causing a high intensity burn or a stand-replacing wildfire. This would decrease the impacts by minimizing duff consumption and scorching of plant and fungi species.

The BLM will protect known and future found populations for S&M fungi, and the presence of late-successional forest stands in reserves (Riparian, Late-successional, RA32, and other special management areas) across the landscape would prevent Sensitive species from trending toward listing or threaten S&M species' persistence (USDI 2004).

Noxious Weeds

Historic and recent inventories detected Canada thistle, an ODA designated noxious weed species, within the project area.

Timber harvest and fuels treatments could introduce or spread noxious weeds within the project area unless Project Design Features (Chapter 2) are applied, in conjunction with active weed control. Management activities which disturb the soil and remove existing vegetation leave areas open for possible invasion by noxious weeds. Burning post-harvest slash and non-commercial excess vegetation in handpiles would also remove ground cover under the piles, leaving those areas open to occupation by weeds. Underburning creates a different type of risk for weed spread because it is often less intense than pile-burning and burns in a patchy pattern. However, it removes ground vegetation over larger areas, potentially leaving them vulnerable to invasion by noxious weeds if populations are present nearby. A combination of these two methods of burning fuels is proposed for up to 281 acres in the project area. Re-vegetating burn pile spots and hot burn areas with native plant materials would reduce the ability of weeds to spread into these areas.

Noxious weed seeds or plant parts could be transported from infested areas outside the project area to non-infested areas within the project area along the 16.96 miles of haul routes on equipment or vehicles used for timber harvest or road work. Implementing vehicle washing prior to deployment of equipment would mitigate this risk.

In the short term (approximately 1-5 years), proposed timber harvest activities within the project area could result in a moderate probability of introducing or spreading noxious weeds (see Noxious Weed Risk Assessment). However, the rate at which weeds could potentially spread as a result of these activities cannot be predicted due to the indistinguishable causal effect of other activities and factors listed in Table 3-14. Implementing PDFs and continuing weed treatments would mitigate the risk of overall spread and likely improve habitat in the watershed by eliminating this small infestation.

Mechanical road decommissioning roads proposed for decommissioning will be surveyed for noxious weed infestations prior to authorization of activities. Weeds would be treated prior to ground-disturbance, disturbed areas would be seeded with native grasses and mulched with weed-free straw, and equipment used for decommissioning would be washed prior to entering the project area.

Cumulative Effects

Special Status and Survey and Manage Plant and Fungi Species

Past, present, and future activities in the analysis area would be similar to those described in the No Action Alternative, except that the BLM would implement actions proposed in Alternative 2. The BLM will protect all known and discovered Special Status and S&M species as required; therefore, there will be no-effects from the Conde Forest Management Project.

The proposed forest management activities would occur on matrix lands, which are designated for timber production and harvest. Across the Northwest Forest Plan area, approximately 14 percent of the 8 million acres of late-successional forest are designated as matrix or AMAs and are available for harvest, while 86 percent are designated as Late-Successional Reserves (LSRs), congressionally reserved areas, administratively withdrawn areas, or riparian reserves. This reserve system across the landscape is intended to provide protection and development of mature and old growth forests for the protection and expansion of late-successional associated rare plants, animals, and other organisms. Under the Northwest Forest Plan, at least 15 percent of late-successional (80 years or more) conifer forest must be maintained on Federal lands in each fifth field watershed (USDA and USDI 1994).

Implementing the proposed action would partially open up the forest canopy and understory vegetation in such a manner that cattle usage could increase. It is expected that maintenance of 40-60% canopy would not create conditions where cattle useage would increase to an intensity that would trend Special Status plants and fungi towards listing, nor threaten persistence of Survey and Manage plants and fungi.

Areas of temporary spur construction would be susceptible to illicit OHV use, particularly those areas that are considered to be mild-to-moderate hill slopes. However, proper implementation of the PDFs (i.e. same-season open and closure, blockading/obliterating entry points) would result in no effect on botanical resources, and no increase in unauthorized use.

Noxious Weeds

Past, present, and anticipated future activities in Alternative 2 would be similar to those described in the No Action Alternative. These human-caused activities and natural processes will continue to present a risk of introducing new noxious weeds and spreading existing populations. However, the BLM has an on-going program of inventory and treatment of noxious weeds in the Ashland Resource Area. Treatments in the past few years have focused on road systems, project areas, special areas and small infestations where short-term success (local eradication) is possible.

The proposed timber harvest and related road and fuels treatment could contribute to the spread of noxious weeds in the project area; however, project design features are required to reduce the risk. The risk of introducing or spreading noxious weeds as a result of activities proposed in Alternative 2 is low if

weed treatments continue to be funded and moderate if not funded (Noxious Weed Risk Assessment Report for Conde Forest EA). The application of PDFs and other mitigation measures would reduce the risks that activities in Alternative 2 would add cumulative effects to noxious weeds in the analysis area.

A slight increase in cattle usage in the project area, construction of temporary spur roads, and short-term potential for increased OHV use creates a higher risk of noxious weed infestation and spread. It is expected that implementing weed control PDF's – including three years monitoring and treatment - would not have cumulative effects beyond those described in Alternative 1. Monitoring and treatment are contingent upon adequate funding and resource availability.

