Lost Creek
Forest Management Project
Environmental Assessment

DOI-BLM-ORWA-M050-2016-0001-EA

BLM

Butte Falls Resource Area

July 2016

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Dear Reader:

The Butte Falls Resource Area, Medford District Bureau of Land Management (BLM) has completed the environmental analysis for the proposed Lost Creek Forest Management Project. This document, the Lost Creek Forest Management Project Environmental Assessment (EA), provides a description of the project and Project Area, background information, and the possible effects of implementing the project.

The EA analyzed the following activities proposed on **BLM-administered lands** located northeast of the city of Medford, Oregon in the Lost Creek-Rogue River 5th field watershed and a small portion of the South Fork Rogue River 5th field watershed (see Maps 1-12):

- Forest Management
  - Timber harvest—1,209 acres,
- Timber Yarding
  - Ground-based—937 acres
  - Skyline-cable—71 acres
  - Helicopter—165
- Transportation Management
  - Temporary route construction—0.83 mile
  - Temporary route reconstruction—0.29 mile
  - Road reconstruction—0.34 mile
  - Road renovation—96.57 miles
  - Haul routes—96.91 miles
  - Wet season haul routes—59.08 miles
  - Wet season haul routes with rock needs—9.85 miles
  - Roadside vegetation maintenance—16.75 miles
  - Partial road decommissioning—3.15 miles
  - Full road decommissioning—1.54 miles
  - Pre-designated skid trails—0.62 miles
  - New landings—5 helicopter, 14 log, and 2 service landings
- Treatment of Forest Management Activity Slash
  - Lop and Scatter
  - Hand pile and hand pile burn
  - Underburn

    - Biomass removal
- Water source restoration—5 sites
- Meadow Restoration – 106 acres

The 30-day comment period for this EA will begin when the legal notice is published in the *Medford Mail Tribune* newspaper on July 1, 2016. Any comments you may have regarding this project must be received by August 1, 2016 to be considered in final decisions for this proposal.

The BLM will host a field tour of the Lost Creek Project area on Tuesday, July 12, 2016 at 8:30 a.m. The visit will include a selection of proposed harvest areas, including a stand proposed for Regeneration Harvest, Selective Thinning, and Density Management. We will also visit some proposed temporary route locations. Interested individuals should **RSVP by July 8** to Stephanie Kelleher (email skellehe@blm.gov or call 541-618-2205). The field tour will begin from the public entrance of the Medford Interagency Office at the address below.

Please send your comments to Bureau of Land Management, Attention: Stephanie Kelleher, 3040 Biddle Road, Medford, OR 97504, or e-mail your comments to BLM_OR_MD_Mail@blm.gov (Attention: Stephanie Kelleher). You may also submit comments through the BLM's national register website by selecting "Comment on Document" in the Documents section of the webpage for this EA. Questions on the proposed project should be directed to Stephanie Kelleher at 541-618-2205 or Nick McDaniel at 541-618-2356.

Please note that all written submissions from private individuals in response to this notice, including your name, address, telephone number, email address, or other personal identifying information may be made available for public inspection and disclosure under the Freedom of Information Act, unless you specifically request confidentiality. If you wish to withhold your personal identifying information from public review or disclosure, you must state this at the beginning of your written comment and provide justification for doing so. We will honor such requests to the extent allowed by law, but you should be aware that release of that information may be required under certain circumstances. All submissions from organizations or businesses and from individuals identifying themselves as representatives or officials of organization or business will be made available for public inspection and disclosure in their entirety.

Thank you for your continued interest in the Lost Creek Forest Management Project. Your input plays an important role in our land management decisions.

Teresa J. Trulock
Field Manager
Butte Falls Resource Area

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CHAPTER 1 - PURPOSE AND NEED

1.1 INTRODUCTION

This environmental assessment (EA) documents the environmental analysis the BLM conducted to estimate the potential site-specific effects on the human environment that may result from implementation of this project. The EA will provide the BLM's Authorized Officer (Butte Falls Resource Area Field Manager) with current information to aid in the decision-making process. It will also determine if there are significant impacts not already analyzed in the Environmental Impact Statement (EIS) for the Medford District's Resource Management Plan (RMP) and whether a supplement to that EIS is needed or if a Finding of No Significant Impact (FONSI) is appropriate. 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).

1.2 WHAT IS THE BLM PROPOSING?

The Bureau of Land Management (BLM), Butte Falls Resource Area, is proposing forest management actions, including timber harvest, on approximately 1,209 acres of forest lands in the Lost Creek Project Area. Silviculture prescriptions include Density Management, Selective Thinning, Regeneration Harvest, Small Diameter Thinning, and Understory Reduction. The prescriptions are tailored to the various site conditions (i.e. elevation, aspect, soil conditions, stand health, etc.) found throughout the Project Area. Fuel loads resulting from harvest would be reduced by lopping and scattering, piling and burning, underburning, or biomass removal. Forest management would be accomplished through a combination of commercial timber sale contract(s) and service contracts.

Proposed transportation management activities include temporary route construction (0.83 miles) and reconstruction (0.29 miles), road renovation (96.57 miles) and reconstruction (0.34 miles) along haul routes, roadside vegetation maintenance (16.75 miles), partial road decommissioning (3.15 miles), full road decommissioning (1.54 miles), and pre-designated skid trails (0.62 miles) and landing construction (21 sites). Select roads were identified for wet season haul (59.08 miles), depending on road surface type and their current condition. An additional 9.85 miles of road were identified for wet season haul if adequate rock is added to the roadbed.

Other proposed projects include water source restoration at five sites and 106 acres of meadow restoration.

A more detailed description of BLM's Proposed Action and other alternatives considered is included in Chapter 2, Alternatives.

1.3 WHERE IS THE PROJECT LOCATED?

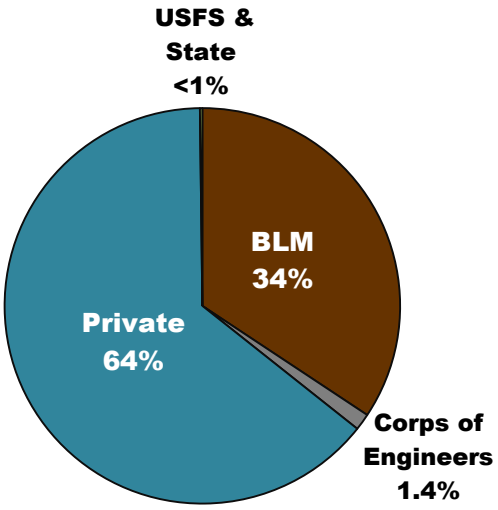
The Lost Creek Forest Management Project is located in southwest Oregon northeast of Medford near Lost Creek Lake (Map 1). The 41,881-acre Lost Creek Project Area is located within the 32,088-acre Lost Creek-Rogue River 5th field watershed and a small portion of the 160,773-acre South Fork Rogue River 5th field watershed.

The Public Land Survey System (PLSS) description of the Lost Creek Project Area is as follows:

- T. 32 S., R. 01 E., Sections 35 and 36;
- T. 32 S., R. 02 E., Sections 27, 28, and 32-34;
- T. 32 S., R. 03 E., Sections 32 and 33;
- T. 33 S., R. 01 E., Sections 1-3, 10-15, 21-28, and 34-36;
- T. 33 S., R. 02 E., Sections 2-36;
- T. 33 S., R. 03 E., Sections 4-9, 16-21, 29, and 30;
- T. 34 S., R. 01 E., Sections 1-3 and 11;
- T. 34 S., R. 02 E., Sections 2-6; Willamette Meridian; Jackson County, Oregon.

Lands in the Project Area are a mix of BLM-administered, private, Corps of Engineer, Forest Service and state lands (Figure 1-1). BLM-administered lands compose 34% (14,368 acres) of the Lost Creek Project Area (Figure 1-1.). The Lost Creek Project proposals only apply to public lands within the Project Area managed by the Butte Falls Resource Area, Medford District Bureau of Land Management. Within the BLM ownership, Revested Oregon and California Railroad (O&C) lands comprise 86% of the Project Area with Public Domain (PD) lands at 14%.

Figure 1-1: Land Ownership in the Lost Creek Project Area



All BLM-administered lands in the Project Area are designated as Matrix land use allocation. Matrix is one of seven land use allocations designated in the Northwest Forest Plan (NWFP) (USDA and USDI 1994a) and the Medford District RMP (USDI 1995). It is the Federal land in which most timber harvest and silviculture activities are anticipated to occur. Matrix is divided into the northern and southern general forest management areas and connectivity/diversity blocks.

Approximately 14% (5,849 acres) of the Project Area is within the Lost-Floras Special Management Watershed (see Chapter 2, Section 2.2.1.1 and Appendix A, Issue P for more information).

The Lost Creek project proposals only apply to public lands within the Project Area managed by the Butte Falls Resource Area, Medford District Bureau of Land Management (BLM).

1.4 WHY IS THE BLM PROPOSING THIS PROJECT?

The Lost Creek Forest Management Project is designed to implement specific Management Objectives consistent with the BLM's 1995 Medford District RMP in the Lost Creek Project Area. Specifically, this forest management proposal is designed to meet the following objectives:

- Manage forest stands to promote tree survival and growth and to improve stand vigor, resiliency, and stability necessary to meet land use allocation objectives (USDI 1995, pp. 62, 72);
- Protect and conserve federally listed and proposed species, and manage their habitats to contribute toward their recovery in compliance with the Endangered Species Act (ESA), approved recovery plans, and Bureau Special Status Species policies (USDI 1995, pp. 17-18, 50-51);
- Produce a sustained yield of products to support local and regional economic activity (USDI 1995, pp. 38, 72, 73, and 81);
- Reduce the risk of wildfire that may result from the fuels (e.g. limbs, branches, twigs) produced during harvest activities (USDI 1995, p. 91);
- Manage water drafting sites (sites where water is pumped to suppress fires) to minimize adverse effects on riparian habitat and water quality consistent with Aquatic Conservation Strategy and riparian reserve objectives (USDI 1995, pp. 30, 90);
- Use management practices, including fire, to obtain desired vegetation conditions in special habitats, such as meadows (USDI 1995, p. 49); and
- Maintain a transportation system within the Project Area that serves resource management needs in an environmentally sound manner (USDI 1995, pp. 84-86).

1.4.1 Need for the Lost Creek Project

The following discussion provides more detail concerning the need for forest and road management based on the 1995 RMP direction that applies to the Matrix land use allocation, current forest, meadow, road, and water drafting site conditions, and their desired future conditions:

There is a need to promote tree survival and growth and to improve the vigor, resiliency, and stability of forest stands in the Lost Creek Project Area.

Forest stands selected for treatment in the Lost Creek Project Area are overstocked and experiencing declining growth rates due to high levels of density-related competition. As trees compete for limited water, nutrients, and growing space they become stressed and more susceptible to mortality from insects, forest pathogens, and drought. Forest thinning treatments are needed to reduce stand densities to natural carrying capacities and create favorable conditions to improve individual tree health (vigor) for desirable species and to promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes (USDI 1995, pp. 62, 186).

Forest thinning treatments are needed to accelerate the development of forest stand conditions that meet long-term management objectives for northern spotted owl (NSO) habitat and shift stand trajectories to encourage key habitat components for the future. Desired future conditions for NSO habitat include encouraging tree growth; promoting species diversity; increasing heterogeneity; enhancing and creating horizontal and vertical structure; and reducing the risk of habitat loss from wildfire, disease, and insects (USDI FWS 2011, pp. III-33 to III-34).

A summary of silvicultural prescriptions by forest stand type (i.e. Douglas-fir and mixed conifer) and treatment objectives for the action alternatives is included in Chapter 2, Section 2.3.1.

There is a need to protect and conserve federally listed and proposed species, and manage their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, the Medford District Resource Management Plan (USDI 1995, pp. 50-51), and Bureau Special Status Species policies.

The ESA directs the Secretary of the Interior and all federal agencies to utilize their authorities to carry out programs for the conservation and recovery of listed species. One of the purposes of the ESA is the preservation of ecosystems upon which endangered and threatened species depend and would minimize the need to list species under the ESA. Lands administered under the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act of 1937 (O&C Lands Act) must be managed in accordance with other environmental laws, such as the ESA and the Clean Water Act. Some provisions of these laws take precedence over the O&C Act. For instance, the ESA requires the Secretary to ensure that management of O&C lands will not likely result in jeopardy to listed species or destruction or adverse modification of critical habitat (USDI 1995, p. 17-18).

There is a need to produce a sustained yield of products to support local and regional economic activity.

The management of the O&C lands in the Project Area is governed by a variety of statutes, including the O&C Lands Act. The O&C Lands Act requires the Secretary to manage O&C lands for permanent forest production; however, such management must also be in accord with sustained-yield principles (USDI 1995, p. 17).

Matrix lands within the Lost Creek Project Area are intended to achieve sustainable timber production and other forest commodities, provide jobs, and contribute to local and regional community stability through both growth and harvest, while also promoting the development of fire-resilient forests (USDI 1995, pp. 38, 81). Timber products produced from this area would be sold in support of the District's Allowable Sale Quantity (ASQ) declared in the 1995 RMP (USDI 1995, pp. 17, 72-73).

There is a need to reduce the potential risk of wildfire that may result from the fuels (e.g. limbs, branches, twigs) produced during harvest activities.

Forest management activities produce fuels that could remain a fire hazard for 10 to 20 years, if left untreated, until natural decomposition occurs. The Medford District ROD/RMP direction is to reduce activity-based fuel hazards (USDI 1995, p. 91).

There is a need to manage water drafting sites (sites where water is pumped to suppress fires) to minimize adverse effects on riparian habitat and water quality consistent with Aquatic Conservation Strategy and Riparian Reserve objectives.

Water sources at five sites are in need of repair to ensure availability for fire suppression resources and by wildlife for drinking water, habitat, and foraging opportunities. The RMP direction (USDI 1995, p. 90) is to locate and manage water drafting sites to minimize adverse effects on riparian habitat and water quality and to supply water for various resource programs while protecting water quality and riparian vegetation (ibid., p. 165).

Within the Lost Creek Project Area, there is a need to develop and maintain a transportation system that serves the needs of users in an environmentally sound manner.

Roads throughout the Lost Creek Project Area are in need of maintenance to restore, repair, or improve road surfaces, culverts, and roadside drainage ditches in order to reduce road related erosion and sedimentation to stream courses. Some roads have been identified that no longer serve resource program needs.

BLM roads in the Project Area have not been maintained in recent years, resulting in heavy vegetation and trees along roads that prevent road maintenance equipment from maintaining and improving the drainage patterns along BLM roads. Removing the vegetation would improve and maintain drainage patterns.

Proposed transportation management activities are designed to improve road access to areas in need of forest management, reduce road densities in areas where the road system no longer serves resource program needs, and to maintain roads to reduce road-related erosion and sedimentation to stream courses.

1.5 DECISION FRAMEWORK

This Environmental Assessment (EA) provides the information needed for the responsible official, the Butte Falls Resource Area Field Manager, to select a course of action to be implemented for the Lost Creek Forest Management Project. The Field Manager must decide whether to implement one of the Action Alternatives, select the No Action Alternative, or choose a combination of components found within those alternatives analyzed.

In choosing the alternative that best meets the project needs/objectives, the Field Manager will consider the extent to which each alternative responds to the decision factors listed below. The forthcoming Decision Record will document the authorized officer's rationale for selecting a course of action based on the effects documented in the EA, and the extent to which each alternative:

- Reduces competition-related mortality and wildfire risk, and increases tree vigor and growth, and stand resiliency;
- Provides for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris;
- Maintains or improves existing suitable NSO habitat within the provincial home range (1.2 mile radius) of known active NSO sites and all or substantially all of the older and more structurally complex, multi-layered conifer forests;
- Captures opportunities to implement improvements in the transportation system to provide for public safety and protect water quality;
- Contributes to the District's Allowable Sale Quantity as directed by the Medford District RMP; and
- Reduces the short-term and long-term costs of managing BLM-administered lands in the Project Area.

The decision will also include a determination of whether or not the impacts of the actions are significant to the human environment. If the impacts are determined to be within the range analyzed in the Medford District RMP Final Environmental Impact Statement (FEIS) (USDI 1994) and the Northwest Forest Plan (NWFP) Supplemental FEIS (USDA and USDI 1994), 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/FEIS and the NWFP, then a project-specific EIS must be prepared.

1.6 LAND USE CONFORMANCE AND LEGAL REQUIREMENTS

1.6.1 Conformance with Land Use Plans

The Butte Falls Resource Area of the Medford District BLM designed this project to be in conformance with the objectives, land use allocations, and management direction in the *Medford District Record of Decision and Resource Management Plan* (ROD/RMP) (USDI 1995). The 1995 Medford District RMP 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* (USDA and USDI 1994).

The Lost Creek Forest Management Project is consistent with the Medford District RMP 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* (USDA and USDI 2001); the *BLM Vegetation Treatments Using Herbicides Final Programmatic EIS Record of Decision* (USDI 2007); Record of Decision (BLM): Vegetation Treatments Using Herbicides on BLM Lands in Oregon (USDI 2010); *Medford District Integrated Weed Management Plan Environmental Assessment* (USDI 1998) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, USDI 1985).

This project utilizes the December 2003 Survey and Manage species list. This list incorporates species changes and removals made as a result of the 2001, 2002, and 2003 Annual Species Reviews (ASRs) with the exception of the red tree vole. For the red tree vole, the Ninth Circuit Court of Appeals vacated the category changes and removal of the red tree vole in the mesic zone, and returned the red tree vole to its status as existed in the 2001 ROD Standards and Guidelines, which make the species Category C throughout its range.

1.6.2 Special Status Species Policy

The Lost Creek Forest Management Project is consistent with BLM Manual 6840 (USDI 2008a), the purpose of which is to provide policy and guidance for the conservation of BLM Special Status Species and the ecosystems upon which they depend on BLM-administered lands. BLM Special Status Species include those species listed or proposed for listing under the ESA, as well as those designated as Bureau Sensitive by the State Director. The objectives of the BLM Special Status policy are:

- To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species; and
- To initiate proactive conservation[1] measures that reduce, or eliminate, threats to Bureau Sensitive species to minimize the likelihood of and need for listing of these species under the ESA (USDI 2008, Section .02).

1 Conservation: as applied to Bureau Sensitive species, is the use of programs, plans, and management practices to reduce or eliminate threats affecting the status of the species, or improve the condition of the species' habitat on BLM-administered lands (USDI 2008, Glossary p. 2).

1.6.3 Statutes and Regulations

The Proposed Action is designed to be in conformance with the direction given for the management of public lands in the Medford District and the following:

- **Oregon and California Lands Act of 1937 (O&C Act)**. Requires the BLM to manage O&C lands for permanent forest production. Timber shall be sold, cut, and removed in accordance with sustained-yield principles for the purpose of providing for a permanent source of timber supply, protecting watersheds, regulating stream flow, contributing to the economic stability of local communities and industries, and providing recreational facilities.
- **Federal Land Policy and Management Act of 1976 (FLPMA)**. Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.
- **National Environmental Policy Act of 1969 (NEPA)**. Requires the preparation of environmental impact statements for major federal actions which may have a significant effect on the environment.
- **Endangered Species Act of 1973 (ESA)**. Directs Federal agencies to ensure their actions do not jeopardize species listed as "threatened and endangered" or adversely modify designated critical habitat for these listed species.
- **Clean Air Act of 1990 (CAA)**. Provides the principal framework for national, state, and local efforts to protect air quality.
- **National Historic Preservation Act of 1966 as amended (NHPA).** Requires federal agencies to take into account the effect of their federal or federally-licensed undertakings on historic properties, whether those properties are federally owned or not.
- **Archaeological Resources Protection Act of 1979 (ARPA)**. Protects archaeological resources and sites on federally-administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.
- **Safe Drinking Water Act (SDWA) of 1974 (as amended in 1986 and 1996)**. Protects public health by regulating the nation's public drinking water supply.
- **Clean Water Act of 1987 (CWA)**. Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.

1.7 RELEVANT ASSESSMENTS AND PLANS

The following documents contain information related to existing conditions and management practices in the Lost Creek Project Area. These documents are incorporated by reference into the project documentation.

Lost Creek Watershed Analysis (1998)

Watershed Analysis (WA) is a procedure used to characterize conditions, processes, and functions related to human, aquatic, riparian and terrestrial features within a watershed. WAs are issue driven. Teams of resource specialists identify and describe ecological processes of greatest concern in a particular 5th field watershed (also referred to as 5th Hydrologic Unit Codes, or HUC5s), and recommend restoration activities and conditions under which other management activities should occur. Watershed Analysis is not a decision-making process. The resulting WA is not a decision document under NEPA, and there is no action that is proposed for implementation with the completion of the analysis. Rather, WAs provide information and non-binding recommendations for agencies to establish the context for

subsequent planning, project development, regulatory compliance, and agency decisions (REO 1995, p. 1).

The Lost Creek Project Area falls within Lost Creek WA Area. The WA 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 Lost Creek Forest Management Project, has been collected and is considered, along with existing information provided by the 1998 *Lost Creek Watershed Analysis.* Management Objectives and Recommendations provided by the 1998 Watershed Analysis were also considered and addressed as they applied to the Lost Creek Project proposal.

Revised Recovery Plan for the Northern Spotted Owl (2011)

In June 2011, the U.S. Fish and Wildlife Service (USFWS) finalized the *Revised Recovery Plan for the Northern Spotted Owl*, which contains 33 Recovery Actions. Recovery Actions are recommendations to guide activities needed to accomplish the recovery objectives and ultimately lead to delisting of the species. Specifically, Recovery Action 32 (RA 32) in the Recovery Plan recommends "maintaining and restoring the older and more structurally complex multi-layered conifer forests (USDI FWS 2011, III-67)." The intent of RA 32 is to maintain substantially all of the older and more structurally complex multi-layered conifer forests on federal lands to prevent further exacerbation of the competitive interactions between NSOs and barred owls.

Also included in the Revised Recovery Plan is Recovery Action 10 (RA 10) which recommends that federal agencies "Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population" (USDI FWS 2011, III-43). Within the administrative units of the Rogue River-Siskiyou National Forest (FS) and the Medford District BLM, an interagency interdisciplinary team was created to develop interim guidance for incorporating RA 10 when planning and implementing management activities on federal lands in southwest Oregon (USDA, USDI, and USDI FWS 2013). As part of the proposal development process for the Lost Creek Project, a core team of specialists worked to incorporate this interim guidance. Refer to Chapter 2, Section 2.2, Development of the Project, for more details.

The Lost Creek Project defers proposed treatment in RA 32 stands identified by interagency survey guidance (USDA and USDI 2010), follows principles in the SW Oregon Recovery Action 10 Guidance Document (USDA, USDI, and USDI FWS 2013), and is consistent with consultation requirements with the USFWS; therefore, the Lost Creek Project is consistent with the *Revised Recovery Plan for the Northern Spotted Owl* (USDI FWS 2011).

U.S. Department of Interior, Bureau of Land Management, Western Oregon Districts, Transportation Management Plan (1996, updated 2002 and 2010).

The Western Oregon Transportation Management Plan provides goals, objectives, and guidelines for managing BLMs road and trail transportation systems throughout Western Oregon. This transportation management plan, is not a decision document, rather it provides guidance for implementing applicable decisions of the Medford District RMP (which incorporated the Northwest Forest Plan).

Southwest Oregon Fire Management Plan (ODF 2014)

The Southwest Oregon Fire Management Plan (FMP) provides Southwest Oregon with an integrated concept for coordinated wildland fire planning and protection among federal, state, local government entities and citizen initiatives. The FMP is not a decision document.

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

The Lost Creek Project Area falls within the Lost Creek Watershed Analysis (WA) area. The WA 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 Lost Creek Forest Management Project, has been collected and is considered along with the existing information provided in the Lost Creek WA. Management recommendations provided by the WA were considered as they applied to the Lost Creek Project proposal.

1.8 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, (3) alternatives or refinements to the Proposed Action, and (4) potential environmental impacts of the Proposed Action. Scoping is performed not to build consensus or get agreement on a project proposal, but rather to solicit relevant site-specific comments that could aid in the analysis and final design of the proposal.

Scoping has occurred for the Lost Creek Project. The Lost Creek Project appeared in the Butte Falls Resource Area's Schedule of Proposed Actions published in *Medford's Messenger* (BLM's quarterly newsletter) beginning in the Summer 2015 edition. A letter briefly describing the Proposed Action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies on November 10, 2015. Four (4) comments and numerous Interest Response Forms were received during the 30-day scoping period.

Numerous articles were submitted for BLM review during the scoping process. The BLM reviewed these documents, and considered the information in developing the final Proposed Action and alternatives. A list of the literature submitted can be found in the References section of this EA.

1.8.1 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.

1.8.1.1 Forest Condition

Issue 1: How would thinning and regeneration of conifer stands affect species composition, long-term productivity of stands, resiliency, and structural characteristics in the Matrix (GFMA and Connectivity) land use allocation within the Analysis Area?

1.8.1.2 Terrestrial Wildlife and Special Status Species

Issue 2: How would timber harvest and road construction activities affect constituent elements (canopy cover, snags and down wood, large trees, mistletoe brooms, stand structure, and prey availability) within stands used by northern spotted owls for nesting, roosting, and foraging?

Issue 3: How would timber harvest and road construction activities affect constituent elements (canopy cover, snags, large trees, and down wood) within stands used by fishers for denning, resting, foraging, and dispersal?

1.8.1.3 Hydrology and Aquatic Resources

Issue 4: How would timber harvest, road work, meadow restoration, and water source restoration activities affect attainment of Aquatic Conservation Strategy (ACS) objectives?

1.8.1.4 Economics

Issue 5: How would the removal of forest products contribute towards the local and regional economy?

1.8.2 Issues Considered but not Further Analyzed

In addition to the issues listed above, there were other issues raised by the public or the interdisciplinary (ID) team during the development of the project that were considered but not further analyzed, often because the project's design or implementation of Project Design Features (PDFs) would eliminate or reduce effects on the resource. The PDFs are described in Chapter 2, Section 2.5 *Project Design Features*. In some cases, issues raised by the public or the ID team were not considered in detail as they were determined to be beyond the scope of this project. These issues, along with a rationale for their being "considered but not analyzed in detail" in this EA, are listed in Appendix A*, Issues Considered but Eliminated from Detailed Analysis*. Also see Chapter 2, Section 2.6 *Alternatives and Actions Considered but Eliminated from Detailed Analysis* for options and alternatives considered but not further analyzed.

CHAPTER 2 - ALTERNATIVES

2.1 INTRODUCTION

This Chapter describes how the project was developed, describes what is being proposed in detail, and presents the Proposed Action and alternatives developed by the BLM to achieve the objectives identified in the Purpose and Need statements in Chapter 1. A "No Action" Alternative is presented to form a baseline for analysis. Project Design Features (PDFs), which apply the Best Management Practices (BMPs) as described in Appendix D of the RMP (and modified by Resource Management Plan Maintenance dated July 12, 2012), are integral to the design of the Action Alternatives (Alternatives 2 and 3). The PDFs are incorporated into the analysis of anticipated environmental impacts described in Chapter 3.

2.2 DEVELOPMENT OF THE PROJECT

2.2.1 Treatment Area Selection

The Lost Creek Project was designed to conform to the 1995 Medford District RMP (USDI 1995) and to meet the purpose and need identified in Chapter 1. The Lost Creek Project is in the Matrix land use allocation (LUA), which includes federal lands outside of reserves and special management areas that are available for scheduled timber harvest at varying levels (USDI 1995). Matrix lands are intended to achieve sustainable timber production and other forest commodities, provide jobs and contribute to community stability through both growth and harvest, while also promoting the development of fire-resilient forests (USDI 1995, p. 38). The Lost Creek Project was considered for treatment as a result of a previous review that identified dense forested stands within the Project Area that need to be treated to reduce competition and promote forest resiliency. The 41,881-acre Lost Creek Project Area lies within the 32,088-acre Lost Creek-Rogue River 5th field watershed and a small portion of the 160,773-acre South Fork Rogue River 5th field watershed (Map 1).

The Medford District's 2012 Integrated Vegetation Management analysis of the current conditions of watersheds within the Medford District evaluated all 5th field watersheds based on the specific timber, fuels, silviculture, and northern spotted owl needs. In 2015, the District reassessed the watersheds and updated the rankings. The following categories with separate measurements were used to score and rank the watersheds:

1) Percentage of BLM-administered lands within the watershed;
2) Departure acres in need of disturbance weighted by BLM ownership;
3) The amount of 10-30 inch diameter at breast height (DBH) class available for harvest;
4) The amount of high and moderate wildfire hazard and Fire Regime Condition Class (FRCC) within Wildland Urban Interface (WUI) within the watershed;
5) Opportunities for enhancement of northern spotted owl sites; and
6) The amount of existing roads within the watershed.

The Lost Creek-Rogue River 5th field watershed was ranked as a low priority for treatment in 2012 and was updated to medium priority in 2015. The South Fork-Rogue River 5th field watershed was ranked as medium priority for treatment in 2012 and again in 2015. All of the high priority watersheds in the Butte Falls Resource Area have already been or are currently being treated.

Once the Project Area was established, an interdisciplinary team (IDT) of resource specialists was brought together to begin evaluating the area for potential treatments. The IDT filtered the Project Area through a series of screens before developing the Proposed Action. The screening process was intended to ensure the proposal meets RMP guidelines and conservation and recovery actions for federally listed species. The screening process described below helped to distill feasible treatment areas from the larger Project Area.

The first step in the screening process was to identify ownership within the Project Area (Chapter 1, Figure 1-1. The following screens were then applied to BLM-administered lands within the Project Area. They are broken out into four categories to better understand the overarching reason for elimination.

2.2.1.1 Policy – RMP Plan Level

Timber Production Capability Classification (TPCC) Withdrawn: TPCC is the process for partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis. TPCC withdrawn lands are lands identified as unavailable for planned forest management based on site-specific information. There are exceptions to this rule (USDI 1995, p.72); however, for this project, forest management activities on TPCC withdrawn lands (5,024 acres) were screened from consideration.

Known Owl Activity Centers (KSOACs): KSOACs are the best 100 acres of NSO habitat around the nest site or owl activity center, for all documented sites as of January 1, 1994 in Matrix and Adaptive Management Area land allocations (USDA and USDI 1994a). KSOACs are managed as Late-Successional Reserves intended to preserve an intensively used portion of the breeding season home range close to a nest site or center of activity (USDI 1995). Because these areas are important to meeting objectives for species other than NSOs, these areas are to be maintained even if they become no longer occupied by NSOs (USDA and USDI 1994a). There are approximately 826 acres of KSOACs overlapping the Project Area and no proposed treatment would occur in the activity centers.

Great Gray Owl Core and Buffers: Great Gray Owl (GGO) Core or Meadow Buffer: As per the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA and USDI 2001, p. 39), a no-harvest buffer of 300 feet around meadows and natural openings adjacent to potential GGO habitat and a ¼ mile protection zone around known nest sites has been provided.

Special Habitat Buffers: The Medford District RMP provides management guidelines to protect special habitats for plants and animals, such as meadows, cliffs, caves, and talus slopes with a no-harvest buffer ranging from 100 to 200 feet depending on site-specific circumstances and the objective to protect the special habitat values; new road locations would avoid special habitats (USDI 1995, pp. 45, 49).

Riparian Reserves: Northwest Forest Plan (NWFP) Riparian Reserves, as incorporated by the Medford District RMP, are located on federal lands throughout the Project Area. A BLM stream survey crew conducted an inventory within the Lost Creek Project Area in order to ensure that all areas needing Riparian Reserve protection were identified. The survey crew assessed stream conditions, documented the location of wetland and unstable areas, and determined whether stream channels were perennial, intermittent, or dry draws (USDA and USDI 1994, pp. C30-C31). Stream maps were updated with the new information. Riparian Reserves are excluded from commercial treatment units by clearly marking unit boundaries on the ground.

Riparian Reserve widths were determined using the NWFP Standards and Guidelines (USDA and USDI 1994, pp. C-30-31) and the *Lost Creek Watershed Analysis* (USDA and USDI 1998), and are based on a site potential tree height of 185 feet within the Lost-Creek Rogue River watershed and 210 feet within the South Fork Rogue River watershed. Site-specific widths for each Riparian Reserve have been mapped in GIS and would be implemented under the two Action Alternatives. Riparian Reserve widths in the Lost Creek Project Area are as follows:

(1) Fish streams: 370- or 420-foot slope distance on each side of the stream.

(2) Perennial non-fish-bearing streams: 185- or 210-foot slope distance on each side of the stream.

(3) Intermittent non-fish-bearing streams: 185- or 210-foot slope distance on each side of the stream. Intermittent streams have a defined channel, annual scour and deposition, and are further described as short-duration or long-duration:

Short-Duration Intermittent: A stream that flows only during storm or heavy precipitation events. These streams can also be described as ephemeral streams.

Long-duration Intermittent Stream: A stream that flows seasonally, usually drying up during the summer.

(4) Unstable and potentially unstable ground: the extent of the unstable and potentially unstable ground.

(5) Springs, seeps, and other non-stream wetlands less than one acre in size: the wetland and the area from the edges of the wetland to 185- or 210-foot slope distance.

(6) Constructed ponds and reservoirs, wetlands greater than one acre in size: Riparian Reserves consist of the body of water or wetland and the area to the outer edges of the riparian vegetation; or the extent of the seasonally saturated soil; or the extent of unstable or potentially unstable areas; or to a distance equal to the height of one site potential tree; or the maximum pool elevation of constructed ponds and reservoirs, whichever is the greatest.

Lost-Floras Special Management Watershed: The BLM established watershed deferrals with standard land use allocations in 1995 as part of the Medford District Record of Decision and Resource Management Plan (USDI 1995). The Lost-Floras sub-watershed is one of the areas identified for deferral from management activities, including timber harvest for 10 years starting in 1993 (USDI 1995, pp.42-43). Areas that were deferred had cumulative effects generally rated as "high" at the time of designation. In 2012, almost 20 years after being deferred, the Lost-Floras sub-watershed was re-evaluated and the BLM found that the Lost-Floras deferral area has experienced substantial vegetative recovery and was removed from deferral status as long as a set of special management practices are followed (USDI 2012, p. 15). Proposed projects in the Lost-Floras sub-watershed were designed to meet the recommendations in the Lost Creek/Big Butte Creek Watershed Deferral Status Report (USDI 2012b).

2.2.1.2 Policy – Project Level

Northern Spotted Owl (NSO) Recovery Plan Recommendations: In 2011, the U.S. Fish and Wildlife Service issued a Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. The BLM worked with the USFWS to incorporate the Recovery Goals and Actions in the Recovery Plan consistent with BLM laws and regulations. The effects to NSOs and their critical habitat were considered while planning this project. The following strategies were implemented in order to meet the project objectives and reduce effects to NSOs and their

critical habitat. To the extent practicable, the Relative Habitat Suitability (MaxEnt) model described in the 2011 Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011), the Medford District known owl sites layer, and recent NSO survey results were used to determine treatment options in order to reduce effects to known NSO sites. Refer to the Wildlife Issues section in Chapter 3 for more information (e.g. methodology, description of habitat types, etc.).

- RA10 Important Habitat/Historical High Priority Site: In 2011, the USFWS issued the Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. Recovery Action 10 (RA 10) recommends conserving NSO sites and high value NSO habitat to provide additional demographic support to the NSO population. Within the administrative units of the Rogue River-Siskiyou National Forest (FS) and the Medford District BLM, an interagency, interdisciplinary team was created to develop interim guidance for incorporating RA 10 when planning and implementing management activities on federal lands in southwest Oregon. The southwest Oregon plan established two primary objectives as described in the plan; 1) prioritize known and historic spotted owl sites and 2) identify vegetation management that would enhance spotted owl habitat.
- The Lost Creek interdisciplinary team worked to meet the intent of RA 10 as one purpose of the project is to protect and conserve federally listed species and their habitat, including the NSO. To the extent practicable, the BLM followed principles in the SW Oregon Recovery Action 10 Guidance Document (USDA and USDI 2013) to reduce impacts to sites with resident singles, recent pairs and/or reproduction activity within the Project Area. NSO sites within the Project Area were prioritized in high and low categories based on occupancy and reproductive success data. The objective at the high priority sites was to avoid adverse effects by not removing or downgrading nesting, roosting, and foraging (NRF) habitat within the home range. The objectives at the low priority sites are to accelerate the growth of NSO habitat or treat stands for ecological benefits as described in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011). Regeneration harvest, which would remove existing habitat, was avoided within NSO home ranges. These objectives would result in short-term adverse effects, for long-term benefits. Approximately 363 acres were removed from consideration for timber harvest and detailed analysis.
- NSO Nest Patch: The nest patch is the 300-meter radius (70 acres) area around a known NSO nest tree or center of activity that is important to owls. It is one of three scales developed in 2008 by a regional interagency team to analyze effects to NSOs. The other two scales are the home range and 0.5 mile core area. Nest area arrangement and nest patch size have been shown to be an important attribute for site selection by spotted owls (Perkins et al. 2000; Miller et al. 1989; and Meyer et al. 1998). The nest patch size also represents key areas used by juveniles prior to dispersal. Miller et al. (1989) found that on average, the extent of forested area used by juvenile owls prior to dispersal averaged approximately 70 acres.
- RA 32 Deferred Stands: In 2011, the USFWS issued a Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. Recovery Action 32 (RA 32) recommends that agencies work with the USFWS to "maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees

(USFWS 2011, p. III-67)." The purpose of Recovery Action 32 is to provide refugia for NSOs as they adapt to competitive pressures from an increasing population of barred owls.

The BLM decided to defer forest management in stands identified as RA 32 within the Project Area at this time. Using the 2010 Draft RA 32 Habitat Evaluation Methodology (version 1.3) developed jointly by the Medford BLM, Rogue River-Siskiyou National Forest, and the Roseburg Office of the USFWS, BLM wildlife biologists identified areas within the Lost Creek Forest Management Project that met the intent of Recovery Action 32. Stands identified as RA 32 forest stands (906 acres) were removed from consideration for timber harvest and detailed analysis.

2.2.1.3 Suitability of Stands

The timber sale planner and silviculturist assessed the timber harvest potential on BLM-administered lands within the Project Area using the Forest Operations Inventory (FOI) layer and other GIS layers. Identified treatment needs were based on the Medford District Resource Management Plan (RMP) silvicultural management systems for those lands (*North General Forest Management Area* (NGFMA). The following criteria were used to eliminate stands from treatment consideration:

- Vegetative Condition – grasslands, shrublands, hardwood/woodlands.
- Young stands from previous regeneration harvest – not ready for treatment.
- Young stands regenerated from fire – too small for harvest.
- Stands below relative density thresholds – no treatment needed at this time.

2.2.1.4 Feasibility

Potential treatment units were screened by members of the IDT (timber sale planner, engineer, and logging systems specialist) for economic and logistical feasibility for treatment. For example, a potential unit may have been deemed uneconomical when the harvest volume per acre resulting from the application of canopy cover retention prescriptions to treat and maintain habitat for owls dropped to a level that was too low to be economically feasible.

Resource specialists determined other applicable soils, hydrologic, wildlife, and other RMP management guidelines to minimize impacts to resources.

2.2.2 Transportation Management Inventory and Assessment

An interdisciplinary transportation working group comprised of BLM resource specialists (road engineer, hydrologist, fisheries biologist, wildlife biologist, soils specialist, fuels specialist, forester, and outdoor recreation planner) was established to review the transportation system in the Lost Creek Project Area and make recommendations for roads that could be analyzed.

An inventory and review of the existing transportation network was conducted to aid in the assessment of the current condition, to evaluate the transportation system for an appropriate level of management, as well as to identify opportunities to reduce road densities. Roads within the Project Area vary from primitive, four-wheel drive roads (non-system roads) to engineer-designed roads with culverts, drainage features, and crushed rock surfacing or bituminous surfacing that receive regular maintenance by BLM (system roads). The inventory process specifically identified:

1) Roads that need maintenance to restore, repair, or improve road surfaces, culverts, and roadside drainage ditches in order to reduce road-related erosion and sedimentation to stream courses;

2) Roads that are no longer serving resource programs needs and whether they are contributing to sedimentation and riparian habitat fragmentation;
3) Roads needed to provide access for forest management that are in need of maintenance or repair;
4) Existing closure status of roads ;
5) Roads under existing agreements for private land access and reciprocal right-of-ways; as well as
6) Current condition of signs in the Project Area.

Opportunities to more appropriately manage the road system were incorporated into the Action Alternative described in the next section. Road decommissioning, as well as road maintenance, renovation, and improvement opportunities have been identified to address the needs acknowledged during the assessment process.

2.3 PROPOSED PROJECTS

2.3.1 Forest Management

The vegetation treatments proposed under the Lost Creek Forest Management Project are divided into two categories: commercial and non-commercial treatments. Commercial refers to treatment areas where the trees to be removed are of sufficient size to be sold as saw logs to produce dimensional lumber or plywood veneer. Non-commercial refers to treatment stands where the material to be removed is smaller than eight inches diameter at breast height (DBH).

Proposed treatments would apply silvicultural prescriptions to achieve management goals by putting stands on trajectories towards the development of structural complexity, age and size variability, increased vigor, and resiliency to disturbances (USDI 1995, p.62). The prescriptions take into account changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition, stem density, and habitat considerations for late-successional dependent species, particularly the NSO. For some stands, silvicultural objectives were superseded by NSO habitat considerations and thus do not fully address forest health objectives. The silvicultural prescriptions that would be used to accomplish commercial and non-commercial treatments are described in the following sections.

2.3.1.1 Commercial Treatment (Timber Harvest)

Density Management (DM)

Density Management is proposed in select stands that are currently providing NSO nesting/roosting/foraging and roosting/foraging habitat, in which smaller trees are targeted for removal over larger trees. The primary objective of the Density Management prescription is to reduce tree density in order to promote the growth and structural development of the remaining stand. Spatial distribution of the residual (leave) trees would be determined by the crown spacing of the healthiest dominant and co-dominant trees necessary to achieve a canopy cover of 60% or greater at the stand level. Stands would be treated to a relative density within a range of 0.50-0.60 index rating as a result and would be thinned using guidelines to reduce basal area to between 160 and 220 ft^2 per acre. Unique stand features such as snags, coarse woody debris, large hardwoods, and trees exhibiting old-growth characteristics would typically be retained to maintain desired structural components for wildlife.

Density Management would include a combination of thinning and group selection, to the extent or amount recommended by vegetation type and/or plant series that exist. Treatment would consist of both

proportional thinning and thinning from below. Proportional thinning typically consists of removing trees from each size class and thinning from below consists of removing trees from the lower canopy classes, such as intermediate and suppressed trees. In this case, the proportional thinning would not quite meet the described definition of a proportional thin because trees exhibiting old-growth characteristics would typically be retained (see Appendix B, Marking Guidelines). Generally, smaller trees would be targeted for removal over larger trees but the intent is to maintain the current structure and not remove single tree layers or simplify the stand. Trees targeted for removal would include those exhibiting a decline in crown ratio and narrow crown widths, and which contribute least to the canopy layer or structural diversity. Trees may be marked in small patches (i.e., groups of trees with poor crowns) and left in clumps (i.e., groups of old trees) to create hiding cover for wildlife species and increase spatial heterogeneity. The size of openings should be no greater than 0.20 acres and should not exceed 5% of the total treatment area.

Selective Thinning

There are two types of Selective Thinning prescriptions proposed in the Lost Creek Forest Management Project based on the vegetation type. The general silvicultural objectives for both Selective Thinning prescriptions include:

1) Reducing stand density to increase tree growth, quality, and vigor of the remaining trees;
2) Creating diversified stand structure (height, age, and diameter classes);
3) Developing spatial heterogeneity within stands (e.g., fine-scale structural mosaic);
4) Increasing resilience/resistance of forest stands to wildfire, drought, disease, insects, etc. by reducing stand density and ladder fuels; and
5) Increasing growing space and decreasing competition for large and/or legacy trees, especially pine, oak, and cedar.

Selective Thinning would include a combination of thinning and group selection, to the extent or amount recommended by vegetation type and/or plant series that exist. These stand treatments would generally target low vigor trees to reduce stand density and improve stand resiliency and individual tree health.

Trees infected with mistletoe would be selectively removed in order to reduce the level of infection in target stands and decrease the rate of proliferation. Treatment of mistletoe would be considered a higher priority when infected trees are adjacent to or are shading out younger, smaller trees or when mistletoe is likely to spread into unaffected areas.

Proportional thinning and thinning from below, as previously described, would be used to accelerate the growth of remaining trees while promoting desired species that are best adapted to site conditions. Spatial distribution of leave trees would be based on tree condition (live crown ratio and crown form). Stands would have a wide range of basal area or tree spacing targets based on stand types or conditions. Trees would be removed singly or in groups (openings); the amount and size of openings created would depend on vegetation types (Douglas-fir and mixed conifer) and current stand development stages. Opening size would range from 0.10-0.25 acre where fire resilient and drought tolerant species need release to reduce competition. In Units 3-1, 18-1, and 19-1, opening size would range from 0.25-0.50 acres where regeneration is encouraged or where poor crown conditions exist (due to density-related suppression and mistletoe infection). The extent or amount of openings permitted would range from 5-10% of the total treatment unit area. Openings should be no closer than 100 feet from the next opening. Trees may be marked in patches (e.g., groups of trees with poor crowns) and left in clumps (e.g., groups of old trees) where necessary. Unique stand features such as snags, coarse woody debris, large

hardwoods, and trees exhibiting old-growth characteristics would typically be retained to maintain desired structural components for wildlife. In addition to such stand features, rock outcrops, special status species sites, and seeps/wet areas would be protected. See Appendix B, Marking Guidelines for more information.

The following target conditions would be applied to Selective Thinning units based on their vegetation composition.

Selective Thinning —Douglas-fir (ST/DF)

Stands that are predominantly Douglas-fir and have low to moderate productive site conditions would be treated to a relative density range of 0.30-0.40. Stands would be harvested to a range of 40-50% canopy cover and would be thinned using guidelines to reduce basal area to between 100 and 140 ft^2 per acre, except for Units 3-1, 18-1 and 19-1. These three units would be reduced to canopy cover levels between 35- 45% with the addition of openings created around healthy shade intolerant species and/or legacy trees. These units were outside of any known NSO sites and outside of the transient snow zone. These stands lack suitable natural regeneration of drought tolerant and fire resilient species in the understory, while the overstory is greater than 90% Douglas-fir with scattered legacy ponderosa pine, incense cedar, and black oak. Treatment would allow more growing room for regeneration of less common but desired species such as sugar pine, ponderosa pine, and incense cedar by creating openings suitable for growth and removing trees overtopping healthy regeneration.

Selective Thinning —Mixed Conifer (ST/MC)

Stands that are predominantly Douglas-fir and have moderate to high productive site conditions would be treated to a relative density range of 0.35-0.45. Stands would be harvested to a range of 40-50% canopy cover and would be thinned using guidelines to reduce basal area to between 110 and 150 ft^2 per acre. Depending on aspect and elevation these mixed conifer stands can have a relatively high amount of stand density due to the presence of shade tolerant species. These stands are generally dominated by a Douglas-fir, ponderosa pine, and white fir overstory, with less prominent species as incense cedar and sugar pine.

Regeneration Harvest

Two types of regeneration harvest are proposed in stands with declining growth rates that are experiencing deterioration due to high stand density levels, insects, disease, or other factors: A) NGFMA Regeneration Harvest and B) Structural Retention. The silvicultural objectives for these stands are as follows:

1) Create growing space for a new cohort of trees and/or increase the growth of existing understory trees;
2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability;
3) Create regeneration opportunities for shade intolerant species and provide long-term success or survival for less prominent species (e.g., sugar pine); and
4) Reduce the long-term effects of forest disease by reducing its spread to existing overstory and understory trees.

Northern General Forest Management Area (NGFMA) Regeneration Harvest

To maximize volume growth and yield, regeneration harvest should occur in older forest stands with declining growth rates or experiencing deterioration from insects, disease, or other factors. Retained

trees would be the most vigorous trees and would be selected based on tree crown ratio and form (Appendix B, Marking Guidelines). Healthy understory ponderosa pine, sugar pine, incense cedar, and Douglas-fir trees free of insects, disease, or damage would be retained. Wildlife snags would be designated for retention and all existing coarse woody debris would retained on-site (see Section 2.5, Project Design Features). All other trees that do not fit the above criteria would be removed. Slash would be piled and burned or trees would be whole tree yarded and slash removed from the landings. Conifer seedlings would be planted following harvest.

Regeneration harvest using northern NGFMA prescription guidelines would retain 6 to 8 trees per acre greater than 20 inches DBH (diameter at breast height) (USDI 1995, pp. 75, 188). Spatial distribution of these trees would vary from individual trees to groups.

Structural Retention (SR)

This prescription applies to stands primarily dominated by mature Douglas-fir that have poor annual stand growth and/or have limited conifer regeneration. Thinning these stands would not provide the desired growth and increase in productivity. As directed by the Medford District RMP, structural retention as proposed under this project would leave at least 16 to 25 large green conifer trees per acre, provided structural objectives are met (USDI 1995, p. 188). Large green conifer trees are described as those greater than 20 inches DBH. Stands would be harvested to a range of 30-40% canopy cover.

Small Diameter Thinning (SDT)

High stand densities in younger ponderosa pine and mixed conifer stands would be reduced to promote stand health, create structural diversity, and increase landscape resiliency to environmental disturbances.

High stand densities in young ponderosa pine and mixed conifer stands have resulted in slow or stagnant growth rates. These stands are overstocked with more trees than the site has water, nutrients, and growing space to sustain. Precommercial thinning and commercial thinning would reduce the number of trees per acre to levels the site has resources to sustain. A minimum of 40-60% canopy cover would remain after the harvest depending on NSO habitat type and proximity to high priority NSO owl sites.

Stands proposed for treatment within NSO high priority sites would maintain the current habitat in those stands. For roosting/foraging stands a minimum of 160 square feet of basal area and 60% canopy would be retained. In dispersal stands a minimum of 40% canopy would be retained. Stands outside of high priority sites would be thinned to a target basal area of 120-130 ft^2 and would retain a minimum of 40% canopy.

2.3.1.2 Commercial Harvest/Yarding Methods

Trees designated for removal as a result of application of the forest stand prescriptions described above would be moved from forest stands to landing areas using the following yarding methods:

Ground-Based Yarding

In ground-based yarding, a moving vehicle travels to the logs and pulls them to the landing. The machines used for skidding are diverse and can be wheeled or tracked. Trees and logs are removed from the woods and yarded to the landing by lifting the front end of the logs off the ground. Skidders travel on skid trails that are approved by the BLM. Ground-based yarding is generally limited to slopes of 35% or less. After harvest is complete, skid trails and landings not needed for future management would be ripped.

A feller-buncher fells and bunches trees mechanically. The typical feller-buncher is track mounted. Some must move from tree-to-tree for felling, while others use a boom to fell multiple trees from a single position. The feller-buncher bundles trees for a skidder to pick up and move to a landing.

A forwarder is a rubber-tired machine that typically works with a harvester. Harvesters move through the stand felling, delimbing, bucking, and bunching trees selected for harvest. Forwarders travel into the woods on slash created by the harvester. They load the logs piled by the harvester and carry them to the road where they are off-loaded. The logs carried by a forwarder do not touch the ground during travel.

Bull-lining is a ground-based yarding method where a cable is dragged from the skidder to the log and the log is dragged along the ground to a skid trail.

Skyline-Cable Yarding

Skyline-cable yarding is a cable system that pulls the logs to the landing using steel cables. A stationary machine, or yarder, would be located on the road and would pull logs up to the landing with one end of the log suspended. Skyline-cable yarding is typically used where the ground is too steep for ground-based yarding (>35% slope).

Helicopter Yarding

Helicopters are used to lift logs above standing timber and fly them to a landing. Helicopters are capable of yarding long distances and are not dependent on terrain, road location, or harvest type. They require larger landings for dropping and sorting the logs, and a service area for refueling, maintenance, and nighttime storage of the helicopter.

Pre-Designated Skid Trails and Landings

Skid trail routes are specifically selected by the BLM to facilitate yarding operations. The skid trail can be an existing skid trail or newly located and is intended to be used by the yarding operator. Skid trails are generally about 12 feet wide and vary in length.

New log landings would be 0.5 acre or less; helicopter landings would be one acres or less; and service landings would be three acres or less and would be located on stable locations, such as ridgetops, stable benches, or flat areas outside of Riparian Reserves and 100-acre NSO cores, and would adhere to associated Project Design Features (see Section 2.5). All new landings would be approved by the Contract Administrator prior to construction.

2.3.1.3 Non-Commercial Treatments

Understory Reduction (UR)

The silvicultural objectives here are as follows:

1) Reduce stand density to increase tree growth, quality, and vigor of existing understory trees;
2) Reduce understory stem density in the current stand and control the growth rates of existing understory trees for long term survivability.

UR is used to accomplish pre-commercial thinning and fuels reduction treatments for even and uneven-aged conifer stands. UR consists of using a chainsaw to cut small conifers less than 8 inches DBH, hardwoods less than 12 inches DBH, and vegetation; while disposing of the material by hand-piling and burning or using a lop and scatter method in lighter fuels. Understory Reduction increases tree growth rates and promotes horizontal and vertical structural stand diversity. Understory Reduction is also used in stands where pine and shade-intolerant hardwood species are diminishing in vigor and numbers

because of overcrowded stand density conditions. This prescription may be applied to understories and/or areas of high stocking of small trees in commercial stands after harvest in conjunction with wildlife considerations and habitat objectives.

Fuels Treatment of Forest Management Activity Slash

The BLM would conduct a fuels assessment within each unit following harvest activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. Fuels treatments could include lop and scatter, pile and burn, underburning, and biomass removal. Most fuels treatments would begin within 90 days after completion of harvest activities.

Lop and Scatter

When the slash (live and dead material nine inches or less in diameter) remaining in the treatment units after harvest is less than 11 tons per acre, all stems and branches would be cut from the tree trunk and scattered. Trunks seven inches in diameter and less would be cut to 3-foot lengths and left on the ground. Slash depth would not exceed 18 inches.

Slash Piling and Pile Burning

Hand piling and hand pile burning would occur when the slash remaining in the treatment units after harvest is greater than 11 tons per acre. Material between one and seven inches in diameter, and longer than two feet, would be handpiled. The piles would be a minimum of four feet high and six feet in diameter. Piles would be burned in the fall, winter, or spring and would occur within one year or less of being piled.

Mechanical piling and pile burning would occur when the slash remaining in the treatment units after harvest is greater than 11 tons per acre and the slope is less than 35%. Mechanical equipment would pick up material and walk it to the pile. Material would not be pushed into a pile. Equipment would only travel on previously used skid trails. If machine piled, material between two and twelve inches in diameter and two feet long would be piled. The piles would be a minimum of eight feet high and ten feet in diameter. Piles would be burned in the fall to winter and would occur within one year or less of being piled.

Underburning

Underburning may be proposed in treatment units to treat residual slash and reduce fire hazard. In proposed treatment units, underburning would be used to remove at least 60% of slash less than three inches in diameter and a lesser amount of larger fuel size classes. Underburning would be implemented in the spring or fall. Treatment units are analyzed for possible underburning based on the anticipated amount of residual slash, resource objectives, strategic and logistical concerns (aspect, ridges, roads, proximity to other fuels treatments, values at risk, etc.). BLM fire and fuels management personnel would conduct post-treatment evaluations to determine the need for underburning.

Biomass Removal

Whole trees or tree tops would be yarded to log landings, the tree tops and limbs removed and piled at the landings, and the resulting slash piles hauled away from the landings. Whole tree yarding and tree top yarding would not be required but are options for treating activity slash.

2.3.2 Transportation Management

2.3.2.1 Temporary Routes

Temporary routes would allow operators temporary access to treatment units. Temporary routes would be located on stable areas such as ridges or gentle side slopes. After harvest is complete, routes would be ripped, water barred, mulched, blocked, and seeded with native grass (where needed).