It is anticipated that ongoing activities on private lands and activities over which the BLM does not have control will continue to create situations in which noxious weeds could be introduced and spread. On-going treatments and monitoring by the BLM, and continued collaboration with outside groups (e.g. Forest Capital Partners, the Jackson County Cooperative Weed Management Area, and The Nature Conservancy's Early Detection and Rapid Response (EDRR) program) increase the chances of containing or reducing noxious weed populations in the project and analysis area.

Noxious Weed Risk Assessment

BLM Manual 9015 - Integrated Weed Management (USDI 1992) directs BLM botanists to conduct a weed risk assessment to determine the risk of introducing weeds into an area and/or spreading them throughout a project area. Surveys for all species on the Medford District Weed list were conducted over several years starting in 1998. Noxious weed and non-native plant populations in the project area and on BLM land vary by location and species (see Affected Environment for weed species, locations).

Class A Weeds: Those noxious weeds that are exotic (not native) to the State or area, and are of limited distribution, or are unrecorded in the State or area and pose a serious threat to agricultural crops and rangelands in the State. Class A weeds receive highest priority. Management emphasis is complete control. These weeds approximate the Oregon Department of Agriculture List A weeds. A records check and surveys of areas that may be affected by the proposed project resulted in zero sites of Class A weeds.

Class B Weeds: Those noxious weeds that are non-native (exotic) plant species that are of limited distribution, or are unrecorded in a region of the State but are common in other regions of the State and have been identified by the BLM or State as potentially harmful. Class B-Weeds receive second highest priority. Management emphasis is to control the spread, decrease population size, and eventually eliminate the weed population when cost-effective technology is available. These weeds approximate the Oregon Department of Agriculture List B weeds. Note that percent cover of these species is less than the infestation area because most weeds, with the occasional exception of Blackberry, usually cover less than 100% of their infested area (Table 3-17).

Table 3-17. Class B Weeds Located Within or Adjacent to the Project Area

Scientific Name	Common Name	Total size of infestation
Circium arvense	Canada Thistle	Medium - <500m^2
Circium vulgaris	Bull Thistle	Medium - <500m^2
Hypericum perforatum	Klamath Weed	Medium - <500m^2

Class C Weeds: Consists of any other noxious weeds (exotic or native) or undesirable plants. This classification receives the lowest priority. Management emphasis is to contain spread to present population size or decrease population to a manageable size. The following species are exotic, have a

high frequency from recent survey lists in nearby stands, and have the potential to cause ecological damage. See Table 3-18 for species located within the Conde Forest Management Project area.

Table 3-18. Class C Weeds Located Within or Adjacent to the Project Area

Scientific Name	Common Name	Frequency in treatment units
Bromus tectorum	Downy Brome (Cheatgrass)	40%
Bromus japonicas	Japanese Brome	10%
Bromus diandrus	Ripgut Brome	10%
Bromus sterilis	Soft Brome	10%
Lepidium campestre	Poormans Peppergrass	10%
Phleum pratense	Timothy grass	20%
Poa bulbosa	Bulbous Bluegrass	60%
Torilis arvensis	Field Hedge-Parsley	30%
Verbascum thapsus	Hairy Mullein	20%

The likelihood of Class B and C weed species spreading into the project area is moderate (Table 3-19). There are Class B and C weed populations immediately adjacent to and within the project. Forest management activities will create patchy, moderately intensive ground disturbance. Some weed seeds and plant material may spread from the road prism into units without aggressive treatment. Project Design Features (PDFs) are included that will prevent the extensive spread of noxious weeds due to direct effects of the proposed project.

Table 3-19. Factor 1: Likelihood of Noxious Weed Species Spreading to Analysis Area

Level	Value	Description
None	0	Noxious weed species not located within or adjacent to the analysis area. Project activity is not likely to result in the establishment of noxious weed species in the analysis area.
Low	1	Noxious weed species present in areas adjacent to but not within the analysis area. Project activities can be implemented and prevent the spread of noxious weeds into the analysis area.
Moderate	5	Noxious weed species located immediately adjacent to or within the analysis area. Project activities are likely to result in some areas becoming infested with noxious weed species even when preventative management actions are followed. Control measures are essential to prevent the spread of Noxious weeds within the analysis area.
High	10	Heavy infestations of Noxious weeds are located within or immediately adjacent to the analysis area. Project activities, even with preventative management actions are likely to results in the establishment and spread of noxious weeds on disturbed sites throughout much of the analysis area.

Canada thistle, bull thistle and Klamath weed located within the affected area would be reduced in the short term if the PDFs and treatments are implemented. The budget to treat and monitor noxious weeds is not fixed for this project. There is no budget to treat Class C weeds; also, it is not permitted to use herbicides on Class C weeds at this time. If the weeds are not treated due to insufficient budget or workforce, the likelihood of noxious weed and non-native species spreading into and within the project area would be moderate. If the weeds are treated for the next one to three years, the likelihood of noxious

weed and non-native species spreading into the project area remains moderate. However, one to three years of weed treatments would prevent additional spread of weeds and non-native species within the project area.