Temporary Route Construction

Temporary route construction would occur where no previous routes exist. An access route would be constructed to minimum standards. Construction would include clearing, grubbing, removing, and disposing of vegetation and debris from within established clearing limits. Work also includes the construction of a minimum-width subgrade by excavating, leveling, grading, and outsloping.

Temporary Route Reconstruction

Temporary route reconstruction would occur on previously decommissioned roads. These decommissioned roads are not currently part of the designated transportation network system. The routes were blocked and closed to all forms of motorized vehicles. They have a defined prism and receive no periodic maintenance. Routes would be made suitable for hauling timber by removing encroaching vegetation, repairing narrowed sections, and blading the route surface.

Temporary Route Renovation

Temporary route renovation would occur on existing, overgrown inaccessible routes that are not currently used by motorized vehicles. The routes contain various stages of overgrowth ranging from sparse low-growing shrubs to a nearly closed forest canopy. Routes would be made suitable for hauling timber by clearing, grubbing, and disposing of vegetation along with excavating and grading to establish a minimum width route.

2.3.2.2 Timber Hauling and Road Renovation

Before roads are used for forest management activities, they would be surfaced or spot rocked if needed; ditches would be cleaned where needed; catch basins would be cleaned or enlarged; brush growing near culvert inlets or outlets would be removed; culvert inlets and outlets would be cleaned; and brush, limbs, and trees would be removed along roadways to improve sight distance and allow for proper road maintenance.

Road surfacing is placing rock the full width and desired length of the road. Surfacing is done by grading and reshaping the road subgrade, then hauling, placing, and compacting the new surfacing material on the prepared subgrade.

Spot rocking is placing rock on the road in areas as needed to help control erosion and maintain the road surface. This restores the road surface and road condition making it suitable for driving and hauling. Crushed aggregate material would be placed on sections of inadequately surfaced roads that would be used for hauling timber.

2.3.2.3 Road Reconstruction

Road reconstruction would occur on existing road prisms that are overgrown and have received no periodic road maintenance. The roads would be made suitable for timber hauling by removing encroaching vegetation, repairing and/or widening narrow sections, and blading the road surface. It may include installation of cross-drain culverts. Reconstruction uses clearing, grubbing, excavating, and grading operations.

2.3.2.4 Roadside Vegetation Maintenance

Many BLM roads in the Lost Creek Project Area have not been maintained in recent years. Large vegetation and trees have grown up along some roads since they were constructed and were not removed when they were smaller as part of a regular maintenance program. This vegetation prevents maintenance equipment from creating, maintaining, and improving proper road drainage patterns. The large vegetation and trees create berms on the outside shoulder of the road, which causes water to flow down the road in a concentrated flow instead of allowing water to disperse off the road at the earliest possible point (Figure 2-1).

Trees and vegetation up to 24 inches DBH would be removed up to six feet horizontally from the centerline of ditches and up to six feet horizontally from the outside shoulder of the road prism. Trees and vegetation would be cut rather than uprooted, unless otherwise approved. Remaining brush and stumps that would interfere with road grading and maintenance operations would be removed or ground down to a depth of six inches below the road surface or ditch line. Debris and trees that are not merchantable or desired for firewood cutting would be assessed by a BLM fuels specialist and would be hand piled and burned, clipped, or lopped and scattered, depending on the location. Fuel reduction would begin within 90 days after the vegetation maintenance project is completed.

Figure 2-1: Vegetation growing along road is limiting road maintenance

2.3.2.5 Full and Partial Road Decommissioning

Road decommissioning would occur where roads are not needed at this time but may be used in the future. Partial road decommissioning would include water barring roads, removing culverts (armored if necessary), seeding with native grasses, and mulching with weed-free mulch. Full road decommissioning would include the same actions as partial road decommissioning, but would also include ripping the road and planting the area to reestablish vegetation. In addition, any cross-drain culverts, road fills in stream channels, and potentially unstable fill areas would be removed to restore the natural hydrologic flow.

Decommissioned roads would be closed with a device similar to an earthen barrier or equivalent and would not be maintained in the future. Roads would be closed to vehicles on a long-term basis, but may be used again in the future.

2.3.3 Water Source Restoration

Restoration activities are proposed at five existing water sources (Maps 1 to 12) to allow use by fire suppression resources and by wildlife for drinking water, habitat, and foraging opportunities. Restoration activities would include clearing brush and trees; removing accumulated sediment from developed spring sites; installing, repairing, or replacing spring boxes and culverts; repairing or replacing pipelines; installing, repairing, or replacing devices such as bentonite or pond liners that impede water seepage; installing safety devices such as fences and exit ramps; and completing minor road work such as grading and adding rock.

2.3.4 Meadow Restoration

A 106-acre meadow area in section 5 of T33S, R02E would be restored using manual and prescribed fire techniques. Areas of older or decadent brush would be targeted for burning in an effort to rejuvenate brush species that would benefit wildlife as browse. A secondary benefit would be maintaining existing meadows as natural fuel breaks.

In some cases, the brush pockets and small conifers (less than seven inches DBH) would be cut with a chainsaw and "cured" before ignition by hand with drip torches. In other areas, the brush may burn in the current condition without the manual cutting as a pre-treatment. Prescribed fire would be used to remove encroaching conifers and shrubs and to reduce grass thatch build-up of native or nonnative grasses. Prescribed fire would likely be implemented in the fall and winter. If burning occurs in the spring, only cut and cured brush pockets would be available to burn due to green up.

2.4 ALTERNATIVES ANALYZED IN DETAIL

2.4.1 Alternative 1 – No Action

The No Action Alternative describes a baseline against which the environmental effects of the Proposed Action can be compared. The No Action Alternative discusses the consequences of not taking action. No Action Alternative assumes the current resource trends would continue into the future. Under the No Action Alternative, no vegetation management would be implemented; there would be no commercial cutting of trees and there would be no understory reduction or fuels reduction treatments. Normal programmed road maintenance would be performed. Other activities authorized by separate NEPA analyses could happen. The analysis of the No Action Alternative answers the question: What would occur to the resources of concern if the Proposed Action does not take place?

Selection of the No Action Alternative would not constitute a decision to reallocate these lands to non-commodity uses. 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 NEPA process ended. Future harvesting, young stand forest development work, fuels reduction treatments, other connected actions, and road management in this area would not be precluded and could be analyzed under a subsequent NEPA document.

2.4.2 Alternatives 2 and 3

The interdisciplinary team for the Lost Creek Project developed two action alternatives for meeting the multiple project purposes (see Chapter 1). Alternative 2 applies forest management actions that would provide economic return and benefit stand health, resiliency, and stability while minimizing the impacts to northern spotted owls and other special status species within stands in the Project Area (Maps 3 to 7).

Alternative 3 applies forest management actions that would also achieve the previously listed objectives but would achieve a higher level of protection for NSOs by reducing the amount of acres treated within NSO home ranges and reducing the amount of habitat downgrade. Alternative 3 does not include regeneration harvest. Refer to Maps 8 to 12.

These two action alternatives vary in response to the issues identified in Chapter 1. The action alternatives explore a range of options for forest management in the Project Area (Table 2-1).

Table 2-1: Summary of Proposed Projects in Alternative 2 and 3

Forest Management	Alternative 2	Alternative 3
Commercial Prescriptions	**Est. Acres**	**Est. Acres**
Density Management (DM)	353	500
Selective Thinning – Douglas fir (ST/DF)	136	54
Selective Thinning – Mixed Conifer (ST/MC)	538	163
Regeneration Harvest – NGFMA	15	0
Regeneration Harvest – Structural Retention	15	0
Small Diameter Thinning	152	152
Total	1,209	869
Non-commercial Prescriptions	**Est. Acres**	**Est. Acres**
Understory Reduction	1,209*	869*
Activity Fuels	1,209*	869*
Timber Harvest Method	**Est. Acres**	**Est. Acres**
Ground-based Yarding	973	690
Skyline-Cable Yarding	71	49
Helicopter Yarding	165	130
Total	1,209	869
Transportation Management	**Est. Miles**	**Est. Miles**
Temporary Route Construction	0.83	0.53
Temp Route Reconstruction	0.29	0.11
Road Reconstruction	0.34	0.34
Road Renovation	96.57	77.48
Haul Routes	96.91	77.82
Wet Season Haul Routes	59.08	48.74
Wet Season Haul Routes with Rock Needs	9.85	7.76
Roadside Vegetation Maintenance	16.75	11.84
Partial Road Decommissioning	3.15	3.15
Full Road Decommissioning	1.54	1.54
Pre-Designated Skid Trail	0.62	0.49
New Landings	5 – Helicopter 14 – Log 2 – Service	5 – Helicopter 8 – Log 2 – Service

Other Projects	Alternative 2	Alternative 3
Water Source Restoration	5 sites	5 sites
Meadow Restoration	106 acres	106 acres
* This is the maximum amount of acres that may be treated; actual acres treated could be less depending on post-harvest assessment.		

2.5 PROJECT DESIGN FEATURES

Project Design Features (PDFs) are an integral part of the Action Alternatives (Alternatives 2 and 3) and are considered in the analysis of project impacts in Chapter 3. They are developed to avoid or reduce the potential for adverse impacts to resources. PDFs include seasonal restrictions on many activities that help minimize erosion and reduce disturbance to wildlife. PDFs also outline protective buffers for sensitive species, mandate the retention of snags, and delineate many measures for protecting Riparian Reserves throughout the project. Where applicable, PDFs reflect Best Management Practices and standard operating procedures.

The PDFs listed below would be carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the operations of contractors to ensure that contract specifications are implemented as designed.

Best Management Practices (BMPs) are designed to reduce nonpoint source pollution to the maximum extent practicable and are considered the primary mechanisms to achieve Oregon Water Quality standards (USDI 2012a). PDF implementation, in addition to establishment of Riparian Reserves, would exceed Oregon State Forest Practices Rules. A review of forest management impacts on water quality concluded that the use of BMPs in forest operations was generally effective in avoiding significant water quality problems; the report noted that proper implementation of BMPs was essential to minimizing non-point source pollution (Kattelmann 1996). BMPs would be monitored and, where necessary, modified to ensure compliance with Oregon Water Quality Standards.

2.5.1 Common to All Proposed Projects

Objective 1: Prevent and contain hazardous material spills.

- During operations described in the proposed action, 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.
- Store all hazardous materials and petroleum products in durable containers placed outside of Riparian Reserves. Locate so an accidental spill would be contained nor drain into any stream system.

- Refuel equipment at least 190 feet from streams, ponds, or other wet areas. Equipment would not be stored in a stream channel overnight. Hydraulic fluid and fuel lines would be in proper working condition in order to minimize leakage into streams.
- Check equipment for leaks prior to starting work. Do not allow equipment use until leaks are repaired or leaking equipment is replaced.

Objective 2: Minimize the spread of noxious weeds.

- Ensure hay, straw, and mulch are certified as free of prohibited noxious vegetative parts or seeds, per 75 FR 159:51102. Straw or hay must be obtained from the BLM or purchased from growers certified by the Oregon Department of Agriculture's Weed Free Forage and Mulch Program. If hay is used, it must be from native grasses only.
- Washing of equipment travelling off system roads or temporary routes would be required prior to entry onto federally administered lands.

Objective 3: Protect Special Status, Survey and Manage, and Sensitive botanical species

- Protect known Special Status, Survey and Manage (S&M), and Sensitive vascular plant, lichen, bryophyte, and fungi sites. Buffers would be determined based on species, proposed treatment, site-specific environmental conditions, and available management recommendations (Special Status Species Conservation Assessments and S&M Management Recommendations). The use of skid trails and/or skidding logs through plant site buffers would not be allowed except where approved by the Authorized Officer. Exceptions could be made on a case by case basis depending on the specific plant species.

Objective 4: Protect known and newly identified cultural resources.

- Cultural sites located within the Area of Potential Effect would be buffered. Buffers would be established sufficient to protect the site features from adverse impacts of any proposed management activities. Buffers would be designed by BLM archeologists or cultural resource specialists. No treatments would occur within this buffer. No fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources. Timber that is to be removed next to a buffer would be directionally felled away from buffers for one site-potential tree length.
- 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, fossils, or artifacts, the contractor would immediately suspend all operations in the vicinity of the cultural value and notify the Contracting Officer or Contract Officer Representative so the site can be evaluated by a BLM archaeologist.

Objective 5: Protect Special Status, Survey and Manage, and Sensitive wildlife species.

- Protect raptor species, if any are located. Apply the appropriate buffers and seasonal restrictions based on species, proposed treatment, site-specific environmental conditions, and protection recommendations as determined by the BLM wildlife biologist (Table 2-2).
- If a gray wolf den or rendezvous site is identified prior to or during project activities, the BLM would implement a seasonal restriction from March 1st to June 30th and suspend project activities located within 1 mile of a known den or rendezvous site. Because these sites are difficult to locate and can change from year to year, this would be assessed on an ongoing basis

throughout the life of this project through annual updates and communication with the USFWS and Oregon Department of Fish and Wildlife (Table 2-2).

- Protect known Special Status, Survey and Manage (S&M), and Sensitive terrestrial wildlife species through the incorporation of no-treatment buffers and seasonal restrictions. Buffers are determined based on species, proposed treatment, site-specific environmental conditions, and available management recommendations (Special Status Species Conservation Assessments and S&M Management Recommendations) (Table 2-2). No yarding would be allowed through buffered wildlife sites.

Table 2-2: Protection Measures and Seasonal Restrictions for Known Special Status, Survey and Manage and Sensitive Terrestrial Wildlife Species in the Project Area.

Wildlife Species	Status	Protection Measures	Known-Site Seasonal Restrictions
Bald Eagles	SSS/EPA	30-acre Nest Core Area	0.5-Mile, February 1 – August 15
Bats	SSS	Retain Snags; 100-200 foot Cave Buffer	None
Cavity Nesting Birds	SSS	Retain Snags	None
Golden Eagles	SSS	30-acre Nest Core Area	0.5-Mile, March 1 – July 15
Goshawks	SSS	Site-Potential-Tree-Height Nest Buffer	0.25-Mile, March 1 – August 31
Great Gray Owls	S&M	0.25-Mile Nest Core Area; 300-foot Meadow Buffers	0.25-Mile, March 1 – July 15
Mollusks	SSS, S&M	Up to 0.10-acre Known-site Buffer; Retain Large Down Wood; 100-200 Foot Talus Buffer	None
Northern Spotted Owl	FE	300-Meter Nest Patches	0.25-Mile, March 1 – September 30
Fisher	FP	Retain Large Down Wood and Snags*	None
Other Raptor Species	SSS	Retain Nest Trees	0.25-Mile, March 1 – July 15
Peregrine Falcons	SSS	100-200 Foot Cliff Buffer	1-Mile, January 1 – August 15
Gray Wolves	FE	Retain Large Down Wood	1-Mile, March 1 – June 30

* Snags felled for safety reasons or for logging systems (skyline corridors, etc.) would be left on site.

Status:

FE – Federally Endangered (ESA) SSS – Special Status Species

FT – Federally Threatened (ESA) S&M – Survey and Manage Species

FP – Federally Proposed (ESA) EPA – Bald and Golden Eagle Protection Act

Objective 6: Minimize disturbance to Wintering Elk.

- Within the portions of the Project Area that are inside the Elk Winter Range, all roads, except major collectors and arterials would be closed between November 15th and April 1st to avoid disturbance to wintering elk. Minimize road construction in this area as well (USDI 1995, p. 48).

2.5.2 Timber Harvest and Small Diameter Thinning

Objective 1: Minimize impacts to wildlife species and special habitat elements.

- Maintain existing snags except those that need to be felled for safety reasons or for logging systems (skyline corridors, etc.) to minimize impacts to cavity-dependent species. Snags felled for safety reasons would be left on site.
- Retain existing large coarse woody debris in the stands.
- Locate skid trails to minimize disturbance to coarse woody debris. Where skid trails encounter large coarse woody debris, a section would be bucked out for equipment access. The remainder would be left in place and would not be disturbed.
- Provide a 300-foot no-harvest buffer around meadows 10 acres or larger adjacent to suitable great gray owl nesting habitat (USDI 1995, p. 36; USDA, USDI, and USDI FWS 2004, p. 5) (Table 2-2).
- Restrict harvest activities within 100 to 200 feet of special habitats (such as meadows, cliffs, caves, and talus slopes) (USDI 1995, pp. 45, 49).
- Construct new landings outside of Riparian Reserves and designated 100-acre NSO cores.
- Seasonally restrict harvest activities from March 1st to September 30th within 0.25 mile of known NSO sites (within 0.5 mile for helicopter operations and blasting). The seasonal restriction could be waived if non-nesting status is determined. If any new owls are discovered in harvest units following the sale date, activities would be halted until mitigation options are determined (Table 2-2).

Objective 2: Minimize impacts from timber yarding operations.

- Limit landings to 0.5 acre or less for tractor or skyline-cable yarding, one acre or less for helicopter yarding, and three acres or less for service landings. New service landings would be three acres or less. All landings would be located on stable locations, such as ridgetops, stable benches, or flat areas outside of Riparian Reserves and 100-acre NSO cores and would be approved by the Authorized Officer before construction.
- For helicopter yarding:
    - Keep service pad and helispot construction no larger than necessary and obtain approval from the Contract Administrator before construction.
    - Lift logs vertically (without horizontal movement) to a height above the adjacent leave trees.
    - Vertically lift multiple log turns from a small enough radius to result in minimal damage to the residual forest stand as determined by the Authorized Officer.
    - Restrict aerial operations within 0.5 mile of any residence to an operating time of 6:00 a.m. to 6:00 p.m., Monday through Friday.
- Limit the width of skyline corridors to be as narrow as operationally feasible; do not exceed a 15-foot width.

Objective 3: Prevent off-site soil erosion and soil productivity loss

Temporary Route and Landing Construction and Timber Hauling:

- Locate temporary routes and landings on stable locations such as ridge tops, stable benches, or flats with gentle to moderate side slopes and use existing jeep road and skid trail footprints where possible. Do not construct temporary routes or landings on steep slopes, slide areas or other unstable soils and headwalls, seeps, springs, high landslide hazard locations, or in Riparian Reserves.
- Limit temporary route and landing construction and reconstruction to the dry season (generally May 15th to October 15th).
- Rip, seed, mulch with straw, water bar, and block new temporary routes and associated landings in the same season of use. Seed must be native species, site-specific, and approved by the resource area botanist. If hauling on a temporary route is not completed in the same year the route is constructed, the route would be storm-proofed and blocked by October 15 or when soil moisture exceeds 25%.
- Restrict all timber hauling and landing operations on native surface or rocked roads whenever soil moisture conditions or rain events could result in road damage or the transport of sediment to nearby stream channels, generally October 15th to May 15th. If the Authorized Officer, in consultation with resource area watershed specialists and engineers, determines that hauling would not result in road damage or the transport of sediment to nearby stream channels based on soil moisture conditions or rain events, a conditional waiver for hauling may be granted. The conditional waiver may be suspended or revoked if conditions become unacceptable as determined by the Authorized Officer.
- No hauling would occur during the wet season (October 15th to May 15th) except on roads determined to have adequate surfacing as identified in the EA (Map 2)2. In addition, a selection of roads have been identified as available for wet season haul if adequate rock is added to the roadbed (Map 2). If the Authorized Officer, in consultation with resource area watershed specialists and engineers, determines that hauling would not result in road damage or the transport of sediment to nearby stream channels based on soil moisture conditions or rain events, a conditional waiver for hauling may be granted. The conditional waiver may be suspended or revoked if conditions become unacceptable as determined by the Authorized Officer.
- Install protective features such as certified weed-free straw bales, silt fences, geo-fabric rolls, and water bars where there is potential for haul-related road sediment to enter the aquatic system. Maintain protective features by removing accumulated sediment and placing sediment in stable location where it cannot enter the aquatic system.

Ground-Based Yarding

- Designate skid trails with an average of 150-foot spacing. In order to minimize ground disturbance, use existing trails and avoid creating new skid trails where feasible.
- Apply native, site-specific seed approved by the resource area botanist and weed-free straw, water bar as needed, and block skid trails by October 15th of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season. Install waterbars at the same time as subsoiling unless skid trails are needed to complete harvest the following season. In that case,

2 Wet season haul would be allowed on roads with durable rock surfacing and sufficient surface depth to resist rutting or development of sediment on road surfaces in accordance with the Medford District RMP plan maintenance BMPs (USDI 2012).

water bars would be constructed and straw would be applied to exposed soil prior to fall rains to reduce sedimentation during winter months. Water bar spacing on tractor skid trails would be based on the RMP erosion-control measures for timber harvest, which considers slope and soil series (USDI 1995, p. 167).

- Use erosion-control techniques (e.g., water bar, apply native, site-specific grass seed and weed-free straw mulch, scatter chipped material, or scatter limbs and other fine material) on skid trails, forwarder trails, and landings to minimize sediment movement off site.
- Water bar skid trails based on gradient and erosion class guidelines (USDI 1995, p. 167). Where soil erosion is not expected to occur (e.g. flat ground), water bars would not be necessary.
- Restrict ground-based yarding and soil ripping operations from October 15th to May 15th, or when soil moisture exceeds 25%.
- Once soil moisture exceeds 25%, ground-based operations may only occur when snow depth is at least 18 inches. In the condition where snow is present but soil moisture is below 25%, ground-based operations may occur. Stop ground-based harvest if rutting begins to occur within the unit or when soil moisture exceeds 25%.
- To minimize soil disturbance, mechanized felling equipment must have an arm capable of reaching at least 20 feet.
- Restrict tractor and mechanical operations to slopes generally less than 35%. In areas where it is necessary to exceed these gradients to access adjacent tractor area, use ridge tops where possible
- In order to restrict the amount of compacted soil to less than 12% in a timber harvest unit,
    - Allow mechanized equipment capable of creating and walking on slash (such as a cut-to-length system) to work off designated skid trails for one or two passes on at least eight inches of slash and under dry soil conditions (less than 25% soil moisture content);
    - Allow mechanized equipment (feller-buncher systems) to work off designated skid trails during the dry season (soil moisture content less than 15%) for one or two passes only (one round-trip);
    - Space the one to two-pass harvest trails a minimum of 50 feet apart off of designated skid trails;
    - Use low, ground-pressure equipment (8 psi or less);
    - Restrict all other use of ground-based equipment to designated skid trails; and
    - Stop the use of forwarding trails if logging equipment is causing continuous mineral soil displacement greater than two inches deep for a distance of 20 feet, a change of soil structure/compaction indicators at depths greater than two inches, or as determined by the Authorized Officer.

Skyline Yarding:

- Immediately after use, construct water bars by hand in cable yarding corridors where gouging occurs, as directed by the Authorized Officer. Construct water bars by hand and pull available slash on skyline-cable yarding corridors if gouging of mineral soil occurs for a continuous distance of 20 feet or more.

- Apply native, site-specific seed approved by the resource area botanist and certified weed-free straw to the top 20 feet of the skyline-cable yarding corridor where yarding logs to the road results in extended soil exposure.
- Use full or partial suspension when skyline-cable yarding.
- Avoid downhill yarding (USDI 1995, p. 166)

Objective 4: Prohibit unauthorized OHV use

- Place woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of skid trails leading off system roads in all ground-based yarding units upon completion of yarding to block and discourage unauthorized vehicle use.

Objective 5: Reserve non-commercial hardwood and conifer tree species.

- Reserve Pacific yew and hardwoods, where operationally feasible.

Objective 6: Protect Riparian Reserves

- Do not cut vegetation within two site-potential trees (370 feet or 420 feet) of fish-bearing streams and within one site-potential tree (185 feet or 210 feet) of non-fish-bearing, perennial, and intermittent streams.

Objective 7: Protect Rangeland Improvements

- During logging operations use of techniques such as directional falling would be used to prevent damage to fences, cattle guards, livestock watering troughs and other improvements.
- If damage to range improvements does occur, the BLM shall be notified immediately and proper repair or replacement would occur within two weeks. Proper repair of fences and gates includes keeping wire properly attached to posts, splicing or replacing broken wire in kind, repairing structures such as corners, stress panels or gates, and any other work necessary to keep improvements functional. Repair of structures such as stress or corner panels and gates requires pre-approval by BLM staff. Repair or cleaning of cattle guards damaged of filled with sediment by logging activities would require approval of BLM road engineering staff for structural integrity and public safety compliance.

Objective 8: Prevent Livestock Trespass

- During logging activities, operators would keep all gates closed and all livestock containment systems functional to keep livestock in authorized areas.

2.5.3 Timber Harvest

Objective 1: Prevent off-site soil erosion and soil productivity loss

- Where the width of the trail permits, and no damage to residual trees would occur, skid trails within regeneration harvest units would be discontinuously subsoiled to a depth of at least 12 to18 inches, to a point where stones 10 inches or larger diameter are the dominant substrate, or to bedrock (whichever is shallower). Where the Authorized Officer determines that subsoiling skid trails would cause unacceptable damage to the root systems of residual trees along a majority of the skid trail, such as where new skid trails are constructed within the dripline of leave trees, subsoiling may be intermittent, or scarification may be used instead. Equipment must be able to avoid rocky areas and adapt to changes in rock depth.

- Apply native, site-specific seed approved by the resource area botanist and certified weed-free straw to the top 20 feet of the skyline-cable yarding corridor where yarding logs to the road results in extended soil exposure.

Objective 2: Limit residual stand damage from yarding activities

- In tractor units, trees 21 inches DBH and smaller designated for cutting would be felled and yarded to an approved landing location as either whole trees or log segments. If excessive stand damage occurs from whole tree yarding, as determined by the Authorized Officer, bucking, limbing, or both would be required.
- In tractor units, trees over 21 inches DBH designated for cutting would be felled and cut into log lengths not to exceed 44 feet and would be completely limbed prior to yarding.

Objective 3: Provide for public safety in a high use recreation area

- Do not conduct logging operations on weekends and holidays in units adjacent to recreation sites and trails, specifically Units 23-1, 23-2, 23-3, 35-1, and 19-1.
- Close Fire Glen Campground to the public during logging operations in Units 19-1 and 18-1.
- Install signing at trailheads, along the trails, and along the roads in areas that the public travel to access recreational opportunities. Specific areas include the trail on the west side of the lake, the trail in section 35, and in section 19 on the north side of the lake.
- Coordinate with the Army Corps of Engineers to close parking areas as needed in the Takelma/Four Corners Campground area during logging operations.
- Lake Shore Trail would remain open during logging operations, with safety measures in place (e.g. signing and outreach).
- Close the Viewpoint Mike Trail during logging operations in Unit 35-1; place closure signs at the trailhead and trail entrance.

Objective 4: Retain existing character of recreation opportunities

- Any recreation infrastructure impacted by logging operations (trails, service roads, kiosks, buildings, picnic tables, etc.) would be restored to their condition as it was prior to logging operations.
- In the Takelma/Four Corners Campground area, coordinate with the Army Corps of Engineers on developing landings along the service road.
- No timber harvest would occur within 50 feet of the Lakeshore Trail.
- In the Takelma/Four Corners Campground area, coordinate with the Army Corps of Engineers to limit logging operations to the east/downhill of the short trail from the parking area to the service road.

Objective 5: Keep the public informed of proposed timber activities and the potential effect on recreation access

- Lost Creek Lake staff would be contacted with as far in advance as possible as to when, where, and how logging operations are to take place.
- Conduct outreach to public, in the form of news releases, signing, and prior to any timber activities in the high use recreation areas.

2.5.4 Road Maintenance, Decommissioning, and Quarry Work

Objective 1: Prevent off-site soil erosion and soil productivity loss.

- Suspend ground-disturbing activity if forecasted rain would saturate soils to the extent that there would be potential for movement of sediment from the road to wetlands, floodplains, and waters of the state. Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground-disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include, but are not limited to, erosion control blankets and mats, soil binders, soil tackifiers, and slash placement.
- Restrict road renovation, closure, and decommissioning work from October 15th to May 15th, or when soil moisture exceeds 25%.
- Block or barricade identified roads after use and before beginning of rainy season (generally by October 15th).
- Rip and water bar all temporary routes and associated landings (new construction or reconstruction) to a depth of 18 inches or bedrock (whichever is shallower), apply native, site-specific seed approved by the resource area botanist and weed-free straw, and block upon completion of use. If hauling is not completed in the same year the route is constructed, storm proof and block the route by October 15th or when soil moisture exceeds 25%.
- Rip roads identified for decommissioning to a depth of 18 inches using a subsoiler or winged-toothed ripper, apply native, site-specific seed approved by the resource area botanist and weed-free straw, and block. Seeding and mulching would occur in the same operational season that construction activities occur.
- Restrict the application of dust abatement materials, such as lignin, magnesium chloride, or approved petroleum-based dust abatement products, during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25 feet of a water body or stream channel).
- Place waste stockpile and borrow sites resulting from road reconstruction in a location where sediment-laden runoff can be confined, at least one site-potential tree height from a stream.

For culvert removal, replacement, or installation:

- Restrict culvert removal and replacement from October 15th to May 15th, or when soil moisture exceeds 25%.
- When removing culverts, pull slopes back to the natural slope, or at least 2:1, to minimize sloughing and erosion and minimize the potential for the stream to undercut stream banks during periods of high stream flows.
- Apply site-specific native seed and straw to soils that are disturbed or exposed during stream culvert removal, replacement, and installation in the same operational season the work is completed.
- De-water streams during culvert installation and replacement to maintain optimum bedding material moisture content and minimize the movement of sediment downstream.
- Remove all possible excess sediment from stream channels during culvert removal, replacement, and installation in the same operational season the work is completed.

- Perform instream work from June 15th to September 15th.

For Road 33-2E-19.01 (Culvert removal, low water crossing construction, and road improvement):

- Existing material shall be excavated down approximately six to eight inches in depth below the bottom of the existing culvert. The existing road shall be excavated down to the same level as the draw crossing and tapered back up to meet the existing road surface approximately 75 feet on each side of the draw crossing.
- The excavated area shall have four inch minus crushed aggregate placed in two to three separate lifts not to exceed six inches in depth to reestablish the road surface.
- Low water crossing construction shall be constructed when draw is not flowing water.
- Limit log hauling to the dry season, generally May 15th to October 15th of the same year.
- If turbidity is above 10% of background levels below the low water crossing during log hauling, stop activities until drier conditions exist when turbidity would not be 10% above background levels.
- After log hauling is complete, low water crossing would be maintained to pre-haul conditions.
- To reinforce the soft subgrade from milepost 0.15 to milepost 0.20, geotextile fabric or geogrid shall be placed for the entire width and length of section.
- An eight inch lift of rock (four inch minus crushed aggregate) shall be placed on geotextile fabric before haul commences.

For quarry development and operations:

- Restrict quarry development and rock crushing operations whenever soil moisture conditions or rainstorms could cause the transport of sediment resulting from quarry operations to nearby stream channels (generally October 15th to May 15th).
- If blasting is necessary, require a detailed blasting plan to minimize the amount of rock material outside the designated quarry perimeter.
- Construct silt fences or other preventive structures (diversion ditches, settling ponds) as needed to prevent the potential for runoff from quarry operations into nearby stream channels.
- Plant site-specific native grass seed, native vegetation, or both within the same operating season to stabilize exposed soil in overburdened areas from quarry operations.

Objective 2: Minimize disturbance to wildlife during their nesting season

- Seasonally restrict blasting activities from March 1st to September 30th within 0.5 mile of known NSO sites. The seasonal restriction could be waived if non-nesting status is determined.
- Seasonally restrict mechanical roadside brushing activities and heavy equipment use from March 1st through September 30th within 200 feet of known NSO and raptor nests. This seasonal restriction could be waived if non-nesting status is determined.

Objective 3: Minimize the spread of noxious weeds

- Use approved rip rap, aggregate, and borrow material for road renovation and surfacing. BLM material sources would be surveyed prior to use and would be free of noxious weeds. If noxious weeds are found, they would be treated before material extraction and use.

- Aggregate, including rip rap, from a commercial source would be from an accredited, weed-free quarry or would have to be crushed between November 1st and June 15th immediately prior to application. Aggregate stockpiled between June 16th and October 31st of the previous year would not be accepted.
- Inspect soil imported for use on roads or other areas for noxious weeds prior to use. Only weed-free material would be used. The resource area botanist would inspect the sources for soil prior to importation from non-BLM sites and prior to disturbance at BLM sites.

2.5.5 Fuels Treatments Associated with Timber Harvest and Small Diameter Thinning

Objective 1: Minimize disturbance to wildlife during their nesting season

- Seasonally restrict prescribed burning and site preparation with chainsaws from March 1 to July 15 within 0.25 mile of known active NSO nests. The seasonal restriction could be waived if non-nesting status is determined.

Objective 2: Minimize amount of surface fuel loading from harvest activities

- Conduct a post-activity fuels assessment in treated areas. Modifications or additional treatment recommendations would be based on the fuels assessment and the amount of slash created during harvest and small diameter thinning project activities. Treatments including, but not limited to, hand or machine slash piling, slash pile burning, underburning, and biomass removal may be needed to further reduce the fuels hazard to an appropriate level within all units.
- To reduce the amount of surface fuel loadings and emissions from prescribed burning, remove slash from the site, when feasible, by using whole tree harvesting, chipping limb slash in the harvest unit, or a combination of both methods. Where whole tree harvesting is permitted, landing slash would be chipped, burned, or moved off site.

Objective 3: Minimize the spread of noxious weeds

- When post-harvest slash is piled and burned on landings located along main roads, apply native, site-specific seed and weed-free straw to the burn pile scars after the close of the timber sale contract.

Objective 4: Minimize affects to riparian areas

- Do not machine pile slash within riparian areas.
- Do not treat vegetation or stack slash piles within 120 feet of fish-bearing, perennial streams or more within 50 feet of non-fish-bearing, intermittent streams. Piles would not be placed in channel bottoms and dry draws.
- Prohibit the use of foam agents within two site potential trees of fish-bearing, perennial streams and within one site potential tree of non-fish-bearing, intermittent streams during prescribed burning and mop-up activities.

Objective 5: Conduct fuels reduction to minimize impacts to other resources.

- Provide an approved prescribed fire plan prior to ignition of all prescribed burn units in compliance with the 2014 Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484). The prescribed burn plan would contain measurable objectives, a predetermined prescription, and an escape fire plan to be implemented in the event of an escape.

- To prevent fire escapes and to minimize damage to residual vegetation and trees, schedule burning to occur when weather and fuel conditions allow for lower fire intensities (typically late fall through spring).
- Conduct prescribed burning in compliance with Oregon Department of Forestry's Smoke Management Plan. Smoke emission control could also include conducting mop-up as soon as possible after ignition is complete, covering hand piles to permit burning during the rainy season, and burning lighter fuels with lower fuel moistures to facilitate rapid and complete combustion, while burning larger fuels with higher moisture levels to minimize consumption.
- Disperse slash piles across the treatment areas. Burn slash piles when soil and duff moisture content is high.

2.5.6 Water Source Restoration

Objective 1: Minimize disturbance to wildlife during their nesting season

- Seasonally restrict chainsaw and heavy equipment use from March 1st through September 30th within 200 feet of known NSO or raptor nests. This seasonal restriction could be waived if non-nesting status is determined.

Objective 2: Minimize the amount of surface fuel loading from restoration activities

- Lop and scatter, hand pile and burn, chip, or remove from the site slash resulting from brushing and clearing activities in order to reduce fire hazard.

Objective 3: Prevent off-site soil erosion and soil productivity loss

- Dispose of end-haul material in stable sites outside of floodplains, as identified by the BLM Authorized Officer. Apply erosion control measures at disposal sites to minimize sediment delivery to water bodies.
- Use sediment-control measures such as weed free straw bales, filter cloth, or sediment fences.
- Perform water source restoration work between June 15th and September 15th.
- Temporarily suspend work if monitoring indicates that rain storms have saturated soils to the extent that excessive stream sedimentation is possible.
- Apply native plant seed and weed-free straw as soon as possible after excavation or ripping to reduce erosion.
- Minimize disturbance to existing riparian vegetation in order to maintain slope stability and shade.

2.5.7 Meadow Restoration

Objective 1: Restore meadow features

- Use broadcast burning, underburning, or hand cutting and piling to remove encroaching conifers and shrubs.

Objective 2: Minimize the spread of noxious weeds

- Pre-treat noxious weeds or other nonnative species, conduct post-burning monitoring, and re-treat as needed.

- Seed or plant appropriate, site-specific native plants after burning to restore native plant composition.
- Seed burn pile scars with site-specific native grass or forb seed.

Objective 3: Retain unique habitat features.

- Retain down wood, snags, and other unique legacy features.
- Leave 10% of shrub patches untreated for bird and small mammal cover.

2.6 ALTERNATIVES AND ACTIONS CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

In the development of the Proposed Action, BLM considered numerous ways to meet the Purpose and Need. What is presented in this Environmental Assessment (EA) as the Proposed Action reflects what the planning team determined to be the best balance and integration of resource conditions, resource potential, competing management objectives and expressed interests of the various communities that have a stake in the project. Other actions or alternatives were discussed and eliminated from detailed study for the reasons given below.

1. Develop an alternative that focuses on long-term benefits and implements the most appropriate silvicultural treatment (including regeneration harvest) based on stands needs, regardless of the impacts to the northern spotted owl (NSO) and their habitat, including treating in nest patches.

Rationale for Elimination: The Lost Creek Forest Management Project is designed to manage forest stands to promote tree survival and growth and to improve stand vigor, resiliency, and stability while protecting and conserving federally listed and proposed species (including the NSO) and managing their habitat to contribute toward their recovery in compliance with applicable laws and policies (USDI 1995, pp. 17-18, 50-51). This alternative was not analyzed in detail as it would not meet the purpose and need of this project or conform to Medford District's current land use plan (USDI 1995) or BLM's Special Status Species Management Manual (USDI 2008), which states to ensure that BLM actions are not likely to jeopardize the continued existence of any endangered species or threatened species or to destroy or adversely modify designated critical habitat of any threatened or endangered species listed under the ESA (USDI 2008, p. 13).

Approximately 531 acres would be available for regeneration harvest based on their age and past management; however, due to competing management objectives, only 30 acres were identified as available for this prescription and the resulting impacts.

2. Develop an alternative that would avoid regeneration harvest.

Rationale for Elimination: The purpose and need identified for this project (see Chapter 1) includes promoting tree survival and growth, improving stand vigor, resiliency, and stability, and providing timber products. In order to meet these objectives, silvicultural prescriptions, consistent with the Medford District RMP (USDI 1995, Appendix E) were proposed and vary depending on current forest stand conditions. Stands in the Project Area were identified as having declining growth rates or experiencing deterioration due to high density stand levels.

Of the 30 acres of proposed regeneration harvest, 15 acres are proposed for Structural Retention harvest, which would create growing space for a new cohort of trees and/or increase the growth of existing understory trees while maintaining structural complexity with the retention of 16 to 25 trees per acres

greater than 20 inches DBH (diameter at breast height); reduce understory stem density in the current stand and control the growth rates of existing understory trees for long-term survivability; and create regeneration opportunities for species that are shade intolerant and provide long-term success or survival of less prominent species (e.g. sugar pine).

The remaining 15 acres of regeneration harvest would apply the NGFMA Regeneration prescription to maximize volume growth and yield. Regeneration harvest is proposed in older forest stands with declining growth rates or experiencing deterioration from insects, disease, or other factors. Regeneration harvest using the NGFMA Regeneration prescription guidelines would retain 6 to 8 trees per acre greater than 20 inches DBH (USDI 1995, pp. 75, 188). Spatial distribution of these trees would vary from individual trees to groups. Retained trees would be the most vigorous trees and would be selected based on tree crown ratio and form (Appendix B, Marking Guidelines). Healthy understory ponderosa pine, sugar pine, incense cedar, and Douglas-fir trees free of insects, disease, or damage would be retained. Wildlife snags would be designated for retention and all existing coarse woody debris would be retained on-site. Regeneration harvest prescriptions are not proposed within any NSO home ranges or within the transient snow zone.

By avoiding regeneration harvest, the BLM would not be able to meet forest health objectives and would therefore not meet the multiple purpose and needs identified for this project.

In the development of the Proposed Action, BLM considered numerous ways to meet the Purpose and Need. What is presented in this Environmental Assessment (EA) as the Proposed Action reflects what the planning team determined to be the best balance and integration of resource conditions, resource potential, competing management objectives, and expressed interests of the various communities that have a stake in the project.

3. Develop an alternative that includes thinning in Riparian Reserves. Include a variety of thinning intensities and gap cuts in the outer portions of Riparian Reserves.

Rationale for Elimination: Within the Project Area, forest stands in both upland and riparian areas were considered for treatment to meet land use allocation objectives. Thinning in Riparian Reserves was considered if a need was identified for forest restoration treatments to attain Aquatic Conservation Strategy (ACS) and Riparian Reserve objectives (e.g. to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics) (USDI 1995, pp. 27, 62). Through the proposal development process, thinning in Riparian Reserves were considered, but not carried forward as part of the final proposed action or alternative because there were very few opportunities to include riparian treatments due to the location of the proposed upland units in the Lost Creek Project. This is in part due to the relatively low stream density for the area where proposed units are located. The Riparian Reserve adjacent to unit 35-2 was reviewed by the resource area's professional staff including the silviculturist, fish biologist, hydrologist, soil scientist, and layout forester who all agreed the Riparian Reserve did not need treatment at this time. Other proposed upland units had much smaller areas of Riparian Reserves adjacent to them and were not in need of treatment. The BLM looks for stands that are in need of stocking control, stand reestablishment, establishment, and management of desired nonconifer vegetation to acquire desired vegetation characteristics needed to attain the objectives of the ACS. The Interdisciplinary Team (IDT) determined that there would not be a benefit from the small amount of area that would be left to treat in order to meet ACS objectives.

4. Develop an alternative that would avoid new road construction.

This alternative would have eliminated any new road construction needed to improve vehicle access for the purpose of managing forest stands.

Rationale for Elimination: While new road construction was not avoided, road construction was limited when possible and the road construction proposed is temporary. The Medford District RMP directs that all silvicultural systems (forest thinning strategies) applied to achieve forest stand objectives should be economically practical (USDI 1995, p. 180; USDI 1994, pp. 2-62). The economic feasibility of forest management actions is affected by the ease of access from the forest road system. An alternative that would eliminate all new road construction would make it uneconomical to manage stands within the Project Area. While road construction was not completely eliminated, new temporary road construction was limited to ten locations totaling 0.83 miles. The project initially started with about 2.0 miles of proposed temporary routes; after careful consideration the miles were reduced to the 0.83 miles.

5. Develop an alternative that would not downgrade or remove northern spotted owl habitat.

Rationale for Elimination: In 2011, the USFWS issued the Revised Recovery Plan for the Northern Spotted Owl (NSO). The Recovery Plan includes Recovery Actions, which are recommendations to guide activities that would help to further the recovery objectives for the NSO. Recovery Action 10 (RA 10) recommends conserving NSO sites and high value NSO habitat to provide additional demographic support to the NSO population. Within the administrative units of the Rogue River-Siskiyou National Forest (FS) and the Medford District BLM, an interagency, interdisciplinary team was created to develop interim guidance for incorporating RA 10 when planning and implementing management activities on federal lands in southwest Oregon. The southwest Oregon plan established two primary objectives as described in the plan; 1) prioritize known and historic spotted owl sites and 2) identify vegetation management that would enhance spotted owl habitat.

The Lost Creek interdisciplinary team worked to meet the intent of RA 10 as one purpose of the project is to protect and conserve federally listed species and their habitat, including the NSO. To the extent practicable, the BLM followed principles in the SW Oregon Recovery Action 10 Guidance Document (USDA and USDI 2013) to reduce impacts to sites with resident singles, recent pairs and/or reproduction activity within the Project Area. NSO sites within the Project Area were prioritized in high and low categories based on occupancy and reproductive success data. The objective at the high priority sites was to avoid adverse effects by not removing or downgrading nesting, roosting, and foraging (NRF) habitat within the home range. The objectives at the low priority sites are to accelerate the growth of NSO habitat or treat stands for ecological benefits as described in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011). These objectives would result in short-term adverse effects, for long-term benefits. Approximately 363 acres were removed from consideration for timber harvest and detailed analysis as they would not meet the above stated objectives.

6. Consider implementing a diameter limit so as not to cut big, old, fire-resilient trees within the watershed.

Rationale for Elimination: Trees with the old-growth characteristics such as, bottle-brush-shape (non-symmetrical crown), large-diameter limbs indicating that the tree was once open-grown and had a large crown, and Douglas-fir with thick bark, deep fissures and a chocolate brown color, and ponderosa pines with thick bark, plate-like and yellow or orange in color would be typically retained on 1,179 acres.

The intent of retaining trees with the aforementioned characteristics is to retain and/or promote structural complexity within treated stands. There may be situations where trees with the above-mentioned characteristics may be harvested if determined by OSHA health and safety guidelines to present a risk to people or due to logging system operations.

The objective of the silvicultural prescriptions is to manage a landscape or a stand, not individual trees. The EA contains the information on the current stand condition, and explains how the proposed treatments would affect the stands relative to the goals set out in the RMP and the stated Purpose and Need of the Project (Chapter 1, Section 1.4). Each alternative has specific objectives for the stands to be treated. Silvicultural prescriptions for each stand take into consideration the stand inventory data as it relates to objectives of the alternative (Chapter 2, Section 2.3.1). The larger, healthier trees, particularly drought- and fire-tolerant species, would be favored for retention.

On the 30 acres where regeneration harvest would occur, trees greater than 20 inches DBH would likely be harvested after tree retention requirements are met (e.g. 6 to 8 trees per acre greater than 20 inches DBH). This represents less than 0.02% of forestland in the Project Area where larger trees would be removed. Regeneration harvest prescriptions are proposed to address the following purpose and needs identified for this project: 1) manage forest stands to promote tree survival and growth and to improve stand vigor, resiliency, and stability necessary to meet land use allocation objectives (USDI 1995, pp. 62, 72), and 2) produce a sustained yield of products to support local and regional economic activity (USDI 1995, pp. 38, 72, 73, and 81). Regeneration Harvest prescriptions would create growing space to allow a new cohort of trees to occupy the stand and create early-seral conditions and increase species diversity.

2.7 MONITORING

Much of implementation monitoring is accomplished in the day to day work by BLM employees. Project supervisors, contract inspectors, and timber sale administrators review the work being done and assure compliance with the regulations and stipulations in the applicable administrative documents. The majority of actions described under the alternatives are implemented through a timber sale, service, or stewardship contract. In the case of contracts, implementation monitoring is accomplished through BLM's contract administration process. PDFs included in the project description are carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the daily operations of contractors to ensure that contract specifications are implemented as designed. The inspection reports would be shared with the Field Manager and Project lead and the ID team would be notified when inspection reports are available. If work is not being implemented according to contract specifications, contractors are ordered to correct any deficiencies. If unacceptable work continues, suspension of contracts and/or monetary penalties can be applied. Coordination with resource specialists to develop workable solutions would occur when site specific difficulties arise.

The BLM would monitor the extent of spotted owl habitat affected by the proposed Lost Creek Project to ensure that those effects are consistent with the analysis in this EA and in relevant consultation documents. The BLM would report the results to the Service through annual monitoring reporting requirements. Implementation of Project Design Criteria (PDC) is monitored through the BLM sale-contracting program in coordination with the Resource Area wildlife biologist.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

3.1.1 Brief History of the Project Area

The history of the Lost Creek watershed provides the foundation for understanding the conditions that exist in the Project Area today. Natural processes and human activities influence and shape the vegetation and landscape found within the Project Area. They may cause slow and subtle changes only visible through the passage of time, or sudden, devastating changes that occur in an instant.

Fire was a common occurrence in this region and the natural fire return interval for Cascade mixed conifer forests was historically around 7-13 years. These wildfires were largely of mixed-severity (low-medium severity) and occurred in a patchy distribution, creating a mosaic of stand ages, tree sizes, and structures across the landscape. Stand replacing fires occurred at substantially longer return intervals of around 200 years. Lower elevation sites were dominated by oak savannahs with scattered individual white oak (*Quercus garryana*) which is adapted to low-density conditions with frequent wildfires. White oak communities were typically burned by Native American tribes for the purpose of regenerating vegetation and encouraging new growth for subsequent harvest periods. Fire was also a substantial factor in the development of old-growth stands by reducing competition from stems that would have otherwise increased competition for growing space and nutrients. Old-growth stands were generally open with scattered, large-diameter trees because smaller trees, which often lacked the thick bark necessary to resist fire, were often killed (Sensenig 2002).

Fire was the main disturbance agent for centuries until around the mid-19th century when two major activities, logging and fire suppression, put forest stands on a trajectory that greatly differed from historical development patterns and landscape-level variability. Much of the forestland within the Project Area therefore reflects unnatural and undesirable changes in characteristics and conditions, such as lack of species diversity, homogenous stand structure, and high stand density. Logging and road construction have created a landscape that is more fragmented and has greater edge and patch densities than historic levels. Fire suppression has created uncharacteristically dense stands that are susceptible to stand replacing fires.

From 1960 to 2015, the Project Area has experienced 220 small fires (less than 100 acres) on BLM-administered, Corps of Engineers, and private lands. Since 1930, three large fires totaling 1,291 acres have occurred in the Project Area.

By the mid-1940s, much of the mature timber on private timber company lands had been harvested and the demand for timber from federal lands increased. The high demand for lumber during World War II also served to increase timber harvest on federal lands. Roads were built or extended to provide access to timber stands, improve fire protection capabilities, and provide access for recreation and administration.

Passage of the O&C Act in 1937 provided direction for BLM-administered federal lands in this area. The O&C Act is intended to contribute to the local economy by providing for federal timberlands to be managed for permanent timber production on a sustained yield basis. One of the purposes of the O&C Act was to increase timber harvest on these lands to their timber-producing capacity. Timber harvest revenues were to provide a consistent level of income to the counties that contain O&C lands.

In January 2008, a windstorm brought strong winds and heavy rain and snow to southern Oregon. Wind gusts up to 90 miles per hour downed power lines and uprooted trees through the eastern portion of the BLM Medford District's Butte Falls Resource Area. Blown down trees occurred throughout the Big Butte Creek, Little Butte Creek, South Fork Rogue River, and Rogue River/Lost Creek 5th field watersheds. The blowdown severity varied from scattered individual trees to severely damaged stands showing catastrophic impacts. Blowdown was scattered across 6,300 acres of BLM-administered lands. Through a series of roadside salvage and area salvage timber sales, the BLM salvage harvested approximately 5,000 acres throughout the 4, 5th field watersheds. The BLM salvaged blowdown on 802 acres located within the Lost Creek Project Area.

Land ownership patterns, past timber harvest, windstorms, wildfires, and fire exclusion have helped to create the existing conditions in the Lost Creek Project Area. Fire exclusion and harvest methods have contributed to the current high density and multiple-layered stand conditions in many of the proposed harvest units. Past harvest methods also influenced the locations and conditions of the roads within this watershed. These past practices have contributed to the affected environments described in detail later in this section.

Since the mid-1990s, the BLM has closed or decommissioned approximately 50 miles of road in the Lost Creek Project Area.

3.1.2 Consideration of Past, Ongoing, and Reasonably Foreseeable Actions in Effects Analysis

Past Actions

The current condition of the lands in the Lost Creek Project Area is the result of 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. Instead of incurring these exorbitant costs in terms of time and money, it is possible to implement simpler, more accurate, and less costly ways to obtain the information concerning the effects of 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 the definition of "cumulative impact" in 40 CFR § 1508.7). For the Lost Creek Forest Management Project, aerial photograph analysis and GIS databases were utilized in helping to determine past actions on both federal and private lands.

43 CFR § 46.115 states that when considering cumulative effects analysis, the agency must analyze the effects in accordance with relevant guidance issued by the Council on Environmental Quality (CEQ). As the CEQ points out in guidance issued on June 24, 2005, 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 of past action may be useful in two ways according to the CEQ guidance: for consideration of the Proposed Action's cumulative effects, and as a basis for identifying the Proposed Action's direct and indirect effects.

The CEQ stated in this guidance that "Generally, 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 Lost Creek 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. 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.

Ongoing and Reasonably Foreseeable Actions

The following listing of activities is presented to provide an overview of land management activities occurring or that is reasonably foreseeable within or adjacent to the Lost Creek Project Area or associated Analysis Areas.

Forest and Fuels Management on BLM-administered Lands

Taggart Hazard Tree Reduction Project - The BLM is proposing to remove thirty two (32) hazard trees along the lower Taggart Creek road system (T. 33 S., R. 02 E., section 27) in the Lost Creek Project Area. Vehicles would not leave the existing roads. Trees would be felled to the road and winched out when necessary. Slash/residue would be sold as firewood or lopped and scattered. Tree removal is planned to occur in the summer of 2016.

Baker Cypress Restoration Project - Within the Flounce Rock Area of Critical Environmental Concern (ACEC) (T. 33 S., R. 02 E., section 5), the BLM plans to conduct restoration activities in the Flounce Rock Baker cypress stands (approximately 2 acres). The project will include using prescribed fire and thinning to stimulate seedling regeneration and to improve habitat conditions. The treatments are planned to be completed in the spring of 2016 using non-commercial, manual methods, using chainsaws and hand tools. No yarding systems (helicopter, cable, or tractor) will be used. Cut trees will be piled and burned or lopped and scattered and burned.

Vine Maple Blowdown Salvage Project – On February 6, 2015, a wind storm blew over a large number of trees scattered throughout the east side of the Butte Falls Resource Area. The BLM is proposing to salvage harvest 15 acres (approximately 30 trees) of blowdown trees and standing hazard trees in the T. 33 S., R. 02 E., section 25 SE ¼ NE ¼ along the 33-3E-30.0 road. This project is just outside the Lost Creek Project Area, but it directly adjacent to Unit 30-4. Trees would be harvested with a tracked or rubber-tired skidder using existing skid trails. Trees would be yarded to existing landings. Logging residue would be lopped and scattered. Logging and timber haul would occur during dry conditions. No temporary or permanent roads would be constructed. The trees are located within a previously harvested commercial thinning unit in the Vine Maple Timber Sale. This project is planned to occur in the summer of 2016.

Vine Maple Timber Sale – Approximately 79 acres were harvested in the Vine Maple Timber Sale within the Project Area in 2012. Treatment prescriptions were Restoration Thinning and were yarded using ground-based operations. The Vine Maple Timber Sale contract will expire in fall of 2016 and has approximately 40 acres left to be harvested outside of the Project Area. Approximately 100 MBF will

be hauled out on a portion of the B road in the southeastern portion of the Project Area. No other harvest associated with the Vine Maple Timber Sale will occur within the Project Area.

Clark's Dog Timber Sale – In May 2016, approximately 149 acres was sold for harvest in the Clark's Dog Timber Sale within the NSO (northern spotted owl) Analysis area. These acres will be harvested by 2019. Prescriptions include Disease Management, Proportional Thin, and Thin from Below.

Elk Creek Forest Management Project – The Butte Falls Resource Area is in the early stages of planning a forest management project within the Elk Creek 5th Field watershed. Approximately 191 acres of forest stands within the Lost Creek NSO Analysis Area have been identified as needing treatment and will be evaluated during the Elk Creek project development phase beginning in the fall of 2016. Field review of these preliminary planning acres is still needed to identify specific silvicultural prescriptions, logging methods, and final acres.

Grazing Leases

Of the 41,880-acre Lost Creek Project Area, 30,671 acres are available for grazing. The Project Area contains portions of the Lost Creek and Summit Prairie grazing allotments, which authorize up to 2,046 AUMs on 12,725 acres of BLM-administered lands available for grazing in the Project Area.

Mining

There are currently no active mining claims in the Project Area.

Timber Harvest on Private Lands

The landscape pattern in the Lost Creek Project Area is largely determined by the checkerboard ownership. Blocks of BLM-administered lands intermingle with privately owned lands. Field observation and review of aerial photographs indicates that most private timber lands within the watershed have been harvested. The majority of merchantable overstory trees were removed, leaving a younger stand of Douglas-fir with lesser amounts of ponderosa pine, incense cedar, and scattered hardwoods. Some of these harvested acres have been planted and are now plantations of ponderosa pine or Douglas-fir of varied sizes and ages.

"The nonfederal forests within the range of the northern spotted owl are predominantly forests that have grown back since harvest and are generally even-aged stands. They are typically managed as commercial forests. . . . harvest generally occurs in a stand's fifth or sixth decade" (USDA and USDI 1994, p. 3&4-6). The Northwest Forest Plan states "these forests generally are now in early and mid-successional stages, with many at or approaching ages and sizes that will predictably result in harvest."

There are three known timber harvest activities planned on private industrial lands in the Project Area in 2016:

1) Indian Hill LLC plans to harvest timber on their land in T. 33 S., R. 03 E., section 18 adjacent to Unit 18-1;
2) Lone Rock Timber Management plans to harvest timber on their land in T. 33 S., R 02 E., section 24 near Units 23-1, 23-2, and 23-4; and
3) Silver Butte Timber Co. plans to harvest timber on their land in T. 33 S., R. 02 E., section 28 adjacent to Units 29-2B and 29-3.

Proposed Projects on Corps of Engineers Lands in the Project Area

The Rogue River Basin Project, Army Corps of Engineers (COE) is planning a non-commercial forest thinning project on about 488 acres of COE lands in the Project Area adjacent to Lost Creek Lake. Treatments would be thinned for forest health and fire regime improvement.

Resource Management Plans for Western Oregon

The BLM is revising the resource management plans for the western Oregon BLM Districts, including the Medford District. The Draft Resource Management Plan/Environmental Impact Statement was released for public review on April 25, 2015. The Proposed RMP / Final EIS for Western Oregon was released on April 15, 2016 for a 30 day public review period. The new RMP/FEIS, if implemented, will replace the 1995 Medford District RMP and the Northwest Forest Plan and provide guidance for the management of BLM lands in western Oregon.

3.2 FOREST CONDITION

Issue 1: How would thinning and regeneration of conifer stands affect long-term productivity of stands, resiliency, species composition, and structural characteristics in the Matrix (GFMA and Connectivity) land use allocation within the Analysis Area?

3.2.1 Introduction

The primary forest condition-related objectives for the Lost Creek Forest Management Project are to manage forest stands to promote tree survival and growth, and to improve stand vigor, resiliency, and stability. The treatment and modification of forest vegetation is the primary focus of this analysis. This section describes the current condition of the forested environment and how that relates to the proposed actions and subsequent vegetation conditions within the Analysis Area and the effects of the project on forest resources.

Forest health and forest condition in the Project Area include all components of forest ecosystems that influence stand and forest resiliency to environmental disturbances. Forest and individual stand resiliency to environmental stresses (natural or human-caused) is a direct reflection of stand health and stand condition. Environmental factors that can affect resiliency in this analysis include, but are not limited to, high stand densities, insect and disease occurrences, frequent frosts, high growing-season temperatures, moisture and nutrient availability, vegetative competition, soil type, fire, and fire suppression. All of these factors can influence stand resiliency, production, mortality rates, and vigor. This project would directly affect the factors of high stand densities and vegetative competition to help increase stand resiliency.

3.2.2 Analysis Area/Spatial Extent

Due to the anticipated stand-level impacts of the proposed actions, the Analysis Area encompasses only BLM-administered lands in the Project Area. The Lost Creek Project Area is located east of Shady Cove surrounding Lost Creek Lake. Crater Lake Highway is the main transportation route running through the center of the Analysis Area. Forest management activities are proposed within the center of the Lost Creek-Rogue River and the east side of the South Fork-Rogue River 5th field watersheds. The total size of the Project Area is 41,881 acres, or approximately 65 square miles. The Analysis Area covers approximately 34% of the Project Area and is arranged in a checkerboard pattern (see Chapter 1, Section 1).

3.2.3 Methodology

Forest condition and forest health information for the Analysis Area was compiled using the following sources:

- The Medford District Proposed Resource Management Plan/Environmental Impact Statement (PRMP/EIS, 1994) provided general vegetation information for planning and analysis.
- The Lost Creek Watershed Analysis (1998) provided baseline information specific to forest vegetation and the impacts of managing forest stands.
- Geographic information system (GIS) data described the type, amount, and distribution of forest vegetation on BLM-administered lands across the watersheds in which the project is located.
- Field visits to proposed treatment units and stand exam data provided site specific information.
- Research publications provided baseline information specific to forest vegetation, fire effects, and plant succession.

3.2.4 Assumptions

- Forest management activities would occur on BLM-administered lands allocated to planned, sustainable harvest. The type, quantity, and impacts of timber management activities were analyzed in the Medford PRMP/EIS for both the short-term (10 years) and long-term (decades).
- Impacts to forest vegetation by predicted regional climate change is uncertain. The regional climate has become warmer and drier with reduced snowpack and continued change is likely (USDI 2008c).

3.2.5 Forest Environment

The forest environment is comprised of accumulated live and dead plant biomass generally arranged in terms of the dominate vegetation in the overstory, midstory and understory. These characteristics of the forest environment can be manipulated and mitigated to achieve defined modifications to the composition, structure, ecosystem functions and potential effects (Pyne et al. 1996, Stephens and Ruth 2005). This report identifies five metrics that describe the forested environment as it relates to the project effects within the Lost Creek Forest Management Project. The metrics that are modeled over time are as follows:

1. *Basal Area*: Basal area3 is the common term used to describe the average amount of an area (usually an acre) occupied by tree stems. It is defined as the total cross-sectional area of all stems in a stand measured at breast height, and expressed as per unit of land area (typically square feet per acre).

2. *Relative Density Index*: Various scientific methods have been developed that can predict or identify a threshold level of density at which a forest stand will decline in production and health

[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 volume and density.

due to the impacts of excessive competition. Relative Density Index (RDI) is one such measure and is defined as the ratio of actual stand density to the maximum stand density attainable or expected for that stand, which is dependent upon the species composition. The maximum stand density or carrying capacity used in these equations is the density at which self-thinning (mortality) will occur. Relative density measures help determine if resources are being optimally utilized in stands and at which point density-dependent mortality will occur. Drew and Flewelling (1979) concluded that the correlative density index rating of 0.55 and greater for any given stand marks the initial point of imminent mortality and suppression.

3. *Trees per Acre*: The most basic measure of stand density expressed as the number of trees per acre (TPA).

4. *Quadratic Mean Diameter*: Quadratic mean diameter (QMD) is a measure of the average mean diameter of all trees in a measurement unit, which is calculated using the central tendency of the averages.

5. *Canopy Cover*: "Canopy cover refers to the proportion of the forest floor covered by the vertical projection of the tree crowns….Measurements of canopy cover assess the presence or absence of canopy vertically above a sample of points across an area of forest" (Jennings et al. 1999). Canopy cover is a key metric important to stand-level microclimate, wildlife habitat requirements, and prey protection.

3.2.6 Affected Environment

Location

The Lost Creek Forest Management Project is located in Southwest Oregon northeast of the city of Medford. See Chapter 1, Section 1.3 for a more detailed description of the project location.

Topography

Elevations in the Lost Creek Analysis Area ranges from 1,560 feet to 5,040 feet and about 23% of the total area is within the Transient Snow Zone (see Appendix A, Issue I).

Physiography

The Lost Creek Forest Management Project is located within the Cascades West Physiographic Province and includes portions of the Oak Savanna Foothills and Southern Cascades Ecological Regions (EPA).

Geology/Soils/Site Potential

Growth and development patterns of forests stands within the Analysis Area are driven by site productivity, which is a function of soil type, elevation, and available water and nutrients. Soil factors such as topsoil depth, soil texture, nutrient availability, and drainage affect the productivity of a site. While these factors impact the rate of tree growth and to what sizes they can attain, factors such as tree density and health impact the level to which trees are able to fully utilize on-site resources (Hann & Scrivani, 1987; Tappeiner et al, 2007).

Climate

The climate of the Analysis Area is generally warm and dry with typically cool, wet winters and hot, dry summers. Summer temperatures range from the daytime highs of 70 to 100+ degrees Fahrenheit (F) during occasion heat spells. Annual precipitation averages less than 35 inches. Most of the precipitation occurs from mid-October to mid-April as rain or snow.

Disturbance Ecology

Fire Ecology: The historical role of fire, fire suppression, and previous management actions have led to the development of current stand conditions including reduced growth, reduced resiliency to insects and pathogens, and reduced structural heterogeneity. The level of competition and the impacts of current stand conditions necessitate treatment in the proposed units. Treatments can reduce existing negative conditions by improving growth in residual trees and assisting the development of trees with old-growth characteristics such as high volume growth, thick bark, and better resilience towards fire, insects, and pathogens.

Fire has shaped the evolutionary trajectories of nearly all terrestrial ecosystems within the Cascade Range bioregion, including the Lost Creek Analysis Area. It is widely accepted that forested environments across the west have been altered by Euro-American land use practices. Most forest lands in Southwest Oregon were logged, grazed, and burned beginning in the mid to late 19th century (Atzet and Martin 1992). These activities were followed by a century or more of fire exclusion in addition to a policy of fire suppression, which was implemented on BLM-administered lands and has successfully excluded fire from much of the landscape. Fire exclusion has had a profound influence on the structure, function, and composition of forest stands and forest landscapes in these fire-adapted systems. Reduced fire frequency in mixed conifer forests has created unprecedented accumulations of biomass (Stephens and Sugihara 2006). Higher stand densities and increased horizontal and vertical fuel continuity has increased the risk of undesirable disturbance events such as high intensity fire, including crown fire (Scott and Reinhardt 2001, Hardy 2005). Fire has historically played a crucial role in the development of forests as a disturbance agent which has helped to manage stand density, influence species composition, create snags, affect the availability of certain key nutrients, and direct the pattern of plant succession. It is therefore an important variable to consider when analyzing forest conditions. For a more detailed description of fire history in the Project Area, see Chapter 3, Section 3.1.1.

Insects and Disease: Douglas-fir bark beetles and flat-headed wood borers are currently invading Douglas-fir at low to mid elevations in the Analysis Area and causing mortality in small pockets. Western pine beetle (*Dendroctonus brevicomis)* is invading ponderosa pine in the Analysis Area, particularly in stands with a high proportion of pine. Bark beetles are initially attracted to trees that are under stress. The susceptibility of trees to damage by bark beetles can be mitigated by stocking control which is tied closely with tree vigor (Larsson et al. 1983). Stocking control increases growing space, water and nutrient availability, sunlight penetration, and photosynthesis rates. Altogether, site disturbance such as fire and thinning improves tree vigor. Although there is not a current widespread beetle infestation, treatments are designed to improve the ability of trees to withstand potential outbreaks. Treatments primarily bring the vigor of Douglas-fir and ponderosa pine to a level where they are more likely to withstand attacks of any intensity in order to ensure the survival and perpetuation of pine in the Analysis Area. DeMars and Roettgering (1982) recommend that "reducing stand stocking to 55 to 70 percent of the basal area needed for full site utilization will relieve the competitive stress among the remaining trees, improve their vigor, and make them less prone to successful bark beetle attack." The Goheen (2010) state that whenever stand basal area exceeds 120 square feet per acre on drier sites or 140 square feet per acre on moister sites, the risk of beetle infestation is high.

Forest pathogens and subsequent beetle kill contribute to changing the forest stand structure and forest development pattern by creating openings of varied sizes and allowing light to reach the forest floor. In the Analysis Area, laminated (*Phellinus weirii*), annosus (*Heterobasidian annosum*) and Armillaria (*Armillaria ostoyae*) root diseases are present. White fir is the most susceptible and can be readily infected and killed. Infections occur primarily in small pockets within the Analysis Area. Disease centers vary in size, containing dead standing trees, and occasionally wind thrown trees. Infections are

found scattered throughout the Analysis Area. These root diseases kill host cambium, decay root wood, plug water conducting tissue, or cause some combination of these effects. Tree mortality from root disease occurs when trees with decayed roots are wind thrown or by bark beetle attack on root disease-weakened trees.

Douglas-fir dwarf mistletoe (*A. douglasii*) is also present within the Analysis Area and is affecting Douglas-fir growth and vigor of all age and size classes. The most severe cases of Douglas-fir dwarf mistletoe are common on moist sites at elevations above 3,000 feet in the Analysis Area. Infections are widespread throughout the 3,000-5,000 feet elevation gradient of the Analysis Area. Infections are usually systemic and form bunched globose growths of branches called "witches' brooms." These growths, occurring mostly in the lower third of the tree canopy, are produced by local physiological changes induced by the parasite to get the tree to transport food to the mistletoe. Heavy infections result in growth loss, wood quality reduction, top-killing, and mortality. Food needed for healthy tree growth becomes diverted to the brooms, significantly draining the host (Hull and Leonard 1964). Although the spread of the infection is slow, infected trees lose vigor and become increasingly susceptible to other infectious diseases and insect attack. Weakened trees emit a different chemical signature than healthy trees. Bark beetles are consequently drawn to these trees, eventually killing them.

Plant Associations

The Analysis Area lies within three different forest zones as described by Franklin and Dyrness (1973): Interior Valley, Mixed-Conifer, and White Fir. Within each forest zone are different plant series and plant association groups based on the concept of "potential natural vegetation": the vegetation composition reflective of climax conditions developed without disturbance by biotic and abiotic factors such as fire, insects, and humans after approximately 500 years. These climax conditions, however, would not necessarily occur naturally because of the historical reoccurrence of fire and its role in the development of species composition, seral stages, and plant succession. Thus, the effects of disturbance on the landscape must be taken into consideration when evaluating vegetation conditions.

The Interior Valley Zone encompasses the lower elevation ranges of the Analysis Area (up to about 2,700 feet) and contains the Oregon white oak and ponderosa pine plant series. This area is characterized by a more xeric (dry) soil moisture regime and higher average temperatures which are more suitable conditions for species adapted to drier conditions. The Interior Valley Zone encompasses the least amount of acreage in the Analysis Area.

The Mixed-Conifer Zone encompasses the mid to upper elevation ranges (2,460-4,592 feet) and has higher levels of precipitation and lower average temperatures than that of lower elevation sites. Plant series that typify this area include Douglas-fir series, western hemlock series, and white fir series. The Mixed-Conifer Zone is the most dominant zone within the Analysis Area.

The White Fir Zone is generally located at elevations above that of the Mixed-Conifer Zone but its presence is not substantial and it can be difficult to directly ascertain the scope and characteristics that make this zone distinct from the Mixed-Conifer Zone. Stands that are within the stricter definition of this zone are typically comprised almost exclusively of white fir, lacking the species diversity found in the Mixed-Conifer Zone, and have cooler temperatures (Franklin and Dyrness, 1973). Given the species composition of stands it is likely that the White Fir Zone overlaps with the Mixed-Conifer Zone in many of the units. Table 3-1 displays the plant associations with these plant series.

Table 3-1: Plant Association Groups within the Analysis Area

White Oak	Ponderosa Pine	Douglas-fir	White Fir	Western Hemlock
QUGA4-PSME/RHDI6	PIPO-PSME	PSME-QUKE/RHDI6	ABCO-PSME/SYMO-ROGY/TRLA6	TSHE/BENE2-GASH/POMU
		PSME/BENE2/ POMU	ABCO/BENE2/ WHMO	TSHE-ABCO/BENE2/ LIBOL
			ABCO/BENE2-ROGY/CHUM	

Abbreviations:

ABCO: White fir
BENE2: Dwarf Oregon grape
CADE27: Incense cedar
GASH: Salal
PIPO: Ponderosa pine
POMU: Western sword fern
PSME: Douglas-fir
QUGA4: Oregon white oak
QUKE: Black Oak
RHDI6: poison oak
SYMO: Creeping snowberry
TRLA6: Starflower
TSHE: Western Hemlock
WHMO: Whipplevine

Current Forest Conditions

Forest conditions have reached their current state through centuries of disturbance patterns, but the most recent developments in forest management and utilization of timber have had a more pronounced impact on the landscape we see today. Fire was the main disturbance agent for centuries until around the mid-19th century when two major activities, logging and fire suppression, put forest stands on a trajectory that greatly differed from historical patterns and landscape-level variability (USDI 1998). Much of the forestland within the Analysis Area therefore reflects unnatural and undesirable changes in characteristics and conditions, such as lack of species diversity, homogenous stand structure, and high stand density.

Landscape Pattern

Vegetation condition classes[4] can be used to describe the relative distribution of seral stages[5] across a watershed or landscape. The seedling/sapling and early condition classes most often represent the early-seral stages of forest succession. The poles and mid condition classes are best represented as the mid-seral stage, while the mature condition class represent more late-seral stages of forest succession. Table 3-2 shows the majority of forested BLM-administered land in the Analysis Area is comprised of mature vegetation condition classes. Since water, rock, and urban/agricultural are not considered vegetation, Table 3-2 below does not include them.

4 Vegetation Condition Class - The BLM Medford District Watershed Analysis Committee designated 8 vegetation condition classes to describe the types of and size of vegetation present on the landscape. The condition classes are as follows: grass and herbaceous vegetation; shrub lands; Hardwood/Woodlands; early seral stage trees (0 to 5 years of age); 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 and larger trees). (DBH=diameter at breast height)

5 Seral stages - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage (USDI 1995, p. 112)

Table 3-2: Vegetation Condition Classes- Lost Creek Analysis Area

Vegetation Condition Class	Acres	Percentage of Total (%)	Percentage of Forestland (%)
Grasslands/Shrubs	1,022	7	0
Hardwoods/Woodlands	1,760	12	0
Seedlings/Saplings (0-4.9" DBH)	2,775	19	23
Poles (5-11" DBH)	683	4	6
Mid Seral (11-21" DBH)	2,240	15	18
Mature/Old Growth (21" DBH +)	6,438	43	53
Total Acres	**14,918**	**100**	
Total Forestland Acres	**12,136**		**100**

Vegetation condition classes are used to describe landscape patterns and are more easily measured by vegetation size than by age. Micro*storms[6] stand age or birth date is not correlated directly with Vegetation Condition Class because age and size are only roughly correlated. The above condition classes in themselves do not describe the structural characteristics of the vegetation and its degree of intactness (open vs. closed canopy, partial cut previously, never entered, etc.) Since most of our stands naturally exist with several cohorts, lumping them into one diameter range, such as the condition class definitions do, will often not permit the assessment of the functional characteristics of the class for vegetative and habitat assessments. They also do not allow the separation of functional old-growth from mature stands. For that reason, three optional descriptors have been added which can provide additional information for the condition classes. These are: 1) McKelvey Rating for the operations inventory (OI) unit; 2) whether the OI unit is intact or not; and 3) dominant age class for the OI unit entered in Micro*storms (USDI 1994c, p. 26).

Since landscape vegetative patterns are in constant development, current observations of the landscape vegetation are a snapshot at one single point in time. Although current vegetation stem densities are high and are mostly in the mid- and mature-seral stages, the vegetation condition classes of today are atypical when compared to historic patterns. Natural disturbances, such as fire, have historically controlled stand densities. With or without silvicultural management, the vegetation will continually change due to natural succession, a process in which vegetation types and conditions change over time in a given site. Species that appeared at an early stage of a site may be entirely nonexistent in future successional stages. The species that initially appear on a site are largely dependent on the seed availability (windblown seed sources, seed bank, serotinous cones, etc.), the type and severity of disturbance that brought the stand into an early-seral stage (either following a fire, wind event, harvest, insect infestation, disease, or other disturbance), and other biotic or abiotic factors.

Stand competition is directly correlated with stand density. The more trees that exist per acre on a site, the fewer resources are available per tree to sustain it. Each tree draws water and nutrients from the soil and occupies a place in the stand that captures sunlight. With the absence of disturbance due to fire suppression, these sites become occupied by shade tolerant species capable of out-competing their shade intolerant neighbor trees. Various scientific methods have been developed over the decades that can predict or identify a threshold when a forest stand will decline in production and health due to factors such as competition. Relative Density Index (RDI: the ratio of actual stand density to the maximum stand density attainable in a stand with the same mean tree volume) is a measure of both stand and tree level health and productivity. Undisturbed populations eventually compete for growing space and

6 Micro*Storms - A micro-computer database system providing background information and recommended treatment for each operations inventory unit (stand) (USDI 1995, p.107)

gradually reduce the population as individuals die in a self-thinning process (Barbour, et al., 1987). Drew and Flewelling (1979) concluded that the correlative density index rating of 0.55 for any given stand marks the initial point of imminent mortality and suppression. A productive forest stand absent of natural or human density control will continue growing until it reaches a condition where the vegetation in the stand occupies all the available growing space. The aftermath result is widespread competition and declining productivity, as evident in dense stem exclusion stands (Oliver 1981). A decrease in stand vigor occurs with continued overstocking and increasing stand age. According to stand exam data recorded in proposed treatment units, relative density indices with the Analysis Area range from 0.48-1.13 RDI (average 0.76 RDI), suggesting that the majority of stands have either entered the zone of imminent mortality or would enter that zone in the near future.

Coarse Woody Debris

Many ecological processes have created the even- and uneven-aged forest stand structure as seen today in the Analysis Area. These processes are responsible for the variable amounts of coarse woody debris (CWD) across the landscape. Coarse woody debris provides habitat for wildlife, invertebrates, microbial and fungal species, as well as important ecological functions such as moisture retention, soil stabilization, and nutrient recycling. Amounts of CWD are influenced by forest stand history, soils and respective plant associations, climate, and topography. The amount and decay class of CWD reflects the stage of stand development (Table 3-3). In a natural cycle, two stages (stand initiation and old growth) typically have the greatest amounts of CWD. Older decay classes (3, 4, and 5) are more common and reflect coarse woody debris created since stand initiation wildfires in the early 1900s.

Table 3-3: Coarse Woody Debris Decay Classes

Log Characteristics	Decay Class				
	1	2	3	4	5
Bark	Intact	Intact	Trace	Absent	Absent
Twigs <3 cm.	Present	Absent	Absent	Absent	Absent
Texture	Intact	Intact to partly soft	Hard, large pieces	Small, soft blocky pieces	Soft and powdery
Shape	Round	Round	Round	Round to oval	Oval
Color of wood	Original color	Original color	Original color to faded	Light brown to reddish brown	Red brown to dark brown
Portion of log on ground	Tree elevated on support points	Tree elevated on support points but sagging slightly	Tree is sagging near ground	All of tree on ground	All of tree on ground
Invading roots	None	None	In sapwood	In heartwood	In heartwood

3.2.7 Environmental Consequences

Specific Methodology

Stands were modeled in a growth and yield modeling system called ORGANON edition 9.1 (Hann 2013). Developed at Oregon State University, College of Forestry, the model predicts forest growth outputs based on scientific formulas programmed into it. This model was used to better capture the difference of effects of forest treatments versus no forest treatments over time. The Southwest Oregon

variant was used to model stands in the Analysis Area. Output data reflects modeling assumptions (i.e. growth curves, regeneration dynamics, and spatial variability) and variability within the common stand exam plots.

Alterative 1- No Action

Under Alternative 1, no forest, restoration, or transportation management actions would be implemented and there would be no direct effects to forest condition on BLM-administered lands in the Project Area. Alternative 1would not meet the silvicultural objective to reduce stand densities to natural carrying capacities and create favorable growing conditions to improve individual tree health (vigor) for desirable species. Forest stands would remain at or surpass the overall average of 0.76 RDI, allowing density-dependent mortality to occur and leaving forested stands more susceptible to insect and disease agents (Table 3-4). Stand densities would continue on their current trajectory of stand development and remain overpopulated. The current average relative density for the area indicates that the trees have entered the zone of imminent density-induced mortality. Tree vigor and growth would continue to decline as these stands continue on this trajectory. Growing conditions become stagnant at or above stand density index of 0.55 RDI, resulting in intensified competition and the stand begins excluding the weakest trees. If stand densities remain in this condition, large diameter trees would decline in number and individual tree vigor would be reduced. “Individual trees have smaller crowns in dense stands, and thus each tree has less capacity for diameter growth than trees with larger crowns in less-dense stands” (Tappeiner et al. 2007). No action would allow forest stands to remain overstocked and individual tree vigor and growth would remain poor. Lack of disturbance in fire-adapted systems, such as those found in the Analysis Area, has resulted in higher stocking densities than the site is capable of maintaining.

Without silvicultural treatments to control the establishment and growing space of trees, forest structure and species composition can shift. On pine sites that require at least 25% full sunlight, shade-tolerant white fir and Douglas-fir would continue to encroach and stands would remain in a dense stand condition in the absence of disturbance. Shade-intolerant pine and oak species would continue to decline in number from competition with encroaching shade tolerant white fir and Douglas-fir. Because shade-tolerant species (white fir) are encroaching on sites better suited to early-seral species (ponderosa pine), the shade-tolerant species exhibit poor vigor and requires more moisture than the site can deliver, becoming easily stressed and succumbing to density mortality or beetle kill. The No Action Alternative would result in higher numbers of white fir and Douglas-fir trees that may cause long-term ecological impact to the conifer forests in the Lost Creek Analysis Area. A shift in species composition has major implications on forest processes and function. These shade tolerant trees would become a large component of the canopy that would contribute to a dense forest structure prone to a perpetual cycle of overcrowded stand densities (competition mortality), drought induced mortality, and/or mortality caused from insect and disease agents. Without management action, shade intolerant species like ponderosa pine and large diameter trees would continue to decline in number from such competition. The No Action Alternative would not meet the silvicultural objective of the purpose and need to promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes.

Forested stands in the Analysis Area have become predisposed to stand-replacing fires across the landscape due to their relative densities. A decrease in stand vigor is expected with continued overstocking and increasing stand age. Fire suppression has altered the landscape pattern of forest structure, density, and species composition. Without any form of density control, and the predicted periods of drought in the region, slow tree growth and poor vigor would result in individual tree and stand mortality. Wildfires have functioned as a natural tool for thinning out the understories and

removing dense pockets of forest. Without this tool, Douglas-fir trees in the Analysis Area have increased in number, along with other species such as white fir.

The increase in the amount of Douglas-fir and white fir trees can perpetuate forest pathogen effects that may result in a less resilient forest. The increase of Douglas-fir in southern Oregon coincides with the increased levels of dwarf mistletoe seen today. Without the cleansing effect of fire on densities of Douglas-fir seedlings, the pathogen is consequently perpetuating on the infected sites and spreading into previously uninfected stands. The amount of Douglas-fir dwarf mistletoe present in Southwest Oregon is at unprecedented levels (Goheen 2010). The spread of the parasite can infect nearby stands of Douglas-fir and decrease their growth rates, thereby reducing stand volume production and promoting poor forest health. The presence of dwarf mistletoe can contribute to increased fire behavior during wildfire events. Higher levels of insect and disease infestation/infection are expected as stand density increases (Fetig et al. 2007). Tree mortality represents a reduction in stand volume production, a loss of revenue, and poor forest health. Diseases such as Douglas-fir dwarf mistletoe would persist and perpetuate the infection cycle on currently infected sites. Disease-susceptible trees continue to recolonize these sites and understory trees become infected and their likelihood of attaining large sizes is low. The pathogen survives on the site unless disease resistant species occupy the forest openings. Alternative 1 would allow unchecked disease spread to continue throughout the Analysis Area. The Medford District RMP (USDI 1995, p. 191) gives the instruction to "design silvicultural treatments so that within-stand endemic levels do not increase and where possible, the affected trees contribute to the achievement of land use allocation objectives." The No Action Alternative would not meet the stated need to maintain and promote vigorously growing conifer forests, reduce tree mortality, and provide timber resources, in accord with sustained yield principles, on BLM-administered Matrix lands within the Lost Creek Project Area.

The 1995 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). The No Action Alternative does not meet the forest health objectives as defined in the 1995 Medford District RMP.

Alternative 2 – Proposed Action

Alternative 2 proposes to treat 1,209 acres, or approximately 10%, of BLM forestland in the Analysis Area. Selective Thinning would be used to treat 674 acres of forest stands; Density Management would be used to treat 353 acres of forest stands; 30 acres would be treated using Regeneration Harvest; and Small Diameter Thinning would be used on 152 acres of forest stands. Refer to Chapter 2 for descriptions of the Silvicultural Prescriptions.

Actions proposed under Alternative 2 are designed to benefit stand health, resiliency, and stability. Under commercial thinning and Small Diameter Thinning prescriptions, forest stands would be thinned to a more desirable stocking level in comparison to current conditions to improve the growth and vigor of the remaining trees. These thinning treatments would also help to accelerate the development of heterogeneous stand structure, increase species diversity, and reduce hazardous ladder fuels. Regeneration Harvest prescriptions would create growing space to allow a new cohort of trees to occupy the stand and create early seral conditions and increase species diversity. Additionally, these treatments would aid in reducing the effects of insect and disease and their rate of spread to adjacent lands. Thinning and Regeneration Harvest prescriptions provide the opportunity to affect tree species composition with a species preference order of: sugar pine, ponderosa pine, incense-cedar, Douglas fir,

and white fir. Maintaining drought-resistant species (ponderosa pine and sugar pine) helps to ensure the resiliency of forest stands during a period of climatic uncertainty. Alternative 2 would break up surface and crown fuels that have been created under a regime of fire exclusion.

Table 3-4 shows the difference in stand conditions between taking No Action (Alternative 1) and the Proposed Action (Alternative 2) within a 30-year time period. The stand data below was collected from all vegetation condition classes (poles through mature) and vegetation types (Douglas-fir and Mixed Conifer) collected in the proposed treatment units, were modeled to capture the differences in impacts to stand characteristics that collectively affect NSO habitat quality. Table 3-4 also highlights the trends associated with stand density and canopy cover as silvicultural prescriptions are applied. Table 3-4 displays the current canopy cover to demonstrate the relationship of relative density index (RDI) of a stand and the number of trees occupying that same stand with and without management intervention.

Table 3-4: Current and Future Stand Conditions and Effects on Habitat (Alternative 2)

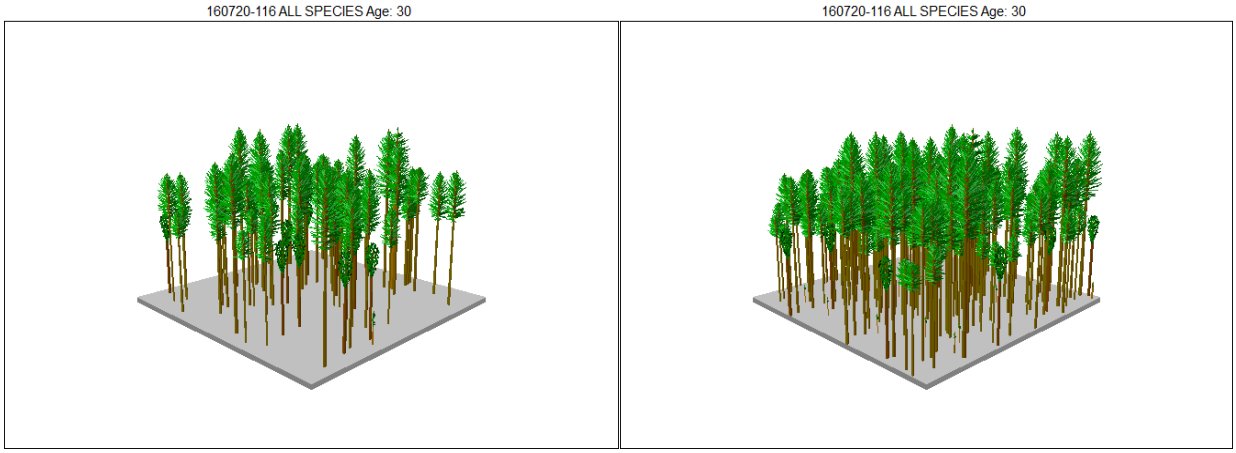
	QMD (inches)	BA (ft^2)	TPA	Crown Ratio (%)	Canopy Cover (%)	Relative Density
Selective Thinning- Dispersal Maintain						
Current Conditions	14	220	214	38	70	67*
30 years No Action	18	288	160	33	72	79*
Post-Treatment	22	120	45	43	42	30
30 Years Post-Treatment	26	164	43	36	46	39
NGFMA Regeneration Harvest- Dispersal Removal						
Current Conditions	12	206	271	33	68	67*
30 years No Action	14	240	215	30	69	72*
Post-Treatment	26	44	12	43	15	11
30 Years Post-Treatment	30	54	11	41	16	12
Selective Thinning- Nesting, Roosting, and Foraging Downgrade						
Current Conditions	13.5	240	242	38	77	74*
30 years No Action	17	290	197	33	79	83*
Post-Treatment	16	120	91	39	51	35
30 Years Post-Treatment	18	147	84	34	54	40
Density Management- Roosting and Foraging Maintain						
Current Conditions	9	211	457	40	73	75*
30 years No Action	12	264	322	34	75	84*
Post-Treatment	11	170	280	42	61	58*
30 Years Post-Treatment	14	223	224	35	67	69*
Selective Thinning- Roosting and Foraging Downgrade						
Current Conditions	12	232	284	37	69	74*
30 years No Action	17	300	193	32	71	85*
Post-Treatment	12	120	154	38	45	39
30 Years Post-Treatment	16	179	122	37	52	51

*Relative Density (Curtis 1982) indices above 0.55 = zone of occurrence of suppression mortality. Without stand treatments that reduce trees per acre, RDIs that remain above the 0.55 RDI threshold leaves stands more vulnerable to drought, insect, and disease mortality. Reducing stand density is critical in meeting the stated purpose and need of the Lost Creek Forest Management Project.

Table 3-4 displays that 30 years following treatment these stands would have less canopy cover than the No Action Alternative would provide in 30 years; however, stand densities would be reduced and the largest trees in the stand would have more optimal growing conditions than the No Action 30-year projection. A treatment to reduce stand densities now would direct the stand toward a more desirable development trajectory to create a multiple canopy, multi-age stand for the future (refer to Figure 3-1a). These treatments would accelerate the development of forest stand conditions that meet long-term management objectives for NSO habitat and shift stand trajectories to encourage key habitat components for the future. Leaving stands at their current condition would not reduce stand densities to their natural carrying capacities and would not improve individual tree vigor in the next 30 years. Reducing stand densities through thinning and regeneration treatments would promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes. Without treatment, these stands would maintain a higher relative density and would remain in a homogenous and uniform stand structure of less complexity for at least 30 years (refer to Figure 3-1b).

Figure 3-1 below illustrates the difference in stand structure conditions in a mature Douglas-fir stand in the Lost Creek Analysis Area modeled with ORGANON and SVS over a 30-year time period. The Stand Visualization System (SVS) illustrates the prescriptions, portraying what existing forest stands look like after application of the proposed prescriptions (USDA and University of Washington, 1995). ORGANON plot data was entered into the SVS program for the simulations. The SVS images below simulate the two modeled scenarios. The figure below shows the long-term change in stand condition following Selective Thinning treatment and No Treatment.

Figure 3-1: Selective Thinning/Mixed Conifer - Nesting, Roosting and Foraging Downgrade



a): Stand structure 30 yr. post-treatment **b): Stand structure 30 yr. no treatment**

Figure 3-2: Selective Thinning/Mixed Conifer - Roosting and Foraging Downgrade

a): Stand structure 30 yr. post-treatment **b): Stand structure 30 yr. no treatment**

Figure 3-3 below shows the long-term change in stand condition following Density Management treatment and No Treatment.

Figure 3-3: Density Management - Roosting and Foraging Maintain

a): Stand structure 30 yr. post-treatment **b): Stand structure 30 yr. no treatment**

Many stands within the Analysis Area exhibit simple, single layer structure or possibly a two-aged structure with overstory trees and understory trees but which lack mid-layer structure. These stands are overstocked and therefore lack growing space to accommodate new cohorts of trees to grow. To create multi-layered structure, with multiple heights and age classes, space must be created through thinning and the creation of openings. Retaining canopy covers of greater than 60% can hinder the ability to thin and create large enough openings for multi-layered tree structure.

Alternative 2 proposes active forest management in conifer stands that would meet multiple stand and landscape-level objectives discussed in Chapter 2 (Section 2.3.1). The prescribed commercial thinning and regeneration harvest treatments under Alternative 2 would allow long-term stand management flexibility. The retention of drought-tolerant and fire-resilient species and reducing the abundance of more shade-tolerant species in the area like white fir, allows for a greater abundance of trees better adapted to local site conditions. In these conifer stands, a reduction of trees per acre would reduce competition-related mortality, increase tree vigor and growth, and maintain preferred species. With an increased tree vigor, the stands would be less susceptible to insects and diseases. Alternative 2 would

reduce the impacts of dwarf mistletoe at the stand level by controlling the spread of the disease through the removal of heavily-infected trees and by maintaining and encouraging resistant species such as pine and incense cedar. Tree species diversity would be maintained or enhanced with the proposed treatments as shade-intolerant species, such as pine, are retained. The trend of forest conditions in the commercially thinned stands would improve and approach the range of natural variation associated with the plant series, leading to more complex stand structures.

Alternative 2 would reduce the effects described above in Alternative 1. Treatments in Alternative 2, combined with past and potential future density reduction treatments in the watershed, would improve stand and landscape resistance and resiliency to environmental disturbances. Commercial and non-commercial treatments would reduce stand densities on BLM-administered lands. Tree growth and vigor would improve through the reduction of competition for limited site resources. This would increase the resiliency of stands and individual larger, older trees to ensure their longevity.

Alternative 3

Alternative 3 proposes to treat 869 acres, or approximately 7%, of BLM forestland in the Analysis Area. Selective Thinning would be used to treat 217 acres of forest stands; Density Management would be used to treat 500 acres of forest stands; and Small Diameter Thinning would be used to treat 152 acres of forest stands. Refer to Chapter 2 for descriptions of the Silvicultural Prescriptions. Alternative 3 proposes less acres of treatment than Alternative 2; therefore, impacts at the landscape level would be less than Alternative 2. At the stand level, the thinning intensity of treatments proposed would be reduced as well. Alternative 3 proposes to treat 869 acres of conifer stands, which is approximately 7% of the forestland in the Analysis Area (refer to Table 2-1).

Alternative 3 focuses on trying to achieve a higher level of protection for NSOs while still trying to achieve the other purpose and needs identified for the project. This alternative focused on reducing the amount of acres treated within NSO home ranges and reducing the amount of habitat downgrade. As a result, target canopy cover retention levels are higher compared to Alternative 2. Similar to Alternative 2, the proposed silvicultural treatments would result in stands with fewer but larger trees and trees with increased growth rates. The healthiest large conifers and hardwoods would be maintained by reducing adjacent competing vegetation, although considerably less competing vegetation would be removed in comparison to Alternative 2. Commercial thinning treatments would promote more drought-tolerant and fire-resilient species (pine) over shade-tolerant species (white fir) by reducing tree competition around healthy pine species and by selecting trees based off of tree species preference Variable stand structure would be maintained through individual tree selection. These treatments would be beneficial to the units treated; however, there would be considerably less acres treated than in Alternative 2. The effects of treating less acreage are described in detail under Alternative 1 the No Action Alternative.

Summary of Action Alternatives

In summary, stands proposed for treatment under the Lost Creek Project would benefit immediately from silvicultural treatments. However, the stand and landscape benefits vary by Alternative. The degree of silvicultural benefit varies between Alternative 2 and Alternative 3. Alternative 2 would meet silvicultural and management objectives described in the Medford District RMP on approximately 71% of commercially treated acres. The remaining 29% of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60%, it is likely that conifer growth and yield projections would not be met on these acres. However, these silvicultural treatments would reduce short-term impacts to forest stands previously described in this section. Silvicultural treatments would improve and/or maintain vigorously growing conifer forests, reduce tree mortality, and encourage a mixture of tree species that are more fire resilient and have greater longevity than the current

composition. Short-term reductions in canopy cover would eventually recover and treated stands would be put on a trajectory towards developing more optimal conditions. Alternative 3 would meet silvicultural and management objectives described in the Medford District RMP on approximately 42% of the acres commercially treated. Of the remaining 58% of commercially treated acres, where silvicultural treatments maintain a canopy cover greater than 60%, it is likely that conifer growth and yield projections would not be met on these acres.

Alternative 2 would treat the most acres and bring stands to more optimal density levels and would have more ability to create favorable conditions for species diversity compared to Alternative 3. In most stands that retain 60% or greater canopy cover, relative densities would remain above the zone of suppression mortality. Stands that remain above this threshold are more vulnerable to drought, insect, and disease mortality, and are therefore less resilient to disturbance. Shade-intolerant species require higher levels of light and lower levels of tree competition than more shade-tolerant species. The ability to create favorable conditions for shade-intolerant species, such as pine and oak, are limited when canopy cover retentions remain at 60% or greater on average, because high levels of canopy cover retention can be compromised when openings are created around shade-intolerant species.

Cumulative Effects

Past Actions

Refer to the Brief History of the Project Area and Consideration of Past, Ongoing, and Reasonably Foreseeable Actions in Effects Analysis sections of this EA (Sections 3.1.1 and 3.1.2).

Ongoing and Reasonably Foreseeable Future Actions

Timber Sale activities in progress on BLM-administered lands in the Lost Creek Analysis Area include the Vine Maple Timber Sale Contract. Approximately 79 acres were harvested in the Vine Maple Timber Sale within the Project Area in 2012. The treatment prescription for these stands was Restoration Thinning, which is similar to proposed prescriptions in the Lost Creek Project.

Additional vegetative treatments such as protection, maintenance, precommercial thinning, and release would likely continue to occur as needed in young stands within the reasonably foreseeable future. Brush and hardwood control are two primary management activities that are most likely to occur. Hazard tree reduction, Baker Cypress Restoration Projects and Blowdown Salvage Projects are also planned to occur this summer (2016). These projects would not have a measurable effect on forest condition.

Findings

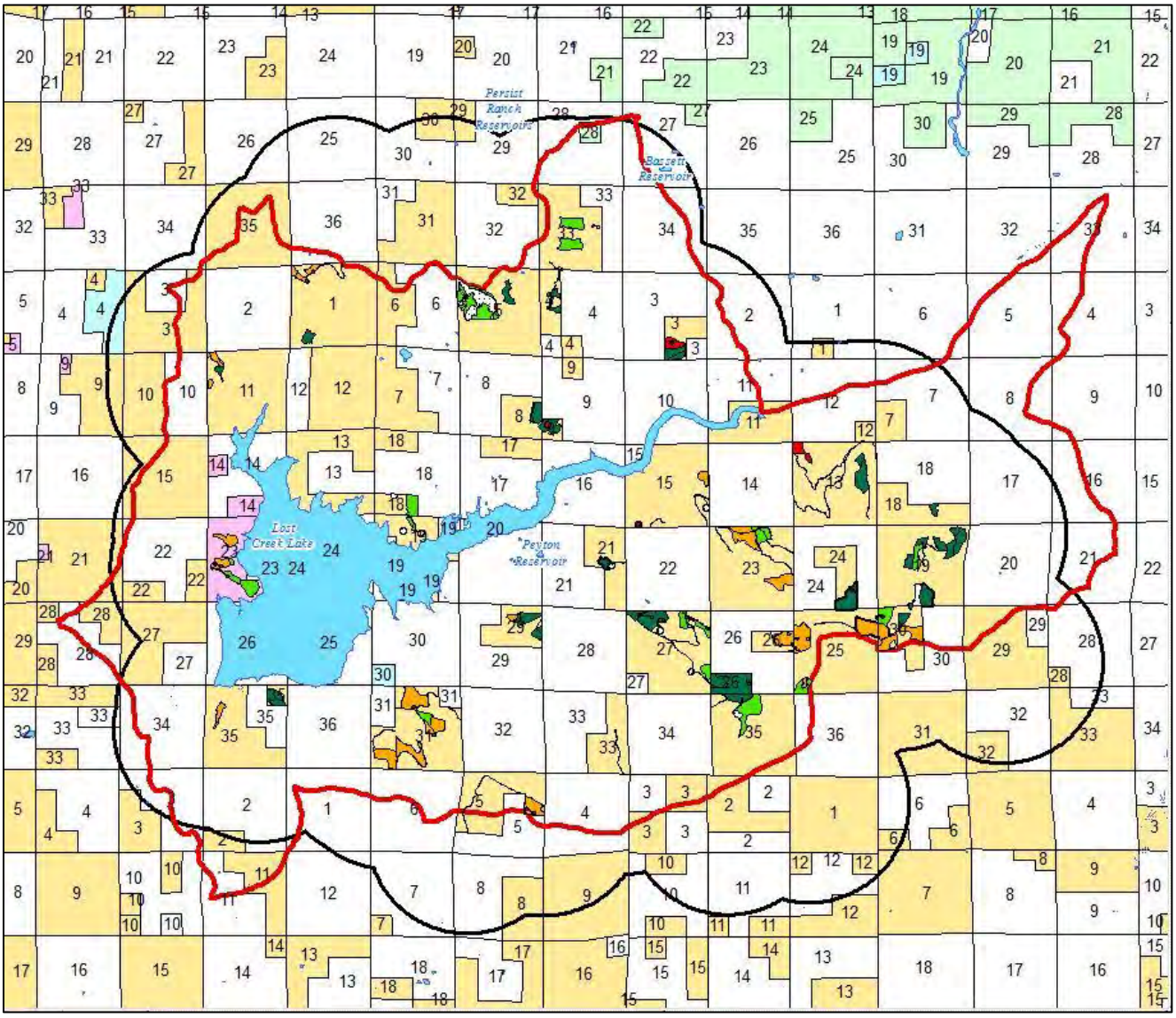
When considering the effects of the proposed actions, under either Alternative 2 or Alternative 3, in combination with other ongoing and reasonably foreseeable actions in the Analysis Area, there is no potential for adverse cumulative effects to forest vegetation. Other forest management projects (ongoing and reasonably foreseeable) within the Analysis Area will improve tree vigor, reduce risk for insect and disease impacts, and will improve fire resiliency in the treated forest stands. This project only increases the acreage of treated forestlands within the Analysis Area. Alternative 2 would treat 1,209 acres representing 10% of the BLM forestland in the Analysis Area. Alternative 3 would treat 869 acres representing 7% of the BLM forestland in the Analysis Area. The actions proposed under the Lost Creek Project, when combined with other relevant ongoing and reasonably foreseeable actions on BLM-administered lands within the Analysis Area would further improve tree vigor, reduce the impacts of disease, and improve fire resiliency.

3.3 NORTHERN SPOTTED OWL HABITAT

Issue 2: How would timber harvest and road construction activities affect constituent elements (canopy cover, snags and down wood, large trees, mistletoe brooms**, stand structure, and prey availability) within stands used by northern spotted owls for nesting, roosting, and foraging, dispersal, and within their Critical Habitat?**

This section analyzes the potential impacts from the proposed forest management activities on northern spotted owl (NSO) habitat.

Figure 3-4: The Analysis Area and the Lost Creek Project Area



3.3.1 Methodology

- The NSO Habitat Analysis Area includes all areas of suitable NSO habitat on federal lands (BLM and Forest Service (USFS)) within the home range circles (1.2 miles) for the 18 known owl sites affected by, or in the vicinity of, the proposed projects; and, includes all areas of suitable NSO habitat on federal lands within the provincial home range radius (1.2 miles) of proposed treatment units. Figure 3-3 above illustrates the Analysis Area (black) in relation to the Project Area (red).

- The process for conducting biological evaluations and assessments includes a review of existing records, field reconnaissance, field surveys, and analysis of potential impacts. The project wildlife biologist conducted a review of potential wildlife habitat using field assessments, maps, aerial photographs, GIS software, wildlife survey data, and stand exam records for the Analysis Area.
- The BLM wildlife biologist classified NSO habitat in the Analysis Area by habitat type (Table 3-5) using 1997 IVMP (Interagency Vegetation Mapping Project), FOI (Forest Operations Inventory), TPCC (Timber Production Capability Classification), and on-site habitat analysis. IVMP is a joint USFS/BLM project that derives a 25-meter pixel-based vegetation map from 1997 satellite imagery. The 1997 IVMP provides a representation of vegetation age classes across all ownerships within the Analysis Area. The vegetation map has been classified into categories according to the Interagency Vegetation Standards that were adopted by the Interagency Advisory Committee. IVMP data is primarily useful for cumulative effects analysis that includes public and private lands. The FOI gives a more detailed description of age classes on BLM-administered lands because it is based on field data as well as aerial photo inventories. The combined data allows the vegetation to be grouped into the early, mid-, and late seral age classes for comparison purposes, although these data sources have differing degrees of detail and resolution. The TPCC refers to the suitability of the soil to produce timber.
- RA 32 Habitat Evaluation Methodology 1.3 was used to determine the presence or absence of highly suitable, structurally complex NSO nesting habitat in all project units under consideration in this analysis. This methodology complies with the Recovery Action 32 (RA 32) recommendation in the *Revised Recovery Plan for the Northern Spotted Owl* (USDI FWS 2011) to maintain all of the older and more structurally complex, multilayered coniferous forests.
- Using recommendations from Recovery Action 10 (RA 10) in the NSO Recovery Plan, known NSO sites within the Analysis Area were identified and considered for habitat retention or enhancement (see Chapter 2, section 2.2, Development of the Project).
- The BLM is conducting strategic NSO surveys following the 2011 Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls (USDI FWS 2011).

3.3.2 Assumptions

Late-successional forest habitat is 80 years or older. Late-successional forest generally, but not always, provides suitable dispersal, foraging, and/or nesting habitat for NSOs. Suitable NSO nesting habitat is usually 80 years and older, but also contains other attributes, such as multiple tree layers, snags, and decaying logs. NSO habitat is specifically rated for its suitability for NSOs, while late-successional forest (not always rated as suitable NSO habitat) may provide habitat for other wildlife species.

3.3.3 Affected Environment

3.3.3.1 Northern Spotted Owl Habitat

The northern spotted owl (NSO), listed as threatened under the Endangered Species Act, is associated with the existing habitats found within the Analysis Area. NSOs prefer coniferous forest with multiple vertical layers of vegetation; a variety of tree species and age classes; and the presence of large logs and large diameter live and dead trees (snags) for nesting/roosting/foraging (NRF) habitat. They may also be found in younger stands with multilayered, closed canopies, large diameter trees, and abundance of dead and down woody material. Based on studies of owl habitat selection, including habitat structure and use and prey preference throughout the range of the owl, NSO habitat consists of four components: nesting, roosting, foraging, and dispersal (Thomas et al. 1990) (Table 3-5).

Table 3-5: Northern Spotted Owl Habitat Types

Habitat Type	Description
High-quality habitat (RA 32) Subset of NRF habitat	Older, multilayered, structurally complex forests characterized as having large trees greater than 17 to 21 inches in diameter (depending on annual precipitation), high canopy cover (greater than 60%), and quantifiable decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees (Figure 3-4). RA 32 habitat may vary due to climatic gradients across the range.
Suitable nesting/roosting/ foraging (NRF)	These forests have a high canopy cover (greater than 60%), a multilayered structure, and large overstory trees greater than 21 inches in diameter. Deformed, diseased, and broken-top trees, as well as large snags and down logs, are also present. NRF habitat meets all NSO life requirements.
Roosting/Foraging (RF)	Canopy cover greater than 60% and canopy structure generally single layered. Overstory trees are generally greater than 16 inches in diameter. Snags and down wood not considered a requirement.
Dispersal	This habitat is not suitable for nesting, but provides requirements believed important for NSO dispersal. Canopy cover is generally between 40 and 60%. In stands with greater than 60% canopy cover, overstory tree diameters are generally between 11 and 16 inches DBH. The area has the capability of becoming foraging or nesting habitat. Deformed trees, snags, and down wood are absent or less prevalent than in Type 1 habitat.
Capable	Does not presently meet NSO needs but has the potential to grow into habitat Types 1, 2, or 5.
Non-habitat	Does not have the potential to develop into late-successional forest or supporting old-growth dependent species.

Suitable NRF habitat in southwest Oregon is typified by mixed-conifer habitats with recurrent fire history, patchy habitat components, and higher incidences of woodrats. A review of current habitat ratings of 20,266 acres of federal lands (BLM and USFS) within the Analysis Area indicates that 40% (8,166 acres) of federal lands provide NRF habitat (of which 906 acres were identified as RA 32 habitat); 4% (791 acres) provide roosting/foraging habitat; 19% (3,788 acres) provide dispersal-only habitat; 27% (5,546 acres) provide capable habitat; and 10% (1,949 acres) is non-habitat (Table 3-6.. Suitable NRF and roosting/foraging habitat also functions as dispersal habitat.

Figure 3-5: Example of the RA 32 habitat identified and retained in the Analysis Area. Photo by David Roelofs

Table 3-6. Percentage of Habitat Types Present in the Analysis Area

Habitat Type	NRF	RF	Dispersal	Capable	Non-Habitat
Analysis Area	40%	4%	19%	27%	10%

3.3.3.2 Critical Habitat

In December 2012, the USFWS released the *Designation of Revised Critical Habitat for the Northern Spotted Owl, Final Rule*, which designated NSO critical habitat on federal lands. A critical habitat unit (CHU) identifies geographic areas that contain features essential for the conservation of the NSO and may require special management considerations. For the NSO, these features include particular forest types of sufficient area, quality, and configuration distributed across the range of the species that will support the needs of territorial owl pairs throughout the year, including NRF and dispersal habitat.

The Analysis Area is outside of designated critical habitat (only federal land is designated as critical habitat) and critical habitat will not be analyzed further.

3.3.3.3 Northern Spotted Owl Recovery Plan

The 2011 *Revised Recovery Plan for the Northern Spotted Owl* recommends retaining or enhancing all known NSO sites as well as retaining high quality habitat (see Section 3.3.1). The Recovery Plan is not a regulatory document; it provides guidance to bring about recovery through prescribed management actions and supplies criteria to determine when recovery has been achieved. The BLM works with the USFWS to incorporate the Recovery Goals and Actions in the Recovery Plan consistent with BLM laws and regulations.

The current foundation of the NSO recovery plan is the 1994 Northwest Forest Plan (NWFP). Management direction and land use allocations in the standards and guidelines of the NWFP are intended to constitute the USFS and BLM contributions to the recovery of the NSO (USDA and USDI 1994a). The Medford District ROD/RMP and the NWFP provide a network of late-successional reserves (including 100-acre activity centers), connecting riparian corridors, connectivity/diversity blocks, and 15% late-successional forest retention on federal lands in 5th field watersheds.

3.3.3.4 Known Northern Spotted Owl Activity Centers

The NWFP designated 100 acres of the best habitat on federal lands to be retained as close as possible to NSO nest sites or activity centers for all known sites as of January 1, 1994. This was intended to preserve an intensively used portion of the breeding season home range close to a nest site or center of activity (USDI 1995; USDA and USDI 1994). These known northern spotted owl activity centers (KSOACs) are managed as late-successional reserves. Eleven 100-acre KSOACs are located within the Analysis Area.

3.3.3.5 Provincial Home Range

The home range is a circular area around a NSO center of activity. The size of the home range is based on the geographic province in which it is located. The Lost Creek Project is located within the West Cascades province. The provincial home range for the West Cascades province is a 1.2-mile radius from the KSOAC. Proposed projects are located within the provincial home ranges of 18 known NSO sites (Table 3-6). A known NSO site is defined as a location with evidence of historic or current use by NSOs. Evidence includes breeding, repeated location of a pair or single bird during a single season or over several years, presence of young before dispersal, or some other strong indication of occupation. Each of the owl sites is a mixture of private and public lands. Seven of the known NSO sites were

discovered after January 1, 1994 and do not have established 100-acre activity centers (USFS and BLM 1994, C-10). In the past ten years, 12 of the 18 known sites had a pair of NSOs, with seven known sites having a pair in the past five years. Surveys detected a single owl during night surveys in four known sites in the past five years. The BLM conducted surveys in the Analysis Area in 2015; a nesting pair has been documented in Site #2220O and #3561B in 2015.