The consequence of noxious weed establishment in the project area is moderate (factor 5). The noxious weed and non-native populations in the affected areas vary by species and are primarily located along roads or other human activity areas. The roadside species (Klamath weed, bull thistle) are competitive when in open-canopy conditions, i.e., roadside or disturbed open gaps, but are not competitive under a closed-canopy. These species, as well as the class C weeds, could infest or expand into open patches between canopy cover. Canada thistle could invade disturbed areas with remaining canopy and out-compete native forbs and graminoids. Unrelated activities could transport weed seed (e.g. wind, water, wildlife, wildfire, hiking, OHV, etc.) into any newly disturbed areas.

Table 3-20. Consequence of Noxious Weed Establishment in the Analysis Area

Level of Consequence	Value	Description of Possible Effects
Low to Nonexistent	1	None. No cumulative effects expected.
Moderate	5	Possible adverse effects on site and possible expansion of infestation within analysis area. Cumulative effects on native plant community are likely but limited.
High	10	Obvious adverse effects within the analysis area and probable expansion of noxious weed infestations to areas outside the analysis area. Adverse cumulative effects on native plant community are probable.

Risk Rating

Step 1 - Identify level of likelihood and consequence of adverse effects and assign values according to the following:

None = 0 Low = 1 Moderate = 5 High = 10

Step 2 - Multiply the level of Likelihood value (Table 3-19) by the Consequence value (Table 3-20) to determine Value.

Step 3 - Use the value resulting from Step 2 to determine Risk Rating and Action in Table 3-21.

Table 3-21. Risk Rating and Action

Value	Risk Rating	Action
0	None	Proceed as planned.
1-10	Low	Proceed as planned. Initiate control treatment on noxious weed populations that get established in the area.
25	Moderate	Develop preventative management measures for the proposed project to reduce the risk of introduction or spread of noxious weeds into the area. Preventative management measures should include modifying the project to include seeding the area to occupy disturbed sites with desirable species. Monitor area for at least 3 consecutive years and provide for control of newly established populations of noxious weeds and follow-up treatment for previously treated infestations.
50-100	High	Project must be modified to reduce risk level through preventative management measures including seeding with desirable species to occupy disturbed sites and controlling existing infestations of noxious Weeds prior to project activity. Projects must also provide for control of newly established populations of Noxious weeds and follow-up treatment for previously treated infestations.

5x5=25 Moderate risk. Implement PDFs. Monitoring and control treatments shall occur.

The Medford District BLM Resource Management Plan directs the use of integrated pest management actions to contain and reduce noxious weed infestations. The Conde Forest Management Project incorporates project design features (PDFs) as part of the proposed action to control noxious weeds and avoid new infestations. The PDFs include both preventive features and active control. The PDFs represent the most current and widely employed methodology for weed control and prevention. The EA analyzes effects to resources in the context of a project design that includes PDFs prescribed for the Conde Forest Management Project; thus, the effects of PDFs have been generally incorporated into the analysis of the proposed action. While ground disturbance associated with this project would create site conditions initially more favorable for noxious weeds and introduced plants, with the implementation of project design features, weed spread would be minimized and roadside weed populations would be controlled or reduced.

PDFs included in the Conde Forest Management Project to control noxious weeds are consistent with:

- Medford District BLM Resource Management Plan (USDI 1995);
- Medford District BLM Integrated Weed Management Plan and Environmental Assessment (USDI 1998); and the
- Bureau's 2007 Final Programmatic Environmental Impact Statement, *Vegetation Treatments Using Herbicides*, Prevention of Weeds and Early Detection and Rapid Response strategy (USDI 2007).

I. RANGELAND RESOURCES/GRAZING

1. Affected Environment

The existing grazing leases for the Conde Creek Allotment authorize 591 active Animal Unit Months (AUMs) from June 16 to September 30. One AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. Total AUMs represent the number of cow/calf pairs multiplied by the number of months included in the season of use. Additionally, 352 AUMs are permitted under an Exchange of Use (EOU) Agreement for a total of 943 AUMs. The AUMs in Table 3-22 reflect the forage that would be used on BLM-administered lands and the approved EOU AUMs coming from private lands within the Conde Creek Allotment.

Table 3-22. Summary of Conde Creek Allotment Use

Authorization	Use Type	Number of Livestock	Season of Use	AUMs	EOU AUMs	Total AUMs
Lessee 1	Active Lease	135 cattle	06/16-9/30	485		485
Lessee 1	Exchange of Use	100 cattle	06/16-9/30		352	352
Lessee 2	Active Lease	33 cattle	06/16-9/30	116		116
Total		**268 Cattle**		**591**		**943**

Range Improvements & Maintenance

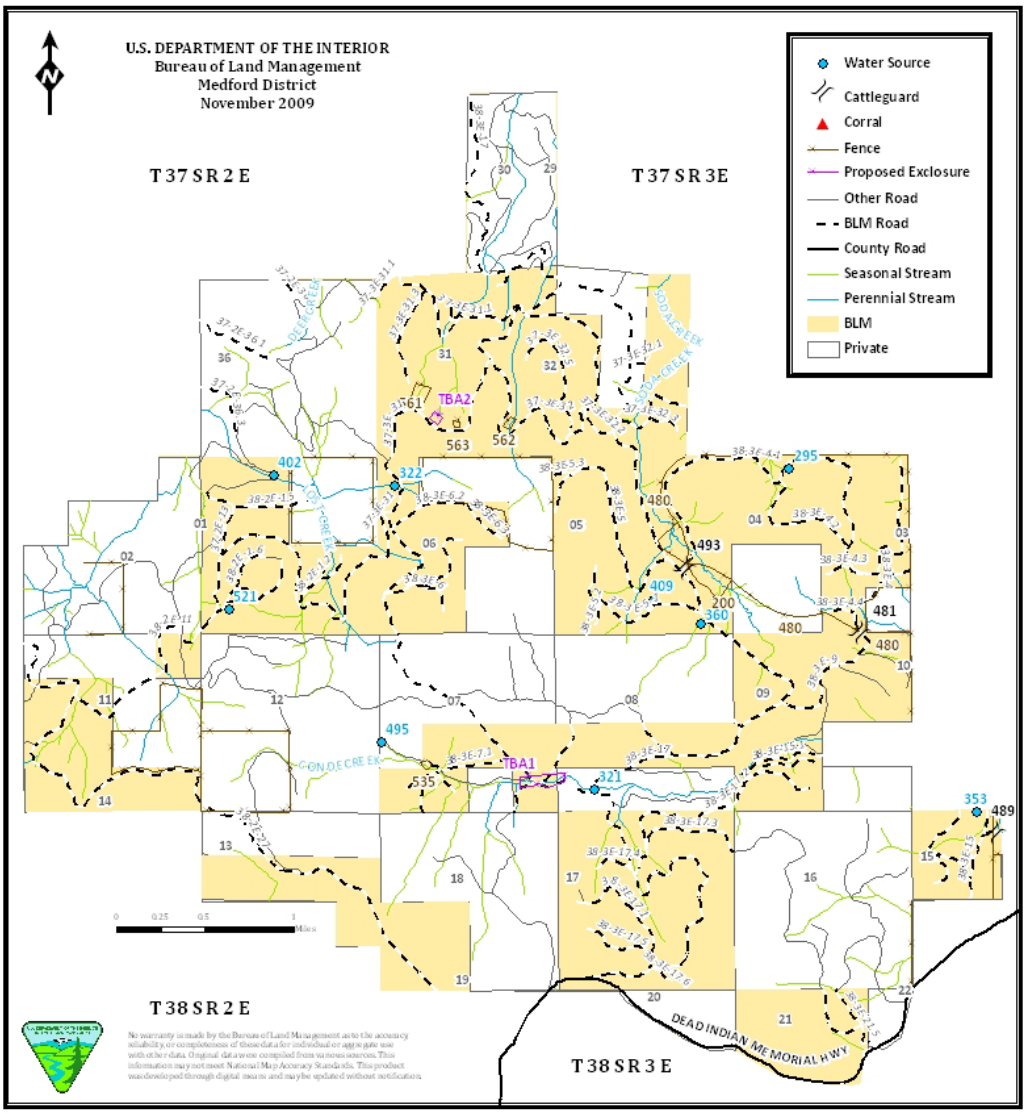
There are currently 21 rangeland improvement projects in the Conde Creek Allotment. Five of these are located within the Conde Forest Management Project area (Table 3-23 and Map 3-3).

Table 3-23. Range Improvement Projects Within the Conde Forest Mangement Project

Project Name:	Project Type:	Township	Range	Section
Conde Cattleguard	Internal cattleguard	38S	3E	4
Soda Creek Cattleguard	Internal cattleguard	38S	3E	5
Dead Indian Pit Reservoir	Reservoir	38S	3E	15
Conde Creek Check Dams	Riparian	38S	3E	7
Conde Creek Exclosure	Riparian Exclosure	38S	3E	7

Items in bold print are structures where PDFs are applicable.

Map 3-3. Range Improvement Projects Within the Conde Forest Management Project



2. Environmental Consequences

a. Alterative 1

<u>Changes to Forage and Authorized Use</u>

Under the No-Action Alternative, the current trend of declining forest health would continue due to the spread of forest pathogens. The risk of a catastrophic wildfire due to increased fuel loading would increase. Vegetative material would increase over time as stand densities decrease and as a function of increases in forest gap size. Forest stands with higher mortality (and resulting decreased densities) will allow higher rates of solar exposure to the forest floor, allowing for potential increases in vegetative production and increases in forage abundance.

Authorized grazing levels would not be increased without further evaluation, per direction in 43 Code of Federal Regulations (CFRs), Part 4180, Fundamentals of Rangeland Health, and 43 CFR 4110.3-1 (Increasing Permitted Use).

Effects to Rangeland Improvements

Rangeland improvements would see a slight increase in damage in areas where dead and dying trees fall, or live trees suffer blow-down as wind-firmness deteriorates due to opening in forest stands. Damage to range improvements (such as fences and water developments) would result in increased maintenance for parties responsible and where materials damaged beyond repair would need to be replaced. This effect is only expected to cause a slight increase in damages to resources over time.

While damage to rangeland resources is not expected to be significant, it could result in some instances of unauthorized use or use in areas currently excluded from grazing. These conditions will result in notification to the livestock owner at the earliest opportunity so that movement of livestock back to areas where use is approved occurs and effects to areas where improvement mitigations have been applied are returned to their functional status.

b. Alternative 2

Changes to Forage and Authorized Use

The implementation of Alternative 2 would allow for a brief period of increased solar exposure to the forest floor before overstory release of healthy trees begins to close canopy gaps, limiting the long-term increase in vegetative forage production. As with Alternative 1, authorized grazing levels, would not be increased without further evaluation, per direction in 43 Code of Federal Regulations (CFRs), Part 4180, Fundamentals of Rangeland Health, and 43 CFR 4110.3-1 (Increasing Permitted Use).