Based on studies, suitable (NRF) habitat coverage of at least 40% or higher at the home range scale (Bart and Forsman 1992; Bart 1995) and 50% or higher at the core area scale (Dugger, et al. 2005) is likely necessary for maintaining NSO life history functions. As the amount of suitable habitat in an owl's home range decreases, so does site occupancy, reproduction, and survival. A combination of forest fires, severe wind storms, and timber harvest on private and BLM-administered lands has occurred in these home ranges. Each home range located within the Lost Creek Analysis Area currently contains less than the 40% suitable NRF habitat that the best available information indicates are the habitat amount values important to NSO habitat fitness at the home range scale.

The BLM integrated Recovery Action 10 (RA 10) into project planning to minimize effects to NSOs and their habitat within known home ranges. BLM incorporated RA 10 to the extent it was compatible with the primary purpose and need of the project to provide for a sustainable supply of timber, help meet the Medford BLM's annual timber volume target, and improve forest health. To the extent practicable, the BLM followed principles in the SW Oregon Recovery Action 10 Guidance Document (USDA, USDI, and USDI FWS 2013) to reduce impacts to sites with recent pair or reproduction activity within the Analysis Area.

The project's wildlife biologist prioritized the NSO sites within the Analysis Area in high or low categories based on occupancy and reproductive success data. Six of the eighteen sites (Table 3-7) rated as high in the RA 10 prioritization because of their recent pair occupation or reproductive status within the last five years. The remaining twelve sites within the Analysis Area rated as low in the RA 10 prioritization because of the poor recent NSO occupation history. The objective at the high priority sites is to avoid adverse effects by not removing or downgrading NRF habitat within the home range. The objective at the low priority sites are to accelerate the growth of NSO habitat or treat stands for ecological benefits as described in the Revised Recovery Plan for the Northern Spotted Owl. A core team consisting of the project's wildlife biologist, silviculturist, and forester worked together using the RA 10 methodology to identify areas to conserve or enhance within NSO home ranges based on whether they were ranked as high or low. The core team focused on reducing the amount of timber harvest within the 0.5-mile core area because it is the area that provides the important habitat elements of nest sites, roost sites, and access to prey that benefit NSO survival and reproduction (Bingham and Noon 1997).

Table 3-7. Northern spotted owl Sites within the Lost Creek Analysis Area

Site #	Survey Results 2011 - 2016	Historic Summary				
		Number of Years			Last Year	
		Surveyed (at least 1 visit)	With Pairs	Nested with Young	With Pair	Nested with Young
RA 10 High Priority Sites						
1831O	Pair in 2016. Single spotted owl detected once in 2012. Barred owl pair 2013 – 2014. Single barred owl in 2011.	23	6	3	2016	2007
2220O	Occupied by pair. Nested 2014 – 2015.	25	20	8	2016	2015
2276O	Pair observed in 2016. Barred owl 2013 – 2015. Barred owl pair in 2012	25	12	4	2016	2005
3561A*	Pair in 2013.	7	6	0	2013	-
3561B*	Occupied by pair.	3	3	1	2016	2015
3561O	Pair in 2011 – 2012.	25	10	2	2012	2010
RA 10 Low Priority Sites						
0879O	Single male spotted owl and barred owl in 2015. Barred owl pair in 2011 – 2014.	23	14	5	2006	2006
0953A*	Single spotted owl in 2012.	9	6	2	2009	2006
0953O	Undetected 2012 – 2015. Pair detected once in 2011.	18	14	8	2011	2010
2003O	No spotted owl detections. Barred owl pair 2011 – 2016.	25	15	2	2004	1989
2024O*	No spotted owl detections. Barred owl 2013 – 2014.	11	3	0	2007	-
2058O	No spotted owl detections. Barred owl 2012 – 2015.	25	8	3	1998	1996
2221O	No spotted owl detections. Barred owl in 2015.	24	12	3	2006	2002
2359O	Single spotted owl male in 2013 and 2011. Barred owl pair 2013 – 2016.	24	0	0	-	-
3562O*	Single male spotted owl detected once in 2014.	17	0	0	-	-
4036O	No spotted owl detections. Barred owl 2011, 2012, 2014. Barred owl pair in 2013.	22	6	3	2002	2001

Site #	Survey Results 2011 - 2016	Historic Summary				
		Number of Years			Last Year	
		Surveyed (at least 1 visit)	With Pairs	Nested with Young	With Pair	Nested with Young
4465O*	No spotted owl detections.	14	3	2	1999	1999
4617O*	No spotted owl detections. Barred owl pair 2012 – 2016.	11	6	1	2008	2003
*Sites discovered after January 1, 1994.						

3.3.3.6 Late-Successional Forest

The Medford District RMP (USDI 1995, pp. 39, 47) and the NWFP (USDA and USDI 1994a) require that 15% of all federal forest lands within 5th field watersheds retain late-successional forest conditions, generally defined as stands 80 years or older. Late-successional forest conditions allow for NSO dispersal, foraging, or nesting opportunities. Currently, 62% (7,989 of 12,927 acres) of BLM forested land in the Lost Creek-Rogue River 5th field watershed is in late-successional condition, and 51% (3,283 of 6,382 acres) of BLM forested land in the South Fork Rogue River 5th field watershed is in late-successional condition.

3.3.3.7 Connectivity/Diversity Blocks

The 1995 Medford District ROD/RMP designated connectivity/diversity blocks that are located throughout the northern General Forest Management Area (GFMA) matrix land use allocation. These blocks provide habitat connectivity for old-growth dependent and associated species within the northern GFMA and between late-successional reserves. Each block is to maintain at least 25% to 30% in late-successional forest (USDI 1995, p. 40). These blocks may be a combination of NSO nonhabitat and NRF, dispersal, and capable habitat. The Analysis Area contains three connectivity/diversity blocks in T33S, R1E, section 1; T33S, R2E, section 15; and T33S, R3E, section 29. Currently, 84%, 90%, and 96% of forested land in the connectivity blocks is in late-successional condition, respectively.

3.3.3.8 Northern Spotted Owl Population Trends

NSO reproduction, or productivity, varies widely year-to-year, depending on how spring weather conditions affect prey availability (Franklin et al. 2000). Eleven demographic study areas have been established to represent owl status across the range of the NSO (Forsman et al. 2011). Owl sites and productivity are annually monitored within these areas to:

- Assess changes in population trend and demographic performance of NSOs on federal forest lands within the range of the owl; and
- Assess changes in the amount and distribution of NRF and dispersal habitat for NSOs on federal forest lands.

The Medford District shares the Klamath Demographic Study Area with Roseburg BLM and the Rogue River-Siskiyou National Forest. The Klamath Study Area is one of eight long-term study areas that were established before the NSO was listed and before the NWFP was developed. The Klamath Study Area is located approximately 40 miles west of the Lost Creek Analysis Area.

The Southern Oregon Cascades Demographic Study Area is located approximately 10 miles east the Lost Creek Analysis Area, on USFS lands. Metadata analysis evaluates population statistics of the owls in the demographic study areas. Recent metadata analyses were completed in 2011 and 2014, which found that fecundity, the number of female young produced per adult female, is declining. Forsman et al. (2011) concluded that fecundity, apparent survival, or populations were declining on most study areas, and that increasing numbers of barred owls and habitat loss were partly responsible for these declines.

According to the 2012 Annual Report for the Southern Oregon Cascades Demography Study Area, at least one NSO was detected at 71 (42%) of the sites. This represented a 3.5% increase from 2011. However, the 44 pairs located were the fewest recorded during the study. The average fecundity rate in 2012 was 0.24 (averaged across sites in Matrix and late-successional reserve land use allocations, and wilderness). There were 22 juveniles detected in the Southern Oregon Cascades Study Area in 2012 (Dugger et al. 2013). The 2013 data indicates the occupancy and fecundity rates declined compared to 2012. At least one NSO was detected at 60 (35%) of the sites in 2013, which represents a decline in occupancy of 7% from 2012. The average fecundity rate was 0.20 in 2013, which also represents a decline from 2012. Thirteen juveniles were detected in the study area in 2013 (Dugger et al. 2014). The 2014 data indicates the occupancy rate declined compared to 2013. At least one NSO was detected at 53 (31%) of the sites in 2014, which represents a decline in occupancy of 4% from 2013. The average fecundity rate was 1.31 in 2014, which is an increase from 2013. Forty-seven juveniles were detected in the study area in 2014 (Dugger et al. 2015).

3.3.3.9 Barred Owls

Barred owls (*Strix varia*) are native to eastern North America, but have moved west into NSO habitat. The barred owl's range now completely overlaps that of the NSO (Courtney et al. 2004). Barred owls are considered generalists and make use of a variety of vegetation and forage species (Wiens, Anthony and Forsman 2014). Existing evidence suggests barred owls compete with NSOs for habitat and prey with near total niche overlap. Interference competition (Dugger et al. 2011; Van Lanen et al. 2011) is resulting in increased NSO site abandonment, reduced colonization rates, and likely reduced reproduction (Dugger et al. 2011; Forsman et al. 2011; Wiens et al. 2014), ultimately resulting in probable range-wide population reductions (Forsman et al. 2011). Barred owl effects on NSO survival and colonization appear to be substantial and additive to effects of reduction and fragmentation of habitat in NSO home ranges. The magnitude of the barred owl effect may increase somewhat as habitat quantity decreases and fragmentation increases (Dugger et al. 2011).

Activities that reduce the quantity of older forests adjacent to KSOACs reduce the probability of continued occupancy, survival, and reproduction (Franklinet al. 2000; Olsonet al. 2004; Dugger, et al. 2005; Dugger et al. 2011; Schilling et al. 2013). When barred owls are present, the effect of such activities on NSO pair survival (estimated as probability of extinction of a single territory and termed "extinction probability") may be exacerbated by 2–3 times (Dugger et al. 2011). Some NSOs appear to be able to successfully defend territories and reproduce when barred owls are present, (Dugger et al. 2011; Wiens et al. 2014), but the mechanism that allows them to persist is currently unknown.

Single barred owl detections were made at three different NSO sites, along with barred owl pairs detected at eight different sites during NSO surveys between 2011 and 2015 within the Analysis Area (Table 3-7). While the BLM did not specifically survey for barred owls, a study in the Oregon Coast range suggests that over the course of a season, NSO surveys to protocol (> 3 visits) allow approximately 85% of the barred owls present in the area to be detected (Wiens et al. 2011). Additionally, the USFWS's *Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls* (2011 NSO Survey Protocol) allows for a reasonable assurance that NSOs in an

area will be detected, even where barred owls are present. The USFWS and cooperators conducted analyses of historical NSO survey data, leading to estimates of detection rates for NSOs that account for the effects of barred owl presence. These detection rates, along with data on NSO site colonization and extinction probabilities, and empirical analysis of NSO site occupancy, were employed in developing the survey protocol used by the BLM in the Analysis Area. Use of the 2011 Protocol serves two primary purposes: (1) provide a methodology that results in adequate coverage and assessment of an area for the presence of NSOs, and (2) ensure a high probability of locating resident NSOs and identifying owl territories that may be affected by a proposed management activity, thereby minimizing the potential for unauthorized incidental take (USDI FWS 2011, p. 4).

3.3.4 Environmental Consequences

Alternative 1 - No Action

Under Alternative 1, no forest management activities would occur. Stands providing suitable NSO habitat would remain owl habitat. Without treatments, the trajectories of some stands to grow into suitable habitat would continue at a slower rate. Without forest management actions, simplified stands would take longer to develop heterogeneity and multiple tree layers, and stands would remain overstocked and at a higher risk of stand-replacement fire. Simplified stands would remain as dispersal or roosting/foraging habitat longer than if they were opened up and allowed to develop lower tree layers, becoming NRF habitat. Stand-replacing fires would remove habitat until it can recover in up to 80 years.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Northern Spotted Owl Habitat

The following management actions are proposed on 1,209 acres in Alternative 2: Density Management, Selective Thinning/Douglas Fir (DF), Selective Thinning/Mixed Conifer (MC), Regeneration Harvest (NGFMA), Regeneration Harvest (Structural Retention), Small Diameter Thinning, Understory Reduction, and Activity Fuels Management. Temporary route construction; roadside vegetation maintenance; log, helicopter, and service landing construction; timber haul; Meadow Restoration; and Water Source Restoration are also proposed in Alternative 2 (Table 3-8.). See also Table 3-10: *Anticipated Impacts within Owl Home Ranges*.

A seasonal restriction would be implemented for projects that could cause a noise disturbance to nesting NSOs (See Chapter 2, PDFs and Appendix A, Issue Q).

Logging activity disrupts ground-level shrub and coarse woody debris habitat for NSO prey species; however, the shrub layer would fill back in within two to five years and current coarse woody debris would be left on site. The impacted prey species would rebound within two to thirty years.

Ground-based yarding, skyline cable yarding, helicopter yarding, Understory Reduction, and activity fuels treatments would work in conjunction with the commercial prescriptions described below and would not increase the effects to owl habitat described below.

Haul routes that would be renovated, and roads that would be partially or fully decommissioned, are not functioning as NSO habitat and therefore would not contribute to NSO habitat downgrade or removal.

Pre-designated skid trails would not contribute to reducing the overall canopy cover within stands of trees (0.04 miles are proposed within stands in NRF habitat, 0.1 miles in roosting/foraging habitat, and

0.2 miles in dispersal habitat). The remainder of proposed pre-designated skid trails (0.28 miles) is in locations that are not currently functioning as NSO habitat. Existing coarse woody debris would be avoided or moved, and retained, when located (See Chapter 2, Section 2.5).

Water source restoration sites (5 sites) are not functioning as NSO habitat and therefore would not contribute to NSO habitat downgrade or removal.

The proposed projects (Density Management, Selective Thinning, Small Diameter Thinning, roadside vegetation maintenance, and Meadow Restoration) that would maintain NSO habitat include:

- Canopy cover within treated stands functioning as NRF, roosting/foraging, or dispersal habitat would be retained at or above 60% and 40%, respectively;
- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment; and
- Multiple canopy, uneven-aged tree structure that was present prior to treatment would remain post-treatment.

The proposed projects (Selective Thinning and Small Diameter Thinning) that would downgrade NSO NRF and roosting/foraging habitat include:

- Canopy cover within treated stands functioning as roosting/foraging habitat would be brought to between 40% and 60%;
- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
- Multiple canopy, uneven-aged tree structure that was present prior to treatment would remain post-treatment; and
- Heterogeneity in tree structure and forest health would be promoted.

The proposed projects (Selective Thinning, Regeneration Harvest, and temporary route and new landing construction) that would remove NSO habitat include:

- Canopy cover in treated areas would be brought below 40%; and
- Coarse woody debris and fallen large snags would be moved adjacent to the treated footprint as down wood.

Table 3-8. Proposed Projects and the Potential Impact to NSO Habitat – Alternative 2

Forest Management			
Commercial Prescriptions	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Density Management	NRF	NRF Maintained	186
Density Management	RF	RF Maintained	167
Selective Thinning	NRF	NRF Downgraded	100
Selective Thinning	RF	RF Maintained	16
Selective Thinning	RF	RF Downgraded	307
Selective Thinning	RF	RF Removed	21
Selective Thinning	Dispersal	Dispersal Maintained	184
Selective Thinning	Dispersal	Dispersal Removed	26
Selective Thinning	Capable	No Effect	20
Regeneration Harvest – NGFMA	NRF	NRF Removed	15
Regeneration Harvest – Structural Retention	RF	RF Removed	15
Small Diameter Thinning	RF	RF Maintained	70
Small Diameter Thinning	RF	RF Downgraded	40
Small Diameter Thinning	Dispersal	Dispersal Maintained	42
		Total	**1,209**
Transportation Management	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Temporary Route Construction	NRF	NRF Removed	2
Temporary Route Construction	RF	RF Removed	3
Temporary Route Construction	Dispersal	Dispersal Removed	4
Temporary Route Construction	Capable	No Effect	1
Roadside Vegetation Maintenance	NRF	NRF Maintained	5
Roadside Vegetation Maintenance	RF	RF Maintained	6
Roadside Vegetation Maintenance	Dispersal	Dispersal Maintained	5
Roadside Vegetation Maintenance	Capable	No Effect	11
New Landings	NRF	NRF Removed	4
New Landings	RF	RF Removed	10
New Landings	Dispersal	Dispersal Removed	3
New Landings	Capable	No Effect	21
		Total	**75**

Forest Management			
Transportation Management	**Current Habitat**	**Treatment Affect**	**Est. Miles**
Temp Route Reconstruction	Non-Habitat	No Effect	0.29
Road Renovation/Reconstruction	Non-Habitat	No Effect	97.0
Partial Road Decommissioning	Non-Habitat	No Effect	3.0
Full Road Decommissioning	Non-Habitat	No Effect	2.0
Rocking Wet Season Haul Routes	Non-Habitat	No Effect	10.0
Pre-Designated Skid Trail	NRF	NRF Maintained	0.04
Pre-Designated Skid Trail	RF	RF Maintained	0.10
Pre-Designated Skid Trail	Dispersal	Dispersal Maintained	0.20
Pre-Designated Skid Trail	Capable	No Effect	0.28
		Total Miles	**112.9**
Other Projects	**Current Habitat**	**Treatment Affect**	**Sites**
Water Source Restoration	Non-Habitat	No Effect	5
Other Projects	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Meadow Restoration	Dispersal	Dispersal Maintained	51
Meadow Restoration	Non-Habitat	No Effect	55

Density Management (353 acres) would be a combination of both proportional thinning and thinning from below. Proportional thinning consists of removing trees from each size class and thinning from below consists of removing trees from the lower canopy classes, such as intermediate and suppressed trees. The proportional thinning would not meet the exact definition of a proportional thin because trees exhibiting old-growth characteristics would typically be retained (see Appendix B, Marking Guidelines). Generally, smaller trees would be targeted for removal over larger trees but the intent is to maintain the current structure and not remove one single tree layer and simplify the stand. Trees targeted for removal would include those exhibiting a crown ratio decline and narrow crown widths, and which contribute least to the canopy layer or structural diversity.

Density Management would:

- Maintain 186 acres of NRF habitat;
- Maintain 164 acres of roosting/foraging habitat; and
- Remove three acres of roosting/foraging habitat for landings and temporary routes.

Trees may be marked in small patches (i.e., groups of trees with poor crowns) and left in clumps (i.e., groups of old trees) to create hiding cover for wildlife species and increase spatial heterogeneity. The size of patches or openings would be no greater than 0.20 acres and would not exceed 5% of the total treatment unit area.

Through Density Management, maintaining diversity and heterogeneity within the stand, opening up the canopy to promote regeneration, and reducing tree density to accelerate growth of remaining trees, would have a long-term benefit towards creating future NRF habitat.

Selective Thinning (674 acres) would be a combination of thinning and group selection, to the extent or amount recommended by vegetation type and/or plant series that exists. These stand treatments would generally target low vigor trees to reduce stand density and improve stand resiliency and individual tree

health. Selective Thinning would be thinned using guidelines to reduce basal area to between 100 and 150 ft² per acre. These stands are generally dominated by a Douglas-fir, ponderosa pine, and white fir overstory, with less prominent species as incense cedar and sugar pine.

Selective Thinning would:

- Downgrade 98 acres of NRF habitat to dispersal habitat;
- Remove two acres of NRF habitat for landings and temporary routes;
- Maintain 16 acres of roosting/foraging habitat;
- Downgrade 300 acres of roosting/foraging habitat to dispersal habitat;
- Remove seven acres of roosting/foraging habitat for landings and temporary routes;
- Remove 21 acres of roosting/foraging habitat;
- Maintain 179 acres of dispersal habitat;
- Remove five acres of dispersal habitat for landings and temporary routes;
- Remove 26 acres of dispersal habitat; and
- Have no effect on 20 acres of capable habitat.

Through Selective Thinning, stand density would be reduced in order to reduce stand mortality from wildfire, drought, disease, and insects; and promote tree growth, quality, and vigor of the remaining trees; stand structure would be diversified; spatial heterogeneity would be developed; and growing space would be increased for large legacy pine, oak, and cedar. The increased stand diversity and structure promoted through Selective Thinning would have a long-term benefit by pushing stands towards future suitable roosting/foraging and NRF habitat sooner than if not treated.

Also, through Selective Thinning, trees infected with mistletoe would be selectively removed where mistletoe is likely to spread into unaffected areas without treatment, in order to reduce the level of infection in target stands and decrease the rate of proliferation.

Regeneration Harvest NGFMA (15 acres) would reduce the canopy cover to below 40% and would retain six to eight trees per acre greater than 20 inches DBH (diameter at breast height).

Regeneration Harvest NGFMA would:

- Remove up to 15 acres of NRF habitat, which would become capable habitat.

Regeneration Harvest Structural Retention (15 acres) would reduce the canopy cover to below 40% and would retain 16 to 25 trees per acre greater than 20 inches DBH.

Regeneration Harvest Structural Retention would:

- Remove up to 15 acres of roosting/foraging, which would become capable habitat.

Small Diameter Thinning (152 acres) would thin in younger ponderosa pine and mixed conifer stands that have high stand densities to promote stand health, create structural diversity, and increase landscape resiliency to environmental disturbances.

Small Diameter Thinning would:

- Maintain up to 70 acres of roosting/foraging habitat;
- Downgrade up to 40 acres of roosting/foraging to dispersal habitat; and

- Maintain up to 42 acres of dispersal habitat.

Helicopter, service, and log landing (23 acres) **and temporary route construction** (6 acres) **outside proposed treatment units** would:

- Remove up to four acres of NRF, up to one acre of roosting/foraging, and up to two acres of dispersal habitat, which would become capable habitat; and
- Use up to 22 acres of capable habitat for landings and temporary routes with no effect on owl habitat.

Roadside vegetation maintenance would remove vegetation from about 6 to 24 inches in diameter six feet horizontally from the center line of the ditch away from the road and six feet horizontally from the outside shoulder of the road. Vegetation may be hardwood or conifer trees that have grown up since the road was constructed and were not removed during road maintenance when the vegetation was smaller. Roadside vegetation maintenance would:

- Remove vegetation along up to 17 miles of road and would maintain up to five acres of NRF, six acres of roosting/foraging, five acres of dispersal habitat, and have no effect on eleven acres of capable habitat.

The roadside vegetation treatment is not expected to change the overall function of the NSO habitat adjacent to the roads. The change in canopy cover within blocks of habitat would be negligible because of the narrow treatment width of six feet on either side of the road. Uncut trees adjacent to the treatment would still provide canopy cover.

Meadow Restoration would treat older or decadent brush through burning in an effort to rejuvenate brush species that would benefit wildlife as browsing habitat, and to maintain existing meadows as natural fuel breaks. Brush pockets and small conifers (less than seven inches DBH) would be cut and burned, where needed, and brush may be burned in the current condition without the manual cutting as a pre-treatment. Prescribed fire would be used to remove encroaching conifers and shrubs and to reduce grass thatch build-up of native or nonnative grasses. Meadow Restoration would:

- Maintain up to 51 acres of dispersal habitat; and
- Have no effect on up to 55 acres of non-habitat.

Where NRF habitat removal would occur (21 acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for nesting, roosting, or foraging, or dispersal for 30 to 80 years until larger diameter trees (21 inches and greater) are present, and the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Where roosting/foraging habitat removal would occur (50 acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for roosting or foraging for 15 to 30 years until larger diameter trees (16 inches and greater) are present, and the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Where dispersal habitat removal would occur (31 acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for dispersal for 30 to 80 years until the canopy cover returns to above 40%.

Where NRF (98 acres), and roosting/foraging (340 acres) habitat downgrade would occur, post-harvest canopy cover would be between 40% and 60%. NSOs would no longer use these areas for nesting or roosting/foraging for 15 to 30 years until larger diameter trees (16 inches and greater) are present, or the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Following proposed harvest, the amount of NRF habitat would decrease by 119 acres (0.6% of federal lands in the Analysis Area), roosting/foraging would decrease by 390 acres (2.0% of federal lands in the Analysis Area), while dispersal habitat would increase by 407 acres and capable habitat would increase by 102 acres in the Analysis Area (Table 3-9). NSOs can still use the remaining NRF, roosting/foraging, and dispersal habitat for dispersing through the landscape. NSOs can disperse across a fragmented mosaic of non-forested areas and a variety of forest age classes (Forsman et al. 2002).

Table 3-9. Northern Spotted Owl Habitat Pre- and Post-Treatment in the Analysis Area

Habitat Type	NRF	RF	Dispersal	Capable	Non-Habitat
Analysis Area (Current)	40%	4%	19%	27%	10%
Analysis Area (Post-Treatment)	40%	2%	20%	28%	10%

The proposed forest management project does not attempt to eradicate dwarf mistletoe from the landscape; rather, it attempts to minimize it in specific areas so that the forest health objectives and management direction pertaining to all land use allocations as defined by the 1995 Medford District Resource Management Plan can be attained. Specifically, treatments occurring within mistletoe-infected stands meet the following objectives and direction:

- Promote tree survival and restore the vigor, resiliency, and stability of forest stands that are necessary to meet land use allocation objectives (USDI 1995, pp. 62, 72).
- Design and implement silvicultural treatments in stands that are in a condition, or that will soon be in a condition, that prevents management objectives from being achieved. Treatments are intended to restore the ability of stands to respond to other management and to reduce the risk of mortality from insects, disease, and wildfire (USDI 1995, p. 62).
- Design forest condition restoration treatments to be consistent with the long-term objectives of the allocation in which the treatment is proposed. Develop treatments in an interdisciplinary manner (USDI 1995, p. 62).

Mistletoe would not be eradicated from the treatment areas or Analysis Area, and would continue to persist in all NRF habitat for potential use by NSOs for nesting platforms. Also, within project units, treatments will provide flexibility in allowing some infected stems to be retained for wildlife habitat purposes. As treated stands become suitable NRF habitat, the retained mistletoe would spread and create potential nesting opportunities for owls. Trees with bird nests, wildlife cavities, and wide forks with flat nesting spots, or loose bark (which also function as bat roosts) would generally not be removed. Additionally, clumps of trees adjacent to snags or wildlife trees may be retained for stand diversity. When available, treatments would leave some broken, forked top, deformed trees, and trees with

mistletoe infections on the tree bole, that are greater than 20 inches DBH; specifically, those that currently provide a structure or platform for wildlife habitat.

Timber harvest proposed in Alternative 2 would have short-term adverse impacts to NSO habitat because NRF and roosting/foraging habitat would be downgraded or removed, and dispersal habitat would be removed. The long-term benefit, however, would be the development of greater structural diversity within the treated stands and faster tree growth for the trees that are retained. In addition, four acres of NRF habitat, one acre of roosting/foraging habitat, and two acres of dispersal habitat would be removed for landing and temporary route construction outside of timber harvest units. The landings and temporary routes would be decommissioned, following harvest, allowing reforestation to occur and a return to suitable habitat.

The long-term (>10 years) effects of the Proposed Action are anticipated to increase the health and vigor of the residual stands post-treatment. It is more 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). Many of the treatments as proposed under Alternative 2, especially those that would occur in roosting/foraging and dispersal habitat, would have long-term beneficial effects to NSOs by increasing growth rates of the residual stand and accelerating the development of late-successional structural complexity within the treated areas than would occur if left untreated.

In Southwest Oregon, woodrats and flying squirrels are the primary sources of food for NSOs. Sakai and Noon (1993) found the highest number of dusky-footed woodrats in sapling and brushy pole timber (20 – 30 year old). Although these young stands are seldom used for nesting or foraging by NSOs, these areas are a good source of woodrats dispersing into older stands that are more frequented by and accessible to foraging NSOs that hunt along the edges where old forest meets young. Flying squirrels prefer multi-layered, structured stands, preferably with tree crowns that extend down most of the bole of the trees. However, a consistent mid-layer can make up for crowns that do not extend that far down. Stands with such structure provide cover from predation. Flying squirrels nest predominantly in cavities of live trees, but will also nest in stick nests near the bole of a tree. Woodrats and flying squirrels rely on a shrub layer near the forest floor for cover and foraging.

Proposed treatments on approximately 459 acres are within stands that currently have bottom, middle, and top layer structure and also provide NRF or roosting/foraging habitat for NSOs. While these stands were not surveyed for flying squirrel or woodrat presence, they may have a higher abundance of flying squirrels and woodrats because of the increased cover from predators. These stands would be treated by Density Management (198 acres of NRF and roosting/foraging habitat would be maintained), Selective Thinning (206 acres of roosting/foraging habitat would be downgraded and 13 acres of roosting/foraging habitat would be removed), Small Diameter Thinning (40 acres of roosting/foraging would be downgraded) and Regeneration Harvest Structural Retention (15 acres of roosting/foraging habitat would be removed).

Proposed treatments on approximately 82 acres are within stands that currently lack the middle tree layer, but have a bottom and top tree layer structure and also provide roosting/foraging habitat for NSOs. While these stands were not surveyed for woodrat presence, they may have a higher abundance of woodrats because of the increased cover from predators. These stands would be treated by Density Management (13 acres of NRF habitat would be maintained and 67 acres of roosting/foraging habitat

would be maintained) and Selective Thinning (two acres of roosting/foraging habitat would be downgraded).

Prey abundance may be reduced in up to 276 acres of roosting/foraging habitat from 5 to 30 years until a shrub layer begins to form and tree structure and canopy cover return to suitable levels that NSOs would again use.

All 18 of the NSO home ranges within the Analysis Area overlap one another to a certain extent. Within NSO home ranges, log landing and temporary route construction would remove up to six acres of NRF, up to 13 acres of roosting/foraging, and up to five acres of dispersal habitat. Selective Thinning would downgrade up to 100 acres of NRF and up to 318 acres of roosting/foraging habitat within low priority home ranges. Treatments that would downgrade existing NRF habitat were designed to enhance NSO habitat over the long-term. The remainder of the 667 acres of treatments (Density Management, Selective Thinning, Small Diameter Thinning, Roadside Vegetation Maintenance, and Meadow Restoration) in NSO habitat (NRF, roosting/foraging, and dispersal) within NSO home ranges was designed to maintain NSO habitat. No Regeneration Harvest is proposed within NSO home ranges.

Table 3-10. Alternative 2: Anticipated Impacts within Owl Home Ranges

Commercial & Non-commercial Prescriptions			
Current Habitat	**Treatment Effect**	**Low Priority Sites**	**High Priority Sites**
		Est. Acres	**Est. Acres**
NRF	NRF Maintained	28	163
NRF	NRF Downgrade	100	0
NRF	NRF Removed	4*	2*
RF	RF Maintained	96	164
RF	RF Downgrade	318	0
RF	RF Removed	7*	5*
Dispersal	Dispersal Maintained	63	154
Dispersal	Dispersal Removed	4*	1*
Capable	No Effect	20	23
Non-Habitat	No Effect	0	55
	Total	**636**	**567**
*Numbers from New Temporary Route and Landing Construction			

Within the Analysis Area, the BLM wildlife biologist evaluated and identified 906 acres of highly suitable, structurally complex RA 32 habitat in areas initially proposed for harvest. These acres were subsequently dropped from further consideration in this project. Late-successional forest, RA 32 habitat, and 100-acre known KSOACs would remain post-harvest, allowing opportunities for future dispersal and nesting. Harvest units would have buffers (areas of no harvest) around Special Status and Survey and Manage mollusk, plant, and fungi species. Maintaining stand diversity through the retention of these buffers, snags, and coarse woody debris would provide habitat features important to the NSO's prey base while also providing for future nesting opportunities. Nesting, roosting, and foraging opportunities, however, would be slowed in the 447 acres of habitat downgrade (NRF and roosting/foraging) as suitable habitat begins to return. Nesting opportunities would develop in 20 to 30 years as the canopy cover returns to over 60% and additional tree layers fill in the gaps. Nesting, roosting, and foraging opportunities would be slowed for up to 80 years in the 56 acres of habitat removal (NRF and roosting/foraging).

Late-Successional Forest

Alternative 2 would temporarily reduce the amount of late-successional habitat by 94 acres in the Lost Creek-Rogue River 5th field watershed, and by one acre in the South Fork Rogue River 5th field watershed, until it returns after 80 years. The watersheds would retain 61% and 51%, respectively, of the BLM-administered land in the watershed in late-successional habitat after harvest, well over the 15% retention requirement. Existing coarse woody debris and snags would be retained. Those snags identified to be felled for safety reasons would be left on-site. Where temporary routes or skid trails encounter coarse woody debris, a section would be cut out and moved aside for access. Areas of closed canopy would remain in each section.

Connectivity/Diversity Blocks

The actions proposed under all alternatives meet Medford District ROD/RMP requirements for retaining 25% late-successional forest in connectivity/diversity blocks. Within connectivity/diversity blocks located in T33S, R1E, section 1 (four acres) and T33S, R2E, section 15 (one acre) proposed temporary route and landing construction would remove late-successional habitat. There would be no reduction in late-successional habitat within the connectivity/diversity block located in T33S, R3E, section 29. As a result, 83%, 90%, and 96% of forested land in the connectivity/diversity blocks in the Analysis Area would remain in late-successional condition, respectively.

Known Northern spotted owl Activity Centers

Vegetation treatments would not occur within the 100-acre known KSOACs. If owls are found to be nesting, seasonal restrictions for noise disturbance would be in effect up to 0.25 mile from these activity centers during the nesting season (See Appendix A, Issue Q).

Provincial Home Ranges

Within the higher priority provincial home ranges that have had pair status in the last five years, forest treatments would maintain the function of dispersal, roosting/foraging, and NRF habitat and would create healthier stand conditions (refer to analysis of impacts to NSO habitat). However, up to eight acres of habitat removal would occur as a result of new temporary route and landing construction (Table 3-10). These eight acres are spread out within three separate home ranges and are not contiguous. The removal would not affect the contiguous NRF habitat the owls are using at the center of the 0.5 mile core areas. Due to the location and small acreage, it is unlikely the treatments would adversely impact essential habitat for nesting or foraging.

Cumulative Effects

Cumulative effects are those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Technical issues that complicate analysis of cumulative effects include the large spatial and temporal scales involved, the wide variety of processes and interactions that influence cumulative effects, and the lengthy lag-times that often separate a land-use activity and the landscape's response to that activity.

Wildfires, fire suppression, road building, windstorms, and timber harvest throughout the Analysis Area have resulted in habitat modification and fragmentation, and have changed the distribution and abundance of wildlife species surrounding the Analysis Area. The associated habitat loss has negatively

affected late-successional forest habitat dependent species by reducing stand seral stage and changing habitat structure. Species associated with younger forested conditions, however, have benefited from these changes due to the increased acres of young stands. The change in habitat was included in the basin-wide update of the baseline situation and was used to calculate the current habitat condition within the Analysis Area. As thinned canopies continue to grow, some of these stands would return to being NRF habitat in 30 to 80 years.

Private lands surrounding the Analysis Area are made up of early-, mid-, and late-seral forests, agricultural, and shrub/oak lands. Most private forest lands are managed as tree farms for production of wood fiber on forest rotations. It is expected that any remaining late-seral forests on private timber lands will be converted to early-seral forest over the next one or two decades. For those species dependent on early-seral habitat, private forest lands do not always provide quality habitat as competing vegetation that includes flowering plants, shrubs and hardwood trees are regularly sprayed to reduce competition with future harvestable trees.

Ongoing and foreseeable management actions that are occurring, but are not expected to have an impact on NSO habitat on BLM-administered lands in Analysis Area include:

- Taggart Hazard Tree Reduction Project - The BLM is proposing to remove thirty two (32) hazard trees along the lower Taggart Creek road system (T. 33 S., R. 02 E., section 27) in the Lost Creek Project Area. These trees are scattered, are outside of NSO nest patches and 100-acre activity centers, and most are in capable habitat;
- Baker Cypress Restoration Project - The BLM plans to conduct restoration activities in the Flounce Rock Baker cypress stands (approximately 2 acres) (T. 33 S., R. 02 E., section 5). The project will include using prescribed fire and thinning to stimulate seedling regeneration and to improve habitat conditions. The current habitat is dispersal with no potential to become NRF habitat;
- Vine Maple Blowdown Salvage Project – On February 6, 2015, a wind storm blew over a large number of trees scattered throughout the east side of the Butte Falls Resource Area. The BLM is proposing to salvage harvest approximately 30 trees from blowdown trees and standing hazard trees in T. 33 S., R. 02 E., section 25 SE ¼ NE ¼ along the 33-3E-30.0 road. The treatment area is currently capable habitat for NSOs;
- Vine Maple Timber Sale – Approximately 308 acres were harvested in the Vine Maple Timber Sale within the Analysis Area in 2012. Treatment prescriptions included Restoration Thinning using ground-based yarding techniques. Habitat changes that occurred as a result of these treatments were reflected in the current habitat condition in the Affected Environment Section 3.1.3.1.The Vine Maple Timber Sale contract will expire in fall of 2016 and has approximately 39 Restoration Thinning acres left to be harvested within the Analysis Area: 26 acres of dispersal maintained and 13 acres of NRF maintained;
- Clark's Dog Timber Sale – The BLM plans on harvesting approximately 148 acres within the Analysis Area: 36 acres NRF downgrade to dispersal; one acre of NRF removed; 71 acres of dispersal maintained; and 40 acres of dispersal removed; and
- Elk Creek Forest Management Project – The BLM plans to treat approximately 190 acres within the next five years in the northwest portion of the Analysis Area. The project is in the initial planning stages and treatment effects to habitat have not been determined.

The current baseline includes updates to habitat from all past activities including post-harvest monitoring of the recently implemented timber sale in the Vine Maple Project Area. These actions have determined the existing current habitat condition for the Affected Environment within the NSO Analysis Area. Specific to NSOs, the hazard tree reduction project, Baker Cypress restoration, blowdown salvage, and Vine Maple timber sale activities coupled with other past, present and future management activities ongoing within the Analysis Area would not preclude the NSO from dispersing, foraging, or nesting within the Analysis Area. Nor would these projects diminish the overall amount of suitable habitat found within the Analysis Area. The Clark's Dog Timber Sale would diminish suitable habitat until treated stands returned to functioning as suitable habitat. No other planned or on-going projects on BLM-administered lands would diminish the overall amount of suitable habitat. Some private lands within the Analysis Area may be subject to intensive timber harvest, but the timing and magnitude of such harvest is unknown. Even when considering potential treatments on private lands, up to 8,010 acres of suitable NRF, 401 acres of roosting/foraging, and 4,191 acres of dispersal habitat within the Analysis Area would remain functional and provide adequate habitat for NSOs to disperse, forage or reproduce within the Analysis Area (NRF also functions as roosting/foraging and dispersal habitat). The overall design of the treatments within NSO home ranges within the Analysis Area, and the incorporation of Project Design Features, would either maintain the function of suitable NSO habitat or promote future, long-term benefits to NSO habitat.

This project, when coupled with other recent actions in the Analysis Area, would not preclude the NSO from nesting, foraging, or dispersing within the Analysis Area, but would diminish the NSO's NRF habitat by 156 acres (0.8% of federal lands in the Analysis Area), and roosting/foraging habitat by 390 acres (2% of federal lands in the Analysis Area) in the short-term.

Available evidence suggests that the presence and distribution of barred owls may affect habitat quality for spotted owls (Wiens 2012; Yackulic et al. 2013). Additionally, many studies suggest that the two species compete for resources and that maintaining older, high quality forest habitat may help NSOs persist, at least in the short-term. There are no known forest conditions that give NSOs a competitive advantage over barred owls. While not common, Wiens (2012) did find spotted owls and barred owls occupying the same territories concurrently. It is also not known if forest habitat removal directly results in a range expansion of barred owls (USDI FWS 2013).

The BLM surveyed for RA 32 (structurally complex forest) within the Lost Creek Analysis Area and identified 906 acres of RA 32 habitat. All 906 acres of RA 32 habitat, as well as an additional 6,949 acres of NRF habitat were deferred from treatment within the Analysis Area. The intent of RA 32 is to maintain the older and more structurally complex multi-layered conifer forests on federal lands in order to not further exacerbate the competitive interactions between NSOs and barred owls. Since the BLM is not proposing to treat structurally complex forest and is retaining additional NRF habitat within the Analysis Area, the likelihood that inter-species competition would be exacerbated as a result of this project would be minimal. Some competitive interactions are still anticipated to occur since barred owls have been observed in the Analysis Area.

Alternative 3

Direct and Indirect Effects

Northern Spotted Owl Habitat

The following management actions are proposed on 869 acres in Alternative 3: Density Management, Selective Thinning/Douglas Fir (DF), Selective Thinning/Mixed Conifer (MC), Small Diameter

Thinning, Understory Reduction, and Activity Fuels Management. Temporary route construction, roadside vegetation maintenance, log, helicopter, and service landing construction, timber haul, Meadow Restoration, and Water Source Restoration are also proposed in Alternative 3 (Table 3-11). See also Table 3-13: *Anticipated Impacts within Owl Home Ranges-Alternative 3*.

A seasonal restriction would be implemented for projects that could cause a noise disturbance to nesting NSOs (Chapter 2, Section 2.5 and Appendix A, Issue Q).

Logging activity disrupts ground-level shrub and coarse woody debris habitat for NSO prey species; however, the shrub layer would fill back in within two to five years and current coarse woody debris would be left on-site. The impacted prey species would rebound within two to thirty years.

Ground-based yarding, skyline cable yarding, helicopter yarding, Understory Reduction, and activity fuels treatments would work in conjunction with the commercial prescriptions described below and would not increase the effects to owl habitat described below.

Haul routes that would be renovated, and roads that would be partially or fully decommissioned, are not functioning as NSO habitat and therefore would not contribute to NSO habitat downgrade or removal.

Pre-designated skid trails would not contribute to reducing the overall canopy cover within stands of trees (0.04 miles are proposed within stands in NRF habitat and 0.2 miles in dispersal habitat). The remainder of proposed pre-designated skid trails (0.25 miles) is in locations that are not currently functioning as NSO habitat. Existing coarse woody debris would be avoided or moved, and retained, when located (See Chapter 2, Section 2.5).

Water source restoration sites (5 sites) are not functioning as NSO habitat and therefore would not contribute to NSO habitat downgrade or removal.

The proposed projects (Density Management, Selective Thinning, Small Diameter Thinning, roadside vegetation maintenance, and Meadow Restoration) that would maintain NSO habitat include:

- Canopy cover within treated NRF, roosting/foraging, or dispersal stands would be retained at or above 60% and 40%, respectively;
- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment; and
- Multiple canopy, uneven-aged tree structure that was present prior to treatment would remain post-treatment.

The proposed projects (Small Diameter Thinning) that would downgrade NSO roosting/foraging habitat include:

- Canopy cover within treated roosting/foraging would be brought to between 40% and 60%;
- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
- Multiple canopy, uneven-aged tree structure that was present prior to treatment would remain post-treatment; and
- Heterogeneity in tree structure and forest health would be promoted.

The proposed projects (temporary route and new landing construction) that would remove NSO habitat include:

- Canopy cover would be brought below 40%; and
- Coarse woody debris and fallen large snags would be moved adjacent to the treated footprint as down wood.

Table 3-11. Proposed Projects and the Potential Impact to NSO Habitat – Alternative 3

Forest Management			
Commercial Prescriptions	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Density Management	NRF	NRF Maintained	111
Density Management	RF	RF Maintained	386
Density Management	Dispersal	Dispersal Maintained	3
Selective Thinning	Dispersal	Dispersal Maintained	197
Selective Thinning	Capable	No Effect	20
Small Diameter Thinning	RF	RF Maintained	70
Small Diameter Thinning	RF	RF Downgrade	40
Small Diameter Thinning	Dispersal	Dispersal Maintained	42
		Total	**869**
Transportation Management	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Temporary Route Construction	NRF	NRF Removed	1
Temporary Route Construction	RF	RF Removed	2
Temporary Route Construction	Dispersal	Dispersal Removed	4
Temporary Route Construction	Capable	No Effect	1
Roadside Vegetation Maintenance	NRF	NRF Maintained	3
Roadside Vegetation Maintenance	RF	RF Maintained	4
Roadside Vegetation Maintenance	Dispersal	Dispersal Maintained	3
Roadside Vegetation Maintenance	Capable	No Effect	8
New Landings	NRF	NRF Removed	3
New Landings	RF	RF Removed	8
New Landings	Dispersal	Dispersal Removed	3
New Landings	Capable	No Effect	19
		Total	**59**

Transportation Management	Current Habitat	Treatment Affect	Est. Miles
Temp Route Reconstruction	Non-Habitat	No Effect	0.11
Road Renovation/Reconstruction	Non-Habitat	No Effect	78.0
Partial Road Decommissioning	Non-Habitat	No Effect	3.0
Full Road Decommissioning	Non-Habitat	No Effect	2.0
Rocking Wet Season Haul Routes	Non-Habitat	No Effect	8.0
Designated Skid Trail	NRF	NRF Maintained	0.04
Designated Skid Trail	Dispersal	Dispersal Maintained	0.20
Designated Skid Trail	Capable	No Effect	0.25
		Total Miles	**91.6**
Other Projects	**Current Habitat**	**Treatment Affect**	**Sites**
Water Source Restoration	Non-Habitat	No Effect	5
Other Projects	**Current Habitat**	**Treatment Affect**	**Est. Acres**
Meadow Restoration	Dispersal	Dispersal Maintained	51
Meadow Restoration	Non-Habitat	No Effect	55

Density Management (500 acres) would be a combination of both proportional thinning and thinning from below. Proportional thinning consists of removing trees from each size class and thinning from below consists of removing trees from the lower canopy classes, such as intermediate and suppressed trees. The proportional thinning would not meet the exact definition of a proportional thin because trees exhibiting old-growth characteristics would typically be retained (see Appendix B, Marking Guidelines). Generally, smaller trees would be targeted for removal over larger trees but the intent is to maintain the current structure and not remove one single tree layer and simplify the stand. Trees targeted for removal would include those exhibiting a crown ratio decline and narrow crown widths, and which contribute least to the canopy layer or structural diversity.

Density Management would:

- Maintain 109 acres of NRF habitat;
- Maintain 377 acres of roosting/foraging habitat;
- Maintain three acres of dispersal habitat; and
- Remove two acres of NRF and nine acres of roosting/foraging habitat for landings and temporary route construction.

Trees may be marked in small patches (i.e., groups of trees with poor crowns) and left in clumps (i.e., groups of old trees) to create hiding cover for wildlife species and increase spatial heterogeneity. The size of patches or openings would be no greater than 0.20 acres and would not exceed 5% of the total treatment unit area.

Through Density Management, maintaining diversity and heterogeneity within the stand, opening up the canopy to promote regeneration, and reducing tree density to accelerate growth of remaining trees, would have a long-term benefit towards creating future NRF habitat.

Selective Thinning (217 acres) would be a combination of thinning and group selection, to the extent or amount recommended by vegetation type and/or plant series that exists. These stand treatments would

generally target low vigor trees to reduce stand density and improve stand resiliency and individual tree health. Selective Thinning would be thinned using guidelines to reduce basal area to between 100 and 150 ft² per acre. These stands are generally dominated by a Douglas-fir, ponderosa pine, and white fir overstory, with less prominent species as incense cedar and sugar pine.

Selective Thinning would:

- Maintain 191 acres of dispersal habitat;
- Remove six acres of dispersal habitat for landing and temporary route construction; and
- Have no effect on 20 acres of capable habitat.

Through Selective Thinning, stand density would be reduced in order to reduce stand mortality from wildfire, drought, disease, and insects; and promote tree growth, quality, and vigor of the remaining trees; stand structure would be diversified; spatial heterogeneity would be developed; and growing space would be increased for large legacy pine, oak, and cedar. The increased stand diversity and structure promoted through Selective Thinning would have a long-term benefit by pushing stands towards future suitable roosting/foraging and NRF habitat sooner than if not treated.

Also, through Selective Thinning, trees infected with mistletoe would be selectively removed where mistletoe is likely to spread into unaffected areas without treatment, in order to reduce the level of infection in target stands and decrease the rate of proliferation.

Small Diameter Thinning (152 acres) would thin in younger ponderosa pine and mixed conifer stands that have high stand densities to promote stand health, create structural diversity, and increase landscape resiliency to environmental disturbances.

Small Diameter Thinning would:

- Maintain up to 70 acres of roosting/foraging habitat;
- Downgrade up to 40 acres of roosting/foraging to dispersal habitat; and
- Maintain up to 42 acres of dispersal habitat.

Helicopter, service, and log landing (21 acres) **and temporary route construction** (5 acres) **outside proposed treatment units** would:

- Remove up to three acres of NRF and up to three acres of dispersal habitat, which would become capable habitat; and
- Use up to 20 acres of capable habitat for landings and temporary routes with no effect on owl habitat.

Roadside vegetation maintenance would remove vegetation from about 6 to 24 inches in diameter six feet horizontally from the center line of the ditch away from the road and six feet horizontally from the outside shoulder of the road. Vegetation may be hardwood or conifer trees that have grown up since the road was constructed and were not removed during road maintenance when the vegetation was smaller. Roadside vegetation maintenance would:

- Remove vegetation along up to 12 miles of road and would maintain up to three acres of NRF, four acres of roosting/foraging, three acres of dispersal habitat, and be no effect on eight acres of capable habitat.

The roadside vegetation treatment is not expected to change the overall function of the NSO habitat adjacent to the roads. The change in canopy cover within blocks of habitat would be negligible because of the narrow treatment width of six feet on either side of the road. Uncut trees adjacent to the treatment would still provide canopy cover.

Meadow Restoration would treat older or decadent brush through burning in an effort to rejuvenate brush species that would benefit wildlife as browsing habitat, and to maintain existing meadows as natural fuel breaks. Brush pockets and small conifers (less than seven inches DBH) would be cut and burned, where needed, and brush may be burned in the current condition without the manual cutting as a pre-treatment. Prescribed fire would be used to remove encroaching conifers and shrubs and to reduce grass thatch build-up of native or nonnative grasses. Meadow Restoration would:

- Maintain up to 51 acres of dispersal habitat; and
- Have no effect on up to 55 acres of non-habitat.

Where NRF habitat removal would occur for temporary road and landing construction (four acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for nesting, roosting, foraging, or dispersal for 30 to 80 years until larger diameter trees (21 inches and greater) are present, and the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Where roosting/foraging habitat removal would occur for temporary road and landing construction (10 acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for roosting or foraging for 15 to 30 years until larger diameter trees (16 inches and greater) are present, and the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Where dispersal habitat removal would occur for temporary road and landing construction (seven acres), post-harvest canopy cover would be below 40%. NSOs would no longer use these areas for dispersal for 30 to 80 years until the canopy cover returns to above 40%.

Where roosting/foraging habitat downgrade would occur for Small Diameter Thinning (40 acres), post-harvest canopy cover would be between 40% and 60%. NSOs would no longer use these areas for nesting or roosting/foraging for 15 to 30 years until larger diameter trees (16 inches and greater) are present, or the canopy cover returns to above 60%. Before project implementation, these acres will be surveyed for owls to protocol. If NSOs are located in new areas, the project would be modified to avoid negatively affecting owls, or the BLM would reinitiate consultation with the USFWS.

Following proposed harvest, the amount of NRF would decrease by four acres (0.02% of federal lands in the Analysis Area), roosting/foraging would decrease by 50 acres (0.2% of federal lands in the Analysis Area) while dispersal habitat would increase by 33 acres and capable habitat would increase by 14 acres in the Analysis Area (Table 3-12). NSOs can still use the remaining NRF; roosting/foraging; and dispersal habitat for dispersing through the landscape. NSOs can disperse across a fragmented mosaic of non-forested areas and a variety of forest age classes (Forsman et al. 2002).

Table 3-12. Northern Spotted Owl Habitat Pre- and Post-Treatment in the Analysis Area

Habitat Type	NRF	RF	Dispersal	Capable	Non-Habitat
Analysis Area (Current)	40%	4%	19%	27%	10%
Analysis Area (Post-Treatment)	40%	4%	19%	27%	10%

The proposed forest management project does not attempt to eradicate dwarf mistletoe from the landscape; rather, it attempts to minimize it in specific areas so that the forest health objectives and management direction pertaining to all land use allocations as defined by the 1995 Medford District Resource Management Plan can be attained. Specifically, treatments occurring within mistletoe-infected stands meet the following objectives and direction:

- Promote tree survival and restore the vigor, resiliency, and stability of forest stands that are necessary to meet land use allocation objectives (USDI 1995, pp. 62, 72).
- Design and implement silvicultural treatments in stands that are in a condition, or that will soon be in a condition, that prevents management objectives from being achieved. Treatments are intended to restore the ability of stands to respond to other management and to reduce the risk of mortality from insects, disease, and wildfire (USDI 1995, p. 62).
- Design forest condition restoration treatments to be consistent with the long-term objectives of the allocation in which the treatment is proposed. Develop treatments in an interdisciplinary manner (USDI 1995, p. 62).

Mistletoe would not be eradicated from the treatment areas or Analysis Area, and would continue to persist in all NRF habitat for potential use by NSOs for nesting platforms. Also, within project units, treatments will provide flexibility in allowing some infected stems to be retained for wildlife habitat purposes. As treated stands become suitable NRF habitat, the retained mistletoe would spread and create potential nesting opportunities for owls. Trees with bird nests, wildlife cavities, and wide forks with flat nesting spots, or loose bark (which also function as bat roosts) would generally not be removed. Additionally, clumps of trees adjacent to snags or wildlife trees may be retained for stand diversity. When available, treatments would leave some broken, forked top, deformed trees, and trees with mistletoe infections on the tree bole, that are greater than 20 inches DBH; specifically, those that currently provide a structure or platform for wildlife habitat.

Timber harvest proposed in Alternative 3 would have short-term adverse impacts to NSO habitat because roosting/foraging habitat would be downgraded. The long-term benefit, however, would be the development of greater structural diversity within the treated stands and faster tree growth for the trees that are retained. In addition, four acres of NRF, 10 acres of roosting/foraging, and seven acres of dispersal would be removed for landing and temporary route construction. The landings and temporary routes are scattered across the landscape, however, and would be decommissioned, allowing reforestation to occur and a return to suitable habitat.

The long-term (>10 years) effects of the Proposed Action are anticipated to increase the health and vigor of the residual stands post-treatment. It is more 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). Many of the treatments as proposed under Alternative 3, especially

those that would occur in roosting/foraging and dispersal habitat, would have long-term beneficial effects to NSOs by increasing growth rates of the residual stand and accelerating the development of late-successional structural complexity within the treated areas than would occur if left untreated.

In Southwest Oregon, woodrats and flying squirrels are the primary sources of food for NSOs. Sakai and Noon (1993) found the highest number of dusky-footed woodrats in sapling and brushy pole timber (20–30 year old). Although these young stands are seldom used for nesting or foraging by NSOs, these areas are a good source of woodrats dispersing into older stands that are more frequented by and accessible to foraging NSOs that hunt along the edges where old forest meets young. Flying squirrels prefer multi-layered, structured stands, preferably with tree crowns that extend down most of the bole of the trees. However, a consistent mid-layer can make up for crowns that do not extend that far down. Stands with such structure provide cover from predation. Flying squirrels nest predominantly in cavities of live trees, but will also nest in stick nests near the bole of a tree. Woodrats and flying squirrels rely on a shrub layer near the forest floor for cover and foraging.

Proposed treatments on approximately 338 acres are within stands that currently have bottom, middle, and top layer structure and also provide NRF or roosting/foraging habitat for NSOs. While these stands were not surveyed for flying squirrel or woodrat presence, they may have a higher abundance of flying squirrels and woodrats because of the increased cover from predators. These stands would be treated by Density Management (86 acres of NRF habitat and 222 acres of roosting/foraging habitat would be maintained) and Small Diameter Thinning (40 acres of roosting/foraging habitat would be downgraded).

Proposed treatments on approximately 77 acres are within stands that currently lack the middle tree layer, but have a bottom and top tree layer structure and also provide roosting/foraging habitat for NSOs. While these stands were not surveyed for woodrat presence, they may have a higher abundance of woodrats because of the increased cover from predators. These stands would be treated by Density Management (82 acres of roosting/foraging habitat would be maintained).

Prey abundance may be reduced in up to 40 acres of roosting/foraging habitat from 5 to 30 years until a shrub layer begins to form and tree structure and canopy cover return to suitable levels that spotted owls would again use.

All 18 of the NSO home ranges within the Analysis Area overlap one another to a certain extent. Within NSO home ranges, log landing and temporary route construction would remove up to five acres of NRF habitat, up to eight acres of roosting/foraging habitat, and up to five acres of dispersal habitat. Small Diameter Thinning would downgrade up to 40 acres of roosting/foraging habitat within low priority home ranges (Table 3-13). Treatments that would downgrade existing roosting/foraging habitat were designed to enhance NSO habitat over the long-term. The remainder of the 690 acres of treatments (Density Management, Selective Thinning, Small Diameter Thinning, Roadside Vegetation Maintenance, and Meadow Restoration) in NSO habitat (NRF, roosting/foraging, and dispersal) within owl home ranges was designed to maintain NSO habitat.

Table 3-13. Anticipated Impacts within Owl Home Ranges - Alternative 3

Commercial & Non-commercial Prescriptions			
Current Habitat	**Treatment Affect**	**Low Priority Sites**	**High Priority Sites**
		Est. Acres	**Est. Acres**
NRF	NRF Maintained	97	16
NRF	NRF Removed	4*	1*
RF	RF Maintained	209	162
RF	RF Downgrade	40	0
RF	RF Removed	4*	4*
Dispersal	Dispersal Maintained	62	144
Dispersal	Dispersal Removed	4*	1*
Capable	No Effect	19	19
Non-Habitat	No Effect	0	55
	Total	**439**	**402**
*Numbers from New Temp Route and Landing Construction			

Within the Analysis Area, the BLM wildlife biologist evaluated and identified 906 acres of highly suitable, structurally complex RA 32 habitat in areas initially proposed for harvest. These acres were subsequently dropped from further consideration in this project. Late-successional forest, RA 32 habitat, and 100-acre known NSO activity centers would remain post-harvest, allowing opportunities for future dispersal and nesting. Harvest units would have buffers (areas of no harvest) around Special Status and Survey and Manage mollusk, plant, and fungi species. Maintaining stand diversity through the retention of these buffers, snags, and large down wood would provide habitat features important to the NSO's prey base while also providing for future nesting opportunities. Roosting and foraging opportunities, however, would be slowed in the 40 acres of habitat downgrade as suitable habitat begins to return. Nesting opportunities would develop in 20 to 30 years as the canopy cover returns to over 60% and additional tree layers fill in the gaps. Nesting, roosting, and foraging opportunities would be slowed for up to 80 years in the 14 acres of habitat removal (NRF and roosting/foraging habitat).

Late-Successional Forest

Alternative 3 would temporarily reduce the amount of late-successional habitat by 13 acres in the Lost Creek-Rogue River 5th field watershed, and by one acre in the South Fork Rogue River 5th field watershed, until it returns after 80 years. The watersheds would retain 62% and 51%, respectively, of the BLM-administered land in the watershed in late-successional habitat after harvest, well over the 15% retention requirement. Existing large down wood and snags would be retained. Those snags identified to be felled for safety reasons would be left on-site. Where temporary routes or skid trails encounter large down wood, a section would be cut out and moved aside for access. Areas of closed canopy would remain in each section.

Connectivity/Diversity Blocks

The actions proposed under all alternatives meet Medford District ROD/RMP requirements for retaining 25% late-successional forest in connectivity/diversity blocks. Within the connectivity/diversity blocks in T33S, R1E, section 1 (four acres) and T33S, R2E, section 15 (one acre), proposed treatments that would remove late-successional habitat include new temporary route and landing construction. There would be

no reduction in late-successional habitat within the connectivity/diversity block located in T33S, R3E, section 29. As a result, 83%, 90%, and 96% of forested land in the connectivity/diversity blocks would remain in late-successional condition, respectively.

Known Northern Spotted Owl Activity Centers

Vegetation treatments would not occur within the 100-acre known KSOACs. If owls are found to be nesting, seasonal restrictions for noise disturbance would be in effect up to 0.25 mile from these activity centers during the nesting season (See Appendix A, Issue Q).

Provincial Home Ranges

Within the higher priority provincial home ranges that have had pair status in the last five years, forest treatments would maintain the function of dispersal, roosting/foraging, and NRF habitat and would create healthier stand conditions (refer to analysis of impacts to NSO habitat). However, up to six acres of habitat removal would occur as a result of new temporary route and landing construction (Table 3-13). These six acres are spread out within three separate home ranges and are not contiguous. The removal would not affect the contiguous NRF habitat the owls are using at the center of the 0.5 mile core areas. Due to the location and small acreage, it is unlikely the treatments would adversely impact essential habitat for nesting or foraging.

Cumulative Effects

Cumulative effects are those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Technical issues that complicate analysis of cumulative effects include the large spatial and temporal scales involved, the wide variety of processes and interactions that influence cumulative effects, and the lengthy lag-times that often separate a land-use activity and the landscape's response to that activity.

Wildfires, fire suppression, road building, windstorms, and timber harvest throughout the Analysis Area have resulted in habitat modification and fragmentation, and have changed the distribution and abundance of wildlife species surrounding the Analysis Area. The associated habitat loss has negatively affected late-successional forest habitat dependent species by reducing stand seral stage and changing habitat structure. Species associated with younger forested conditions, however, have benefited from these changes due to the increased acres of young stands. The change in habitat was included in the basin-wide update of the baseline situation and was used to calculate the current habitat condition within the Analysis Area. As thinned canopies continue to grow, some of these stands would return to being NRF habitat in 30 to 80 years.

Private lands surrounding the Analysis Area are made up of early-, mid-, and late-seral forests, agricultural, and shrub/oak lands. Most private forest lands are managed as tree farms for production of wood fiber on forest rotations. It is expected that any remaining late-seral forests on private timber lands will be converted to early-seral forest over the next one or two decades. For those species dependent on early-seral habitat, private forest lands do not always provide quality habitat as competing vegetation that includes flowering plants, shrubs and hardwood trees are regularly sprayed to reduce competition with future harvestable trees.

Ongoing and foreseeable management actions that are occurring, but are not expected to have an impact on NSO habitat on BLM-administered lands in Analysis Area include:

- Taggart Hazard Tree Reduction Project - The BLM is proposing to remove thirty two (32) hazard trees along the lower Taggart Creek road system (T. 33 S., R. 02 E., section 27) in the Lost Creek Project Area. These trees are scattered, are outside of NSO nest patches and 100-acre activity centers, and most are in capable habitat;
- Baker Cypress Restoration Project - The BLM plans to conduct restoration activities in the Flounce Rock Baker cypress stands (approximately 2 acres) (T. 33 S., R. 02 E., section 5). The project will include using prescribed fire and thinning to stimulate seedling regeneration and to improve habitat conditions. The current habitat is dispersal with no potential to become NRF habitat; and
- Vine Maple Blowdown Salvage Project - On February 6, 2015, a wind storm blew over a large number of trees scattered throughout the east side of the Butte Falls Resource Area. The BLM is proposing to salvage harvest approximately 30 trees from blowdown trees and standing hazard trees in T. 33 S., R. 02 E., section 25 SE ¼ NE ¼ along the 33-3E-30.0 road. The treatment area is currently capable habitat for NSOs.
- Vine Maple Timber Sale – Approximately 308 acres were harvested in the Vine Maple Timber Sale within the Analysis Area in 2012. Treatment prescriptions included Restoration Thinning using ground-based yarding techniques. Habitat changes that occurred as a result of these treatments were reflected in the current habitat condition in the Affected Environment Section 3.1.3.1.The Vine Maple Timber Sale contract will expire in fall of 2016 and has approximately 39 Restoration Thinning acres left to be harvested within the Analysis Area: 26 acres of dispersal maintained and 13 acres of NRF maintained;
- Clark's Dog Timber Sale – The BLM plans on harvesting approximately 148 acres within the Analysis Area: 36 acres NRF downgrade to dispersal; one acre of NRF removed; 71 acres of dispersal maintained; and 40 acres of dispersal removed; and
- Elk Creek Forest Management Project – The BLM plans to treat approximately 190 acres within the next five years in the northwest portion of the Analysis Area. The project is in the initial planning stages and treatment effects to habitat have not been determined.

The current baseline includes updates to habitat from all past activities including post-harvest monitoring of the recently implemented timber sale in the Vine Maple Project Area. These actions have determined the existing current habitat condition for the Affected Environment within the NSO Analysis Area.

Specific to NSOs, the hazard tree reduction project, Baker Cypress restoration, Vine Maple Timber Sale, and blowdown salvage activities coupled with other past, present and future management activities ongoing within the Analysis Area would not preclude the NSO from dispersing, foraging, or nesting within the Analysis Area. Nor would these projects diminish the overall amount of suitable habitat found within the Analysis Area. The Clark's Dog Timber Sale would diminish suitable habitat until treated stands returned to functioning as suitable habitat. No other planned or on-going projects on BLM-administered lands would diminish the overall amount of suitable habitat. Some private lands within the Analysis Area may be subject to intensive timber harvest, but the timing and magnitude of such harvest is unknown. Even when considering potential treatments on private lands, up to 8,125 acres of suitable NRF, 741 acres of roosting/foraging, and 5,575 acres of dispersal habitat within the Analysis Area would remain functional and provide adequate habitat for NSOs to disperse, forage, or reproduce within

the Analysis Area (NRF also functions as roosting/foraging and dispersal habitat). The overall design of the treatments within NSO home ranges within the Analysis Area, and the Project Design Features, would either maintain the function of suitable spotted owl habitat or promote future, long-term benefits to spotted owl habitat.

This project, when coupled with other recent or proposed actions in the Analysis Area, would not preclude the NSO from nesting, foraging, or dispersing within the Analysis Area, but would diminish the NSO's NRF habitat by 41 acres (0.2% of federal lands in the Analysis Area), and roosting/foraging habitat by 50 acres (0.2% of federal lands in the Analysis Area) in the short-term.

Available evidence suggests that the presence and distribution of barred owls may affect habitat quality for spotted owls (Wiens 2012; Yackulic et al. 2013). Additionally, many studies suggest that the two species compete for resources and that maintaining older, high quality forest habitat may help NSOs persist, at least in the short-term. There are no known forest conditions that give NSOs a competitive advantage over barred owls. While not common, Wiens (2012) did find spotted owls and barred owls occupying the same territories concurrently. It is also not known if forest habitat removal directly results in a range expansion of barred owls (USDI FWS 2013).

The BLM surveyed for RA 32 (structurally complex forest) within the Lost Creek Analysis Area and identified 906 acres of RA 32 habitat. All 906 acres of RA 32 habitat, as well as an additional 6,949 acres of NRF habitat were deferred from treatment within the Analysis Area. The intent of RA 32 is to maintain the older and more structurally complex multi-layered conifer forests on federal lands in order to not further exacerbate the competitive interactions between NSOs and barred owls. Since the BLM is not proposing to treat structurally complex forest and is retaining additional NRF habitat within the Analysis Area, the likelihood that inter-species competition would be exacerbated as a result of this project would be minimal. Some competitive interactions are still anticipated to occur since barred owls have been observed in the Analysis Area.

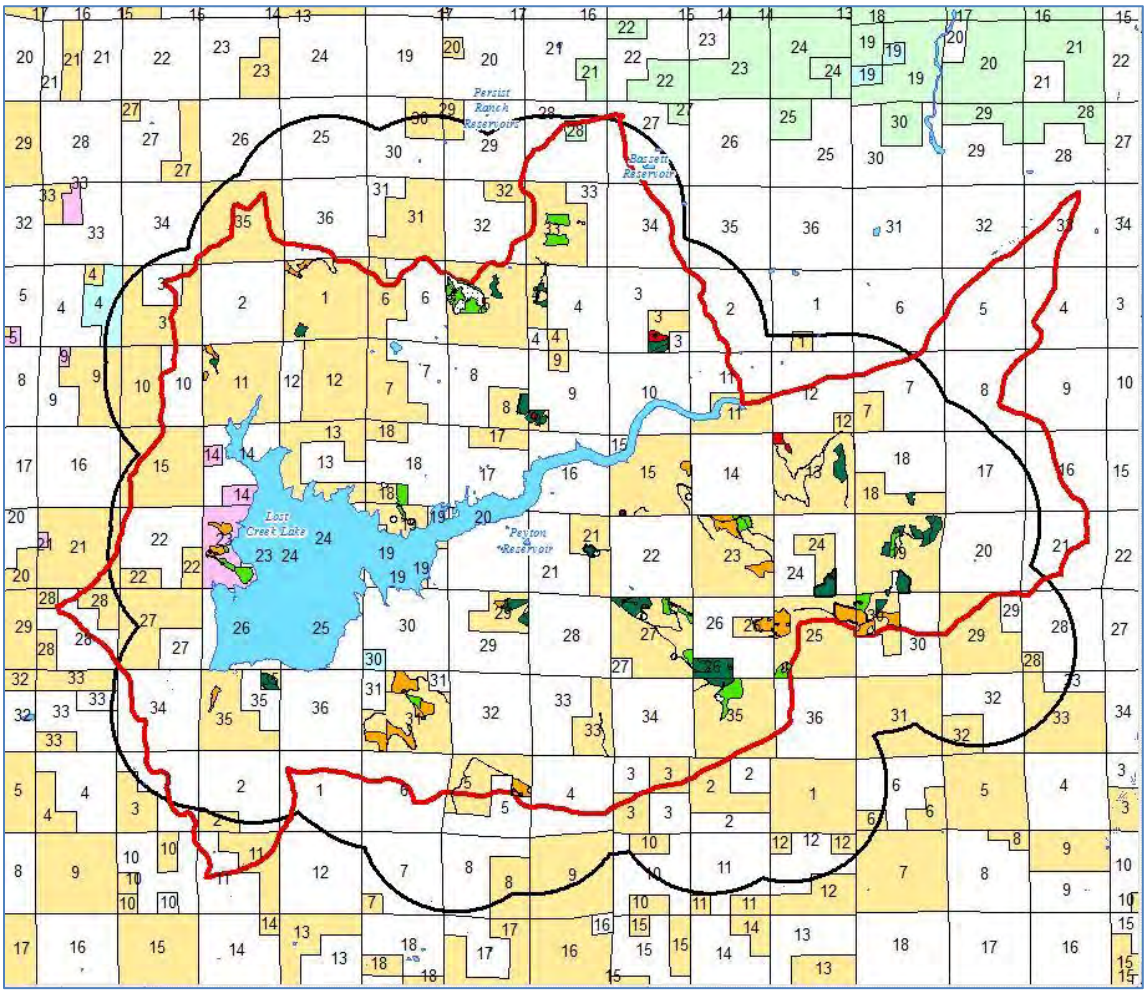
3.4 FISHER

Issue 3: How would timber harvest activities affect constituent elements (canopy cover, snags, and large trees, and down wood) within stands used by fishers for denning, resting, foraging, and dispersal?

3.4.1 Methodology

The Analysis Area used for assessing impacts to fisher is the same Analysis Area used for northern spotted owls (NSO) (see Section 3.3.1). Home range size for fisher is quite variable, but in the southern Cascade Mountains, it ranges from approximately 6,000 to 15,000 acres (female and non-breeding-season males, respectively). Thus, the 20,266-acre NSO Habitat Analysis Area is a conservative approximation of one to three fisher home ranges and would be expected to yield a reasonable representation of effects to the species. Figure 3-5 below illustrates the Analysis Area (black) in relation to the Project Area (red).

Figure 3-5. The Fisher Analysis Area and the Lost Creek Project Area



The process for conducting biological evaluations and assessments includes a review of existing records, field reconnaissance, field surveys, and analysis of potential impacts. The project wildlife biologist conducted a review of potential wildlife habitat using field assessments, maps, aerial photographs, GIS software, wildlife survey data, and stand exam records for the Analysis Area.

The BLM wildlife biologist classified habitat in the Analysis Area using 1997 IVMP (Interagency Vegetation Mapping Project), FOI (Forest Operations Inventory), TPCC (Timber Production Capability Classification), and on-site habitat analysis. IVMP is a joint Forest Service/BLM project that derives a 25-meter pixel-based vegetation map from 1997 satellite imagery. The 1997 IVMP provides a representation of vegetation age classes across all ownerships within the Analysis Area. The vegetation map has been classified into categories according to the Interagency Vegetation Standards that were adopted by the Interagency Advisory Committee. IVMP data is primarily useful for cumulative effects analysis that includes public and private lands. The FOI gives a more detailed description of age classes on BLM-administered lands because it is based on field data as well as aerial photo inventories. The combined data allows the vegetation to be grouped into the early, mid-, and late seral age classes for comparison purposes, although these data sources have differing degrees of detail and resolution. The TPCC refers to the suitability of the soil to produce timber.

3.4.2 Assumptions

The northern spotted owl (NSO) nesting/roosting/foraging (NRF) habitat-type described in the NSO affected environment section 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).

3.4.3 Affected Environment

On October 7, 2014, the USFWS issued a proposal to list the West Coast Distinct Population Segment of fisher (*Pekania pennanti*) as a Threatened species under the ESA (79 FR 194:60419-60425). The USFWS published a finding in April 2016 that the west coast population of fisher will not be listed under the ESA. The October 7, 2014, proposed rule to list the West Coast DPS of fisher as a threatened species is withdrawn as of April 18, 2016 (81 FR 74:22709-22808). The USFWS stated that the best available science shows current threats are not causing significant declines to the West Coast populations of fisher and that listing is not necessary at this time to guarantee survival. Fishers remain a Special Status Species (BLM Bureau Sensitive Species).

Fishers (a mammal from the weasel family) are found in forest woodland landscape mosaics that include conifer-dominated stands. Their occurrence is closely associated with low- to mid-elevation forests (generally less than 4,100 feet) with a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor (Aubry and Lewis 2003). Forest type is probably not as important to fishers as the vegetative and structural complexity that lead to abundant prey populations and potential den sites (Lofroth et al. 2010). 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), but they will use harvested areas if patches of habitat with residual components (i.e. logs, hardwoods) and areas where patches of larger trees are left in the landscape (Lofroth et al. 2010). In addition, 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. Prey and scavenged remains recovered from den and rest sites in southwest Oregon include rabbit, ground squirrel, flying squirrel, woodrat, opossum, skunk, porcupine, bobcat, deer and elk carrion, jay, woodpecker, grouse, berries, and yellow jackets (Lofroth et al. 2011; Aubry and Raley 2006).

Females usually give birth in cavities (natal dens) in large live or dead trees. These cavities are in trees with openings that access hollows created by heartwood decay (Aubry and Raley 2002). After the kits become more active, the females move them to a larger den (maternal den) on or near the forest floor. These dens are primarily cavities in the lower bole or butt of live or dead large trees. Fishers also use snags, mistletoe brooms, rodent nests, logs, and cull piles for rest sites (Lofroth et al. 2010).

Currently, there are two populations of fisher in Oregon which appear to be genetically isolated from each other: a small population in the Southern Cascades near Prospect and Butte Falls, and a second population in southwestern Oregon in the Klamath Siskiyou Mountains (Lofroth et al. 2010; Aubrey et al. 2004). This is considered to be the result of the presence of potentially strong ecological and anthropogenic barriers including the white oak savanna habitat of the Rogue Valley and Interstate 5. Based on DNA analyses, individuals in the southern Oregon Cascades appear to be descendants of animals introduced from British Columbia and Minnesota during the late 1970s and early 1980s by the Oregon Department of Fish and Wildlife (Drew et al. 2003). Animals in the eastern Siskiyou Mountains of Oregon are genetically related to individuals in the northwestern California indigenous population (Wisely et al. 2004; Farber and Franklin 2005).

The Fisher Analysis Area is north of the Klamath Siskiyou Mountains, within the Southern Oregon Cascades range of the fisher.

Fishers are highly mobile, have large home ranges, and travel over large areas. In the Southern Cascades population, the average home range for females was approximately 6,200 acres (25 km^2). Male home ranges varied from approximately 36,300 acres (147 km^2) during breeding season to 15,300 acres (62 km^2) during the nonbreeding season (Aubry and Raley 2006). One male dispersed approximately 34 miles (55 km) to the Big Marsh area on the Deschutes National Forest (Aubry and Raley 2002). Other fisher research studies on the west coast have shown that fisher mean home range size varies considerably. Females' mean home ranges vary from 1.7 km^2 to 59 km^2, and males' from 7.4 km^2 to 177.5 km^2.

The northern spotted owl NRF habitat-type described in Section 3.3.3.1 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 NSO 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 8,166 acres of suitable fisher denning and resting habitat exist on federal lands within the Fisher Analysis Area. All of these acres may not provide optimal fisher habitat, however, because past harvest practices and land ownership patterns have resulted in fragmented habitat. BLM "checkerboard" ownership may be one of the primary factors limiting the ability of BLM-administered lands to provide optimal fisher habitat (USDA and USDI 1994). This checkerboard ownership pattern was created by the Congressional acts that provided land grants, and is beyond the scope of the BLM's authority.

A known population of fisher is present in the southern Cascades near the communities of Prospect and Butte Falls. A research project by Pacific Northwest Research Station Olympia Forestry Services Laboratory (PNW) and Rogue River National Forest (RRNF) documented fishers in the Rogue River/Lost Creek, Big Butte Creek, and South Fork Rogue River 5th field watersheds on BLM-administered lands near RRNF lands. Fisher surveys were conducted within the Analysis Area in 2010 by a Medford BLM fisher biological survey team and in the winter of 2016 by an Oregon State University survey team. Fishers were not detected within the Analysis Area during these studies. Fishers were detected within five miles of the Analysis Area in 1999 during a Pacific Northwest Research Station (PNW) study, and in 2010 and 2016 during the previously mentioned surveys. The size of the fisher population on Butte Falls Resource Area and RRNF lands is unknown, although 22 fishers were captured from 1995 to 2001 in the PNW study (Aubry and Raley 2002).

3.4.4 Environmental Consequences

Impacts to fishers are measured in acres by changes to denning and resting habitat from the proposed activities. Effects are analyzed at the Fisher Analysis Area scale. This scale is appropriate because fishers are a wide ranging species and this scale is large enough to address habitat effects that could affect the species.

Alternative 1 - No Action

Under Alternative 1 (No Action) no management activities would be implemented. Without treatment, current stand conditions would likely develop into less complex stand structures and simplified species composition than of late-successional stands (Sensenig 2002), or at the very least, would require much

longer time scale to develop into a structurally complex forest (Tappeiner et al. 1997). Habitat conditions would remain generally unchanged at the unit scale in the short-term unless major disturbance such as a wildfire, wind event, or disease induced mortality occurred.

Fishers would be expected to behave and utilize the habitat within the Analysis Area in the same fashion as they have in the past. Much of the discussion under the NSO No Action Alternative is also relevant to the fisher, as both species are associated with mature and late-successional habitats.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Fisher occurrence is closely associated with low to mid-elevation (generally less than 4,100 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 (Aubry and Lewis 2003). Forest type is probably not as important to fishers as the vegetative and structural complexity that lead to abundant prey populations and potential den sites (Lofroth et al. 2010). The most applicable data available to the BLM where these key structural habitat components are located across the landscape is the NSO nesting, roosting and foraging (NRF) habitat models and field assessments.

There is considerable information on the importance of structural elements (e.g. large trees and snags with cavities) for fisher. The strongest and most consistent habitat association observed across all fisher studies in the West Coast Distinct Population Segment was the use of cavities in live trees and snags by reproductive females with kits. Natal dens are typically found in the largest trees available in a stand and there is a preference towards hardwood cavities when present on the landscape. These large trees with cavities and platforms are also used extensively by both sexes for resting sites. Naney et al. (2012) stated that the reduction in structural elements used for denning and resting distributed across the landscape was the highest ranked and geographically most consistent threat to fishers. Currently, there are no empirical thresholds at which the reduction of structural elements may begin to negatively affect fishers (Naney et al. 2012).

Other threats to fishers in SW Oregon include overstory reduction, roads, fragmentation, uncharacteristically severe wildfires, and the reduction of structural elements mentioned above (Naney et al. 2012). These changes in habitat have the greatest effect on fisher new home range establishment. Fishers typically have large home ranges, use habitat at multiple spatial scales, and typically avoid areas with little or no contiguous canopy cover (Lofroth et al. 2010). Fragmentation is primarily influenced by land ownership patterns, management practices, and is a higher threat on commercial timber lands (Naney et al. 2012). These effects likely have the strongest influence on females because males have been known to disperse great distances to settle new home ranges. Although not always successful, dispersing juveniles have been documented moving long distances and navigation across or around landscape features including rivers, highways and rural communities (Lofroth et al. 2010). In a study in the south Oregon Cascades, juvenile males averaged a dispersal distance of 18 miles (Aubry and Raley 2006). Dispersal into and through the Fisher Analysis Area may occur from all sides of the Analysis Area, although protocol surveys have not yet detected fishers to the west of the Analysis Area. Additionally, the Rogue River and Lost Creek Lake Reservoir bisect the Analysis Area and may be barriers to fisher dispersal between the north and south halves of the Fisher Analysis Area.

According to the closest fisher study (Aubry and Raley 2006) to the Fisher Analysis Area, fisher male non-breeding home ranges average 24 mi^2 (15,320 acres) and females average 9.6 mi^2 (6,177 acres). Since female home ranges frequently overlap, the Fisher Analysis Area has the potential to contain at

least three female home ranges and one male home range, and possibly more, depending on their home range juxtaposition on the landscape surrounding the Analysis Area. Surveys conducted in 1999, 2010, and 2016 confirmed fisher presence within five miles of the Analysis Area. The nearest proposed timber harvest treatment is approximately five and a half miles away from this detection.

A considerable amount of research exists describing denning and resting habitat use and landscape-level selection (Lofroth et al. 2010), but very little is known regarding how forestry practices affect how fishers continue to use previously untreated areas. Historically, a change in habitat is used as a surrogate to determine the effects of habitat modification in lieu of published research. As previously mentioned, our best tool for determining suitable fisher habitat, while not implying a level of fitness, is to use NSO habitat models. Field surveys have shown that NSO NRF habitat can contain similar decadent attributes or structural elements that fisher use for denning and rest sites.

The proposed treatments in Alternative 2 would treat (and maintain) 191 acres, downgrade 100 acres, and remove 19 acres out of 8,166 acres (total) of NRF habitat in the Fisher Analysis Area (Table 3-14).

Table 3-14. Alternative 2 Proposed Impacts to Fisher Denning and Resting Habitat

Commercial & Non-commercial Prescriptions	
Fisher Denning and Resting Habitat	**Alt 2. Est. Acres**
Maintain	186
Downgrade	100
Remove	15
Total	**301**
Transportation Management	
Fisher Denning and Resting Habitat	**Alt 2. Est. Acres**
Maintain	5
Downgrade	0
Remove	4
Total	**9**

As described more fully under the NSO analysis, the management activities proposed under Alternative 2 would remove or reduce the amount of suitable denning and resting (NRF) habitat in the Analysis Area by 119 acres, 1.0% of the total suitable habitat. No direct impacts to fishers are expected because no known denning sites would be impacted.

Regeneration Harvest (15 acres) and temporary road and landing construction (four acres) would no longer provide suitable fisher denning and resting habitat because key components, such as multiple canopy layers and canopy cover would be reduced and large trees could be removed. As required by the PDFs in Chapter 2, all snags and coarse woody debris would remain within the treated areas post-treatment.

Selective Thinning treatments (100 acres) within suitable fisher denning and resting habitat with at least 40% canopy retention would have short-term negative effects to fisher prey species due to the reduced vegetation. These effects are relatively short-term, as understory vegetation typically returns within five years and 60% canopy cover returns within 10-15 years.

The commercial treatments under Alternative 2 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 five years and some of the fishers' prey species take advantage of early-seral stages. The immediate effects to fisher foraging opportunities would be minimal, because the large amount of untreated areas within the Analysis Area would continue to provide hunting habitat while canopy cover in the treated stands increases. Additionally, treatments would retain key habitat characteristics such as legacy trees, large snags and coarse woody debris to provide existing and future fisher habitat.

Disturbance from treatment activities may affect fisher within the Analysis Area. However, fishers are highly mobile and with large home ranges, they would likely move to another part of their home range while the activity is ongoing. Ongoing radio telemetry work in the nearby Ashland watershed has shown that fishers are quick to respond to environmental changes (e.g. heavy snowfall) and move to other parts of their home ranges (Clayton 2012).

Under Alternative 2, PDFs would minimize impacts to fishers. These include the retention of key structural elements such as legacy trees, snags, down woody debris, and large hardwoods for denning. Also, the majority of treatments (Density Management and Selective Thinning) proposed under Alternative 2 are expected to increase areas of structural complexity within stands that have remained homogenous from previous treatments. While 6% of the Analysis Area (federal lands) is proposed for treatments, areas such as Riparian Reserves, NSO RA 32 habitat, 100-acre KSOAC owl cores, NSO Nest Patches, Administratively Withdrawn land, and other reserves will continue to provide undisturbed fisher habitat.

Cumulative Effects

Refer to the NSO cumulative effects section (section 3.3.4) for a summary of relevant ongoing and reasonably foreseeable projects that could cumulatively affect fisher and their habitat.

The hazard tree, Baker Cypress restoration, Vine Maple Timber Sale, and blowdown salvage activities ongoing within the watershed would not preclude the fisher from foraging or denning within the watershed. Nor would these projects diminish the overall amount of suitable habitat found within the Analysis Area. The Clark's Dog Timber Sale would diminish suitable habitat until treated stands return to functioning as suitable habitat. No other planned or on-going projects on BLM-administered lands would diminish the overall amount of suitable habitat. Some private lands within the watershed may be subject to intensive timber harvest, but the timing and magnitude of such harvest is unknown. Even when considering potential treatments on private lands, up to 8,010 acres of suitable resting and denning habitat within the Analysis Area would remain functional and provide adequate habitat for fishers to occupy, forage, or reproduce within the Analysis Area. The overall design of the treatments and PDFs would maintain the function of suitable fisher habitat within the Analysis Area.

The Lost Creek Project would result in an increased amount of noise disturbance in addition to the other ongoing management activities in the watershed. Even considering other ongoing management activities, however, a large percentage of the watershed would remain untreated.

Fishers have large home ranges and would be able to move away from areas of disturbance while the disturbance is occurring, without impacting their ability to forage and disperse within their home range. The treatments proposed as part of the Lost Creek Project, as well as the other on-going management activities would be spread out both spatially and temporally, reducing the level of disturbance across the

watershed. Considering the cumulative effects of this project and other project activities within the watershed, the project would not preclude the fisher from foraging or denning within the Analysis Area.

Alternative 3

Direct and Indirect Effects

The proposed treatments in Alternative 3 would treat (and maintain) 114 acres (Density Management and Roadside Vegetation Management) and remove four acres (temporary route and landing construction) out of 8,166 acres (total) of NRF habitat in the Fisher Analysis Area (Table 3-15).

Table 3-15. Alternative 3 Proposed Impacts to Fisher Denning and Resting Habitat

Commercial & Non-Commercial Prescriptions	
Fisher Denning and Resting Habitat	**Alt 3. Est. Acres**
Maintained	111
Downgraded	0
Removed	0
Total	**111**
Transportation Management	
Fisher Denning and Resting Habitat	**Alt 3. Est. Acres**
Maintain	3
Downgrade	0
Remove	4
Total	**7**

As described more fully under the NSO analysis, the management activities proposed under Alternative 3 would reduce the amount of suitable denning and resting (NRF) habitat present in the Analysis Area by four acres for temporary route and landing construction. Other than these activities, minimal negative effects to fishers are anticipated from harvest activities because the proposed treatments would retain the habitat features important to fishers across the treated areas. As required by the PDFs in Chapter 2, all snags and coarse woody debris would remain within the treated areas post-treatment.

The commercial treatments proposed under Alternative 3 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 five years and some of the fishers' prey species take advantage of early-seral stages. The immediate effects to fisher foraging opportunities would be minimal, because the large amount of untreated areas within the Analysis Area would continue to provide hunting habitat while canopy cover in the treated stands increases. Additionally, treatments would retain key habitat characteristics such as legacy trees, large snags and large down wood to provide existing and future fisher habitat.

Disturbance from treatment activities would likely be the principal effect to fisher within the Analysis Area. However, fishers are highly mobile and with large home ranges, they would likely move to another part of their home range while the activity is ongoing. Ongoing radio telemetry work in the nearby Ashland watershed has shown that fishers are quick to respond to environmental changes (e.g. heavy snowfall) and move to other parts of their home ranges (Clayton 2012a).

Under Alternative 3, PDFs would minimize impacts to fishers. These include the retention of key structural elements such as legacy trees, snags, coarse woody debris, and large hardwoods for denning. Also, the majority of treatments (Density Management and Selective Thinning) proposed under Alternative 3 are expected to increase areas of structural complexity within stands that have remained homogenous from previous treatments. While 4.0% of the Analysis Area (federal lands) is proposed for treatments, areas such as Riparian Reserves, NSO RA 32 habitat, 100-acre KSOAC owl cores, NSO Nest Patches, Administratively Withdrawn land, and other reserves would continue to provide undisturbed fisher habitat.

Cumulative Effects

The hazard tree, Baker Cypress restoration, Vine Maple Timber Sale, and blowdown salvage activities ongoing within the watershed would not preclude the fisher from foraging or denning within the watershed. Nor would these projects diminish the overall amount of suitable habitat found within the Analysis Area. The Clark's Dog Timber Sale would diminish suitable habitat until treated stands return to functioning as suitable habitat. No other planned or ongoing projects on BLM-administered lands would diminish the overall amount of suitable habitat. Some private lands within the watershed may be subject to intensive timber harvest, but the timing and magnitude of such harvest is unknown. Even when considering potential treatments on private lands, up to 8,125 acres of suitable resting and denning habitat within the Analysis Area would remain functional and provide adequate habitat for fishers to occupy, forage, or reproduce within the Analysis Area. The overall design of the treatments and the PDFs would maintain the function of suitable fisher habitat within the Analysis Area.

Noise disturbance would be the primary cause of negative effects to fisher. The Lost Creek Project would result in an increased amount of noise disturbance within the watershed in addition to the other on-going management activities in the watershed. Even considering other on-going management activities, however, a large percentage of the watershed would remain untreated.

Fishers have large home ranges and would be able to move away from areas of disturbance while the disturbance is occurring, without impacting their ability to forage and disperse within their home range. The treatments proposed as part of the Lost Creek Project, as well as the other on-going management activities would be spread out both spatially and temporally, reducing the level of disturbance across the watershed. Considering the cumulative effects of this project and other project activities within the watershed, the project would not preclude the fisher from foraging or denning within the Analysis Area.

3.5 AQUATIC CONSERVATION STRATEGY

Issue 5: How would timber harvest, road work, and water source restoration activities affect attainment of Aquatic Conservation Strategy (ACS) objectives?

The Record of Decision for the Northwest Forest Plan (NWFP) (USDA and USDI 1994a) contains Standards and Guidelines for the management of the land use allocations and are incorporated into the 1995 Medford District ROD/RMP (USDI 1995). The Aquatic Conservation Strategy (ACS) provides clarification of the intent of the Standards and Guidelines "in order to provide guidance for situations not specifically covered by the standards and guidelines" (USDA and USDI 1994a, B-1).

This analysis considers the impacts of implementing Alternative 2, which proposed to treat more acres than Alternative 3 and would have a higher potential for affecting the attainment of ACS objectives. The anticipated impacts of implementing Alternative 3 would be less than what is described in the following sections and is briefly described at the end of this analysis.

3.5.1 Components of the Aquatic Conservation Strategy

The NWFP ACS has four components: Riparian Reserves, Key Watersheds, Watershed Analysis (WA), and Watershed Restoration. It is guided by nine objectives which are meant to focus agency actions to protect ecological processes at the watershed and site scale.

Riparian Reserves

The 1995 Medford District ROD/RMP (p. 27) states "As a general rule, management actions/direction for Riparian Reserves prohibits or regulates activities that retard or prevent attainment of Aquatic Conservation Strategy and Riparian Reserve objectives."

The Medford District ROD/RMP management direction for timber management within Riparian Reserves (p. 27) states, "Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain ACS and Riparian Reserve objectives."

Riparian Reserve widths for streams, springs, wetlands, and unstable soils have been determined according to the protocol outlined in the NWFPs ACS and are listed in the PDFs for the Lost Creek Project.

Key Watersheds

Key watersheds serve as refugia for "maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species" (USDI 1995, p. 22). They also have a high potential of being restored as part of a watershed restoration program. The Lost Creek Watershed is not a Tier 1 Key Watershed.

Watershed Analysis

The relevant WA for the Lost Creek Project is the 1998 Lost Creek Watershed Analysis (USDI 1998). The WA is intended to enable the planning of watershed- or landscape-scale projects to achieve ACS objectives and serve as the basis for the design of Best Management Practices during project-specific planning (USDI 1995, p. 152).

In 2011, the BLM conducted a review and updated the Best Management Practices to provide direction regarding road maintenance practices and road-related actions (USDI 2011a and USDI 2012a). The update was intended to minimize or prevent sediment delivery to waters of the United States in compliance with the Clean Water Act. Those Best Management Practices were incorporated into the Medford District ROD/RMP.

Watershed Restoration

The Medford District ROD/RMP (USDI 1995, p. 23) states, "Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of instream habitat complexity."

3.5.2 Project Summary

The BLM is proposing forest management activities on up to 1,209 acres of Matrix lands. Forest management activities would include Density Management, Selective Thinning, Regeneration Harvest (NGFMA and Structural Retention), Small Diameter Thinning, Understory Reduction, and slash disposal activities, such as piling and burning. Proposed transportation management projects include

temporary route construction and reconstruction; road reconstruction and renovation along haul routes; roadside vegetation maintenance; partial and full road decommissioning; and pre-designated skid trail and landing construction. Water source (a.k.a. pump chance) and meadow restoration are also proposed. See Chapter 2, Sections 2.3 and 2.4 for more details). There is no activity proposed in Riparian Reserves with the exception of restoring five pump chances.

3.5.3 Project Design Features (PDFs) that would Maintain or Restore ACS Objectives

Project Design Feature (PDFs) listed in Chapter 2 that apply to maintaining or restoring ACS objectives include those listed under Section 2.5.1 Common to All Proposed Projects, Objective 1; Section 2.5.2 Timber Harvest and Small Diameter Thinning, Objectives 3, 4 and 6; Section 2.5.3 Timber Harvest, Objective 1; and Section 2.5.4 Road Maintenance, Decommissioning, and Quarry Work, Objective 1, and Section 2.5.5, Fuels Treatments Associated with Timber Harvest and Small Diameter Thinning, Objective 4; and Section 2.5.6 Water Source Restoration, Objective 3.

3.5.4 ACS Consistency Analysis

The following discussion is based on the proposed project activities combined with specific PDFs that would maintain or restore each ACS objective. ACS objectives are analyzed based on short- (10 years or less) and long- (over 10 years) term effects of the project, and are analyzed at a project scale and watershed scale. For the purposes of this analysis, Alternative 2 was analyzed because it would treat the most acres and would have the most potential for impact to aquatic resources and the ability to maintain or restore ACS 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.

Project Scale

Short-Term: The Lost Creek Project would maintain the distribution, diversity, and complexity of the watershed and landscape-scale features. PDFs would ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted. PDFs include full Riparian Reserves on all streams, lakes, wetlands, ponds, springs, and meadows; no new landing construction in Riparian Reserves; wet season restrictions on hauling, which include seasonal restrictions, hauling during dry periods during the wet season on adequately rocked roads, or adding rock to roads to make adequate for hauling; road construction; and blocking and decommissioning temporary routes in the same season the route is used.

Long-Term: The Lost Creek project is expected to maintain watershed features in the long-term. 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 Lost Creek Watershed. One of the treatment objectives of the Lost Creek Project is to reduce stand densities to natural carrying capacities and create favorable conditions to improve individual tree health (vigor) for desirable species and to promote the growth and establishment of tree species that are well adapted or most resilient to environmental conditions and natural disturbance regimes. Proposed forest management actions would restore landscape scale features at the site level, but would have a minor benefit at the watershed scale due to the small amount of acres treated in the watershed.

Under Alternative 2, a total of 4.69 miles of road would be decommissioned with approximately 3.15 miles of partial decommissioning and 1.54 miles of full decommissioning. The road segments to be

abandoned would be fully decommissioned by ripping, water barring, and planting. The partially decommissioned roads would be blocked and waterbarred. A total of 0.83 miles of temporary route construction and 0.29 miles of route reconstruction would provide temporary access to treatment units and would be decommissioned after use. Approximately 0.34 miles of existing road would be reconstructed and approximately 96.57 miles would be renovated to allow for timber haul.

Riparian Reserves would remain untouched and would continue to function as they currently exist.

Watershed Scale

Short-Term: Riparian Reserves are expected to maintain the distribution, diversity, and complexity of watershed and landscape-scale features primarily because there no vegetation treatments are proposed in Riparian Reserves with the exception of removing vegetation around five water source restoration sites. Removing vegetation at these five sites would involve clearing brush and small trees to provide access to the water sources and would not have effects at the watershed scale.

Long-Term: There would be no long-term impacts from this project at the watershed scale because of the implementation of full Riparian Reserves and road decommissioning would help restore watershed and landscape-scale features.

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.**

Project Scale and Watershed Scale

Short-Term/Long-Term: In the Lost Creek Watershed, BLM-administered land is concentrated in the steeper slopes of the tributary streams of the drainages. Here, longitudinal connectivity and road densities are the primary issues for aquatic species. No activities planned under the Lost Creek Project would affect spatial and/or temporal connectivity, as no culverts are proposed for addition, replacement, or removal on perennial channels. No physical or chemical barriers associated with the proposed forest management activities and associated projects are expected to occur either in the short-term or long-term.

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

Project Scale and Watershed Scale

Short-Term/Long-Term: No actions are proposed in the Lost Creek Project that would negatively affect the physical integrity of the aquatic system. Full Riparian Reserves would be in place on all streams, wetlands, ponds, lakes, and springs; therefore, all banks and stream configurations would remain unchanged during timber sale operations. There are no stream crossings proposed during temporary route construction so stream bank and bottom configurations would remain unchanged. Roadwork would occur on existing roads and not change any stream banks or bottom configurations with the exception of removing one culvert on the 33S-2E-19.01 road and replacing it with a low water ford. The culvert removal and low water ford construction is on an intermittent stream behind a locked gate where traffic is limited. The stream would no longer be confined to an undersized culvert so the physical integrity of the aquatic system would be improved at this location. Water source restoration

would occur within the existing pump chance footprint and not affect stream banks or bottom configuration. The Lost Creek Project would not negatively affect the physical integrity of the aquatic system in the short- or long-term at either the project or watershed scale.

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.

Project Scale

Short-Term/Long-Term: Water quality would be maintained through the use of Riparian Reserves and PDFs in the Project Area. There would be no effect on water temperature, because shade would not be reduced along any stream channels during timber harvest. Water quality would be improved as a result of road renovation and reconstruction, although small amounts of sediment could be mobilized and transported to streams when the work begins. There would likely be a small amount of fine sediment entering stream channels in Project Area from timber hauling. Sediment inputs would be minor relative to existing sediment levels. There are no point sources of pollution associated with this project. PDFs designed to maintain water quality include storing hazardous materials and petroleum products and fueling equipment outside of Riparian Reserves.

Water quality would be maintained in the long-term. Road renovation, reconstruction, and decommissioning would reduce sediment input from roads. There would be a slight improvement in water quality at the project scale as a result of the adding crushed rock to roads identified for renovation where funding permits and through the full and partial decommissioning a total of 4.69 miles of road as funding is acquired.

Watershed Scale

Short Term/Long Term: Water quality would be maintained at the watershed scale because Riparian Reserves would continue to function and protect riparian, aquatic, and wetland ecosystems. Road renovation, reconstruction, and decommissioning would reduce sediment input to local stream channels but would have little impact on reducing sediment at the watershed scale.

Water quality would be maintained as Riparian Reserves continue to grow large conifers. Road renovation, reconstruction, and decommissioning would help maintain or improve water quality; although, the effect at the watershed scale would be small as approximately 402 miles of roads exist in the Project Area.

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.

Project Scale

Short Term/Long Term: The current sediment regime would be maintained because Riparian Reserves would continue to filter sediment and protect aquatic systems from additional sediment loads that may result from proposed management actions.

The sediment regime would be maintained in the short-term as a result of road renovation, reconstruction, and decommissioning, although small amounts of sediment could be mobilized and

transported to streams when the work begins. There would likely be a small amount of fine sediment entering stream channels in the Project Area from timber hauling. Sediment inputs would be minor relative to existing sediment levels.

The current sediment regime would be maintained and slightly improved as a result of 96.57 miles of proposed road renovation, 0.34 miles of road reconstruction, and 4.69 miles of full and partial road decommissioning. The volume of sediment would be reduced locally as a result of adding crushed rock to roads identified for renovation/reconstruction.

Watershed Scale

Short Term/Long Term: The current sediment regime would be maintained during implementation of the Lost Creek Project because timber harvest would occur outside of Riparian Reserves. The sediment regime would be maintained or improved through 96.57 miles of proposed road renovation, 0.34 miles of road reconstruction, and 4.69 miles of full and partial road decommissioning.

The sediment regime would be maintained at the watershed scale. Although the road work would reduce the volume of sediment at the site scale, this would be immeasurable at the watershed scale when compared to the volume of sediment generated from roads throughout the watershed.

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.

Project Scale

Short-Term: Riparian Reserves throughout the Project Area would continue to function. Patterns of sediment, nutrient, and wood routing would not be changed. The project would not diminish large wood recruitment, alter the flow regime, reduce flood-prone areas, or impinge on watershed function.

The Round Mountain Creek drainage in the Project Area currently has a potential risk for peak flow enhancement. Alternative 2 would not increase the risk for peak flow as a result of timber harvest because there would be no treatments that would result in crown closure of less than 30% within the transient snow zone. Within the Round Mountain Creek drainage, nine acres would be thinned using a Selective Thinning prescription, which would retain 40% or greater crown closure. The amount of area in the transient snow zone with less than 30% crown closure would remain at 34% after timber harvest in the Round Mountain Creek drainage. Regeneration harvest on 30 acres would result in crown closures below 30% outside of the transient snow zone. The two units of regeneration harvest (15 acres each) are proposed in the rain dominated zone. The location in the rain zone and relatively small acreage of these two units would be a low risk to affect instream flows. There would not be an increase in peak flows to cause erosion to stream channels and therefore there would be no risk of sedimentation to fish habitat downstream.

Long-Term: In the long-term, it is expected that large wood recruitment would increase within Riparian Reserves as stands continue to grow and eventually enter the stream as snags fall and blowdown occurs.

Watershed Scale

Short-Term/Long-Term: Riparian Reserves throughout the Lost Creek Project Area would continue to recover and maintain patterns of sediment, nutrient, and wood routing. Peak high and low water flows would remain unchanged at the watershed scale. At the watershed scale, there would be no effects

detectable from the background levels because PDFs would be implemented to ensure instream flows are maintained. PDFs include full Riparian Reserves, no new landings in Riparian Reserves, restrictions on wet season hauling, which include seasonal restrictions, hauling during dry periods during the wet season on adequately rocked roads, or adding rock to roads to make adequate for hauling, road construction, and decommissioning temporary routes in the same season of use.

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

Project Scale

Short-Term/Long-Term: The Lost Creek Project would maintain the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands because canopy cover would remain within the range of natural variability after timber harvest and no harvest would occur within Riparian Reserves. Full Riparian Reserves would be applied to all streams, wetlands, ponds, and springs. Project activities would be restricted within 300 feet of meadows 10 acres or larger. There would be no mechanical disturbance within meadows or wetlands.

Watershed Scale

Short-Term/Long-Term: The Lost Creek Project would maintain the timing, variability, and duration of floodplain inundation and the water table elevation in meadows and wetlands because project activities would not increase the risk of peak flows or water accumulations, project activities would not occur in meadows, and full Riparian Reserves would be implemented on all streams, lakes, ponds, springs, and wetlands.

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.

Project Scale

Short-Term: The Lost Creek Project would maintain species composition and structural diversity of plant communities in riparian areas and wetlands because full Riparian Reserve buffers would be in place on all streams, wetlands, ponds, and springs during timber harvest. Temporary route construction would occur on approximately 0.83 miles of stable ground away from streams. Water source restoration at five sites would include clearing brush and trees where access is needed to the pump chance and removing sediment along with vegetation that has accumulated in the pump chance. This would cause a reduction in vegetation in and around the pump chance, but this effect would be short-term and would not affect the species composition and structural diversity of plant communities in riparian areas and wetlands.

Riparian Reserves would continue to ensure nutrient filtering and appropriate rates of surface erosion, bank erosion, and channel migration. Riparian Reserves would supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Long-Term: The Lost Creek Project would maintain species composition and structural diversity of plant communities in Riparian Reserves because this project would use full Riparian Reserves on all

streams, ponds, lakes, springs, and wetlands. There would be no change to plant communities in riparian areas because there would be no timber harvest in Riparian Reserves.

Watershed Scale

Short-Term/Long-Term: The Lost Creek Project is not expected to affect species composition and structural diversity in riparian areas or wetlands at the watershed scale because riparian species such as willow, ash, yew, maple, and California black oak would not be removed from Riparian Reserves in the watershed.

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

Project Scale

Short-Term/Long-Term: The Lost Creek Project would maintain populations of native plant, invertebrate, and vertebrate riparian-dependent species because no riparian hardwood species would be removed and full Riparian Reserve buffers would be implemented on all streams, wetlands, ponds, lakes, and springs. PDFs that would be implemented include restrictions on wet season hauling, which include seasonal restrictions, hauling during dry periods during the wet season on adequately rocked roads, or adding rock to roads to make adequate for hauling, and road construction, no new landings in Riparian Reserves, and decommissioning temporary routes in same season of use. PDFs would minimize disturbance to plants, soil, and water; keep project activities from causing large disturbances at the project scale; and limit the risk of spreading noxious weeds.

Watershed Scale

Short-Term/Long-Term: The Lost Creek Project is not expected to affect populations of native plant, invertebrate, and vertebrate riparian-dependent species at the watershed scale because full Riparian Reserve buffers would be used during project implementation on all stream, wetlands, ponds, and springs in the Lost Creek Watershed.

3.5.5 ACS Summary

In the two action alternatives, timber harvest, road work, and water source restoration would not affect the attainment of ACS objectives in the Lost Creek Project. This project would maintain all ACS objectives in the short-term and long-term at both the site and watershed scales because no permanent roads would be constructed; full Riparian Reserve buffers would be incorporated during timber harvest on all stream channels, lakes, ponds, springs, and wetlands; and other PDFs would limit effects to soil, water, and plants which would maintain aquatic ecological processes at the watershed and site scale. This project is not expected to affect the aquatic environment. The project would allow Riparian Reserves to continue to function, and protect streams within the Lost Creek Project Area.

Full Riparian Reserves would continue to provide shade to streams. Proposed actions would maintain an adequate distance from streams to avoid sediment deposition harmful to fish habitat. Any effects from all proposed actions are expected to be negligible and within the range of natural variability for maintenance of fish populations and habitat.

Alternative 3 proposes approximately 340 acres less of treatment than Alternative 2, which would result in fewer acres of canopy reduction and less ground disturbance from timber harvest. Alternative 2 proposes approximately 0.30 miles less of temporary routes construction, approximately 0.20 miles less

of temporary route reconstruction, and about 19.10 miles less of road renovation than Alternative 2. The reduced amount of acres treated and road work proposed in Alternative 3 would result in a lower potential to impact aquatic resources.

3.6 ECONOMICS

Issue 5: How would the removal of forest products contribute towards the local and regional economy?

This section analyzes the potential impacts of the proposed forest management activities on economics.

3.6.1 Methodology

Economics focuses on the Medford District ROD/RMP objective of producing a sustainable supply of forest commodities from Matrix lands to provide jobs and contribute to community stability (USDI 1995, p. 38). In addition to commodity supply, evaluation of the economic feasibility of management actions is a consideration in project design (USDI 1995, pp. 179-180). The Analysis Area includes all BLM-administered lands within the Project Area. This analysis considers the commodity supplies and associated employment opportunities that would be contributed from lands in the Analysis Area.

Economic values that are assessed include total commodity output (wood fiber harvested), total dollar return to the Federal Treasury, and dollar value per unit of output. Units of output are measured as MBF (thousand board feet) of harvest for sawlog material. The values used per MBF of harvest are based on April 2016 prices for Douglas-fir ($550 per MBF). Level of commodity output provides the basis for assessing commodity supply, resultant employment levels, and estimates of net revenue and revenue per unit of output to the Federal Treasury. Positive net revenue serves as an indicator of economic feasibility and revenue per unit of output indicates the level of economic efficiency.

The economic impacts of noncommodity-based activities are only assessed where there is a correlation to commodity supply. Management actions, such as habitat improvement or fuel hazard reduction, have economic effects; however, the primary focus of these actions is not for inputs to the economy but to provide for resource enhancement. As a result, the economic impacts of these actions are recognized but are not a primary decision factor in considering implementation of an action alternative.

3.6.2 Assumptions

- Affected employment levels per MMBF (million board feet) processed is 9.07 jobs in the solid wood products industry (USDA and USDI 1994b, p. 3&4-293).
- Economic values are static and intended to provide for a relative comparison among alternatives.
- Average harvest levels are from historical yields of treatments in the Butte Falls Resource Area similar to those proposed in the Lost Creek Project Area. Assumed harvest levels range from 20 MBF per acre, for Regeneration Harvest prescriptions, to 5 MBF per acre for lower volume harvest areas such as Density Management thinning treatments that would maintain NSO nesting, roosting, and foraging (NRF) habitat.
- The estimated return to the Federal Treasury is based on current pond values excluding estimated logging costs. Logging costs are based on average yarding distances as well as average road renovation, and temporary route construction and reconstruction costs for each alternative.

- Volumes used in this analysis are estimates and actual average volume from the proposed action alternatives is estimated to range from 4 to 10 MBF/acre.
- Fuels hazard reduction creates approximately 28.8 jobs per $1 million invested (Moseley and Nielson-Pincus 2009).
- Fuels hazard reduction treatments cost approximately $1,000 per acre based on past similar treatments within the Butte Falls Resource Area.