Temporary Spur Roads and Road Closures

Temporary spur roads may provide livestock new avenues of movement in and out of thinned or cut areas, but because they will be short (each is <500 feet in length), they will have no measurable effects on livestock grazing activities. Sedimentation from livestock use will remain unchanged.

In areas where roads are scheduled for decommissioning, an anticipated slight disturbance to livestock movement would occur. As closed roads become re-vegetated with small trees and brush, livestock movement into riparian areas will be reduced along these routes. As grazing and watering use decreases along these routes, effects associated with livestock use would decrease.

Effects to Rangeland Improvements

Ground disturbing activities associated with logging and fuels treatment operations may result in damage to rangeland improvements such as fences, gates or stock tanks. Resulting openings in fences or gates may result in livestock being able to move into or from areas where restrictions or pasture rotations are scheduled. Consequently, unauthorized use could occur with the potential results including increased use or overuse in areas having prior functional rangeland health concerns.

If project design features (PDFs) are implemented properly, there would be little- to no-impact on livestock grazing due to project activity.

J. VISUAL RESOURCE MANAGEMENT (VRM)

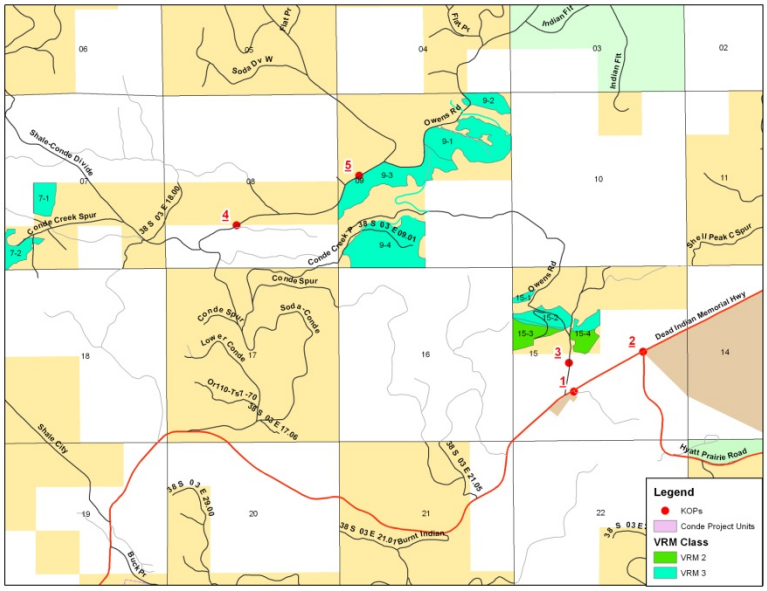
1. Affected Environment

Visual Resources are the land, water, vegetation, structures, and cultural modifications that make up the scenery of BLM-administered land. Medford District BLM-administered lands have been classified under a Visual Resource Management (VRM) Inventory Class system established by the BLM. The criteria used to determine VRM classes are: scenery quality ratings, public sensitivity ratings and distance zone-seen area mapping criteria. Approximately 60 percent of the viewsheds in the Medford District RMP planning area have fragmented land ownership patterns with private lands dominating the viewed landscape (RMP/EIS p. 3-70). Project units in the Conde Forest Management Project area are classified as VRM Class II and Class III.

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

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

Map 3-4. Location of Key Observation Points (KOPs)



In accordance with the 1995 RMP, a visual resource contrast rating system analysis was completed for the Conde Forest Management Project. Four Known Observation Points (KOPs) near project units 15-3, 15-4 (VRM Class II) and near project units 9-3 and 9-4 (VRM class III) management areas were used to complete the visual resource contrast rating system analysis (Map 3-4). Views of the landscape from the major routes of travel as well as a residence in close proximity to these units in the project area were used to determine if any changes in landscape character from the point of view of a casual observer would be observed.

2. Environmental Consequences

a. Alternative 1

Visually, the area associated with project would remain the same. There would be no changes to the existing landscape.

b. Alternative 2

Project units 15-3 and the southern 70 percent of unit 15-4 in T. 38S R. 03E, Section 15 fall within the VRM Class III zone and comprise approximately 26.44 acres (of 279.14) or 9.47 percent of the total planning area acreage. The characteristic landscape within this zone is typical of an area that has had much vegetative manipulation, and retains the look of a fragmented forest and landform view. The proposed treatments and harvest methods will result in a weak fragmentation view, more in concert with the appearance of adjacent stands. Critical viewpoints are from the Dead Indian Memorial Highway and Road 38-3E-15 at KOPs 1, 2, and 3. While views are lengthy from these aspects, the units are mostly screened by adjacent vegetation. These units will not be detectable to the untrained eye.