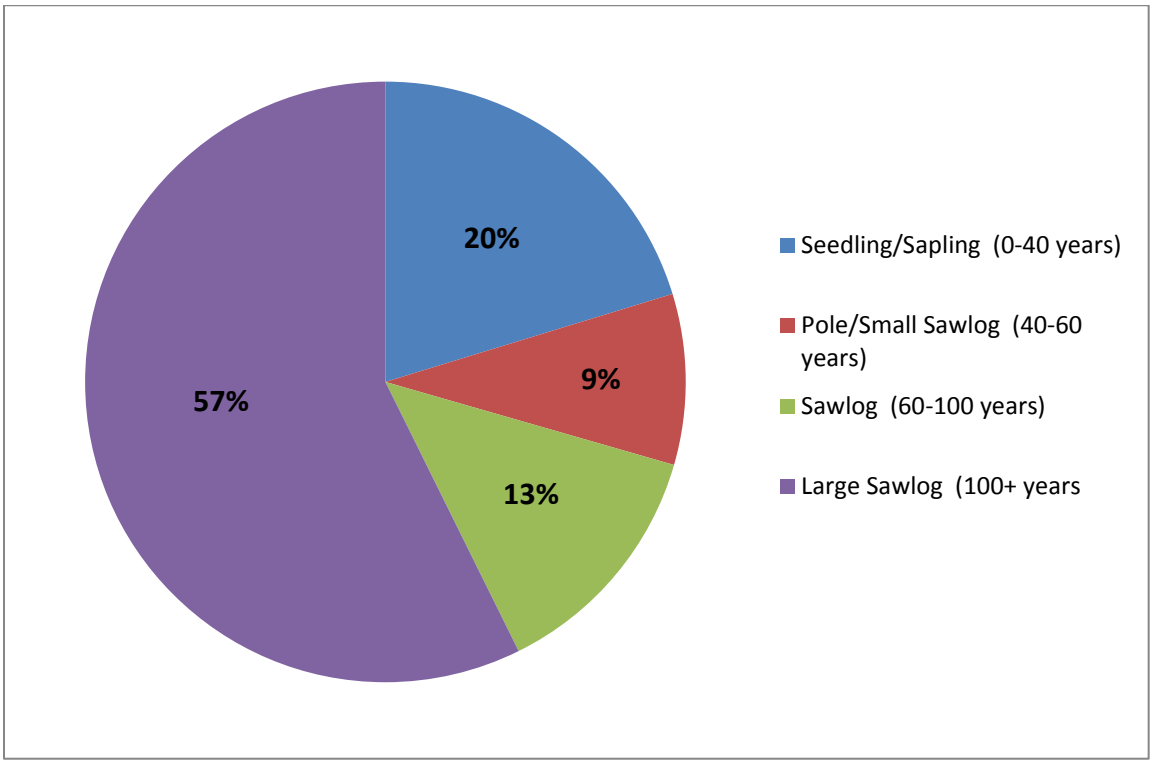
3.6.3 Affected Environment

A regional perspective of the economic setting is provided in the Northwest Forest Plan (USDA and USDI 1994b, pp. 3&4-261 to 3&4-319). One primary variation from the economic setting regarding commodity production from federal lands is that actual timber harvest levels have lagged behind levels projected in the Northwest Forest Plan (USDI 2005, p. 36). During the first 10 years of Northwest Forest Plan implementation (1995–2004), the total BLM timber volume offered for the Medford District averaged 74% of the planned 57 MMBF levels. From 2005 to 2014, the Medford District BLM has offered 51% of the annual target harvest level of 57 MMBF. The overall reduction in timber harvest across all ownerships in the region has resulted in a demand for logs in western Oregon that is being filled with log imports (USDI 2005, p. 35).

Merchantable timber on Matrix land is highly dispersed and the stocking levels of merchantable-size trees are variable. Individual tracts of BLM-administered land within the Lost Creek Project Area are fragmented by a mixed ownership pattern with private lands. Individual BLM tracts range from 40 acres to 640 acres in size. Matrix lands within each tract are further fragmented by varying land use allocations under the Medford District RMP (USDI 1995). This, in conjunction with past harvest treatments on these lands, has resulted in the existing stages of development with respect to potential timber supply. Stages of development by general age and merchantability class on BLM-administered land within the Project Area are summarized in Figure 3-6.

Figure 3-6 shows a fairly regulated condition with respect to commodity supply. Approximately 29% of the Matrix land base exists in a precommercial (seedling/sapling) and developing commercial (pole/small sawlog) condition. Assuming no disturbance occurs, the larger size classes would be expected to increase in representation over time with younger stands becoming less prevalent on the land base. Treatment under existing management direction would tend to accelerate growth to the next development stage through thinning of the younger size classes. The seedling-to-pole size class would be maintained through regeneration of the large sawlog component.

Figure 3-6. Forest Stands in the Project Area by General Age and Merchantability Class



Factors that affect supplying forest commodities in an economically feasible manner are the amount and distribution of material available for harvest, the method of harvest, access to harvest areas, and the associated costs to mitigate the impacts of harvest, such as treatment of activity slash. These factors considered individually or collectively have an effect on the economic feasibility (positive net revenue) and economic efficiency (revenue per unit of harvest) of harvest proposals.

The amount and distribution of commercial forest products existing on Matrix lands is interrelated with access and method of harvest. Harvest of timber stands with a relatively higher harvest volume per acre in a concentrated area would result in lower access and removal costs compared to stands with relatively lower harvest volumes located in a more dispersed pattern.

Common harvest methods (yarding trees from stump to truck) are primary factors affecting actual harvest costs. Ground-based tractor yarding is the most cost-effective method of removal with typical logging costs around $100/MBF. Cable yarding incurs a higher removal cost at around $200/MBF. Helicopter yarding is the most costly removal method, which costs approximately $400/MBF. Appropriate harvest methods vary and are generally based on management objectives in conjunction with site conditions such as access, topography, and available harvest volume. Where more cost-effective harvest methods can be used, economic efficiency is increased. Economic feasibility is affected when relatively lower harvest volumes or values are associated with more costly yarding methods.

Important factors to consider in determining the economic feasibility of ground-based yarding systems (tractor, skidder) are the maximum yarding distance and the average yarding distance to the landing. Maximum yarding distance varies by the type of ground-based equipment used. Typical logging operations in this area would use either crawler tractors or rubber-tired skidders. The maximum yarding distances generally range from 700 feet for tractors and 1,000 feet for skidders. Optimum average yarding distance is in the 500- to 700-foot range for this equipment. Slope is a limiting factor for tractor

yarding in the Lost Creek Project Area. Tractor yarding is limited to slopes generally less than 35%. Felling costs would be minimized in all alternatives by using mechanized felling equipment in ground-based yarding units.

Skyline-cable yarding is proposed on steeper-slopes (>35%) within the Project Area. Strategically located existing roads or new routes, generally at the top of units, are necessary in order to feasibly harvest units using skyline-cable yarding systems. Optimum yarding distance for skyline-cable yarding systems is 1,000 feet with a maximum yarding distance capability of 4,000 feet. Harvest volume per acre, size of harvest trees, and move-in/move-out costs are other important factors that contribute to an economically feasible skyline-cable yarding operation. Limited road access and topographic features such as convex slopes, uneven terrain, and long, constant slopes can present difficulties for skyline-cable yarding systems. Where these difficulties cannot be engineered around or where environmental issues limit road construction or ground disturbance, then helicopter yarding can be considered if economically feasible.

Optimum yarding distance for helicopter yarding is approximately 2,500 to 5,000 feet with a maximum distance of three to four miles. Local experience has shown that operations are optimum at 2,500 feet with a maximum distance of one mile. Harvest volume per acre, size, and weight of harvest trees are other important factors that contribute to an economically feasible helicopter operation.

Access to harvest areas is a factor with respect to the number of road systems needed and the condition of those roads. Cost factors include the level of road improvement needed for hauling material, road surface condition with respect to the length of the operating season, use restrictions during wet conditions, and move-in/move-out costs of equipment where multiple road systems are used for access. Economic feasibility and efficiency is reduced where road improvement costs and the number of road miles or road systems needed for harvest access increase.

There are costs associated with the implementation of required Project Design Features (PDFs), such as ripping compacted soils, decommissioning or closing roads, treating activity slash, and operating under seasonal restrictions. The cost and level of mitigation needed is situation dependent.

3.6.4 Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Under the No Action Alternative, proposed management actions would be deferred. There would be no timber volume from the Project Area in fiscal year 2016 to contribute toward the Medford District's annual allowable sale quantity and there would be no return to the Federal Treasury. Under this alternative, no forestry-related jobs would be provided. This includes jobs directly related to the timber harvest such as timber fallers, logging crews, log truck drivers, road crews, and sawmill employees. Opportunities for future timber harvest in the short- and long-term would remain unchanged in the Project Area. With no action, there would be a lost opportunity in maximizing volume growth potential in mature stands (100 years and older) and in younger stands where densities are high.

The Small Diameter Thinning units would not provide additional timber volume or special forest products resulting in both direct and indirect loss of jobs. Forestry-related jobs for both commercial and noncommercial thinning would not be provided. Understory Reduction would not provide additional jobs either.

Indirectly, fire suppression costs would be higher because fuel loads in planned timber harvest and Small Diameter Thinning units would not be reduced. Also, water source restoration would not occur, which would limit access and water availability if a fire occurred in the Project Area. No action would cause the potential for increased fire suppression costs because of higher severity fires, limited safe access to areas, and reduced water availability. There would be no reduction in long-term maintenance costs on the permanent road system without completing roadside vegetation maintenance.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under Alternative 2, approximately 7.0 MMBF would be harvested on 1,057 acres resulting in an estimated harvest of 6.6 MBF per acre. Direct employment as a result of timber harvest and processing a commodity would result in approximately 63 full-time equivalent jobs. The estimated return to the Federal Treasury for timber harvest would be $360 per MBF for a total value of approximately $2.5 million.

Small Diameter Thinning on 152 acres would remove an estimated 0.4 MMBF. There would be approximately $76,000 invested into the treatment units. The estimated employment resulting from the thinning and possible biomass utilization would be equivalent to 2 jobs.

Indirectly, fire suppression costs would be lower due to the reduced fuel loads on 1,179 acres of Selective Thinning, Density Management, and Small Diameter Thinning, along with the associated activity fuels treatment. Regeneration harvest on 30 acres is not expected to reduce fuel loads in the short-term. Water source restoration at five sites would aid in reducing fire suppression costs by supplying firefighters with better access to larger quantities of water. Road maintenance costs would be decreased in the long-term along 16.75 miles of road within the Project Area.

Alternative 2 would provide harvest volume and net revenue to the Federal Treasury from commercial stands, and improve future timber supply potential in developing stands through thinning treatments as well as maximizing growth rates in mature stands by regeneration harvest. Harvest would contribute approximately 7.4 MMBF to the Medford District's Allowable Sale Quantity of 46 MMBF for fiscal year 2016.

The 674 acres of Selective Thinning, 353 acres of Density Management, and 152 acres of Small Diameter Thinning units could be available for harvest again in 10 to 20 years. Future timber supply from the 30 acres of regeneration harvest would not be provided again from these areas until commercial thinning occurs in 40 to 60 years. In the long-term, volume growth capability would be maximized in regeneration harvest units and increased in the thinned stands.

Cumulative Effects

There are two small blowdown and standing hazard tree projects proposed for salvage harvest within or immediately adjacent to the Project Area in 2016. A total of approximately 70 MBF will be harvested from these sales with a return to the Federal Treasury of approximately $28,000. Direct employment as a result of timber harvest and processing a commodity would result in approximately 0.07 full-time equivalent jobs.

The economic output of these projects in combination with the anticipated economic output from the Proposed Action (Alternative 2) would be $2.53 million. When combined, these actions would

contribute 7.47 MMBF to the Medford District's ASQ of 46 MMBF for FY16 from the Lost Creek Project Area.

Alternative 3

Direct and Indirect Effects

Under Alternative 3, approximately 4.0 MMBF would be harvested on 717 acres resulting in an estimated harvest of 5.6 MBF per acre. Direct employment as a result of timber harvest and processing a commodity would result in approximately 36 full-time equivalent jobs. The estimated return to the Federal Treasury for timber harvest would be $355 per MBF for a total value of approximately $1.4 million.

Small Diameter Thinning on 152 acres would remove an estimated 0.4 MMBF. There would be approximately $76,000 invested into the treatment units. The estimated employment resulting from the thinning and possible biomass utilization would be equivalent to 2 jobs

Indirectly, fire suppression costs would be lower due to the reduced fuel loads on 869 acres of Selective Thinning, Density Management, and Small Diameter Thinning, along with the associated activity fuels treatment. Water source restoration at 5 sites would aid in reducing fire suppression costs by supplying firefighters with better access to larger quantities of water. Road maintenance costs would be decreased in the long-term along 11.84 miles of road within the Project Area.

Alternative 3 would meet the purpose and need of this project and Medford District RMP direction to provide for harvest activity on timber stands available for harvest in the Project Area. This would provide harvest volume and net revenue to the Federal Treasury from commercial stands, and improve future timber supply potential in developing stands through thinning treatments. Harvest would contribute 4.4 MMBF to the Medford District's Allowable Sale Quantity of 46 MMBF for fiscal year 2016.

The 217 acres of Selective Thinning, 500 acres of Density Management, and 152 acres of Small Diameter Thinning units could be available for harvest again in 10 to 20 years. In the long-term, volume growth capability would be increased in the thinned stands.

Cumulative Effects

There are two small blowdown and standing hazard tree projects proposed for salvage harvest within or immediately adjacent to the Project Area in 2016. A total of approximately 70 MBF will be harvested from these sales with a return to the Federal Treasury of approximately $28,000. Direct employment as a result of timber harvest and processing a commodity would result in approximately 0.07 full-time equivalent jobs.

The economic output of these projects in combination with the anticipated economic output from the Proposed Action (Alternative 2) would be $1.43 million. When combined, these actions would contribute 4.47 MMBF to the Medford District's ASQ of 46 MMBF for FY16 from the Lost Creek Project Area. Alternative 3 would provide 3.0 MMBF less volume and $1.1 million less return to the Federal Treasury than Alternative 2 would provide.

CHAPTER 4 - CONSULTATION AND COORDINATION

This section describes any public participation and consultation or coordination with agencies and organizations that occurred during the preparation of this project.

4.1 PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

4.1.1 Scoping

The BLM promotes public involvement in the planning process by soliciting input to determine the scope of the issues to be addressed by the EA. This process, known as scoping, is also used to help identify impacts and potential alternatives that will be analyzed during the development of the project. Scoping input is both internal and external to the agency. Internal scoping uses an interdisciplinary team of resource specialists to identify issues, alternatives, and data needs. External scoping involves notifying other agencies, organizations, tribes, local governments, and the public of the proposed project and providing opportunity for feedback. See Chapter 1, Section 1.8 for more information on the scoping that occurred for this project and the issues that were identified.

4.1.2 Interagency Coordination

4.1.2.1 ESA Consultation

Section 7 of the ESA requires the BLM to work with the US Fish and Wildlife Service (T&E plant and wildlife species) and NOAA Fisheries (T&E fish species) for actions the BLM funds, authorizes, or proposes to ensure the project is not likely to jeopardize the continued existence of listed plant, wildlife, or fish species, or destroy or adversely modify their designated critical habitat.

Before requesting consultation, the BLM determines whether or not the project may affect the listed species or critical habitat. If the project would affect the species, but the effect would be relatively minor, consultation is informal and the BLM submits a written request for informal consultation. If US Fish and Wildlife Service or NOAA Fisheries agrees with the BLM's determination, then informal consultation concludes with the US Fish and Wildlife Service or NOAA Fisheries issuing a letter of concurrence.

If the BLM determines a project is likely to adversely affect a listed species or critical habitat, then formal consultation is required and the BLM submits a written request, or biological assessment, for formal consultation to US Fish and Wildlife Service or NOAA Fisheries. During formal consultation, the US Fish and Wildlife Service or NOAA Fisheries reviews the project to determine if the project is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. The agencies submit the results of the review to the BLM in a biological opinion.

T&E Wildlife

The federally threatened northern spotted owl and the endangered gray wolf are the only threatened and endangered wildlife species within or near the Lost Creek Project Area. The BLM has determined that the Lost Creek Forest Management Project is likely to adversely affect the northern spotted owl. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) for federally-listed wildlife species (northern spotted owl and gray wolf) will begin when the Biological Assessment (BA) is sent to the USFWS in June 2016 by the Medford District BLM. Meetings and a field trip to proposed project units have already taken place as part of a more streamlined consultation process. A Biological Opinion (BO) from the USFWS is expected in August 2016. No Decision will be made until we receive the BO.

T&E Plants

The Lost Creek Project is within the range of one threatened and endangered plant, the federally endangered Gentner's fritillary (*Fritillaria gentneri*). Suitable habitat for this species includes oak woodlands, chaparral shrublands, meadows, mixed hardwood-conifer woodlands, and the transition zones between these plant communities.

The BLM has a programmatic consultation for T&E plants that generically covers the activities proposed in this EA. The Biological Assessment and Letter of Concurrence (#01EOFW00-2014-I-0013) prescribe measures, called Project Design Criteria, to ensure that management actions will not likely adversely affect populations or habitat. One of the project design criteria for Gentner's fritillary for large-scale forest management projects is to conduct two years of surveys if the project is within the range of the species, contains suitable habitat, and the action would negatively impact the population. The Lost Creek Project Area is outside the ranges of T&E plants except for one section (T34S-R2E-Section 5) which falls within the range of Gentner's fritillary. The BLM has completed surveys to protocol in this section and no Gentner's fritillary sites were detected in this section or in the rest of the Project Area.

T&E Fish

There are no federally-listed fish species or habitat within the Lost Creek Project Area. The resource area fisheries biologist determined there would be no-effect to federally-listed Southern Oregon Northern California Coast Coho (SONCC) Salmon or Coho Critical Habitat (CCH) and Essential Fish Habitat (EFH) in the Lost Creek Project; therefore, consultation with the NOAA Fisheries for this federally-listed fish species was not needed. There are no anticipated effects to stream channels, sediment and large wood routing, or stream shade resulting from timber harvest and road construction and renovation. Any mechanism for sediment delivery at stream crossings has been arrested through the use of PDFs and BMPs.

4.1.3 Tribal Coordination

Letters describing the preliminary Proposed Action initiating consultation with the local federally recognized Native American Tribes were sent in November 2015. Further consultation in the form of meetings and phone calls took place and did not identify any concerns.

4.1.4 State Historic Preservation Office

Consultation with the State Historic Preservation Office (SHPO) was not needed as the BLM determined that the project will have "no effect" to cultural resources.

4.2 DOCUMENT AVAILABILITY

A letter or email announcing the availability of the Lost Creek EA for public review was mailed to those who submitted an Interest Response Form or provided scoping comments, and to grazing lessees, tribes, Rogue River-Siskiyou National Forest, Jackson County Commissioners, Association of O&C Counties, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the library at Southern Oregon University.

The Lost Creek EA is available on the BLM ePlanning website at: http://tinyurl.com/BLMePlanning-LostCreekEA.

A notice of the EA availability published in the *Medford Mail Tribune* newspaper will begin the 30-day comment period for the Lost Creek Forest Management EA.

CHAPTER 5 - LIST OF PREPARERS

This section lists the BLM staff involved in the development of the Lost Creek Project and the preparation of this document.

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APPENDIX A. ISSUES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following issues were raised by the public or the interdisciplinary (ID) team during the development of the project. The BLM considered these issues but did not analyze them in detail, often because the project's design or implementation of Project Design Features (PDFs) would eliminate or reduce effects on the resource. In some cases, issues raised by the public or the ID team were not considered in detail as they were determined to be beyond the scope of this project. These issues, along with a rationale for their being considered but not analyzed in detail in this EA, are listed below.

Air Quality

Issue A: How would the smoke created from burning timber slash affect air quality?

Background Information: For all prescribed burning activities, the Medford District BLM is required to be in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates SSRA (Smoke Sensitive Receptor Areas), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. The SSRA closest to the Project Area is the Bear Creek Valley, as described in OAR 629-048-0160. The objective of the Smoke Management Plan is to prevent smoke from prescribed burns from entering the SSRA.

Medford District BLM is also required to be in compliance with the Oregon Visibility Protection Plan (OAR 340-200-0040, Section 5.2) which mandates that prescribed burning does not affect the visibility of Class I areas. Class I areas are defined in the Clean Air Act as Forest Service wildernesses and national memorial parks over 5,000 acres, National Parks over 6,000 acres, and international parks. Local Class I areas include Crater Lake National Park, Kalmiopsis Wilderness, and Rogue Wilderness. The Project Area is not within a Class I area.

Prior to conducting prescribed burning activities, the BLM must register prescribed burn locations with Oregon Department of Forestry. The specific location, size of the burn, fuel loadings, ignition source, time, and duration of ignition are reported prior to ignition. Smoke management advisories or restrictions are generated on a daily basis by the State Meteorologist. This information is used to determine the appropriate time to conduct the planned prescribed burn. Most prescribed burning on the Medford District is accomplished by hand-pile burning. Hand-pile burning generally occurs throughout the winter months during storm events when unstable atmospheric conditions are present in order to maximize mixing and lessen smoke impacts to localized areas. All piles would be covered with four millimeter thick polyethylene plastic sheeting to facilitate rapid ignition and consumption of fuels to minimize residual smoke.

Rationale: This issue was considered but eliminated from further analysis because there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA. Effects on air quality from activity slash burning would be short-term and localized. All units are not burned at the same time or in the same year. A large portion of particulate matter emissions produced during prescribed burning is lifted by convection into the atmosphere where it dissipates by horizontal and downward dispersion. At distances greater than five miles, the air concentrations for these emissions are expected to be small. Under these conditions and by following the prescribed fire management

guidelines in the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA.

Prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan (OAR 340-200-0040, Section 5.2). As a result, prescribed burning emissions are not expected to adversely affect annual PM10 attainment within the Bear Creek Valley SSRA. In addition, the BLM does not expect prescribed burning to affect visibility within Crater Lake National Park and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Rogue Wilderness Areas) due to the distance from the Project Area and implementation of smoke management guidelines. Therefore, this issue was not analyzed further.

Botanical Species and Noxious Weeds

Issue B: How would soil disturbance and compaction from ground-based tractor and cable yarding; road and landing construction; reduction of canopy cover from timber harvest; and underburning, broadcast and pile burning affect the persistence of Bureau Sensitive and S&M plants and fungi in the Project Area?

Background Information: The BLM has or will complete botanical surveys following requirements and the appropriate protocols for federally Threatened & Endangered (T&E), Bureau Sensitive, and Survey and Manage (S&M) plants and fungi in proposed project areas. All surveys will be completed by summer 2016 (Wineteer 2016, Table 1).

The Project Area is outside the ranges of T&E plants except for one section (T34S-R2E-Section 5) which falls within the range of *Fritillaria gentneri*, a federally Endangered species. The BLM has completed surveys to protocol in this section and no *Fritillaria gentneri* sites were detected in this section or in the rest of the Project Area.

As of May 1, 2016, botanical surveys have discovered 76 sites of two S&M lichens and thirteen S&M fungi species in proposed timber harvest units in Alternative 2 and 44 sites of two S&M lichens and twelve S&M fungi in Alternative 3 (Wineteer 2016, Table 2). The fungus *Boletus pulcherrimus* also has Bureau Sensitive status. The BLM would buffer sites in the timber harvest units with 20 to 100 feet radius buffers to prevent direct impacts from logging equipment during timber harvest, temporary route and landing construction; from removal of host trees; or from fire during pile burning or underburning. Buffers would also protect against indirect impacts from changes in environmental conditions when canopy cover is reduced. Thinning dense stands improves stand health and benefits the remaining trees by reducing competition for space, light, and nutrients. Maintaining healthy forest stands benefits fungi, provided canopy covers after treatment are at least 50-60%.

Buffer sizes vary depending on the species, proposed treatment, current canopy cover, canopy cover remaining after treatment, management recommendations, population size, and species rarity (Table A-1; Wineteer 2016, Table 2).

Table A-1. Special Status Species Buffers

Species	Treatment Type	Canopy Cover Post-Treatment	Buffer Size Alternative 2 (radius)	Buffer Size Alternative 3 (radius)
Chaenotheca ferruginea	Selective Thinning-Douglas fir	40-50%	35 feet	N/A
	Selective Thinning-Mixed Conifer	40-50%	40 feet	40 feet
	Regeneration Harvest	20-30%	50 feet	N/A
	Density Management	60%	N/A	35-40 feet
Chaenotheca subroscida	Selective Thinning-Mixed Conifer	40-50%	40-50 feet	N/A
	Density Management	60%	N/A	50 feet
Clavariadelphus ligula	Density Management	60%	50 feet	50 feet
Clavariadelphus occidentalis	Density Management	60%	40 feet	40 feet
Clavariadelphus sachalinensis	Selective Thinning-Mixed Conifer	40-50%	40 feet	40 feet
	Selective Thinning-Doug Fir	40-50%	40 feet	N/A
	Density Management	60%	25-40 feet	25-40 feet
Clavariadelphus truncatus	Selective Thinning-Mixed Conifer	40-50%	35-40 feet	N/A
	Density Management	60%	40 feet	40 feet
Cortinarius magnivelatus	Selective Thinning-Mixed Conifer	40-50%	100 feet	100 feet
Cudonia montincola	Selective Thinning-Mixed Conifer	40-50%	100 feet	N/A
	Density Management	60%	N/A	100 feet
Dendryocollybia racemosa	Selective Thinning-Mixed Conifer	40-50%	85 feet	N/A
	Density Management	60%	N/A	85 feet
Phaeocollybia californica	Selective Thinning-Mixed Conifer	40-50%	100 feet	
	Density Management	60%	N/A	100 feet
Ramaria rubripermanens	Selective Thinning-Mixed Conifer	40-50%	75 feet	75 feet
	Density Management	60%	N/A	75 feet
Rhizopogon truncatus	Selective Thinning-Mixed Conifer	40-50%	20 feet	N/A
	Regeneration-NGFMA	20-30%	50 feet	N/A
	Density Management	60%		20 feet
Spathularia flavida	Selective Thinning-Mixed Conifer	40-50%	40 feet	N/A
	Density Management	60%	25 feet	25 feet
	Regeneration-NGFMA	20-30%	50 feet	N/A
Tremiscus helvelloides	Selective Thinning-Mixed Conifer	40-50%	25-35 feet	N/A
	Density Management	60%	25-40 feet	25-40 feet
Tricholoma venenatum	Selective Thinning-Mixed Conifer	40-50%	100 feet	N/A

The BLM did not survey for Bureau Sensitive or S&M fungi on 892 acres in Alternative 2 and 585 acres in Alternative 3 because the protocol does not require fungi surveys in stands less than 180 years old. If sites are present in those stands, they could be impacted during timber harvest activities. The BLM assumes that conducting equivalent effort surveys in old-growth habitat, protecting known sites, and the presence of reserves (Riparian Reserves, Late-Successional Reserves, and known Northern Spotted Owl Activity Centers) where suitable habitat exists and sites would be undisturbed by management actions, would ensure the persistence of S&M fungi (USDI BLM 2004, p. 5-2), prevent Bureau Sensitive species from trending toward listing, and eliminate the potential for cumulative effects to these species.

Surveys conducted in summer 2016 may detect additional sites in proposed treatment areas. If Special Status plant sites are discovered in the Small Diameter Thinning or meadow restoration areas, they would also be buffered to prevent direct or indirect effects.

Rationale: This issue was considered but not fully analyzed in detail because the required surveys would be completed and known sites would be protected. It was determined that the actions proposed under Alternatives 2 and 3 would have "no effect" to T&E plants or their critical habitat because no sites occur in the treatment areas. Conducting the required surveys for Bureau Sensitive and S&M plants and fungi and protecting known sites from direct or indirect impacts would ensure those species' persistence in the Lost Creek Project Area, prevent species from trending toward listing, and prevent adding cumulative effects to these species during implementation of Alternatives 2 or 3.

Alternative 3 would have less impacts on Bureau Sensitive and S&M fungi because more acres (500) would be thinned to maintain a 60% canopy cover than in Alternative 2, fewer acres (242) would be reduced to 40-50% canopy cover, and no regeneration harvest would occur. Where regeneration harvest is proposed in Alternative 2, those forest stands would not provide suitable habitat for S&M or Bureau Sensitive fungi or nonvascular plants associated with late-successional forests for at least 80 years.

Issue C: How would the movement of vehicles and equipment on and off system roads; soil disturbance and vegetation removal during temporary route and landing construction; road decommissioning; underburning, broadcast, or pile burning; water source and meadow restoration; and the removal of canopy cover during timber harvest affect the introduction and spread of noxious weeds in the Project Area?

Background Information: The BLM has documented noxious weed species in the Project Area over many years of surveys and incidental sightings. Ten species of noxious weeds occur throughout the Project Area (Table A-2). All species are Category B on Oregon Department of Agriculture's Noxious Weed list (ODA 2015), and two species (rush skeletonweed and spotted knapweed) are also listed as Target (T) species. The BLM prioritizes treatment of Category A and T listed noxious weeds and treats Category B species as funding and time allows.

Table A-2. Noxious Weeds Documented in the Project Area through March 31, 2016

Species	Category	Frequency in Project Area	Locations	Proposed Treatment Strategy
Bull thistle	B	Abundant	Openings in timber stands, old landings and skid roads, roadsides, disturbed sites	None
Canada thistle	B	Uncommon	Roadsides, wet areas	Spray
Diffuse knapweed	B	Rare	Roadsides, landings	Spray
Himalayan Blackberry	B	Abundant	Riparian or other wet areas, roadsides, landings	None
Medusahead rye	B	Abundant	Open canopy, dry areas, dry meadows	None
Perennial peavine	B	Uncommon	Roadsides, disturbed sites	None
Scotch broom	B	Uncommon	Roadsides, disturbed sites, open canopy areas	Pull or spray
Spotted knapweed	B	Rare	Roadsides, landing	Spray
Sulfur cinquefoil	B	Rare	Roadsides	Spray
Yellow star-thistle	B	Abundant	Dry fields, roadsides, disturbed areas	Handpull or spray populations along roads or landings; rely on biocontrols in areas that would not be disturbed

To reduce the risk of introducing noxious weeds into the Project Area, the BLM requires equipment that works off main roads to be cleaned of plant parts before entering BLM-administered lands. This reduces the possibility of bringing in weed seed or plant parts from outside the Project Area. Seed or plant parts could still be transported within the project boundary from infested to non-infested areas by vehicles or equipment when they move from one area to another. Areas that are particularly vulnerable to weed invasions are newly disturbed soil, such as skid trails, landings, new route construction, ripped roads, pump chances, burn pile scars, areas that are underburned; and areas where canopy cover is removed or reduced. Noxious weeds could invade these newly disturbed areas when seed or plant parts are transported by vehicles, equipment, or individuals during management actions; by the public or landowners using roads and lands within the Project Area; or by natural processes such as transportation by animals, wind, or water. PDFs such as seeding disturbed areas with native species and mulching with weed free straw would aid the establishment of desirable vegetation which can then compete with noxious weeds on landings and routes that are ripped after use or during road decommissioning and at pump chance sites after restoration.

Weed populations occur throughout the Project Area on private as well as on public lands. The BLM will continue treating some noxious weed populations in the Project Area and will treat new populations of category A and T species that are discovered and category B species as feasible given limited funding and time. The BLM will continue to monitor and treat weed populations in areas where disturbance occurs. However, while some noxious weed populations will be eradicated or reduced, other populations

will increase and new populations will become established whether or not the action alternatives are implemented. Weed management is an on-going process on BLM-administered lands throughout the Medford District. Cooperation with landowners and other agencies increases the success of these efforts.

Rationale: This issue was considered but not fully analyzed in detail because the implementation of PDFs and on-going treatments and monitoring before and after project implementation would reduce the possibility that actions proposed in Alternatives 2 or 3 would introduce or spread noxious weeds in the Project Area. Further analysis of the issue would not lead to a more informed decision.

Climate Change

Issue D: How would the proposed project affect carbon storage and greenhouse gas emissions?

Background Information: The Medford District BLM has conducted analysis on past projects to determine the effects of individual forest management projects on carbon storage and carbon dioxide emissions. These individual BLM proposed actions showed changes in greenhouse gas levels far too small to provide much meaningful information. Recent EAs on the Medford District that included analyses of effects on carbon storage and greenhouse gas emissions include the Evans Creek Forest Management Project (2011) and the Twin Ranch Forest Management Project (2010) in the Butte Falls Resource Area, and the Howard Forest Management Project (2014) and the Heppsie Forest Management Project (2012) in the Ashland Resource Area. All projects had comparable treatments. In those documents, carbon storage and carbon emissions of the proposed actions were calculated to determine the net contributions of greenhouse gases resulting from potential treatments. Carbon emissions (carbon dioxide) were calculated from timber harvest activities (including fuel consumption) and post-harvest fuel treatments. These EAs found that proposed actions would reduce carbon stores temporarily but it would result in net increases over time. For the Heppsie Project "within 10 years after harvest the carbon emission level (3.7 tonnes/acre) for the 20-year analysis period would be offset by carbon storage in tree growth" and "total live tree carbon would equal pre-treatment levels after about 75 years of tree growth" (p. 3-158). The total carbon dioxide emitted during the 20-year analysis periods is considered negligible in the context of total U.S. carbon dioxide emissions of 6 billion metric tons (Heppsie EA, p. 3-158, Evans Creek EA, p. 177, Twin Ranch EA, p. 111, Howard EA, p. 3-114).

Rationale: This issue was considered but eliminated from further detailed analysis because the Medford BLM has determined no further analysis of greenhouse gas emissions and carbon storage are warranted at the individual project level to make a determination of potential for significant effects. The analysis completed for other similar forest management projects showed that emissions were negligible in the context of total U.S. carbon dioxide emission, and proposed actions would reduce carbon stores temporarily but would result in net increases over time.

Cultural Resources

Issue E**:** How would soil disturbance from timber management and road activities, and soil heating from fuels management affect cultural resources?

Background Information: Cultural resources can be defined as a place or places and/or physical evidence of past human activity, and can include a) a site, an object, a landscape, a structure, or b) a site, structure, landscape, object or natural feature of significance to a group of people traditionally associated with it. The BLM is obligated to make a reasonable and good faith effort to identify and protect and/or mitigate effects to historic properties that may be affected by an undertaking. The term "historic

property" is defined in the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object, i.e. cultural resource, that is included in, or eligible for inclusion, to the National Register Historic Places (NRHP). Cultural resources that are unevaluated for eligibility for listing to the NRHP are managed as if they are eligible, whereas cultural resources that have been determined not eligible for listing to the NRHP require no effects analysis or protection from project activities. The Area of Potential Effects (APE) is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of cultural resources that are listed or eligible for listing to the NRHP.

To date, there are seven unevaluated or eligible cultural resources (i.e. historic or potential historic properties) within or adjacent to the APE. The project APE includes proposed forest management treatment units, pre-designated skid trails, temporary routes, roads planned for decommissioning, pump chance sites, a meadow restoration site, landing areas, and haul routes. As per the 2015 Oregon SHPO-BLM Protocol, these seven cultural resources must be protected from project activities that may harm, alter, or directly or indirectly cause changes in their character. As such, the Butte Falls Resource Area archaeologist has established a protective buffer of flagging that extends up to 40 feet beyond and around the portion or portions of each site boundary that falls within or is located adjacent to the project APE. These measures would ensure that each cultural site would be entirely avoided and protected during project activities and that soil disturbance from timber management and road activities, and soil heating from fuels management, would have no effect to cultural resources.

Rationale: This issue was considered but eliminated from detailed analysis because a) cultural resources that have been determined not eligible for listing to the NRHP do not require effects analysis or protection from project activities; and b) cultural resources that are unevaluated, listed or eligible for listing to the NRHP that are located within or adjacent to the APE have each been sufficiently buffered in order to ensure that there would be no effect to them from any project activities, including soil disturbance from timber management and road activities or from soil heating from fuels management activities.

Fire/Fuels

Issue F: What effects would timber management activities have on fuel loading, fuel structure, and fire behavior?

Background Information: Fire behavior describes how a wildland fire burns based on environmental characteristics such as surface fuels, vegetation, canopy base height, density or closure, slope, aspect, weather, and elevation. The identification of fuel models helps to describe the fuels available to a fire based on the amount, distribution, and continuity of the vegetation and wood. Fuels combined with weather and slope can be used to predict potential surface fire behavior characteristics such as rate of spread, flame lengths, and fireline intensity.

Historically, fire was a normal occurrence and has played a key role as a natural disturbance process throughout southwestern Oregon. However, fire suppression and forest management activities have altered the historic vegetative patterns within the Project Area on both public and private lands.

Timber management activities generally increase the surface fuels within a stand. However, whole tree harvesting with disposal of the tops at the landings is the most effective method of preventing surface fuel increases within the residual stand (Agee and Skinner 2005). At the landings, slash would be piled,

chipped, sold for firewood, or prescribed burned. Slash remaining within the stands would be lopped and scattered or hand piled and burned.

Rationale: This issue was considered but not analyzed further because planned fuels reduction mitigation measures in thinning treatment units would minimize the short-term effects to fuel loading, fuel structure, and fire behavior and the resultant long-term effects would be negligible. The increase of fire hazard in stands proposed for regeneration harvest would be negligible at the Project Area scale.

Commercial and non-commercial thinning treatments, such as Density Management, Selective Thinning, Small Diameter Thinning, and Understory Reduction, are intended to create multi-aged and multi-layered stands. Stands would be left in a condition more resilient to environmental stressors such as fire, drought, and insects. Isolated unthinned areas could exhibit isolated and group tree torching during a wildland fire; however, the reduced canopy bulk density of the stand and openings would limit large scale crown fire potential. Because of such structural diversity, these stands would still represent timber understory and timber litter fuel types but with reduced surface fuel loading. Stands would exhibit a decrease in overall potential fire behavior and an increase in suppression capability. Treated stands would experience a decrease in fire hazard and risk for five to fifteen years or until vegetation density returns to existing levels.

Immediately following commercial thinning activities and prior to slash disposal, fire behavior potential could increase from the current condition due to increased surface fuels. Following slash disposal treatments, a reduction in potential fire behavior would occur due to the reduction in surface fuel loading and change in horizontal and vertical fuel arrangement.

Approximately 30 acres (0.00007% of lands in the Project Area) would be managed as a regeneration harvest. Regeneration harvest prescriptions would reset the stand to early seral conditions. Some larger overstory trees would be retained depending on the specific prescription (6-8 trees per acre under NGFMA and 16-25 trees per acre under Structural Retention (see Chapter 2, Section 2.3.1.1). For the first one to five years these stands would remain a slash fuel type until the shrubs, grasses, and planted trees become established. After establishment of regeneration, these units would move into a brush fuel type. Brush fuel types are more volatile and are susceptible to high rates of fire-caused mortality. Stands could exhibit higher flame lengths, rates of spread, and fire intensity. Fires started within these stands could be difficult to initially attack and control. For five to twenty years following planting, the overall fire hazard would increase in these stands.

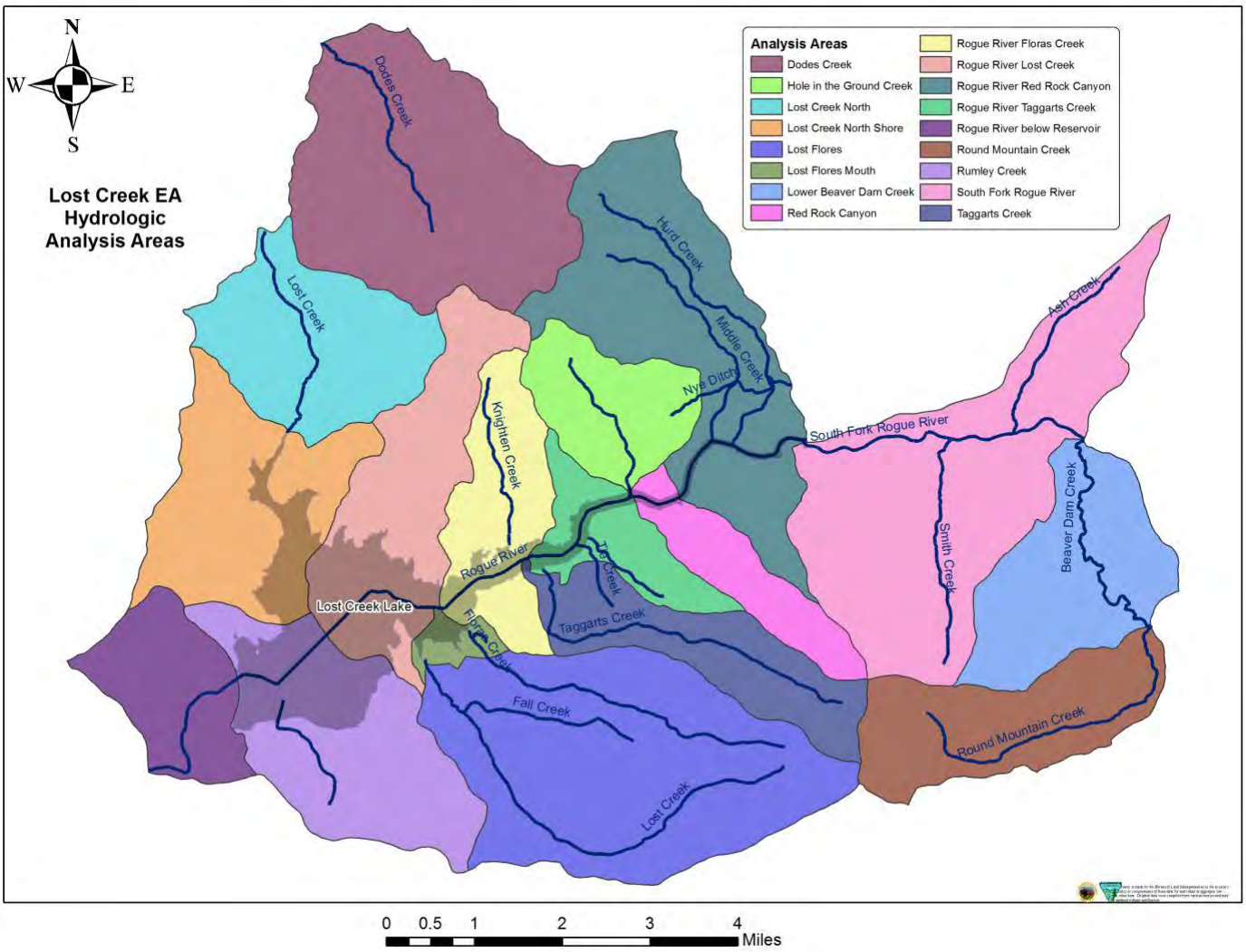
The BLM fuels management specialist would conduct a fuels assessment within each treatment unit following timber harvest activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. The fuels management specialist would mitigate remaining slash concentrations within the stands by a lop and scatter or handpile and burn treatment. At the landings, slash would be piled, chipped, sold for firewood, or prescribed burned. Post-treatment surface fuel loading would be reduced because the majority of the slash would be removed from the unit.

Lopping and scattering the activity slash would reduce the vertical height and horizontal continuity of the fuel bed. However, it would temporarily increase the surface fuel loads. This would put the stand into a slash fuel model resulting in higher predicted flame lengths, fire duration, and intensity. In 10 to 15 years after lopping and scattering, the effect of the slash on fire behavior would be overcome by the effects of decomposition and new vegetation growth (McIver and Ottmar 2006).

Hand piling and burning would decrease fuel loading of material one to six inches in diameter by 85% to 95%. Fuels greater than six inches in diameter would be left on the surface and would contribute to the coarse woody debris load. This treatment would move stands from a slash fuel type into a timber fuel type, which would result in a reduced rate of fire spread and average flame length.

Hydrology and Aquatic/Fisheries Resources

Figure A-1. Lost Creek Analysis Areas for Hydrology Issues



This review will consider the impacts of Alternative 2 as this is the alternative that would have the greatest impact to water resources.

Table A-3. Lost Creek Analysis Areas for Hydrology Issues

Analysis Area	Ownership					Total
	BLM	COE	PV	State	USFS	
Dodes Creek	1,015		3,790			4,805
Hole in the Ground Creek	423		1,139			1,562
Lost Creek North	1,803		866			2,669

Analysis Area	Ownership					Total
	BLM	COE	PV	State	USFS	
Lost Creek North Shore	1,243	408	1,319			2,970
Lost Flores	2,003		3,852	5		5,860
Lost Flores Mouth	66		233			299
Lower Beaver Dam Creek	486		2,093			2,579
Red Rock Canyon	805		369			1,174
Rogue River below Reservoir	846		816			1,662
Rogue River Floras Creek	355		1,553			1,908
Rogue River Lost Creek	1,120		1,851			2,971
Rogue River Red Rock Canyon	1,213		3,237		36	4,486
Rogue River Taggarts Creek	241		930			1,171
Round Mountain Creek	1,178		1,248			2,426
Rumley Creek	620	167	2,525	42		3,354
South Fork Rogue River	2,049		3,604			5,653
Taggarts Creek	660		1,355			2,015
Total	16,126	575	30,780	47	36	47,564

Issue G: How would the creation and use of skid trails/corridors in upland areas, road work, and timber haul affect water quality?

Background Information: The use of skid trails and skyline corridors for logging, road work, and timber haul have the potential to create soil erosion and subsequent sedimentation causing a reduction in water quality. The impacts to water quality can be minimized or eliminated through careful planning and project implementation and the use of Best Management Practices (BMPs), Project Design Features (PDFs), and Riparian Reserves.

Of all forest management activities, roads typically have the greatest potential to influence aquatic habitat in forested watersheds. Roads have three primary effects on hydrologic processes: 1) they intercept rainfall directly on the road surface and road cutbanks and affect subsurface water moving down the hill slope; 2) they concentrate flow, either on the surface or in an adjacent ditch or channel; and 3) they divert or reroute water from paths it otherwise would take were the road not present (Gucinski et al. 2001).

Impacts include both near-term and ongoing (chronic) impacts. Near-term impacts stem from activities that include new ground disturbance, such as construction or maintenance of road segments. These activities lead to increased potential for erosion and transport of sediment to channels. Sediment contribution to channels stemming from these activities generally diminishes after 1 to 3 years (Luce and Black 2001; Megahan 1974).

Weathering of road surfaces can lead to chronic sediment and turbidity contributions to aquatic habitats, and maintenance and use of roads (such as for timber hauling) can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999; Reid and Dunne 1984). Intercepted runoff that becomes concentrated over erodible road surfaces mobilizes and transports sediment with it. Surfaces armored by pavement do not experience this type of chronic weathering, while rocked roads are more resistant than natural-surface roads. For these reasons, natural-surface (or depleted rocked surface) roads

with a high degree of hydrological connectivity are generally more likely than surfaced roads (rocked or paved) to contribute sediment to streams. Approximately 44.8% (46.3 miles) of BLM roads in the Lost Creek Project Area are natural surface roads.

Rationale: This issue was considered but eliminated from detailed analysis as the project was designed to maintain water quality, or would reduce impacts to the point that they would be minor and undetectable.

Water quality would be maintained through the use of Project Design Features (PDFs) when creating and using skid trails for timber harvest. PDFs would restrict the location of these trails outside of Riparian Reserves (at least 185 feet) on slopes less than 35%. The proposed skid trails would be used during the dry season when soil moistures are low and the chance for runoff and erosion are also low. Other PDFs that would maintain water quality while creating and using skid trails include using designated skid trails, installing water bars, and using other erosion control techniques such as scattering tree limbs and other fine material on skid trails. See Chapter 2, Section 2.5 for a full listing of PDFs.

Water quality would be maintained during the creation and use of skyline yarding corridors through the use of PDFs such as constructing waterbars where gouging occurs and pulling available slash on corridors if gouging occurs for a distance of 20 feet or more. The use of full or partial suspension would limit the amount of gouging that would occur to maintain water quality. There would be no skyline corridors located in Riparian Reserves or within 185 feet of streams. Skyline corridors would not have a hydrologic connection to streams and water quality would be protected.

Proposed activities that would be hydrologically connected to the stream network include timber hauling, road renovation, and road decommissioning. Short-term (one to five years), small, undetectable above background levels, inputs of sediment at stream crossings in the Lost Creek Project Area could result from these actions.

Water quality would be maintained through the use of PDFs when completing road work for timber haul. Examples of PDFs to maintain water quality during road work include restricting the work to be done during the dry season, suspending work during forecasted rain events, and stabilizing disturbed areas during work suspension or upon completion over stream crossing structures.

Given the dry season haul restriction, inputs would occur only during a precipitation event following a season of hauling and would be spatially spread over many input locations. It is extremely unlikely that sediment input from these activities would be detectable above background levels and would have an effect on aquatic habitat. Sediment increases would be minor and undetectable relative to existing sediment levels and would not contribute measurable or detectable effects above already elevated background levels. Over the long-term, road renovation on haul routes would reduce road-related sediment inputs by adding rock to depleted areas and natural surface roads. Improving drainage would also reduce sediment inputs by reducing erosion to the road surface and ditchlines. Fully decommissioning approximately 1.5 miles of road and partially decommissioning approximately 3.2 miles of road would address sediment from roads by placing roadbeds in a stable, well-drained, maintenance-free condition that would produce little road-related sediment.

Issue H: How would the increase in road density due to temporary route construction affect the risk of peak flow increase?

Background Information: There are 10 new temporary routes (totaling approximately 0.83 miles) proposed for construction under Alternative 2 and seven routes, totaling about 0.53 miles proposed under Alternative 3 in the Lost Creek Project Area.

The proposed temporary routes are located in 7 of the 17 Analysis Areas (Table A-4). The current road densities in these Analysis Areas range from 2.2 to 6.5 miles per square mile.

Table A-4. Temporary Routes and Existing Road Densities for Alternative 2

Analysis Area	Pre-designated Skid	Temporary Route Reconstruction	Temporary Route Construction	Total	Road Density (mi/sq mi)
Dodes Creek				0.0	6.3
Hole in the Ground Creek		<0.1	<0.1	0.1	3.7
Lost Creek North				0.0	4.4
Lost Creek North Shore				0.0	4.1
Lost Flores	0.2	0.1	0.2	0.5	6.5
Lost Flores Mouth				0.0	6.3
Lower Beaver Dam Creek				0.0	7.7
Red Rock Canyon				0.0	4.4
Rogue River below Reservoir				0.0	5.4
Rogue River Floras Creek				0.0	5.7
Rogue River Lost Creek	<0.1		<0.1	0.1	2.2
Rogue River Red Rock Canyon			0.2	0.2	5.1
Rogue River Taggarts Creek				0.0	3.3
Round Mountain Creek				0.0	6.6
Rumley Creek	<0.1		0.1	0.1	5.0
South Fork Rogue River	0.2	0.2	0.2	0.6	6.3
Taggarts Creek	0.1		0.1	0.2	5.9
Total	0.6	0.3	0.8	1.7	5.4

Rationale: This issue was considered but eliminated from detailed analysis because of the small amount of temporary route proposed for construction and the temporary effects of the proposed routes. The proposed new temporary routes would be located in stable areas away from streams and would not increase the amount of runoff to a point that would increase the risk of peak flows. The proposed temporary routes would be distributed throughout seven Analysis Areas so the temporary effects are not concentrated in any one area.

In addition, the proposed routes would be temporary and would be fully decommissioned within the same season of use before the beginning of the rainy season (Table A-5). The decommissioning would involve ripping the roads surface to decrease the amount of compaction and allow infiltration thereby eliminating the risk for increased peak flows as a result of temporary route construction.

Table A-5. Proposed Full and Partial Road Decommissioning in the Lost Creek Project Area.

Analysis Area	Full Decommissioning	Partial Decommissioning	Total
Dodes Creek		0.7	0.7
Hole in the Ground Creek			
Lost Creek North		0.8	0.8
Lost Creek North Shore		1.0	1.0
Lost Flores	0.1		0.1
Lost Flores Mouth			
Lower Beaver Dam Creek			
Red Rock Canyon			
Rogue River below Reservoir			
Rogue River Floras Creek			
Rogue River Lost Creek			
Rogue River Red Rock Canyon		0.5	0.5
Rogue River Taggarts Creek			
Round Mountain Creek			
Rumley Creek			
South Fork Rogue River			
Taggarts Creek			
Outside Analysis Area	1.4	0.1	1.5
Total	1.5	3.2	4.7

Approximately 1.54 miles would be fully decommissioned as a result of the Lost Creek Project. The road surface would be ripped to reduce compaction so infiltration would be improved and the risk of increased peak flows would be low. Approximately 3.15 miles would be partially decommissioned where the road surface would not be ripped but the roads would be waterbarred and blocked. These roads would recover over time and as vegetation is established runoff would be reduced locally but would not have any effect on peak flows in the Analysis Areas.

Issue I: How would reduction in canopy cover from timber harvesting affect the risk of peak flow events in the transient snow zone?

Background Information: Elevations in the Lost Creek Analysis Areas range from 1,560 feet to 5,040 feet. Within the Analysis Areas, rain predominates in the lower elevations (generally below 3,500 feet). The majority (approximately 64%) of the Lost Creek Analysis Areas are located within the rain zone (Table A-6). A mixture of snow and rain occurs between approximately 3,500 and 5,000 feet elevation; this area is referred to as the transient snow zone (TSZ). The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Snow packs in this elevation range are often shallow and are quickly melted by rain (rain-on-snow event) and warm winds. The Round Mountain Creek Analysis Area contains the largest amount of TSZ at 83%. The Lost Creek Analysis Areas contain a small amount of land (63 acres) in the snow zone (above 5,000 feet elevation).

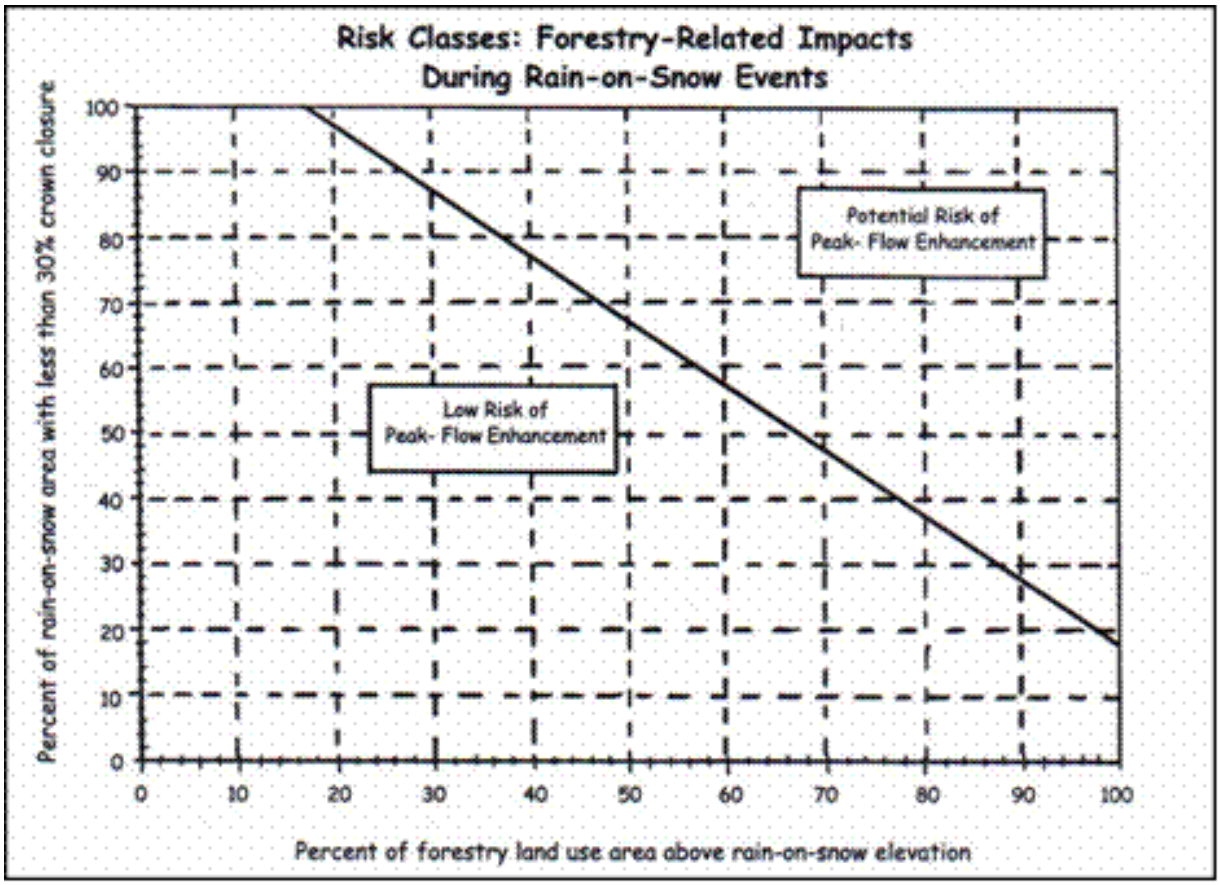
Table A-6. Acres by Precipitation Zone in the Lost Creek Analysis Areas

Analysis Area	Transient Snow Zone	Snow Zone	Rain Zone	Total	Percent in Transient Snow Zone
Dodes Creek	526		4,279	4,805	11%
Hole in the Ground Creek	159		1,402	1,562	10%
Lost Creek North	8		2,661	2,670	0.2%
Lost Creek North Shore			2,970	2,970	0%
Lost Flores	**2,089**	**14**	**3,757**	**5,860**	**36%**
Lost Flores Mouth			298	298	0%
Lower Beaver Dam Creek	**888**		**1,691**	**2,579**	**34%**
Red Rock Canyon	**684**		**490**	**1,174**	**58%**
Rogue River below Reservoir			1,662	1,662	0%
Rogue River Floras Creek	36		1,872	1,908	2%
Rogue River Lost Creek	109		2,863	2,971	4%
Rogue River Red Rock Canyon	**1,332**		**3,154**	**4,486**	**30%**
Rogue River Taggarts Creek	133		1,037	1,171	11%
Round Mountain Creek	**2,012**	**18**	**396**	**2,426**	**83%**
Rumley Creek			3,354	3,354	0%
South Fork Rogue River	**1,829**		**3,825**	**5,653**	**32%**
Taggarts Creek	**1,093**	**31**	**891**	**2,015**	**54%**
Total	**10,896**	**63**	**36,605**	**47,565**	**23%**

Peak flows occur during the winter when periodic snowfall totally or partially melts during warm, mid-winter rain-on-snow events. Low flows normally coincide with the period of low precipitation from July through October. Substantial flows can also be produced by local, high-intensity summer storms, although these events are relatively rare and their effect is limited to the local area.