Units 15-1, 15-2, and the northern 30 percent of 15-4 in T. 38S R. 03E Section 15, as well as units 9-1, 9-2, 9-3, -4 in in T. 38 R.03E Section 9 fall within the VRM Class III zone and comprise approximately 252.70 acres (of 279.14) or 9.47 percent of the total planning area acreage. The characteristic landscape within this zone is typical of an area that has had much vegetative manipulation, and retains the look of a fragmented forest and landform view. The proposed treatments and harvest methods will result in a weak fragmentation view, more in concert with the appearance of adjacent stands. Key viewpoints are from the Dead Indian Memorial Highway, road 38-3E-15 and Conde Creek Road at KOPs 1, 2, 4, and 5. Views of units 15-, 15-2 and 15-4 are located on north facing aspects and slope away from KOPs 1, 2, 3. These units will not be visible to vehicles passersby. KOPs for units 9-1, 9-2, 9-3, and 9-4 in T. 38 R. 03E Section 9 are along Conde Creek Road. The ground slopes away from the road in a majority of the units, the vegetation is patchy and consists of small meadows, dead and dying tree stands, and historic stump remnant of past harvests. While the project objective is to reduce canopy closure of these stands by 10 to 15 percent, the outcome will create a more consistent landscape, blending the adjacent lands lie and form. Changes would repeat the basic elements found in the predominant natural features of the characteristic landscape.

It was determined that Alternative 2, the Conde Forest Management Project Proposed Action, would meet Visual Resource Management objectives for Class II and Class III management areas. The level of change to the landscape character as a result of the project would be low. Timber stands on private inholdings located in the viewshed foreground between Dead Indian Memorial Highway and the project units will act as a visual buffer obscuring landscape changes. The changes in landscape character as a result of the project would not attract the attention of the casual observer. An observer living in the area or more familiar than the casual observer with the landscape may notice the changes in character of the landscape as a result of the project. However, the project as proposed in Alternative 2 would meet Visual Resource Management objectives of the 1995 Medford District RMP.

K. RECREATION

1. Affected Environment

Recreation use across the Medford District BLM is described in the Medford District Proposed Resource Management Plan/Environmental Impact Statement. BLM lands fall into two recreation management categories, special recreation management areas and extensive recreation management areas. Extensive recreation use areas are all BLM-administered lands not included in Special Recreation Management Areas identified in the RMP (PRMP/EIS, p. 3-71) that provide for dispersed recreation opportunities across the Medford District BLM. Special Recreation Management Areas are those areas identified with high concentrations of recreation use and developed facilities. An estimated 799,243 acres provide for dispersed recreation use across the Medford District (PRMP/EIS p. 3-84). Much of the Conde Project Area is described by the RMP as extensive recreation use areas (approximately 279.14 acres) that provide for dispersed recreation.

Recreation within or in close proximity to most of the proposed sale units included in the Conde Forest Management Project planning area consists of dispersed types of recreation. These areas are characterized as low use recreational areas where no developed or designated recreational sites or activities exist. Dispersed recreation in the project area includes hiking, horseback riding, sightseeing, driving for pleasure, hunting, dispersed camping, and vegetative gathering (i.e., mushrooms).

During the winter, recreational use may include snowmobiling, snowshoeing, and cross country skiing. There are no designated snow routes within the planning area; however, some use has been noted on or in the vicinity of the Conde Creek Road near the intersection of the Dead Indian Memorial Highway where snow plows usually provide enough room to park several vehicles. This wide spot is not a designated Sno Park area.

2. Environmental Consequences

a. Alternative 1

In the No-Action Alternative, recreation opportunities would remain unchanged. Dispersed recreational activities such as hiking, horseback riding, sightseeing, OHV activities, fishing, driving for pleasure, hunting, target practice, dispersed camping, and vegetative gathering would continue.

b. Alternative 2

Moderate OHV use, primarily on existing roads, does take place in and around the project area during the fall Big Game hunting season. The closure of the natural surface roads in section T.38S R.03E Section 9 will reduce access between Conde Creek road and BLM road 38-3E-15.

Impacts to dispersed recreation would be minimal, and would be in the form of temporary road closures and encounters with haul trucks. Depending on the proximity of users to the logging activities, recreational users may be affected by the noise associated with logging and log haul. If the winter snow pack permits winter logging operations, some negative (but short term) impacts to winter recreationists in the vicinity of the intersection of Conde Creek and Dead Indian Memorial Highway would be possible. Activity fuel treatments would produce smoke, but the expected impact to the dispersed recreational user would be minimal and of short duration. However, there may be short periods of time when burning may preclude some recreational use due to safety concerns.

L. OTHER EFFECTS

1. Cultural Resources

In accordance with the National Historic Preservation Act of 1966 (specifically Section 106), as amended, a literature review and archaeological reconnaissance were conducted for the Conde Forest Management Project. The Conde Forest Management Project area was reviewed for the potential for adverse impacts to cultural resources. The area was surveyed previously in conjunction with the Conde Shell Forest Management Project (AH98-33).

Proposed management direction includes protecting and managing the integrity of all historic/prehistoric sites identified in the cultural survey. The minimum level of protection for sites is avoidance. This includes timber removal and road building. Other activities that might damage cultural resources include controlled burning and fuel hazard reduction methods. No cultural sites have been identified within the units proposed for treatment. Therefore, no cumulative impacts on cultural resources are anticipated.

2. Air Quality

Prescribed burns are conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained. Smoke produced from prescribed burning is the major air pollutant of concern.

Fuels management activities generate particulate pollutants in the process of treating natural and activity related fuels. Smoke from prescribed fire has the potential to effect air quality within the project area as well as the surrounding area. The use of prescribed fire for ecosystem restoration can produce enough fine particulate matter to be a public health and/or welfare concern. Fine particulates in smoke can travel many miles downwind impacting air quality in local communities, causing a safety hazard on public roads, impairing visibility in class I areas, and/or causing a general nuisance to the public. If properly managed, most negative effects of prescribed fire smoke can be minimized or eliminated.

The National Ambient Air Quality Standards (NAAQS), set by the authority of the Clean Air Act (CAA), cover six “criteria” airborne pollutants: lead, sulfur dioxide, carbon monoxide, nitrogen oxides, ozone and particulate matter. The lead and sulfur content of forest fuels is negligible, so these two forms of air pollution are not a consideration in prescribed burning.

Prescribed burning does emit some carbon monoxide (CO), from 20 to 500 lb. per ton of fuel consumed. This would be a concern if there were other persistent large CO sources in the immediate vicinity. CO is such a reactive pollutant, however, that its impact is quickly dissipated by oxidation to carbon dioxide where emissions are moderate and irregular and there is no atmospheric confinement.

Burning also emits moderate amounts of volatile organic compounds (VOC) and minor amounts of nitrogen oxides (NOx). These are precursors to formation of ground level ozone. Here, fire-related emissions may be seen as important only when other persistent and much larger pollution sources already cause substantial nonattainment of NAAQS .

Particulate matter smaller than 10 micrometers (PM 10) is a term used to describe airborne solid and liquid particles. Because of its small size, PM 10 readily lodges in the lungs, thus increasing levels of respiratory infections, cardiac disease, bronchitis, asthma, pneumonia, and emphysema.

The fate of PM emissions from prescribed burning is twofold. Most (usually more than 60%) of the emissions are ‘lifted” by convection into the atmosphere where they are dissipated by horizontal and downward dispersion. The “unlifted” balance of the emissions (less than 40%) remain in intermittent

contact with the ground. This impact is dissipated by dispersion, surface wind turbulence and particle deposition on vegetation and the ground. The risk of impact on the human environment differs between the two portions of smoke plume.

Smoke Aloft

Until recent decades, the impact of the lifted portion of smoke was ignored because it seemed to "just go away." These impacts are generally not realized until the mechanisms of dispersal bring the dispersed smoke back to ground level. Because the smoke has already dispersed over a broad area, the intensity of ground-level exposure is minimal. The duration of exposure may include the better part of a day, however, and the area of exposure may be large.

Ground Level Smoke

Unlike smoke aloft, the potential for ground level smoke to create a nuisance is immediate. This part of the smoke plume does not have enough heat to rise into the atmosphere. It stays in intermittent contact with the human environment and turbulent surface winds move it erratically. Also in comparison to smoke aloft, human exposure is more intense, relatively brief (a few hours) and limited to a smaller area. Smoke aloft is already dispersed before it returns to the human environment while ground level smoke must dissipate within that environment. Dissipation of ground level smoke is accomplished through dispersion and deposition of smoke particles on vegetation, soil and other objects.

Smoke Sensitive Receptor Area (SSRA)

The population centers of Grants Pass, Medford/Ashland (including Central Point and Eagle Point), and Klamath Falls in the past were in violation of the national ambient air quality standards for PM 10 and were classified as nonattainment for this pollutant. The nonattainment status of these communities was not attributable to prescribed burning. Major sources of particulate matter within the Medford/Ashland SSRA is smoke from woodstoves and dust and industrial sources. The contribution to the nonattainment status of particulate matter from prescribed burning was less than 4% of the annual total for the Medford/Ashland air quality management area. Over the past ten years the population centers of Grants Pass and Medford/Ashland have been in compliance for the national ambient air quality standards for PM 10.

The pollutant most associated with the Medford District's resource management activities is PM 10 found in smoke produced by prescribed fire. Monitoring in southwest Oregon consists of nephelometers (instrument designed to measure changes in visibility) in Grants Pass, Provolt, Illinois Valley, Ruch and eventually in Shady Cove. One medium volume sampler is collocated with the nephelometer at the Provolt site. The medium volume sampler measures the amount of PM 10 and smaller at ground level.

Administration of Smoke Producing Projects

The operational guidance for the Oregon Smoke Management Program is managed by the Oregon State Forester. The policy of the State Forester is to:

1. Regulate prescribed burning operations on forest land…
2. Achieve strict compliance with the smoke management plan…
3. Minimize emissions from prescribed burning…

For the purpose of maintaining air quality, the State Forester and the Department of Environmental Quality shall approve a plan for the purpose of managing smoke in areas they designate. The authority for the State administration is ORS 477.513(3)(a).

ORS468A.005 through 468A.085 provides the authority to DEQ to establish air quality standards including emission standards for the entire State or an area of the State. Under this authority the State Forester coordinates the administration and operation of the plan. The Forester also issues additional restrictions on prescribed burning in situations where air quality of the entire State or part thereof is, or would likely become adversely affected by smoke.

In compliance with the Oregon Smoke Management Plan, prescribed burning activities on the Medford District require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the Forester on a daily basis concerning smoke management and air quality conditions.