The degrees to which hydrologic processes are affected by vegetation canopy reduction (e.g. land clearing or timber harvest) are summarized based on the extent and location. Extent refers to the amount of a drainage area that is below critical thresholds, and therefore at risk. Location refers to whether or not canopy reduction occurs within the transient snow zone. The risk of peak-flow enhancement is estimated from the OWAM (Oregon Watershed Assessment Manual) risk-assessment graph (Figure A-2) that uses the percent of the Analysis Area within the transient snow zone and the percent of the transient snow zone with less than 30% crown closure (Table A-7). This method indicates that drainages with more than 25% of the area in the transient snow zone may be at risk for possible peak flow increases. The transient snow zone occupies more than 25% of seven of the seventeen analysis areas associated with the proposed project (shown in bold in Table A-6). In addition, the peak flow risk assessment method uses the percent of rain-on-snow area that currently has less than 30% crown closure. We used the most recent aerial photos to estimate the area with less than 30% crown closure in the rain-on-snow zone.

Figure A-2. Estimating the risk of peak-flow enhancement from forestry-related impacts during rain-on-snow events (WPN 1999: IV-11)



Values that fall below the diagonal line represent a low risk of peak-flow enhancement, while values above the diagonal line indicate a potential risk of peak-flow enhancement. The diagonal line roughly represents peak-flow increases of 8 to 10 percent, which represents the lower boundary of detectability. Table A-7 and Figure A-2 was used to determine the percent of rain-on-snow zone with less than 30% crown closure that represents the boundary between the two risk classes for each Analysis Area that has more than 25% in the rain-on-snow zone (Table A-7). When the values of crown closure below 30% are combined with values exceeding 25% within the TSZ (bold highlight Table A-7), only the Round Mountain Creek Analysis Area reflects values that may indicate altered timing and increased potential for peak flows.

Table A-7. Percent Effective Crown Closure Below 30% in Transient Snow Zone of Total Area

Analysis Area	Percent Forested Area Less Than 30% CC	Total TSZ Acres	Total Acres	Percent in Transient Snow Zone	Percentage CC below 30%
Dodes Creek	250	526	4,805	11%	48%
Hole in the Ground Creek	61	159	1,562	10%	38%
Lost Creek North	5	8	2,670	0.2%	63%
Lost Creek North Shore	0	0	2,970	0%	0%
Lost Flores	674	2,089	5,860	36%	32%

Analysis Area	Percent Forested Area Less Than 30% CC	Total TSZ Acres	Total Acres	Percent in Transient Snow Zone	Percentage CC below 30%
Lost Flores Mouth	0	0	298	0%	0%
Lower Beaver Dam Creek	344	888	2,579	34%	39%
Red Rock Canyon	145	684	1,174	58%	21%
Rogue River below Reservoir	0	0	1,662	0%	0%
Rogue River Floras Creek	18	36	1,908	2%	50%
Rogue River Lost Creek	54	109	2,971	4%	50%
Rogue River Red Rock Canyon	463	1,332	4,486	30%	35%
Rogue River Taggarts Creek	0	133	1,171	11%	0%
Round Mountain Creek	616	2,012	2,426	83%	34%
Rumley Creek	0	0	3,354	0%	0%
South Fork Rogue River	466	1,829	5,653	32%	25%
Taggarts Creek	374	1,093	2,015	54%	34%
Total	3,471	10,896	47,565	23%	32%

One watershed Analysis Area, Round Mountain Creek, currently has a potential risk of peak flow enhancement with 83% of the land above the rain on snow elevation and 34% of the rain on snow elevation with less than 30% crown closure. The remaining Lost Creek Analysis Areas are currently in the low risk of peak flow enhancement.

The historic crown closures for the Analysis Areas associated with the proposed project are in the Southern Cascades ecoregion (Watershed Professionals Network 2001, A-80, A-204). Forest types within the Southern Cascades ecoregion historically had 40–45% canopy crown closure (Watershed Professionals Network 2001, A-83). For analysis purposes, historic crown closure is assumed to be approximately 40% for forested lands in the Southern Cascades ecoregion.

Rationale: This issue was considered but eliminated from detailed analysis because it was determined that the proposed actions would not affect peak flows or have the potential to increase the risk for peak flow.

The Round Mountain Creek Analysis Area currently has a potential risk for peak flow enhancement. The proposed action (Alternative 2) would not increase the risk for peak flow as a result of timber harvest because there would be no treatments in the transient snow zone that would result in crown closures of less than 30%. Regeneration Harvest is the only prescription proposed that would reduce canopies to below 30% and this prescription is not proposed in any stands within the TSZ. The amount of area in the TSZ with less than 30% crown closure would remain at 34% after timber harvest in the Round Mountain Creek Analysis Area. There would not be an increase in peak flows to cause erosion to stream channels and therefore there would be no risk of sedimentation to fish habitat downstream.

In addition, peak flows would not be affected by the harvest activities because the amount of canopy retained after harvest in proposed treatment units within the transient snow zone would be within the range of natural variability, which is assumed to be approximately 40% for forested lands in the Southern Cascade ecoregion.

Issue J: How would ground disturbance from timber harvest, timber hauling, and other road activities affect federally-listed and native fish species and their habitat?

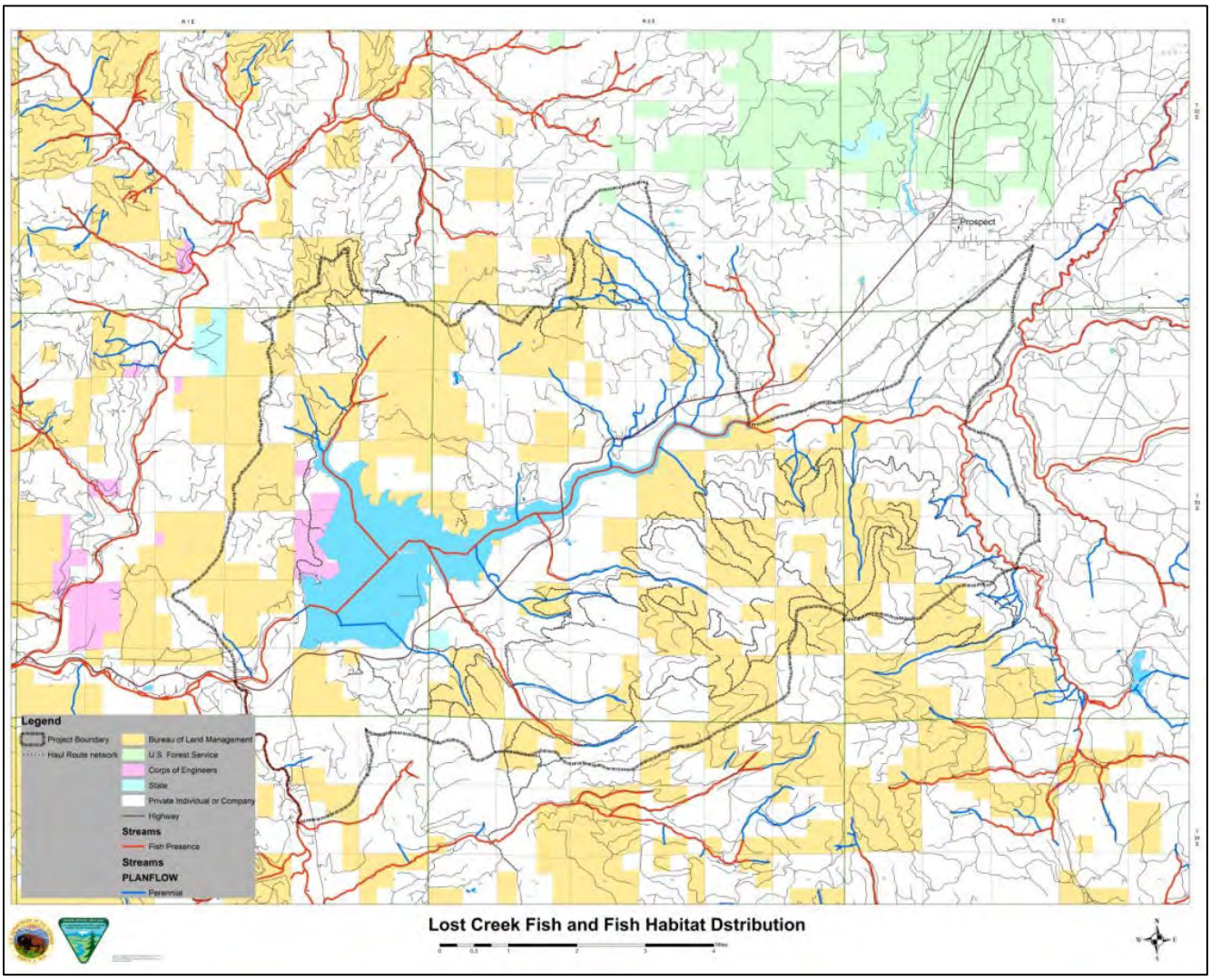
Background Information:. The dominant water body feature in the Project Area is Lost Creek Lake. Lost Creek Dam (William L. Jess Dam) was built by the Army Corps of Engineers to provide for flood control and other social benefits in the Rogue River basin. Major streams within the Project Area include Lost Creek North and South, Taggarts Creek, Beaver Dam Creek and the Middle Fork Rogue River.

There are no federally-listed fish species or habitat within the Lost Creek Project Area; however, a variety of resident fish are present. Historically, anadromous salmonids utilized areas above Lost Creek Dam. However, upon completion of the dam this historic range was eliminated. Overall, there is limited information about the full distribution of native and introduced resident species which occur within the Project Area. Native fish species such as cutthroat trout (*Oncorhynchus clarkia*), rainbow trout (*O. mykiss*), sculpin (*Cottus spp.*), and Klamath smallscale suckers (*Catostomus rimiculus*) are present within the Project Area. Rainbow trout have been found in Beaver Dam Creek and Lost Creek (north side of reservoir) and are the dominant salmonid in these reaches. Cutthroat trout are found primarily in small headwater tributaries where they are the dominant fish species. Although there is some overlap in the distribution of rainbow and cutthroat trout, there appears to be a relatively well defined zone where rainbow trout occurrence decreases and cutthroat trout occurrence increases. Sculpins appear to have a distribution similar to rainbow trout. Klamath smallscale suckers have been documented only in Lost Creek Lake. Table A-8 and Figure A-3 display fish and fish habitat distribution within the Lost Creek Forest Management Project.

Table A-8: Known and Assumed Historic Fish and Habitat Distribution, by River Miles, in the Streams Draining into the Lost Creek Project Area

Catchment	Miles
Lost Creek South	3.1
Taggarts Creek	1.1
Middle Fork Rogue River	3.4
Beaver Dam Creek	3.2
Lost Creek North	1.9

Figure A-3: Lost Creek Forest Management Project Fish and Fish Habitat Distribution



Rationale: This issue was considered but not fully analyzed in detail because it would not lead to a more informed decision. The amount of sediment added to the local stream network would be minor compared to background levels.

Proposed activities that would be hydrologically connected to the stream network include timber hauling and associated road activities. In the short-term (one to five years), there would likely be small inputs of sediment at channel crossings in the Lost Creek Project Area resulting from these actions. Direct inputs of fine sediment resulting from timber hauling and road activities would be of insufficient magnitude to meaningfully affect fish or fish habitat and would not be detectable above background levels. PDFs (Chapter 2, Section 2.5), site conditions, and the spatial separation of most road work from native fish species or habitat, make it unlikely that native fish species would be exposed to measureable quantities of sediment.

Proposed haul routes are predominately gravel surfaced roads leading to paved roads which have lower potential for sedimentation than native surface roads. Transportation management actions would incorporate applicable PDFs to minimize aquatic impacts (See Chapter 2, Section 2.5.2, Objective 3).

For example, road renovation (adding rock, blading, etc.) work would be restricted from October 15th to May 15th, or when soil moisture exceeds 25% (Chapter 2, Section 2.5.2 Objective 3, Section 2.5.4 Objective 1). All timber hauling and landing operations on native surface or rocked roads would be restricted whenever soil moisture conditions or rain events could result in road damage or the transport of sediment to nearby stream channels, generally October 15th to May 15th (Chapter 2, Section 2.5.2, Objective 3). No hauling would occur during the wet season (October 15th to May 15th) except on roads determined to have adequate surfacing or adequate rock is added to the roadbed as identified in the EA (Map 2). On Road 33-2E-19.01, a culvert would be removed and converted into a low water crossing. The low water crossing conversion would have no impacts to fish because the stream is non-fish bearing and construction would occur when there is no flow. Therefore, the combination of well vegetated ditchlines, the implementation of PDFs, and the ability to suspend wet weather haul is expected to prevent unacceptable sediment delivery to fish-bearing streams and likely undetectable compared to existing background levels. Over the long-term, road renovation would improve drainage and reduce road-related sediment inputs.

Upland work, including timber harvest and follow-up activity slash treatments, would have no effect on fine sediment levels due to the filtering action of Riparian Reserve buffers and the implementation of PDFs and Best Management Practices designed to prevent overland sediment movement (see Chapter 2, Section 2.5). Stream temperatures would not be affected as no riparian vegetation would be removed in the primary shade zone adjacent to perennial streams.

Under the No-Action Alternative, some roads or road segments within the Project Area would continue to be chronic sediment sources until they are properly repaired, maintained, or removed as part of another (unplanned) project. Lack of maintenance on area roads (cleaning ditch lines, culvert replacements and maintenance, rocking, grading, etc.) would continue to produce sediment off poorly drained roads.

In summary, no measurable changes in the aquatic habitat conditions are anticipated to result from implementation of this proposed project and, as such, there is no potential for a cumulative effect to aquatic habitats.

Range/Grazing

Issue K: How would proposed harvesting affect grazing and rangeland management in the Project Area?

Background Information: Of the 41,880-acre Lost Creek Project Area, 30,671 acres are available for grazing. The Project Area contains portions of the Lost Creek and Summit Prairie grazing allotments, which authorize up to 2,046 Animal Unit Months (AUMs) on 12,725 acres (89%) of BLM-administered lands available for grazing in the Project Area (Table A-9).

There are 10 lessees who have a total of 11 grazing leases within the Project Area for authorization to graze 743 cattle, utilizing 2,046 AUMs. The 743 cattle authorized to graze 2,046 AUM's is calculated using entire allotment acreage, which includes use outside of the Project Area boundary. The authorized cattle numbers, authorized AUMs, and the season of use listed in Table A-9 are calculated for the whole grazing allotment. An AUM is the amount of forage required to sustain a cow/calf pair for one month. The seasons of use range from April 1st to October 31th annually.

Table A-9. Grazing Allotments in the Lost Creek Project Area

Allotment Name (# of leases)	Total Allotment Acres	Allotment Acres in Project Area (Acres of BLM Land)	Current. Authorized AUMs	Current Authorized (# of cattle)	Season of Use
Lost Creek (3)	34,236	11,353 (5,530)	390	74	4/1 – 10/31
Summit Prairie (8)	91,214	19,318 (7,195)	1,656	669	4/16 – 9/30
Total	-	30,671 (12,725)	2,046	743	4/1 – 10/31

The forested portions of these grazing allotments are seldom accessed by livestock resulting in utilization levels that are generally none to slight (0-10%) within the forest plant community. The AUM rates/carrying capacities that are approved in a grazing lease account for the 0-10% use in forested areas.

Rationale: This issue was considered but eliminated from detailed analysis because it would not lead to a more informed decision. Proposed timber harvest would decrease stand density, increasing forage production by allowing more light to the forest floor for understory growth of herbaceous vegetation in the two allotments where timber harvest is proposed (Table A-9). Harvest and hauling activities could influence known patterns of grazing use and distribution, but is not likely due to treatment locations and the amount of acres treated in comparison to the amount of acres that are available for grazing use. Annual compliance and utilization monitoring occurs within the allotments and would occur where timber harvest and hauling is proposed.

Recreation and Visual Resource Management

Issue L: How would proposed timber management, road activities, and water source and meadow restoration affect the use of developed recreation sites and dispersed recreational activity in the Project Area, including the trails around Lost Creek Lake?

Background Information: Recreational resources in the Lost Creek Forest Management Project Area are managed under the Medford District RMP (USDI 1995). BLM-administered lands fall into two recreation management categories; Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs). EMRAs are all BLM-administered lands not included in SRMAs identified in the Medford District RMP that provide for dispersed recreation opportunities across the BLM Medford District. SRMAs are those areas identified with high concentrations of recreation use and developed facilities.

There are no developed BLM recreation sites in the Project Area, which is bisected by Highway 62, the Rogue-Umpqua National Scenic Byway. Most of the recreational activity in the area occurs on and around the 3,430 acre Lost Creek Lake which offers a wide variety of facilities and recreational opportunities and is managed by both the Army Corps of Engineers (ACE) and Oregon State Parks. There are over 20 developed sites including campgrounds, picnic areas, trailheads, boat ramps, fishing/shoreline access points, and group use areas. Thirty miles of hiking and biking trails surround the lake. Stewart State Park, operated by Oregon State Parks, has over 200 campsites, a marina with a store and café, and many other amenities. The Cole M. Rivers Hatchery consists of 58 acres open to the public and provides tours, interpretive information, viewing areas, and river access for fishing. Downstream of the hatchery is the McGregor Park and Visitor Center complex, which is staffed from Memorial Day weekend through Labor Day weekend by ACE volunteers and BLM staff. BLM staff also

leads educational programs for children from area schools at McGregor Park from mid-September through early November.

Recreational use away from the lake is generally low and dispersed in nature, consisting primarily of hunting, dispersed camping, driving for pleasure and exploration, and off-highway vehicle riding. BLM-administered lands are generally 'open' to off-highway vehicles (OHV) with some exceptions. A small area located west and north of Lost Creek Lake and west to the Elk Creek Road are within a Jackson County Cooperative Travel Management Area. All private and public lands within this area are managed for wildlife habitat and watershed health, and are closed to motorized vehicles from mid-October through April, except for roads posted open.

Rationale: This issue was considered but eliminated from detailed analysis because impacts to developed and dispersed recreational activities would be low due to the implementation of proposed Project Design Features (PDFs) (Chapter 2, Section 2.5) under both Alternatives 2 and 3. Timber harvest and fuels reduction operations that would occur under either Alternative have the potential to disrupt recreation in the following ways:

1) During harvest, noise from truck and helicopter activities could discourage recreational use of some areas;
2) Harvest and fuels treatment activity during the fall deer, elk, and bird hunting seasons may negatively affect hunters' experiences;
3) Treatments occurring adjacent to hiking trails may negatively affect the experience of hikers and cyclists or temporarily limit camping experiences; and
4) Treatments on flat or gentle gradient ground have the potential to 'open up' land to off-highway vehicle intrusions.

It is difficult to predict or quantify the degree of effect to each person as people may be affected differently depending on the values each person places on the various uses of public lands. Regardless, dispersed treatments would cause limited temporary impacts to ERMAs and SRMAs to recreation resources with implementation of appropriate PDFs as outlined in Chapter 2, Section 2.5.

Issue M: How would proposed timber management, road activities, and water source and meadow restoration affect the Visual Resource Management Class II landscape?

Background Information: The 1995 Medford District ROD/RMP designated lands located within the foreground/middle ground of Highway 62 and the view shed of Lost Creek Lake to be managed as visual resource management Class II (USDI 1995, p. 70). Foreground/middle ground is defined as land within one mile or to the first ridge, whichever is closer. Management direction is to manage "for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer" (USDI 1995, p. 70). A Visual Contrast Rating was conducted in May 2016 for proposed timber harvest units located around Lost Creek Lake. The VRM analysis for this project was based on Alternative 2, the alternative that would have the most acres and a higher potential for impacts to visual resources. All of the Project Area is located within VRM Class II.

Rationale: This issue was considered but eliminated from detailed analysis because an assessment was completed and it was determined that proposed treatment would not hinder attainment of VRM Class II objectives. The modification of trees, shrubs, and other woody debris would not be evident to the casual observer. Due to the remote location of heavily prescribed units only low levels of change would occur.

The location of the lake, which is the focal point, directs the viewer away from temporary modifications in the prescribed area; long-term modifications would not be evident. In most cases, within one year there would be sufficient growth of remaining vegetation so no visual contrast would remain. Only in rare occurrences would color or texture contrasts remain for two or three years. Increased amounts of wildflowers and grasses would add seasonal color in spring and summer and would not be uncommon or unusual for this landscape resulting in low levels of change.

The Visual Resource Inventory ranked the lands in the project area as Scenic Quality A and B, high and low visual sensitivity, and within the foreground-middle ground and seldom seen distance zones.

Under Alternative 2, Units 3-2, 23-3, 35-1, and 35-2 would have the most potential to adversely affect attainment of VRM objectives. However, due to vegetative screening along Highway 62 and various types of past and current vegetation treatments on BLM-administered lands and private timber lands along the highway, the prescriptions proposed in these units may be seen but would not attract the attention of the casual observer, and would not be out of character with the typical scenery found along the byway between the communities of Shady Cove and Prospect. Unit 35-1 is located directly adjacent to the highway, but the Selective Thinning prescription would not be noticeable to the casual observer due to the visual draw of the lake and the 90 degree angle the visitor would have to make to see the unit while driving. Other treatment units would either not be visible from the highway, not be discernable to travelers, or would only be visible to travelers on less commonly traveled routes without impacts to the view shed.

Soil Productivity and Stability

Issue N**:** How would helicopter, cable, and ground-based yarding and associated temporary route construction and activities affect soil productivity (compaction, displacement, and change in organic matter and soil chemistry)?

Background Information: 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 et al. 2004, p. 194). Site organic matter and soil porosity are most important when measuring the effects of management, although other factors such as water regimes, soil biological types and populations, and soil loss can also affect long-term soil productivity.

Many factors can affect soil productivity such as: compaction, displacement, erosion, organic matter loss and more. Impacts to soils and soil productivity were evaluated at the Analysis Area scale. The Analysis Area scale includes all areas that a proposed project would occur in (treatment units, temporary route construction, pre-designated skid trails, etc).

Figure A-4 on the following page displays the Soil Map Units as surveyed by the Natural Resource Conservation Service in relation to proposed treatment units (Alternative 2) and fragile soils. Table A-10 provides the description for the Soil Map Units listed in the maps legend.

Figure A-4. Soil Map Units in the Lost Creek Analysis Area

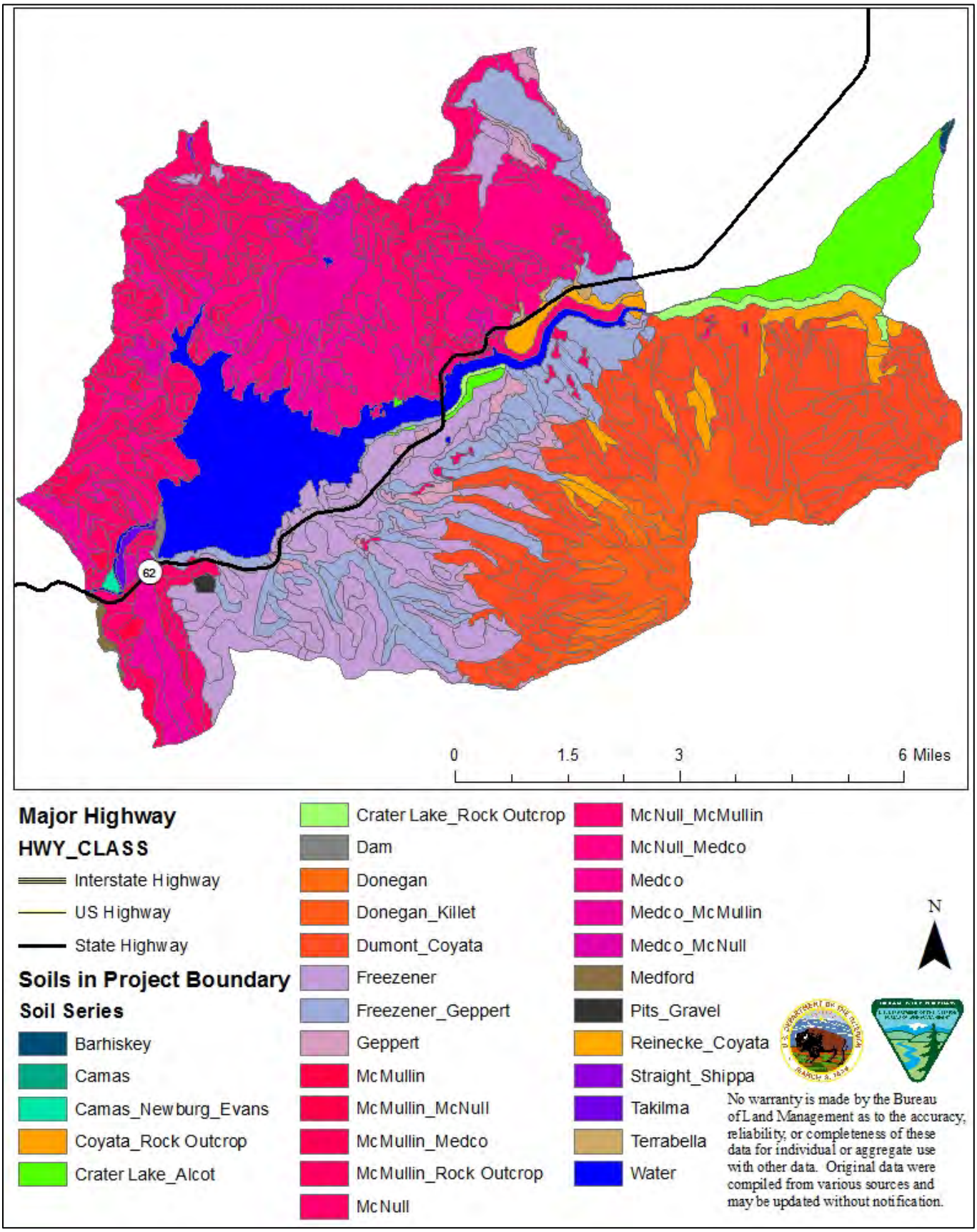


Table A-10. Soil Map Unit Descriptions Present in the Proposed Units (Alternative 2)

Soil Series[1]	Soil Map Unit Number	Surface Texture	Depth	O Horizon	Fragile Soil
Coyata	36G, 37G, 52C, 53E, 54E, 54G	Gravelly loam	31 inches to fractured Andesite	0-1 ½ inches	No
Donegan	45G, 46G, 47C, 48E, 49E	Gravelly loam	32 inches to weathered Basalt	0-3 inches	No
Dumont	52C, 53E, 54E, 54G,	Gravelly loam	60+ inches to bedrock	0-1 inches	No
Killet	47C, 48E, 49E,	Gravelly loam	60+ inches to bedrock	0-2 inches	No
Freezener	62C, 63E, 64E, 65C, 67G	Gravelly Loam	60+ inches to bedrock.	Oi 1½ inches	No
Geppert	65C, 66G, 67G, 69E, 69G, 70E, 70G	Very cobbly loam	30 inches to Andesite bedrock.	Oi ½ inch	No
McMullin	116E, 125F	Gravelly loam	17 inches to fractured Andesite bedrock.	none	No (Yes 125F)
McNull	116E, 118E, 119F	loam	32 inches to fractured Andesite Bedrock with clay films.	Oi 0-1 inch	No (yes 118E and 119F)
Medco	118E, 119F, 123F, 124F, 125F	Cobbly clay loam	30 inches to partially weathered Tuff	no	Yes

Proposed actions that could affect soil productivity include timber harvest and yarding, fuels and understory reduction treatments, temporary route and landing construction, roadside vegetation maintenance, and road renovation and decommissioning. Refer to Table 2-1 (Chapter 2, Section 2.3) for a complete list of proposed project descriptions.

Rationale: This issue was considered but not analyzed in further detail because the project's impacts on soil productivity are expected to be within the range of anticipated effects identified in the Final Environmental Impact Statement (FEIS) for the Medford District ROD/RMP (USDI 1994, pp. 4-12 through 4-16), which accounted for soil compaction on up to 12% or less of the treatment unit. In addition, potential for soil erosion would be minimized due to the implementation of rehabilitation PDFs. These PDFs are an integral part of this project's design and have been incorporated to minimize the potential for effects to soils. Refer to Chapter 2, section 2.5.2: Timber Harvest and Small Diameter Thinning, Objective 2: Minimize impacts from timber yarding operations, Objective 3: Prevent off-site soil erosion and soil productivity loss, and Objective 4: prohibit unauthorized OHV use; section 2.5.3:

[1] Soil series descriptions are saved in the Project File and are available upon request.

Timber Harvest, Objective 1: Prevent off-site soil erosion and soil productivity loss; section 2.5.4: Road Maintenance, Decommissioning, and Quarry work, Objective 1: prevent off-site soil erosion and soil productivity loss; and section 2.5.5: Fuels Treatments Associated with Timber Harvest, Objective 5: Conduct fuels reduction to minimize impacts to other resources.

Timber Harvest and Yarding

In the Project Area, Alternative 2 proposes to harvest 973 acres using ground-based yarding methods, 165 acres using helicopter yarding, and 71 acres using skyline-cable yarding systems. Alternative 3 proposes to treat fewer acres: 699 acres would be harvested using ground-based yarding methods, 130 acres using helicopter yarding, and 49 acres using skyline-cable yarding system. Soil productivity loss can occur from these yarding practices due to compaction and topsoil displacement from ground-based equipment. In skyline-cable yarded units, there would be soil displacement from the activities in the yarding corridors. There is little to no expected soil productivity loss expected in helicopter yarded units due to the lack of soil disturbance. The amount of compaction and soil displacement would be within the acceptable limit (12% of the area) accounted for in the Medford District FEIS and ROD/RMP (USDI 1994, pp. 4-12 to 4-16 and USDI 1995, p. 166).

Soil erosion from ground-based yarding is not anticipated because skidding would mainly occur on gentle slopes. Where soil erosion does occur, it would be localized to skid trails and would not be displaced off-site because of the gentle slope, low degree of soil erodibility, and the adjacent undisturbed soils. The duff organic horizon and vegetation adjacent to ground disturbance would catch displaced soil particles. PDFs such as waterbarring, seeding, mulching, and dry condition haul would limit the amount of soil erosion and, if it were occurring, limit the distance soil particles would be displaced.

In skyline units, water bars would be constructed where gouging occurs and partial or full suspension would be required. These two restrictions would reduce the amount of displacement and further erosion to acceptable levels anticipated in the FEIS for the Medford District RMP (USDI 1994, pp. 4-12 to 4-16).

Any impacts to soil productivity in helicopter yarded units would be minimal to non-existent due to the negligible footprint on the soil surface.

Additionally, activities where unacceptable soil loss would have likely occurred were dropped from the proposal during the field review and development process.

Fuels and Understory Reduction Treatments

The increased potential of soil particle movement as a result of fuels and understory reduction treatments would be low due to the gentle slope, spacing of piles, and vegetation between the piles. High soil temperatures generated by burning piles would severely and negatively affect soil properties in 3-5% of the unit by physically changing soil structure and reducing nutrient content. In most pile burning operations, the duff and woody debris associated with the piles 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 is also reduced (14% in moderate burns, 33% in intense burns), and the effects last at least four years (Atzet et al. 1987, p. 193). Overall, soil productivity would experience a slight (less than 15%) decrease through short-term effects, but potential long-term positive effects would be realized from the proposed actions as the risk of catastrophic fire is diminished.

Temporary Route and Landing Construction

Under Alternative 2, approximately 0.83 miles of temporary routes would be constructed, and under Alternative 3 approximately 0.53 miles of temporary routes is proposed for construction. Based on an estimate that the average temporary route is approximately 4 acres for every one mile of route, 3 acres and 2 acres are expected to be disturbed under Alternative 2 and Alternative 3, respectively. Temporary route construction results in a temporary full loss of soil productivity. After rehabilitation, compaction levels are improved, but not alleviated, nor are productivity losses; however, rehabilitation puts the soil on an expedited trajectory towards prior productivity levels in the long-term (>10 years). Temporary route construction has the potential to cause soil erosion; however, the gentle topography of the area, the nature of the soil along the proposed route, and the implementation of PDFs, such as limiting construction to the dry season, etc., would minimize the potential for soil erosion to occur.

New log (14), helicopter (5), and service (2) landings are proposed as well. In total, 21 landings are proposed to be constructed. The anticipated effects of landing construction are similar to temporary route construction. There are 16 existing landings expected to be used as well.

Roadside Vegetation Maintenance

The effects of roadside vegetation maintenance on soil productivity are expected to be very minimal. No soil disturbance would occur from this activity.

Road Renovation and Reconstruction, Temporary Route Reconstruction, and Road Decommissioning

The proposed 1.54 miles of full road decommissioning under both Alternatives 2 and 3 would improve soil productivity in the long-term on 6.2 acres of land by physically fracturing the compacted soil layer. The effects to soils from full road decommissioning are direct. Full road decommissioning would physically alleviate soil compaction by breaking up the massive soil structure that resulted from road construction and use. This would allow for better water and air infiltration, reduce erosion, and increase the rate of re-vegetation (Switalski et al. 2004, pp. 21-24). Soil erosion from full road decommissioning is expected to be minimized due to the incorporation of PDFs.

The partial decommissioning of 3.15 miles of road, proposed under both Alternatives 2 and 3, would reduce soil erosion and would improve soil productivity on 12.6 acres; however, it would take longer (15-50 years or more) than full road decommissioning because ripping would not occur. However, through time and non-use, natural processes would work to slowly improve the conditions.

The proposed temporary route reconstruction (0.29 miles under Alternative 2 and 0.11 miles under Alternative 3) would have very similar effects to the soil as temporary route construction except that the footprint is already there; these soils have already been disturbed and already have productivity issues. After rehabilitation, compaction levels are improved, but not alleviated, nor are productivity losses; however, rehabilitation puts the soil on an expedited trajectory towards prior productivity levels in the long-term (>10 years). Temporary route construction has the potential to cause soil erosion; however, the gentle topography of the area, the nature of the soil along the proposed route, and the implementation of PDFs (2.5.4 Road Maintenance, Decommissioning, and Quarry Work, Objective 1:

Prevent off-site soil erosion and soil productivity loss) would minimize the potential for soil erosion to occur.

Road reconstruction is proposed for 0.34 miles on existing road prisms in the Project Area under both Alternatives 2 and 3. The road footprint already exists and soil productivity is currently compromised; therefore, there is not expected to be a change to soil productivity as a result of this proposed action.

Road renovation would occur along haul routes on 96.57 miles under Alternative 2 and 77.48 miles under Alternative 3; this work would not be expected to result in a change to soil productivity because the soil productivity within the road bed is currently non-functioning and would continue to be non-functioning as long as the road is there.

Issue O: How would disturbance from ground-based yarding and associated temporary route construction and activities affect slope stability (i.e. the risk of mass movement) of pyroclastic fragile soils in the Project Area?

Background Information: There are soils classified as fragile under the Timber Productivity Capability Classification (TPCC) Handbook (USDI 1988) in the proposed Lost Creek Project. This determination was made by reviewing the Medford District's current corporate GIS layer for fragile soils as well as the Medford District RMP, Map 6 (USDI 1995). Since this information is compiled broadly and is not based on site-specific field review, the proposed projects were assessed during site-specific field review to determine site stability. Data collected from this field review ultimately determined that there were fragile soils present in some areas where activities are proposed.

The type of fragile soils present in this watershed are fragile for mass movement potential soils (FP) and fragile for slope gradient soils (FG). Fragile (FP) soils consist of deep seated, slump, or earth flow types of landslides with undulating topography and slope gradients generally less than 60%. Soils are derived from volcanic tuffs or breccias. FG soils consist of steep to extremely steep slopes that have a high potential for surface travel. Gradients commonly range from 60% to greater than 100% (USDI 1995, p. 155). These FG and FP soils can be placed in two general categories: suitable for timber sale activities or non-suitable for timber sale activities. No treatments are proposed at non-suitable fragile sites; however, treatments are proposed at fragile sites identified as suitable for timber sale activities.

This project incorporates BMPs as described in Appendix D of the RMP (and modified by Resource Management Plan Maintenance dated July 12, 2012) for fragile soils. The applicable BMPs are:

- Avoid fragile soils when planning road systems.
- Cable yarding - use full or partial suspension when yarding on FG, FM and FW soils.
- Tractor yarding - avoid tractor yarding.
- Helicopter yarding - employ helicopter yarding to avoid or minimize new road construction on fragile soils.

The BLM soil scientist developed site-specific analyses to refine the mapping of fragile soils within the Lost Creek Project Area. There are 181 acres of fragile for mass movement potential soils (FP) located within treatment units, of which 97 acres are proposed for helicopter yarding, 11 acres are proposed for skyline-cable yarding, and 73 acres are proposed for ground-based (tractor) yarding. Ground-based (tractor) yarding is only proposed in soils that would not result in instability.

Three of the proposed temporary routes, totaling 0.32 miles, are located on FP soils. The proposed route locations were field reviewed for site-specific indicators of instability. All route locations are in areas that are stable despite the soil type and, mainly due to the position on the slope, would not create instability.

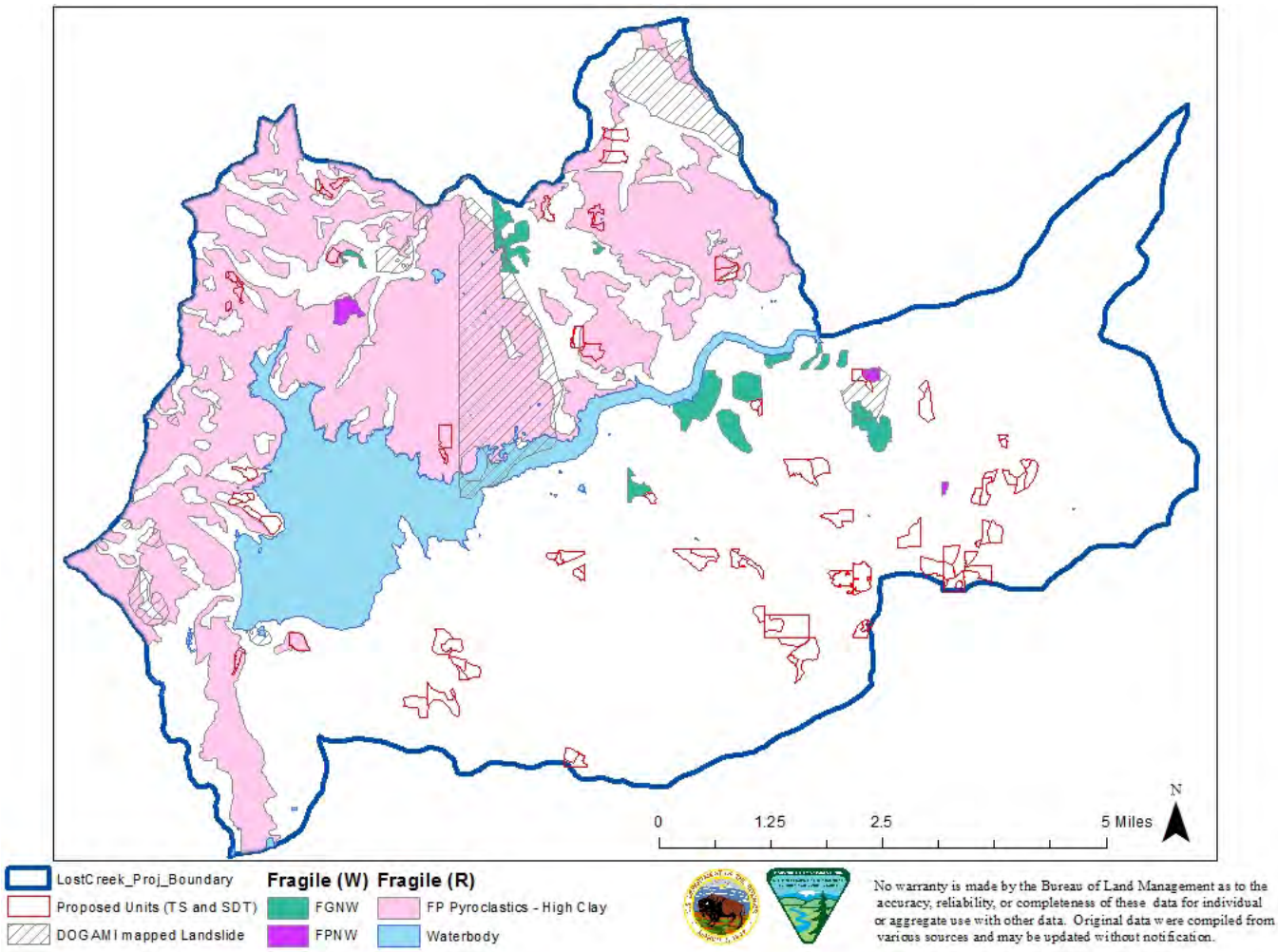
There are eight new landings proposed on FP soils; four helicopter landings and four log landings. There are two existing helicopter landings proposed for use that are on fragile soils as well. The effects of constructing new landings and use of landings on unstable slopes are very similar to roads.

Oregon Department of Geology and Mineral Industries (DOGAMI) geology maps can also help indicate where slope stability issues may occur. In the layer it is mapped where the geologic formation was due to a “landslide”. These landslides may have occurred tens of thousands of years ago and are now stabilized or they could be currently moving. Despite the range of stability, these maps are useful for timber sale planning and assessment of site stability.

Under Alternative 2, Unit 13-1 is within a past landslide area; however, it was dropped from consideration in Alternative 3. This unit was field reviewed and the portions of the unit determined to be unstable were dropped. The mapped landslide areas in the Lost Creek Project Area are consistent with DOGAMI’s latest version of Statewide Landslide Information Database for Oregon (SLIDO), in which areas of landslide hazard are identified.

Figure A-5 is a compilation of the layers used to identify where potential slope stability issues could be. It includes the fragile soils layer, TPCC withdrawn units, and the DOGAMI landslide information. There were other indicators used for determining stability (such as field review, terrain shape, and aerial imagery).

Figure A-5. Fragile Soils in the Project Area



Rationale: This issue was considered but not analyzed in detail because all areas of instability were avoided when planning forest management activities. If any unstable areas are found during the layout of this project, or at any other time, unstable sites would be buffered out of the units. BMPs were incorporated into the project design; many proposed routes and treatment units were dropped due to unstable slopes or changed to helicopter yarding (Meredith 2016).

Extensive field review was completed during project planning and prior to analysis to identify unstable areas due to the nature of the soils and/or the slope. Temporary route construction is proposed on FP soils; however, the routes are located on stable positions.

The PDFs identified to minimize soil productivity loss also work to decrease the risk of slope instability from project activities. Slope instability is not likely to occur mainly due to the design of the project.

Special Management Areas

Issue P: How would proposed timber harvesting and related road activities affect the attainment of special management practices required for the Lost-Floras sub-watershed, a previously deferred watershed?

Background Information: The Lost-Floras sub-watershed was deferred in the Medford District RMP because this area was identified as having high watershed cumulative effects from management activities, including timber harvest and other surface-disturbing activities for ten years, starting from January 1993. The Lost-Floras sub-watershed was re-evaluated in 2012, almost twenty years later, after substantial recovery occurred on BLM-administered lands (USDI 2012b).

Vegetative growth in the past 19 years has resulted in fewer acres at risk for increased runoff (Table 6). In 1990, approximately 34% of BLM-administered lands in the Lost-Floras sub-watershed were less than 10 years old. Currently, less than 4% of BLM-administered lands are less than 10 years old. The amount of BLM-administered lands considered fully recovered hydrologically (vegetation greater than 30 years old) increased from 57% in 1990 to 69% in 2010, which reduced the risk of increased frequency and magnitude of peak flows. If the low end of vegetative recovery and the age range of greater than 10 years are included, the percentage of vegetative recovery increases from 66% in 1990 to 96% in 2010 for BLM-administered lands. This is apparent when current aerial photos are compared with aerial photos used at the time of deferral (USDI 2012).

Rationale: This issue was considered but eliminated from detailed analysis because it was determined that the proposed actions would not affect the attainment of special management practices required for the Lost-Floras watershed. Proposed projects in the Lost-Floras sub-watershed were designed to meet the recommendations in the Lost Creek/Big Butte Creek Watershed Deferral Status Report (USDI 2012). Special management practices that would be attained within the Lost-Floras sub-watershed include, but are not limited to:

1) Canopy covers would remain above 40%;
2) No new permanent roads would be constructed;
3) Road densities would be reduced slightly by 0.1 miles of full decommissioning; and
4) Existing skid trails would be used where possible.

Under Alternative 2, 238 acres of timber harvest is proposed in the Lost-Floras special management watershed; 142 of the harvest acres would be within the TSZ and 95 acres would be in the rain zone. Openings in the TSZ have a greater potential to influence changes in peak flows than canopy reductions outside the TSZ. According to the Oregon Watershed Assessment Manual (WPN 2001), forested crown closure in the transient snow zone would have to be less than 30% to cause a detectable increase in peak flows. No management prescriptions would have less than 30% crown closure remaining after treatment. All timber harvest prescriptions in transient snow zone would have remaining crown closure above 40% which is within the range of natural variability in the Southern Cascades ecoregion. The amount of area in the transient snow zone with less than 30% crown closure would not increase from the existing condition of 32%. Consequently, there would be a low increased risk of peak flows associated with rain-on-snow events as a result of the proposed timber harvest in the Lost-Floras special management watershed.

Under Alternative 2, 0.1 miles of temporary route reconstruction of an existing road that needs work in order to be used by logging trucks is proposed in the Lost-Floras watershed. The temporary route is located on a stable area away from streams and would be decommissioned and re-vegetated after use.

No new permanent roads would be constructed for this project in the Lost-Floras watershed.

Within the Lost-Floras watershed, 0.1 mile of road would be fully decommissioned. Road decommissioning would reduce the miles of open roads in the Lost-Floras watershed to help reduce sedimentation to stream channels.

Approximately 17.9 miles of haul routes would be renovated prior to timber harvest to improve the condition of the road surface and drainage from the roads. Renovation would minimize the potential for stream sedimentation during timber hauling and follow the special management practices for Lost-Floras by maintaining and improving road surfacing. Over the long term, road renovation on haul routes would reduce road-related sediment inputs by adding rock to depleted areas. Improving drainage would also reduce sediment inputs by reducing erosion to the road surface and ditch lines.

Approximately 0.2 miles of skid trail would be pre-designated for use during harvest to minimize impacts in the Lost-Floras Watershed.

Terrestrial Wildlife and Special Status Species

Issue Q**:** How would noise associated with proposed timber harvest activities, water source and meadow restoration, and road work affect northern spotted owls during their nesting season?

Background Information: The proposed Lost Creek Forest Management Project is located within the range of the northern spotted owl and has the potential to cause noise disturbance near spotted owl nest sites.

Guidance from the U.S. Fish and Wildlife Service (USFWS) and the Medford District Resource Management Plan (RMP) (USDI 1995) would be followed, and surveys would be conducted in the Project Area to determine nesting status. No timber harvest would occur within 0.25 mile of nest sites between March 1st and September 30th in accordance with the Medford District RMP (USDI 1995, p. 55). Also, no disturbance would occur within 100-acre activity core areas. The USFWS has also recommended certain noise disturbance distances for activities other than timber harvest (see Chapter 2, section 2.5 Project Design Features).

Rationale: This issue was considered but not fully analyzed in detail because the potential for spotted owls to be impacted by noise associated with proposed project activities is eliminated through the implementation of Project Design Features (PDFs) (Chapter 2, Section 2.5).

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 project activities would follow mandatory PDFs that restrict activities to outside of the breeding season (March 1st to September 30th) and beyond recommended disturbance distance thresholds (see Table 2-2 in Chapter 2, Section 2.5.1, Objective 5), as established by the US Fish and Wildlife Service, no harm to nesting owls, or their young, is expected from project related noise.

Issue R**:** What disruption and habitat effects would the activities associated with timber harvest and temporary route construction have on Bureau Sensitive and S&M wildlife species?

Background Information: The project wildlife biologist has evaluated the effects of the proposed projects in Lost Creek and has determined that the No Action Alternative along with the Action Alternatives would not rise to the level that would result in the following Bureau Special Status wildlife species to no longer be able to persist within the Project Area.

Special Status wildlife species known or suspected to be present in the Lost Creek Project Area based on habitat types, field survey data, and/or literature reviews are: Foothill yellow-legged frog, bald eagle, Lewis' woodpecker, grasshopper sparrow, peregrine falcon, white-headed woodpecker, great gray owl, fisher, fringed myotis bat, Pacific marten, Townsend's big-eared bat, Siskiyou hesperian snail, travelling sideband snail, and western pond turtle.

Special Status wildlife species known or suspected on Butte Falls Resource Area but not suspected to be present in the Lost Creek Project Area based on habitat types, field survey data, and/or literature reviews are: Franklin's and Western Bumblebees, Oregon spotted frog, streaked horned lark, Oregon vesper sparrow, Johnson's hairstreak butterfly, purple martin, tricolored blackbird, white-tailed kite, chase sideband snail, Oregon shoulderband snail, Crater Lake Tightcoil snail, pallid bat, red tree vole, and vernal pool fairy shrimp. These species will not be evaluated any further.

Rationale: This issue was considered but not fully analyzed in detail because the BLM would implement PDFs and Survey and Manage buffers that would provide protection for populations of Bureau Sensitive (Special Status Species) and Survey and Manage wildlife species to continue to persist within the Project Area.

- For species that use, or live within, riparian zones: there would be a 165- to 330-foot no-harvest riparian buffer.
- For raptor species: there would be no-harvest buffers and seasonal restrictions around known nest sites.
- For Special Status mollusk species, there would be no-harvest buffers around known locations.
- For species dependent upon late-successional characteristics: unique stand features such as snags, coarse woody debris, large hardwoods, and trees exhibiting old-growth characteristics would be retained to maintain desired structural components for wildlife. However, under Alternative 2, up to 15 acres of NGFMA Regeneration harvest is proposed in a stand that exhibits late-successional characteristics: large overstory trees (over 21 inches in diameter) and trees with cavities. Potential nesting, denning, or resting habitat would be negatively impacted for the bald eagle, fisher, fringed myotis bat, and Pacific martin. Persistence of these species within the Wildlife Analysis Area would continue because there would still be up to 8,010 acres retained exhibiting these late-successional characteristics and aforementioned buffers and seasonal restrictions would be implemented. Trees with the largest, healthiest crowns would be retained first. Any existing coarse woody debris would be retained, two snags per acre would be retained, and all hardwoods greater than 12 inches DBH would be retained, unless they pose a safety hazard.
- Up to 15 acres of Structural Retention Harvest is proposed in a stand that does not exhibit late-successional characteristics and does not contain trees exhibiting old-growth characteristics. The stand contains mostly trees less than 21 inches in diameter and is low on snags, coarse woody debris, and hardwoods. Persistence of Special Status Species within the Wildlife Analysis Area would continue because buffers and seasonal restrictions would be implemented. Trees with the largest, healthiest crowns would be retained first. Any existing coarse woody debris would be retained, two snags per acre would be retained, and all hardwoods greater than 12 inches DBH would be retained, unless they pose a safety hazard.
- Special habitats, such as meadows and caves, would have no-harvest buffers.

- Riparian Reserves, 100-acre northern spotted owl activity centers, and other reserves would also provide habitat for Bureau Sensitive and Survey and Manage species.

Issue S: How would proposed activities affect gray wolf denning and rendezvous sites during their reproductive season?

Background Information: Wolves use a variety of habitats, but use primarily coincides with wild ungulate ranges, including winter range, summer range and calving/fawning areas. Important wolf habitat components for reproduction are denning sites and rendezvous sites. Den sites may be in hollow logs, clefts between rocks, deep riverbank hollows, spaces under upturned trees or rock overhangs, or in abandoned dens of other animals.

The edge of the nearest, known, established wolf pack activity area overlaps the southeastern edge of the Project Area. A wolf can travel miles in a day and sustained direct effects to individuals from the proposed actions would be improbable. Although unlikely, there may be brief, chance encounters between harvest personnel and a wolf. The majority of the roads in the area are open to year-round traffic; therefore, the likelihood of harvest personnel encountering a wolf is no greater than other forest visitors.

Rationale: This issue was considered but eliminated from further analysis as there is no potential for adverse impacts to wolves as a result of the proposed projects. Unique stand features such as snags coarse woody debris, and large hardwoods would be retained to maintain desired structural components for wildlife under each alternative. Effects from disturbance would be assessed on an ongoing basis throughout the life of the proposed project through annual updates and communication with the US Fish and Wildlife Service and Oregon Department of Fish and Wildlife and a one mile seasonal restriction from noise disturbance would be implemented for known active den sites from March 1st through June 30th.

There would be no effects to wolves because the proposed activities would not disturb key wolf areas such as den sites and rendezvous sites, would not change prey availability, and would not increase public access in the area known to be used for denning and rendezvous sites.

Issue T: How would proposed activities affect elk within the Elk Winter Range?

Background Information: Elk management in Elk Winter Range 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. During the winter months, elk feed on woody plants, including Douglas-fir and western red cedar seedlings and elderberry. Elk take shelter in forested habitat. Proposed treatments that would occur within forested habitat in the Elk Winter Range include Density Management (19 acres) and Selective Thinning (21 acres).

Rationale: This issue was considered but eliminated from detailed analysis as the proposed actions would not have the potential to lead to adverse effects with the implementation of required PDFs. Elk foraging habitat and cover would be maintained and managed for within Elk Winter Range. Density Management would maintain cover and foraging conditions and Selective Thinning would create more diverse stand conditions and would create openings allowing for sun tolerant herbaceous plants and shrubs to regenerate. Regeneration Harvest prescriptions would occur outside of Elk Winter Range. Activities would be restricted to avoid disturbance to wintering elk between November 15th and April 1st. No new, permanent road construction would occur, and approximately two miles of roads would be

decommissioned as part of this project. Temporary routes would be decommissioned after harvest. Meadows would be buffered, providing cover adjacent to foraging habitat.

Issue U: How would proposed timber harvesting activities affect woodpeckers and cavity nesters?

Background Information: Bureau Sensitive woodpeckers such as the Lewis' woodpecker and white-headed woodpecker may be present in the Project Area.

Lewis's woodpeckers are associated with open woodlands near streams and rivers. Habitat preference includes hardwood oak stands with scattered ponderosa pine near grassland shrub communities. Species may be present in the Project Area during the fall and winter seasons (migratory), but no project activities are proposed within their preferred habitat.

The white-headed woodpecker is typically associated with open ponderosa pine or mixed conifer stands dominated by ponderosa pine. They forage on ponderosa pine seed and insects and use large snags (> 20 inches) for nesting. Proposed treatment units are not dominated by ponderosa pine, but the woodpecker may be present in the wider Project Area.