3. Environmental Justice

This project was reviewed for the potential for disproportionately high or adverse effects on minority or low income populations; no adverse impacts to minority or low income populations would occur. *Executive Order 12898 (Environmental Justice).*

CHAPTER 4 - PUBLIC PARTICIPATION

A letter briefly describing the Proposed Action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on August 29, 2011. The scoping letter requested that people contact the BLM using an attached Interest Response Form or by sending a comment letter if they wanted to be updated as the project progressed. A copy of this Environmental Assessment was sent to those individuals and organizations who responded to the scoping notice. The following organizations were among those who received a copy of the Conde Forest Management Project Environmental Assessment.

Organizations and Agencies
Cascadia Wildlands Project
Hannon Library Southern Oregon University
Klamath-Siskiyou Wildlands Center
Oregon Wild
Siskiyou Project
Association Of O&C Counties

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Appendix A: Conde Project Aquatic Conservation Strategy

The Northwest Forest Plan's (NWFP) Aquatic Conservation Strategy (ACS) has four components: Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. It is guided by nine objectives which are meant to focus agency actions to protect ecological processes at the 5th-field hydrologic scale, or watershed, at the 6th and or 7th fields (subwatershed and or drainage), and at the site level. In this case, Dead Indian Creek is a sixth field subwatershed and is composed of numerous smaller 7th field drainages. These 7th field drainages combine to form the tributaries to Dead Indian Creek, such as Conde Creek. The Dead Indian Creek subwatershed is within the larger Little Butte Creek 5th field watershed. How the four components of ACS relate to the Conde project are explained below:

1. Riparian Reserves: Riparian Reserve widths for streams, springs, wetlands, and unstable soils have been determined according to the protocol outlined in the NWFPs Aquatic Conservation Strategy and are listed in the PDFs for the Conde project.

2. Key Watersheds: Tier 1 Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. The Little Butte Creek Watershed upstream of the North and South Forks confluence is designated as a Key Watershed, due to its productivity as a salmonid producing system. Both Dead Indian and Conde Creeks are within the designated Key Watershed.

3. Watershed Analysis: BLM completed the Little Butte Creek Watershed Analysis in 1997.

4. Watershed Restoration: Past and ongoing restoration activities in the watershed include channel and bank restoration projects, riparian plantings, riparian cattle exclusion, dam removal, culvert upgrading, and road stabilization projects.

Evaluation of This Action's Consistency with Northwest Forest Plan Aquatic Conservation Strategy Objectives

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

> Topography, slope, forest fire regime, climate, and the distribution of soil types and plant communities are some of the landscape-scale features affecting aquatic systems in the watershed. One of the treatment objectives of the project is to compensate for an altered fire regime and restore certain plant communities. The intent of this objective is to restore the function of landscape-scale processes like wildfire in order to protect the complexity and distribution of plant communities (including riparian areas) across the landscape. This would be noticeable at the site level, but would have only a minor benefit at the watershed scale, as less than 1% of the watershed would be treated.

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

> In the Little Butte Creek Watershed, reservoirs and diversions have disrupted all of these indicators. No project elements proposed in the Conde project would impact spatial and temporal connectivity at any scale. No stream crossings would be constructed or removed.

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

> No project elements proposed would have any causal mechanism to affect the physical integrity of the aquatic system; activities would not occur in stream channels or adjacent to shorelines, and no increases to sediment delivery or peak flows are anticipated as a result of the Conde project.

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

> There would be no effect on water temperature, because shade would not be reduced along any stream channels. Sediment inputs to aquatic habitat resulting from the Conde project are not anticipated. Peak flows would not be increased because harvest prescriptions would leave canopy levels above thresholds at which increases in peak flows may be incurred.

5. Maintain and restore the **sediment regime** under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

> Of the project elements proposed, only haul has any causal mechanism to input sediment into channels. However, in the Conde project, non-paved haul routes are limited to less than six miles, the majority of which is in upland areas with no hydrological connectivity. PDFs for haul would limit haul to dry or frozen conditions, there is only one perennial stream crossing involved, haul routes are on flat and stable ground, and haul would be spread over a wide spatial and temporal scale. For these reasons, haul is not expected to contribute detectable amounts of sediment to any aquatic habitat.

6. Maintain and restore **instream flows** sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Peak flows and summer low flows are unlikely to be affected by the Conde project. Please see the Hydrology report in the Environmental Assessment for details. Any effects on ground water availability from the project would be too small to be noticeable at the site, much less the drainage or watershed scale. Water transfers and withdrawals for agriculture and residential use have the most significant impacts to instream flows in both the analysis area and in the watershed.

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

Only harvest would have any mechanism to affect the timing, variability, and duration of floodplain inundation and water table elevation. However, harvest would not occur in Riparian Reserves and across the project area would leave canopy cover within the range of natural variability. Because of this, any extra water input intercepted by the ground as a result of harvest would likely be utilized by remaining vegetation before it reached the floodplain. Therefore, this objective would not be measurably affected at any spatial scale.

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

The construction of one temporary operator spur would disturb grass and forbs in a meadow that is within the Riparian Reserve of Conde Creek. No shade or coarse woody debris producing would be affected. The spur would be obliterated in the same season as constructed and used, hence the disturbance would be ephemeral in nature. This site level affect would last for less than one year, as the spur would be seeded and mulched, and quickly returned to a similar state as the area now exists.

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

See above objectives. No project elements proposed in the Conde projects are anticipated to negatively impact any aquatic habitat parameters.