Rationale: This issue was considered but eliminated from detailed analysis because unique stand features such as snags, coarse woody debris, and large hardwoods would be retained to maintain desired structural components for wildlife. Additionally, treatments would promote and retain healthy ponderosa pine trees within the mixed-conifer stands. Under Alternative 2, up to 30 acres of Regeneration Harvest is proposed in stands that provide potential habitat for woodpeckers and cavity nesters. Management recommendations for the white-headed woodpecker, for example, recommend leaving up to one snag per acre to maintain populations at the 100% level. This issue was considered but eliminated from detailed analysis because the Regeneration Harvest prescriptions require retaining at least 2 snags and 16 to 25 live trees (providing for future snag recruitment) per acre.

Issue V: How would timber harvesting activities and brush removal affect neotropical bird population trends?

Background Information: The following bird species have been located, or are likely present, within the Project Area: Olive-sided Flycatcher (BCC), Purple Finch (BCC), Rufous Hummingbird (BCC), Northern Goshawk (BCC), Band-tailed pigeon (GBBC), Willow Flycatcher (BCC).

BLM has issued interim guidance for meeting BLM's responsibilities under the Migratory Bird Treaty Act and EO (Executive Order) 13186. Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through IM (Instruction Memorandum) No. 2008-050. The IM relies on two lists prepared by the U.S. 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 and *Game Birds Below Desired Condition* (GBBDC). In December 2008, the US Fish and Wildlife Service released *The Birds of Conservation Concern 2008*(USDI FWS 2008b). This publication identifies species, subspecies, and populations of migratory and non-migratory birds in need of additional conservation actions, updating the April 2008 Birds of Conservation Concern List. This list meets US Fish and Wildlife Service mandates for the conservation of migratory non-game birds.

Additionally, the US Fish and Wildlife Service and the BLM signed a Memorandum of Understanding in April 2010 that identified strategies to avoid or minimize adverse impacts on migratory birds. The

Lost Creek Forest Management Project would follow these guidelines to reduce the impacts to migratory birds. For example, many of the PDFs, such as seasonal restrictions, that minimize effects to some wildlife species would also benefit migratory birds.

Rationale: This issue was considered but eliminated from detailed analysis as the proposed actions would not have the potential to lead to adverse effects with the implementation of required Project Design Features. Implementation of treatments might occur during bird nesting season. However, many of the PDFs (seasonal restrictions, special status plant and wildlife buffers, and riparian buffers) would benefit migratory birds and help minimize the amount of disturbance during nesting season. The treatments would be broken into smaller units and would occur over the course of several years. Smaller, staggered treatments would minimize the immediate disturbance to nesting birds. Over time, these treatments would create a mosaic landscape with increased structure and biodiversity which may provide a long-term benefit to bird and wildlife species. These resources would all be considered as the project evolves. The BLM fire and fuels management personnel would conduct post-treatment evaluations to determine the need for follow-up maintenance treatments and coordinate with the wildlife biologist and botanist.

There would be no perceptible shift in species composition the following breeding season because of the limited scale of habitat modifications in relation to the Project Area. Adequate undisturbed areas within and adjacent to the Project Area would maintain habitat for displaced individuals. Overall, populations in the region would be unaffected due to this small amount of habitat and/or reproduction loss. These effects would not be measurable at the regional scale. Analyzing bird populations at this scale is supported by Partners in Flight (California Partners in Flight 2002).

3.1.1 Other

Issue W: How would construction of temporary routes, landings, and yarding corridors affect unauthorized off-highway vehicle use and trail creation and illegal dumping and firewood cutting in the Project Area?

Background Information: BLM-administered lands are designated as ‘open’ to off-highway vehicles most of the year. Treatments with direct access to roads have the potential to ‘open up’ land to off-highway vehicle intrusions.

Rationale: This issue was considered but eliminated from further detailed analysis as the potential for adverse effects from unauthorized OHV use would be greatly reduced through the implementation of the following Project Design Features:

- Place woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of skid trails leading off system roads in all ground-based yarding units upon completion of yarding to block and discourage unauthorized vehicle use.
- Rip, seed, mulch with straw, water bar, and block new temporary routes and associated landings in the same season of use. Seed must be native species, site-specific, and approved by the resource area botanist. If hauling on a temporary route is not completed in the same year the route is constructed, the route would be storm-proofed and blocked by October 15th or when soil moisture exceeds 25%.

The BLM proposes to close and decommission roads that are not needed at this time but may be used in the future. Roads would be closed with a device similar to an earthen barrier or equivalent and would

not be maintained in the future. Roads would be closed to vehicles on a long-term basis, but may be used again in the future. Closing and decommissioning roads in the Project Area would help reduce off-highway vehicle use and trail creation and illegal dumping and firewood cutting.

Comment X: Estimate the number of trees to be logged (20-30 inches DBH and >30 inches DBH) and disclose the information in the EA for analysis and public comment.

Response: The environmental assessment has three defined functions. (1) It briefly provides sufficient evidence and analysis for determining whether to prepare an EIS; (2) it aids in an agency's compliance with NEPA when no EIS is necessary, i.e., it helps to identify better alternatives and mitigation measures; and (3) it facilitates preparation of an EIS when one is necessary (40 CFR §1508.9(a)). The BLM has disclosed in the EA the relevant and applicable information available to the agency.

Information regarding the number and location of trees that would be marked for harvest does not become available until after the analysis is completed, and the stands are marked and cruised. Furthermore, there are no requirements that mandate the BLM to disclose the precise number of trees to be harvested of any diameter. Public disclosure and Agency consideration of the exact number of trees to be harvested is not necessary for a reasoned choice among alternatives for a project where the objectives are to manage a landscape, not individual trees. The EA contained the information on the current stand condition, and explained how the proposed treatments would affect the stands relative to the goals set out in the RMP and the stated Purpose and Need of the Project.

APPENDIX B - LOST CREEK MARKING GUIDELINES

Silvicultural Objectives and Prescriptions

The marking guidelines direct the implementation of the silvicultural prescriptions described in Chapter 2 for the Lost Creek Forest Management Project. Proposed thinning treatments would put stands on trajectories to develop structural complexity, tree age and size variability, and an assortment of canopy configurations (USDI 1995, p. 187). Thinning treatments would increase resilience/resistance of forest stands to wildfire, drought, disease, insects, etc. by reducing stand density and ladder fuels. Proposed regeneration harvest treatments would treat stands stagnant in growth and/or deteriorating from culmination of growth, high stand density levels, insects, disease or other factors. Regeneration harvest treatments would create growing space for a new cohort of trees and/or increase the growth rates of existing understory trees for long-term survivability, and create regeneration opportunities for shade-intolerant species and provide long-term success or survival of less prominent species (e.g. sugar pine). These prescriptions take into account changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition, stem density, and habitat considerations for late-successional forest dependent species, particularly the northern spotted owl (NSO).

Due to competing management objectives, some stands proposed for treatment would not meet the long-term silvicultural objectives but in the short-term would see a reduction in stand density. Reduced stand densities would decrease competition and allow for slightly better growing conditions. Retaining 60% canopy cover or greater in select stands would not allow for some forest health objectives to be met.

General Guidance Applicable to <u>all</u> Thinning Prescriptions

- To encourage the maintenance and establishment of drought-tolerant and fire-resilient species, favor leaving sugar pine, ponderosa pine, incense-cedar, Douglas-fir, and white fir, respectively.
- Do not try to create uniformity/evenness in stand conditions in marking; do try to encourage creation of spatial heterogeneity. Retain clusters of trees where appropriate; do consider preserving existing clusters of healthy trees.
- To maintain or create diverse vertical and horizontal stand structure by leaving trees of all crown classes with crown ratios of ≥ 30%. Strive for stand diversity in regard to diameter classes, species composition, tree heights (crown classes), and trees per acre (refer to *Characteristics of Low Vigor Trees* section).
- The preference is to retain trees with the old-growth characteristics as described below:
    - Size and age greater than the second-growth trees currently in the stand. This indicates that the tree may be one of the seed trees of the present-day stand. These trees may have a bottle-brush shape (non-symmetrical crown). These characteristics apply to all conifer species.

- 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. This characteristic applies to all conifer species.
- Douglas-fir with thick bark, deep fissures and a chocolate brown color, second-growth trees have more gray color in the bark. Ponderosa pines with thick bark, plate-like and yellow or orange in color.

- There may be situations where trees with the above-mentioned characteristics may be harvested if determined by OSHA health and safety guidelines to present a risk to people or due to logging system operations.
- Reduce competing vegetation from around healthy pine, oak, and incense-cedar to ensure their survival without compromising the prescribed canopy cover and/or basal area targets for the stand.
- Protect large hardwoods, particularly unique trees for stand diversity, structure, and wildlife habitat. Leave conifers that have their crown entangled in a hardwood tree or pose a threat of potential damage if felled. Unless determined to be a safety hazard by OSHA health and safety guidelines or interfering with logging system operations, all hardwoods greater than 12 inches DBH should be reserved.
- Trees with bird nests, wildlife cavities, wide forks with flat nesting spots, or loose bark (which function as bat roosts) would generally not be removed. Additionally, clumps of trees adjacent to snags or wildlife trees may be retained for stand diversity. When available, leave some broken, forked top, and deformed trees that are greater than 20DBH. Retain some trees of this size with mistletoe infections on the tree bole, specifically those that currently provide a structure or platform for wildlife habitat.
- Retain all snag stages 1-5 and CWD of various size and decay classes, unless determined by OSHA health and safety guidelines to present a risk to people. Snags felled for safety within units will be left as CWD to further contribute towards key habitat. Avoid marking trees that may damage snags from the process of timber falling.
- Do not mark identified seed trees to be cut. Do not cut mark any tree, that if felled, would endanger a seed tree.
- 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. Dwarf mistletoe infected trees may be marked for treatment if prescribed canopy cover retention and/or the target trees per acre for the stand is not compromised.

Thinning Prescriptions (Alternatives 2 and 3)

Selective Thinning

The following are minimum requirements for Selective Thinning harvest:

- Tree selection criteria shall be based on tree vigor. Use *Characteristics of Low Vigor Trees* section to determine the trees to mark.
- Favor retaining drought and fire tolerant tree species, such as sugar pine, ponderosa pine, incense-cedar, and Douglas-fir.
- Favor retaining large (>20 inches DBH), healthy ponderosa and sugar pine trees over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35%. Needles should be dark green, crown tops should be pointed (not rounded), and there should be no evidence of resin flow on the upper bole of sugar pine. Remove pine trees with poor crowns, characterized by a ragged appearance as well as foliage that is bunchy and of poor color,
- Reduce stocking to a Relative Density Index (RDI) ranging from 0.30-0.45 with residual basal area of treated stands ranging between 100-160 square feet per acre. Spacing will vary depending on tree diameter and vigor. See Tables B-1 and B-2 for the target basal area for each stand.
- Increase structural diversity of the stand by creating small openings. Opening size shall range from approximately 0.10-0.25 acres where fire resilient and drought tolerant species need release to reduce competition. The extent or amount of openings shall range from 5-10% of the total treatment unit area. Openings shall be no closer than 100 feet from the next opening. They shall be irregular in shape and be spatially random in occurrence within the stand. Canopy openings could be created where vigorous understory regeneration is present, in root rot pockets, or in areas of lower site productivity.
- In Units 3-1, 18-1 and 19-1 opening size shall range from 0.25-0.50 acres where regeneration is encouraged or where poor crown conditions exist (due to density-related suppression and mistletoe infection).
- Retain all hardwoods ≥12 inches DBH for species diversity, canopy layers, and natural drought tolerance.
- Leave existing snags, deterioration stages 1-5 (see table B-12). When available, leave green trees (any diameter) immediately adjacent to snags that are greater than 20 inches DBH. These trees would provide additional structural and habitat diversity.
- Leave CWD, decay classes 1-5 (see table B-10). When available, leave green trees (any diameter) immediately surrounding large (>20 inches DBH and 8 feet long) pieces of CWD. Retention of green trees would minimize CWD disturbance and maintain the functional integrity of the CWD.
- Units 3-1, 18-1 and 19-1 may be reduced to canopy cover levels below 40% (Table B-1). These units are located outside of NSO home ranges and outside of the transient snow zone. These units would be thinned to around 40% canopy cover, with the addition of openings created around

healthy shade intolerant species and/or legacy trees, which could drop the average canopy cover of the entire unit to below 40%.

Table B-1. Selective Thinning (Douglas Fir) Treatment Units

Unit Number (T-R-S)	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
3-1	RF	Remove	110	35-45%	21
11-1	NRF	Enhance	120	40-50%	10
11-3	NRF	Enhance	120	40-50%	3
18-1	DISP	Remove	100	35-45%	21
19-1	DISP	Remove	100	35-45%	5
23-2 (33-1E-23)	RF	Enhance	100-120	40-50%	17
23-3	DISP	TM	100	40-50%	28
35-1 (33-1E-35)	NRF	Enhance	120-140	40-50%	10
35-2 (33-1E-35)	RF	Enhance	110	40-50%	23

NRF-Nesting/Roosting/Foraging, RF-Roosing/Foraging, DISP-Dispersal, CAP-Capable, TM-Treat and Maintain

Table B-2. Selective Thinning (Mixed Conifer) Treatment Units

Unit Number (T-R-S)	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
15-1	RF	Enhance	120	40-50%	10
19-4B	DISP	TM	140	40-50%	14
19-7	CAP	N/A	110	40-50%	13
23-1 (33-2E-23)	RF	Enhance	140	40-50%	26
23-2 (33-2E-23)	RF	Enhance	120	40-50%	40
23-4	DISP	TM	100-120	40-50%	22
25-1	RF/NRF	Enhance	120-140	40-50%	40
25-2	RF/DISP	Enhance /TM	140	40-50%	18
26-3A	NRF/RF	Enhance	140	40-50%	22
26-3B	CAP	N/A	110	40-50%	4
27-3	DISP	TM	120	40-50%	21
27-4	DISP	TM	120-140	40-50%	10
29-1	RF	Enhance	100-120	40-50%	5
30-1	RF	Enhance	140	40-50%	20
30-3	DISP	TM	140	40-50%	21
30-4	RF	Enhance	140	40-50%	22
31-1	RF	Enhance	140	40-50%	27
31-2	RF	Enhance	120	40-50%	32
31-3	RF	Enhance	120	40-50%	6
31-4	RF	Enhance	120	40-50%	16
31-6	RF	Enhance	120	40-50%	41

Unit Number (T-R-S)	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
31-7	DISP	TM	100	40-50%	10
35-1A (33-2E-35)	DISP	TM	120	40-50%	42
35-1B (33-2E-35)	CAP	N/A	100	40-50%	
5-1	RF	Enhance	110	40-50%	25
1-1	NRF	Enhance	140	40-50%	8
1-2	NRF	Enhance	140	40-50%	9
23-1 (33-1E-23)	RF	Enhance	120	40-50%	15

NRF-Nesting/Roosting/Foraging, RF-Roosing/Foraging, DISP-Dispersal, CAP-Capable, TM-Treat and Maintain

Density Management (Retain 60% Canopy Cover)

The primary objective of this prescription is to reduce stand density in order to promote the growth and structural development of the remaining stand. Reducing stand density would accelerate the growth of dominant, codominant, and minor amounts of intermediate trees. Density Management treatments would primarily be thinning from below, although low vigor codominant or dominant trees may be removed to reduce density if tree vigor is lower than adjacent trees and to avoid simplifying the stand by removing a single tree layer.

The following are minimum requirements for Density Management harvest:

- Favor retaining healthy ponderosa pine, sugar pine, Douglas-fir, and incense-cedar over white fir.
- The preference is to retain large (>20 inches DBH), healthy ponderosa and sugar pine over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35%. Needles should be dark green, crown tops should be pointed (not rounded), and there should be no evidence of resin flow on the upper bole of sugar pine to be left. Remove pine trees with poor crowns, characterized by a ragged appearance as well as foliage which is bunchy and of poor color.
- Reduce stocking to a relative density ranging from 0.50-0.60 RDI with residual average basal area of treated stands ranging between 160 to 220 square feet per acre. Spacing should vary depending on tree diameter and vigor. See Tables B-3 for the target basal area for each stand.
- Leave dominant and codominant trees with the best crown ratios.
- Trees may be marked to cut in small patches (i.e., groups of trees with poor crowns) or to be left in clumps (i.e., groups of old trees). The size of patches or openings should be no greater than 0.25 acre and should not exceed 5% of the total treatment unit area.
- Retain all hardwoods ≥12 inches DBH for species diversity, canopy layers, and natural drought tolerance.

- Leave existing snags when possible, deterioration stages 1-5 (see table B-12). 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 CWD, decay classes 1-5 (Table B-10). When available, leave green trees (any diameter) immediately surrounding large (>20 inches DBH and 8 feet long) pieces of CWD. Retention of green trees would minimize CWD disturbance and maintain the functional integrity of the CWD.

Table B-3. Density Management Treatment Units

Unit Number	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
13-7	NRF	TM	180	60-70%	6
13-8	NRF	TM	180	60-70%	46
18-1	NRF	TM	180	60-70%	6
19-1	NRF/RF	TM	180-200	60-70%	34
19-2	NRF	TM	190	60-70%	10
19-4A	RF	TM	180	60-70%	6
19-6	RF	TM	180	60-70%	7
19-8	RF	TM	160	60-70%	2
26-1	NRF	TM	200	60-70%	61
26-2	NRF	TM	180	60-70%	19
27-1	RF	TM	160	60-70%	47
29-2A	RF	TM	160	60-70%	4
29-2B	NRF	TM	180	60-70%	14
29-3	RF	TM	160	60-70%	9
30-2	RF	TM	180	60-70%	10
35-2 (33-2E-35)	RF	TM	180	60-70%	16
1-3	NRF	TM	180	60-70%	11
4-1	NRF	TM	180	60-70%	13
8-1	RF/NRF	TM	160/180	60-70%	19
9-1	RF	TM	160	60-70%	22
11-2	RF	TM	160	60-70%	6

NRF-Nesting/Roosting/Foraging RF-Roosing/Foraging TM-Treat and Maintain

Small Diameter Thinning (SDT)

SDT treatments would include a combination of commercial thinning and non-commercial thinning (Understory Reduction). SDT would be applied to dense stands with a high proportion of small diameter trees; these stands are generally low in volume and would benefit from both commercial and non-commercial thinning treatments. .Reducing stand densities, removing low vigor trees, encouraging drought tolerant/fire resilient tree species, and accelerating the growth of the remaining trees are the primary objectives for these stands.

SDT (Retain 40% Canopy Cover)

The following are minimum requirements for SDT (40%):

- Tree selection criteria should be based on tree vigor. Use *Characteristics of Low Vigor Trees* section to determine the trees to mark.
- Reduce stocking to a relative density ranging from 0.30-0.45 RDI with residual basal area of treated stands around 120 square feet per acre. Spacing will vary depending on tree diameter and vigor. See Table B-4 for the target basal area for each stand.
- Leave dominant and codominant trees with the best crown ratios.
- Favor retaining healthy sugar pine, ponderosa pine, Douglas-fir, and incense cedar over white fir. In the case where off-site ponderosa pine has been planted to establish seedlings in frost prone areas, favor retaining healthy sugar pine, Douglas-fir, incense cedar and white fir over less vigorous ponderosa pine.
- Retain all hardwoods ≥12 inches DBH for species diversity, canopy layers, and natural drought tolerance.
- After commercial treatments stands that have a dense conifer understory, thin trees less than eight inches DBH to leave approximately 200 trees per acre (16-foot by 16-foot spacing). Favor retaining healthy ponderosa pine, sugar pine, incense cedar, and Douglas-fir over white fir. Uniform grid spacing is not necessary; consider the crown class, species, and vigor of leave trees.
- Leave snags 12 inches and greater, stages 1–5 (Table B-12), if they are not considered a hazard to operations and unit access. When available, leave green trees (any diameter) immediately adjacent to snags greater than 16 inches DBH. These trees will provide additional structural and habitat diversity.
- Leave CWD 12 inches and greater, decay classes 1–5 (Table B-10). When available, leave green trees (any diameter) immediately surrounding large (greater than 20 inches DBH and eight feet long) pieces of CWD. Retention of green trees would minimize CWD disturbance and maintain the functional integrity of the CWD.

Table B-4. SDT (40%) Treatment Units

Unit Number	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
25-1	RF	Enhance	120	40-50%	52
30-1	RF	Enhance	120	40-50%	13
33-1	DISP	TM	120	40-50%	21
33-2	DISP	TM	120	40-50%	21

RF-Roosing Foraging, DISP-Dispersal, TM-Treat and Maintain

SDT (Retain 60% Canopy Cover)

The primary objective for these stands is to target low vigor trees to reduce stand density and improve stand resiliency and individual tree health. Reducing stand density would accelerate the growth of dominant, codominant, and minor amounts of intermediate trees. SDT (60%) treatments would primarily

be thinning from below, although low vigor codominant or dominant trees may be removed to reduce density if tree vigor is lower than adjacent trees and to avoid simplifying the stand by removing a single tree layer.

The following are minimum requirements for SDT (60%):

- Favor retaining healthy sugar pine, ponderosa pine, Douglas-fir, and incense-cedar over white fir. In the case where off-site ponderosa pine has been planted to establish seedlings in frost prone areas, favor retaingin healthy sugar pine, Douglas-fir, incense-cedar and white fir over less vigorous ponderosa pine.
- Reduce stocking to a relative density ranging from 0.50-0.60 RDI with residual basal area of treated stands around 160 square feet per acre. Spacing should vary depending on tree diameter and vigor. See Table B-5 for the target basal area for each stand.
- Leave dominant and codominant trees with the best crown ratios.
- Retain all hardwoods ≥12 inches DBH for species diversity, canopy layers, and natural drought tolerance.
- In post-harvest stands that have a dense conifer understory, thin trees less than eight inches DBH to leave approximately 200 trees per acre (16 feet by 16 feet spacing). Favor healthy ponderosa pine, sugar pine, incense-cedar, and Douglas-fir over white fir. Uniform grid spacing is not necessary; consider the crown class, species, and vigor of leave trees.
- Leave existing snags 12 inches DBH and greater, deterioration stages 1–5 (Table B-11), if they are not considered a hazard to operations and unit access. When available, leave green trees (any diameter) immediately adjacent to snags greater than 16 inches DBH. These trees will provide additional structural and habitat diversity.
- Leave existing coarse woody Debris 12 inches DBH and greater, decay classes 1–5 (Table B-10). When available, leave green trees (any diameter) immediately surrounding large (20 inches DBH and eight feet long) pieces of CWD. Retention of green trees would minimize CWD disturbance and maintain the functional integrity of the CWD.

Table B-5. SDT (60%) Treatment Units

Unit Number	Habitat	Effects Call	Target Basal Area	Target Canopy Cover Retention	Acres
5-1	RF	TM	160	60-70%	14
19-1	RF	TM	160	60-70%	20
24-1	RF	TM	160	60-70%	31

RF-Roosing Foraging, TM-Treat and Maintain

General Guidance Applicable to <u>all</u> Regeneration Harvest Prescriptions

- To encourage the maintenance and establishment of drought-tolerant and fire-resilient species, favor leaving sugar pine, ponderosa pine, incense-cedar, Douglas-fir, and white fir, respectively.
- Retention trees should be the healthiest, most vigourous trees with live crown ratios greater than 35%.
- Retain all snag stages 1-5 and CWD of various size and decay classes, unless determined by OSHA health and safety guidelines to present a risk to people. Snags felled for safety within units will be left as CWD to further contribute towards key habitat. Avoid cut marking trees that may damage snags from the process of timber falling.
- Do not mark identified seed trees to be cut . Do not cut mark any tree, that if felled, would endanger a seed tree.
- Retain two snags per acre. Snags are any standing dead (stage 1 and 2), partially-dead, or defective (cull) tree.
- Maintain 120 linear feet of CWD (refer to *Coarse Woody Debris and Snags* section). Green trees that show signs of imminent mortality may be left in place for CWD that is not present and serve as future recruitment of CWD. Large deformed or unique green trees are most desirable as a substitute for future CWD recruitment.
- Protect large hardwoods, particularly unique trees for stand diversity, structure, and wildlife habitat. Leave conifers that have their crown entangled in a hardwood tree or pose a threat of potential damage if felled. Unless determined to be a safety hazard by OSHA health and safety guidelines or interfering with logging system operations, all hardwoods greater than 12 inches DBH should be reserved.

Regeneration Harvest Prescriptions (Alternative 3 only)

Regeneration Harvest – Structural Retention

The following are minimum requirements for the Regeneration Harvest – Structural Retention:

- Leave 16–25 green conifer trees per acre greater than 20 inches DBH (proportionally representing the total range of tree sizes greater than 20 inches DBH). To the greatest extent possible, the spatial distribution of leave trees should be based on a grid pattern to provide evenly distributed “shelter.” Variances in spacing are allowed in order to leave the best conifers with the largest crowns: it is more important to leave a healthy, full-crowned overstory tree than to meet rigid spacing criteria. Leave trees should have the following attributes: (a) low susceptibility to wind, snow, and ice damage, as measured; (b) crown ratio greater than 35% with a healthy crown, dark foliage, and dense needles; (c) disease free; and (d) healthy species such as Douglas-fir, ponderosa pine, sugar pine, and incense-cedar.

Table B-6. Structural Retention Treatment Units

Unit Number	Habitat	Effects Call	Target Trees Per Acre (TPA)	Target Canopy Cover Retention	Acres
3-2	RF	Remove	16-25 >20inches	N/A	15

RF-Roosing/Foraging

Regeneration Harvest - Northern General Forest Management Area (NGFMA)

The following are minimum requirements for Regeneration Harvest-NGFMA:

- Leave 6-8 green conifer trees per acre greater than 20 inches DBH (proportionally representing the total range of tree sizes greater than 20 inches DBH). To the greatest extent possible, the spatial distribution of leave trees should be based on a grid pattern to provide evenly distributed "shelter." Variances in spacing are allowed in order to leave the best conifers with the largest crowns: it is more important to leave a healthy, full-crowned overstory tree than to meet rigid spacing criteria. Leave trees should have the following attributes: (a) low susceptibility to wind, snow, and ice damage, as measured; (b) crown ratio greater than 35% with a healthy crown, dark foliage, and dense needles; (c) disease free; and (d) healthy species such as Douglas-fir, ponderosa pine, sugar pine, and incense-cedar.

Table B-7. Regeneration Harvest – NGFMA Treatment Units

Unit Number	Habitat	Effects Call	Target Trees Per Acre (TPA)	Target Canopy Cover Retention	Acres
13-1	NRF	Remove	6-8 >20inches	10-25%	15

NRF-Nesting/Roosting/Foraging

Characteristics of Low Vigor Trees

Low vigor trees

Trees meeting the following criteria:

- Crown ratios <30%;
- Crowns are ragged and thin (thin appearance when viewed against the sky);
- Crown top is rounded, and the crown width is narrow or flat on one or more sides;
- Needle color very poor, yellowish; and/or
- Mistletoe infected, with a rating of 4, 5, or 6 (refer to *Douglas-Fir Misteltoe Infected Trees* section).

Low Vigor Ponderosa Pine

Trees meeting the following criteria:

- Crowns are ragged and thin;
- Foliage in parts of the crown is thin, bunchy, or unhealthy; needles are average to shorter than average in length;
- Needle color is poor to fair;
- Some twigs or branches lack foliage and some twigs or branches are fading or dead;
- Localized weakened parts of the crown are present;
- Crown top is rounded, and the crown width is narrow or flat on one or more sides.

Low Vigor Douglas-fir and White Fir

Trees meeting the following criteria:

- Crown has thin appearance when viewed against the sky;
- Needle length is short;
- Needle color is very poor, yellowish;
- Dead or dying twigs or branches in the crown form holes; sparse and ragged crown appearance.
- Crown ratio is poor (less than 30%);
- Mistletoe infected, with a rating of 4, 5, or 6 (refer to *Douglas-Fir Misteltoe Infected Trees* section).

Trees Affected by Root Disease

Trees have the following visual characteristics:

- Groups of trees are affected with trees showing variable levels of decline;
- Trees have reduced height growth;
- Foliage is yellow; decline of the crown is from the top to the bottom;
- Trees may be producing distress cone crop;
- Bark beetles may be present because of the stressed trees;
- Wind thrown trees are common; wood at the base of the downed trees is soft and stringy or has begun to delaminate.

Table B-8. Root Diseases Affecting Conifer Trees

Root Disease	Affected	Resistant
Annosus S-group *Heterobasidion sp.*	White fir	Douglas-fir, sugar pine, Incense-cedar, ponderosa pine
Laminated	Douglas-fir	
Laminated root rot *Phellinus weirii*	Douglas-fir/ white fir	Incense-cedar, ponderosa pine, sugar pine

Insect-Infested Trees

Douglas-fir and white fir trees undergoing attack from bark beetles can be identified by red boring dust and pitch tubes present in bark crevices or on the ground near the base of the tree. Borers typically begin their attack in the top of the tree, and then may spread to the lower bole. Foliage is thinning and yellowish in appearance.

Ponderosa pine and sugar pine trees undergoing current attack from western pine beetle or red turpentine beetle can be identified by red boring dust and pitch tubes containing reddish/brown granular frass. Pitch tubes clear in color indicate the tree has been successful in expelling the beetle; these trees should not be marked for cutting if otherwise healthy.

Douglas-fir Mistletoe Infested Trees

Target the removal of Douglas-fir trees with a mistletoe rating of 4, 5, or 6.

Use the six class rating system to determine the mistletoe rating for individual trees.

Step 1: Divide the live crown into thirds

Step 2: Rate each third separately. Each third should be given a rating of 0, 1, or 2.

0 - no visible infections.

1- light infection (one-half or less of total number of branches are infected).

2 - heavy infection (more than one-half of the total number of branches is infected).

Step 3: Add ratings of each third together to obtain a rating for the tree.

Leave Tree Spacing Guidelines

Timber Harvest—Relative Density (0.35 RDI)

The average diameter of potential leave trees is estimated to determine the desired spacing in feet by referring to Table B-9. Once the area has been marked, verify the leave basal area using a relaskop or prism; adjust mark as necessary. As the average diameter changes, spacing would also change so stand density would remain constant.

Table B-9. Leave Tree Requirements to Attain a Relative Density of 0.35 RDI

Average Leave Tree DBH (inches)	Leave Tree Basal Area (square feet)	Average Leave Tree Spacing (feet)
8	99	12 x 12
10	111	15 x 15
12	121	17 x 17
14	131	19 x 19
16	140	21 x 21
18	148	23 x 23
20	157	25 x 25
22	164	26 x 26
24	171	28 x 28
26	178	30 x 30
28	185	32 x 32
30	191	33 x 33

Coarse Woody Debris and Snags

Trees designated as CWD should have characteristics of decay class 1 and 2 (e.g., bark intact, limbs intact, texture mostly sound, round shape) (Table B-10). To meet the Medford District ROD/RMP guidelines, leave a minimum of 120 linear feet of logs per acre greater than or equal to 16 inches DBH and 16 feet long (120 linear feet is equivalent to 7.5, 16-footlogs)(Table B-11)(USDI 1995, p. 73).

Table B-10. Coarse Woody Debris Decay Classes

Log Characteristics	Decay Class				
	1	2	3	4	5
Bark	Intact	Intact	Trace	Absent	Absent
Twigs <3 cm.	Present	Absent	Absent	Absent	Absent
Texture	Intact	Intact to partly soft	Hard, large pieces	Small, soft blocky pieces	Soft and powdery
Shape	Round	Round	Round	Round to oval	Oval
Color of wood	Original color	Original color	Original color to faded	Light brown to reddish brown	Red brown to dark brown
Portion of log on ground	Tree elevated on support points	Tree elevated on support points but sagging slightly	Tree is sagging near ground	All of tree on ground	All of tree on ground
Invading roots	None	None	In sapwood	In heartwood	In heartwood

Table B-11. Number of 16-foot Logs Produced by Tree Diameter Class

Tree DBH Inches	Number of logs per tree 16 inches by 16 feet
16	1
20	1
22	2
24	3
26	4
28	4
30	5
32	5
34	6
36	6
38	6
40	6
42	7
44	7
46	7

Leave a minimum of two snags per acre in Regeneration Harvest units. For these units, a snag is defined as any standing dead (stages 1 and 2), partially dead, or defective tree (Table B-12). In all other harvest prescriptions, existing snags (stages 1–5) would be retained except those that need to be felled for safety or logging system purposes

Table B-12. Physical Characteristics of Snags by Deterioration Stage

Stage	Characteristics	
1	• Limbs and branches all present • Pointed tree top	• Tight bark • Recently dead
2	• Few limbs • No fine branches	• Pointed or broken tree top • Variable level of bark remaining
3	• Limb stubs only • Decay in upper bole	• Some decay at base of bole • Variable level of bark remaining
4	• Few or no stubs • No fine branches	• Broken top • Loose or no bark
5	• No limbs or branches • No sapwood present	• Broken top • 20% or less of bark remaining

APPENDIX C – ACRONYMS & GLOSSARY

ACS – Aquatic Conservation Strategy
AMA – Adaptive Management Area
ARPA – Archaeological Resources Protection Act
ASQ – Allowable Sale Quantity
AUM – Animal Unit Month
BA – Biological Assessment
BAFH – Biological Assessment of Forest Habitat
BCC – Bird Species of Conservation Concern
BCR – Bird Conservation Region
BLM – Bureau of Land Management
BMP – best management practice
BOR – Bureau of Reclamation
CAA – Clean Air Act
CAP – capable habitat
CC – canopy cover
CCH – Coho Critical Habitat
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
CHU – critical habitat unit
COE – US Army Corps of Engineers
CWA – Clean Water Act
CWD – coarse woody debris
DBH – diameter at breast height
DEQ – Department of Environmental Quality
DOT – Department of Transportation
DSP – dispersal habitat
EA – Environmental Assessment
EF – east fork
EFH – essential fish habitat
EIS – environmental impact statement
ENSO – El Nino Southern Oscillation
EP Act – Energy Policy Act
ESA – Endangered Species Act
ESU – evolutionarily significant unit
EO – Executive Order
FAA – Federal Aviation Administration
FCC – Federal Communications Commission
FEIS – Final Environmental Impact Statement
FERC – Federal Energy Regulatory Commission
FG – fragile for slope gradient
FLPMA – Federal Land Policy Management Act
FMP – Fire Management Plan
FOI – Forest Operations Inventory
FONSI – Finding of No Significant Impact
FP – fragile for mass movement
FW – fragile for ground water
GBBDC – Game Birds Below Desired Condition
GFMA – General Forest Management Area
GIS – Geographic Information System
GGO – great gray owl
GTRN – Ground Transportation Network
HUC – hydrologic unit code
IDT/ ID Team – interdisciplinary team
IM – instructional memorandum
IVMP – Interagency Vegetation Mapping Project
JCEP – Jordan Cove Energy Project
KLE – Klamath East Critical Habitat Unit
KOP – known observation point
KSA – Klamath Study Area
KSOAC – Known Spotted Owl Activity Center
LAA – likely to adversely affect
LNG – liquefied natural gas
LSR – Late Successional Reserve
mbf – thousand board feet
MOA – memorandum of agreement
MOU – memorandum of understanding
NAAQS – National Ambient Air Quality Standards
NEPA – National Environmental Policy Act
NF – north fork
NGA – Natural Gas Act
NH – nesting habitat
NLAA – not likely to adversely affect
NMFS – National Marine Fisheries Service
NRCS – National Resource Conservation Service
NRF – nesting, roosting, and foraging habitat
NSO – northern spotted owl
NWFP – Northwest Forest Plan
O & C – Oregon and California Act, 1938
ODA – Oregon Department of Agriculture
ODEQ – Oregon Department of Environmental Quality
ODF – Oregon Department of Forestry
ODFW – Oregon Department of Fish and Wildlife
OHV – off-highway vehicle
OM – organic matter
ORS – Oregon Revised Statutes
OSHA – Occupational Safety and Health Administration
OSMP – Oregon Smoke Management Plan
PCE – primary constituent element
PCGP – Pacific Connector Gas Pipeline
PCT – pre-commercial thinning
PDF – Project Design Features
PDO – Pacific Decadal Oscillation
PE – polyethylene
PM – particulate matter

PM 2.5 – particulate matter smaller than 2.5 microns
PM 10 – particulate matter smaller than 10 microns
PNW – Pacific Northwest
QMD – quadratic mean diameter
RA-32 – Recovery Action 32
RAWS – Remote Automated Weather Station
RDI – relative density index
RMP – Resource Management Plan
ROD – Record of Decision
ROW – right-of-way
RR – Riparian Reserve
S & M – Survey and Manage
SDWA – Safe Water Drinking Act
SEIS – Supplemental Environmental Impact Statement
SF – south fork
SNEP – Sierra Nevada Ecosystem Project
SONCC – Southern Oregon/Northern California Coasts
SSP – Special Status Plants
SSRA – Smoke Sensitive Receptor Area
SSS – Special Status Species
SVS – Stand Visualization System
T&E – Threatened and Endangered
TMDL – total maximum daily load
TP – tree planting
TPA – trees per acre
TPCC – timber production capability class
TSZ – transient snow zone
USDA – United States Department of Agriculture
USDI – United States Department of the Interior
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service
VRM – visual resource management
WA – Watershed Analysis
WF – west fork
WOPR – Western Oregon Plan Revision
WQMP – Water Quality Management Plan
WUI – Wildland Urban Interface
WQRP – Water Quality Restoration Plan

Glossary of Terms

A

Abiotic: Non-living elements of an environment.

Activity Fuel: The combustible material resulting from or altered by forestry practices such as timber harvest or thinning, as opposed to naturally created fuels.

Affected Environment: The area impacted by the Proposed Action.

Allowable sale quantity: The gross amount of timber volume, including salvage that may be sold annually from a specified area over a stated period of time in accordance with the approved land use plan.

Alternative: Other options to the proposed action by which the BLM can meet its purpose and need.

Animal Unit Month (AUM): The amount of forage required to sustain the equivalent of one cow and a calf for one month.

Anthropogenic: Of human origin or influence.

Aquatic: Living or growing in or near the water.

Authorized Officer: The Federal employee who has the delegated authority to make a specific decision.

Available Water Capacity: That portion of soil water which plants can extract.

B

Basal Area: The cross-sectional area of a single stem including the bark, measured at breast height (4.5 ft. above the ground); the cross-sectional area of all stems of a species or all stems in a stand measured at breast height and expressed per unit of land area.

Baseline: The starting point for analysis of environmental consequences.

Best Management Practices (BMPs): State-of-the-art mitigation measures, generally considered benchmark standards.

Biotic: Living elements of an environment.

Brush: To remove shrubby undergrowth.

Bryophyte: A type of nonvascular plant including mosses, liverworts, and hornworts.

C

Canopy Class: The position of the canopy of an individual tree relative to the canopies of other trees in a stand. Classes are defined by relative height and the amount of sunlight a canopy receives.

Canopy Cover: The percent of a fixed area covered by the crown of an individual plant species or delimited by the vertical projection of its outermost perimeter; small openings in the crown are included.

Coarse woody debris: The portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20″ in diameter (USDI 1995, p. 102).

Codominant Trees: Trees with crowns forming the general level of the crown canopy and receiving full light above but comparatively little from the side.

Crown Ratio: The ratio between the length of the green crown of a tree and its total height expressed as a percentage.

Cultural Resources: Those resources of historical and archaeological significance.

Cumulative Effects: Those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

D

Dispersal: The movement of an individual from their origin to a new site.

Dispersal Habitat: Northern spotted owl habitat which is not suitable for nesting, roosting, or foraging, but has sufficient patchy cover to be used for travel between suitable stands, a minimum of 40% canopy cover, and an average tree diameter greater

than 11 inches with flying space for owls in the understory.

Diversity: The aggregate of species assemblages (communities), individual species, the genetic variation within species, and the processes by which these components interact within and among themselves. The elements of diversity are 1) community diversity (habitat, ecosystem), 2) species diversity, and 3) genetic diversity within a species. All three change over time.

Dominant Trees: Trees with crowns extending above the general level of the crown canopy and receiving full light from above and partly from the side

Dripline: The line extending vertically from the exterior edge of a tree's live crown to the ground.

Duff: The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles, and leaves.

E

Ecosystem: A system made up of a community of animals, plants, and micro-organisms and its interrelated physical and chemical environment.

Edge Effect: The modified environmental conditions or habitat along the margins of forest stands or patches.

Effects Analysis: Predicts the degree to which the environment will be affected by an action.

Endangered Species: Any animal or plant species in danger of extinction throughout all of a significant portion of its range. These species are listed by the US Fish and Wildlife Service.

Endemic: A species that is unique to a specific locality.

Environmental Assessment (EA): A concise, public document containing a federal agency's analysis of the significance of potential environmental consequences of a proposed action. The EA need not contain the level of analysis contained in an Environmental Impact Statement (EIS). An EA is used to determine whether an EIS is needed or a "finding of no significant impact" (FONSI) is warranted.

Environmental Impact Statement (EIS): A detailed statement of a federal project's environmental consequences, including adverse environmental effects that cannot be avoided, alternatives to the proposed action, the relationship between local short-term uses and long-term productivity, and any irreversible or irretrievable commitment of resources.

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

Erosion: The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

F

Fauna: The animals of a specified region or time.

Finding of No Significant Impact (FONSI): A finding that explains that an action will not have a significant effect on the environment and, therefore, an EIS will not be required.

Fire Regime: The characteristic frequency, extent, intensity, severity, and seasonality of fires within an ecosystem.

Flora: The plants of a specified region or time.

Fuel load: the oven-dry weight of fuel per unit area.

Fully Decommission: The road surface would be decompacted so that the former compacted surface would be rendered loose and friable to a depth of 12 to18 inches or to a point where 10-inch diameter stones are the dominant substrate (whichever is shallower). Slash, boulders, and other debris would be placed along the roads "entire length" as determined by availability of materials to provide ground cover and discourage mechanized use. Blockage at the entrance would consist of placing logs, slash, boulders, berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle access is precluded. Seeding with approved native seed species and mulching with weed-free straw or approved native materials would occur within Riparian Reserves and within 100 feet of the roads entrance. All drainage structures would be removed.

G

Ground Water: Water in the ground that is in the zone of saturation; water in the ground that exists at or below the water table.

GTRN (Ground Transportation Road Network): Roads over which the BLM has jurisdiction and maintenance responsibilities.

H

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Habitat Fragmentation: The breakup of extensive habitat into small, isolated patches which are too limited to maintain their species stocks into the indefinite future.

HUC5: Fifth field hydrologic unit code, or watershed.

HUC6: Sixth field hydrologic unit code, or subwatershed.

HUC7: Seventh field hydrologic unit code or tributary to a subwatershed.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

I

Impact: Synonymous with "effects." Includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts may also include those resulting from actions which may have both beneficial and detrimental (adverse) effects. Impacts may be considered as direct, indirect, or cumulative.

Implementation Action: An action that implements land use plan decisions.

Indicators: Parameters of ecosystem function that are observed, assessed, measured, or monitored directly or indirectly to determine attainment of a standard(s).

Infiltration: The downward entry of water into the soil.

Infiltration Rate: The rate at which water enters the soil.

Intermediate Trees: Trees shorter than dominant or codominant trees with crowns below or barely reaching into the main canopy.

Intermittent Stream: Seasonal stream; a stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

Invertebrate Species: Any animal without a backbone or spinal column.

K

Key Watershed: A watershed containing (1) habitat for potentially threatened species or stocks of anadromous salmonids or pother potentially threatened fish, or (2) greater than 6 square miles with high-quality water and fish habitat.

L

Landing: A cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport.

Late-successional Forest: Forest seral stages which include mature and old-growth age classes.

Lichen: A composite organism formed from the symbiotic association of a fungus and an alga.

Long-Term Closure: The road would be effectively blocked and winterized prior to the wet season. Blockage at the entrance would consist of placing logs, slash, boulders, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded. Prior to closure the road will be left in an erosion-resistant condition.

M

Mass Movement: Soil and rock movement downslope (e.g. slumps, earth flows).

Matrix: BLM-managed lands designated by Congress under the Northwest Forest Plan where

most timber harvest and other silvicultural activities would be conducted.

Mitigating Measures: Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use.

Mixed-Conifer Forest: A mix of tree species that include Douglas-fir, ponderosa pine, sugar pine, incense cedar, and white fir.

Monitoring: A process of collecting information to evaluate if objective and anticipated or assumed results of a management activity or plan are being realized, or if implementation is proceeding as planned.

Morphology: The study of the form and structure of organisms and their specific structure features, internal and external.

N

Nonpoint Source Pollution: Pollution that arises from an ill-defined and diffuse source, such as runoff from cultivated fields, agricultural lands, urban areas, or forests and wildlands.

Nonvascular: Plants with specialized methods of transporting water and nutrients without xylem or phloem (e.g. mosses, hornworts, liverworts, algae).

Noxious Plants: Those plants which are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

O

O&C Lands: Public lands managed by the BLM under the O&C Act of 1937 for permanent forest production, in accord with the principle of sustained yield. Lands administered under the O&C Act must also be managed in accordance with other environmental laws.

Off-Highway Vehicles (OHV): Any motorized vehicle designed for or capable of cross-country travel over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Organic Matter: Plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

ORGANON: An individual tree growth computer model developed at Oregon State University, College of Forestry for areas of the Pacific Northwest.

P

Perennial Stream: A stream that flows continuously. Perennial streams are generally associated with the water table in the localities through which they flow.

Permeability: The ease with which gases, liquids, or plant roots penetrate or pass through bulk mass of soil or a layer of soil.

Planning Area: All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, planning decisions only apply to BLM-administered lands and mineral estate.

Plant Community: An association of plants of various species found growing together in different areas with similar site characteristics.

Point Source Pollution: Pollution that arises from a well-defined origin, such as discharge from an industrial plant or runoff from a feedlot.

Preferred Alternative: The alternative BLM believes would reasonably accomplish the purpose and need for the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. This alternative may or may not be the same as the proposed action.

Prescribed Fire: Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and, at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives for wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

Prey species: An animal taken by a predator as food.

Proposed Action: A proposal for BLM to authorize, recommend, or implement an action to address a clear purpose and need.

Public Lands: Any lands administered by a public entity, including (but not limited to) the Bureau of Land Management and the US Forest Service.

Pyroclastic: Composed chiefly of fragments of volcanic origin.

R

Ravel: Loose rock material on a hillslope, usually of gravel or cobble size.

Record of Decision (ROD): The decision document associated with an environmental impact statement.

Refugia: Locations and habitats that support populations of organisms that are limited to small fragments of their previous geographic range.

Relative Density: The degree of crowding in a forest stand. When two stands result in the same relative density they can be thought of as being at the same degree of crowding, although they may differ in age, tree size, or site quality.

Resource Management Plan (RMP): A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act (FLPMA).

Right-Of-Way (ROW): Federal land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

Riparian Area: An area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Riparian Habitat: The living space for plants, animals, and insects provided by the unique character of a riparian area.

Riparian Reserve (RR): A federally designated buffer around streams, springs, ponds, lakes, reservoirs, fens, wetlands, and areas prone to slumping, on federal lands only. The Northwest Forest Plan's Aquatic Conservation Strategy defines riparian reserve widths for the above water bodies.

S

Scope: The extent of an analysis in a NEPA document.

Scoping: The process by which BLM solicits internal and external input on the issues and effects that will be addressed in planning, as well as the degree to which those issues and effects will be analyzed in the NEPA document.

Sediment Yield: The quantity of soil, rock particles, organic matter, or other dissolved or suspended debris which is transported through a cross-section of stream during a given period.

Seed Tree: A tree of favorable genetic traits and healthy condition that is identified for protection in order to promote the continuation of its genetics.

Sensitive Species: Those species that (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species or (2) are on an official state list, or (3) are recognized by a land management agency as needing special management to prevent their being placed on Federal or state lists.

Seral Stage: A temporal or intermediate stage in the process of succession.

Shelterwood: The cutting of most trees, leaving those needed to produce a new age class in a moderated microenvironment.

Silviculture: The science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet diverse needs.

Silvicultural System: A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

Skid: To drag a log from within a harvest unit to a collection point (landing).

Slash: The residual vegetation (e.g branches, bark, tops, cull logs, and broken or uprooted trees) left on the ground after logging.

Snag: Any standing dead, partially dead, or defective (cull) tree at least 10″ DBH (diameter at breast height) and at least 6 feet tall (USDI 1995, p. 114).

Soil Series: The lowest or most basic category of the U.S. system of soil classification.

Species: A group of related plants or animals that can interbreed to produce offspring.

Special Status Species (SSS) include:

> **Proposed species** – species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the Federal Register.
>
> **Listed Species** – species officially listed as threatened or endangered by the Secretary of the Interior under the provisions of the ESA. A final rule for the listing has been published in the Federal Register.
>
> **Endangered Species** – any species which is in danger of extinction throughout all or a significant portion of its range.
>
> **Threatened Species** – any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
>
> **Candidate Species** – species designated as candidates for listing as threatened or endangered by the FWS and/or NMFS. A list has been published in the Federal Register.

State Listed Species: Species listed by a state in a category implying but not limited to potential endangerment or extinction. Listing is either by legislation or regulation.

Subwatershed: The sixth level in the hydrologic unit hierarchy. A subwatershed is a subdivision within a fifth level watershed.

Succession: A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax.

Suppressed Trees: Trees with crowns entirely below the general canopy receiving no direct light from either above or from the side.

Sustained Yield Forestry: The yield that a forest can produce continuously at a given intensity of management; the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources without impairment of the productivity of the land.

T

Tier 1 Key Watershed: areas that either provide, or are expected to provide, high-quality aquatic habitat. These watersheds are intended to serve as refugia for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species.

Tiering: Using the coverage of general matters in broader NEPA documents in subsequent, narrower NEPA documents, allowing the tiered NEPA document to narrow the range of alternatives and concentrate solely on the issues not already addressed.

Topography: The configuration of a surface area including its relief, or relative elevations, and position of its natural and anthropogenic features.

Total Maximum Daily Loads (TMDLs): Pollution load limits calculated by DEQ for each pollutant entering a water body. TMDLs describe the amount of each pollutant a waterway can receive and still not violate water quality standards. Both point and non-point source pollution are accounted for in TMDLs as well as a safety margin for uncertainty and growth that allows for future discharges to a water body without exceeding water quality standards.

Transient Snow Zone (TSZ): The area where a mixture of snow and rain occurs, sometimes referred to as the rain-on-snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events originate in the transient snow zone.

Turbidity: The cloudy condition caused by suspended solids, dissolved solids, natural or human-developed chemicals, algae, etc. in a liquid; a measurement of suspended solids in a liquid.

U

Understory: That portion of trees or other woody vegetation which forms the lower layer in a forest stand which consists of more than one distinct layer.

V

Vascular: Plants having phloem- and xylem-conducting elements that facilitate the moving of water and nutrients.

Vertebrate Species: Any animal with a backbone or spinal column.

W

Watershed: All land and water within the confines of a drainage divide.

Watershed Analysis: A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning.

Wetlands: Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

Wildland-Urban Interface (WUI): The area where structures and other human development meet or intermingle with undeveloped wildland.

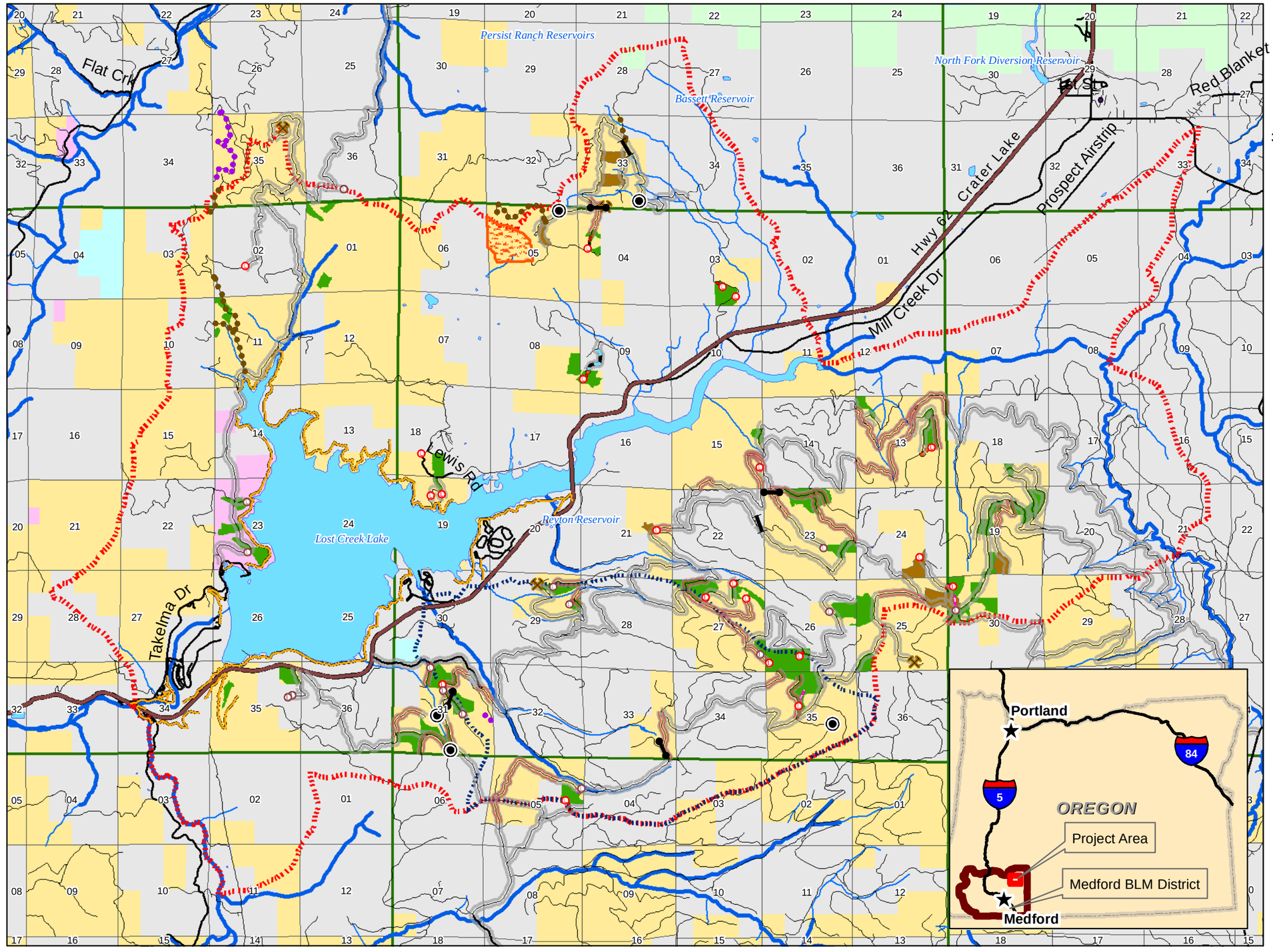
Windthrow: A tree or trees uprooted or felled by the wind.

Y

Yarding: The act or process of conveying logs or whole trees to a landing, particularly by cable, tractor, or helicopter.

Legend

- Timber Harvest Unit
- Small Diameter Thin
- existing landing
- proposed landing
- Road Reconstruction
- Temporary Route Reconstruction
- Temporary Route
- Pre-Designated Skid Trail
- Proposed Earth Barricade
- Proposed Mega Gate
- Pump Chance Restoration
- Meadow Restoration
- Proposed Full Decommissioning
- Proposed Partial Decommissioning
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- U.S. Forest Service
- Corps of Engineers
- State
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Quarry
- Highway
- Paved Road
- Existing Road
- Lost Creek Trails



MEDFORD DISTRICT
June 2016

Lost Creek Forest Management Project
Environmental Assessment

Map 1: Vicinity Map

0 0.5 1 2 3
Miles

N W E S

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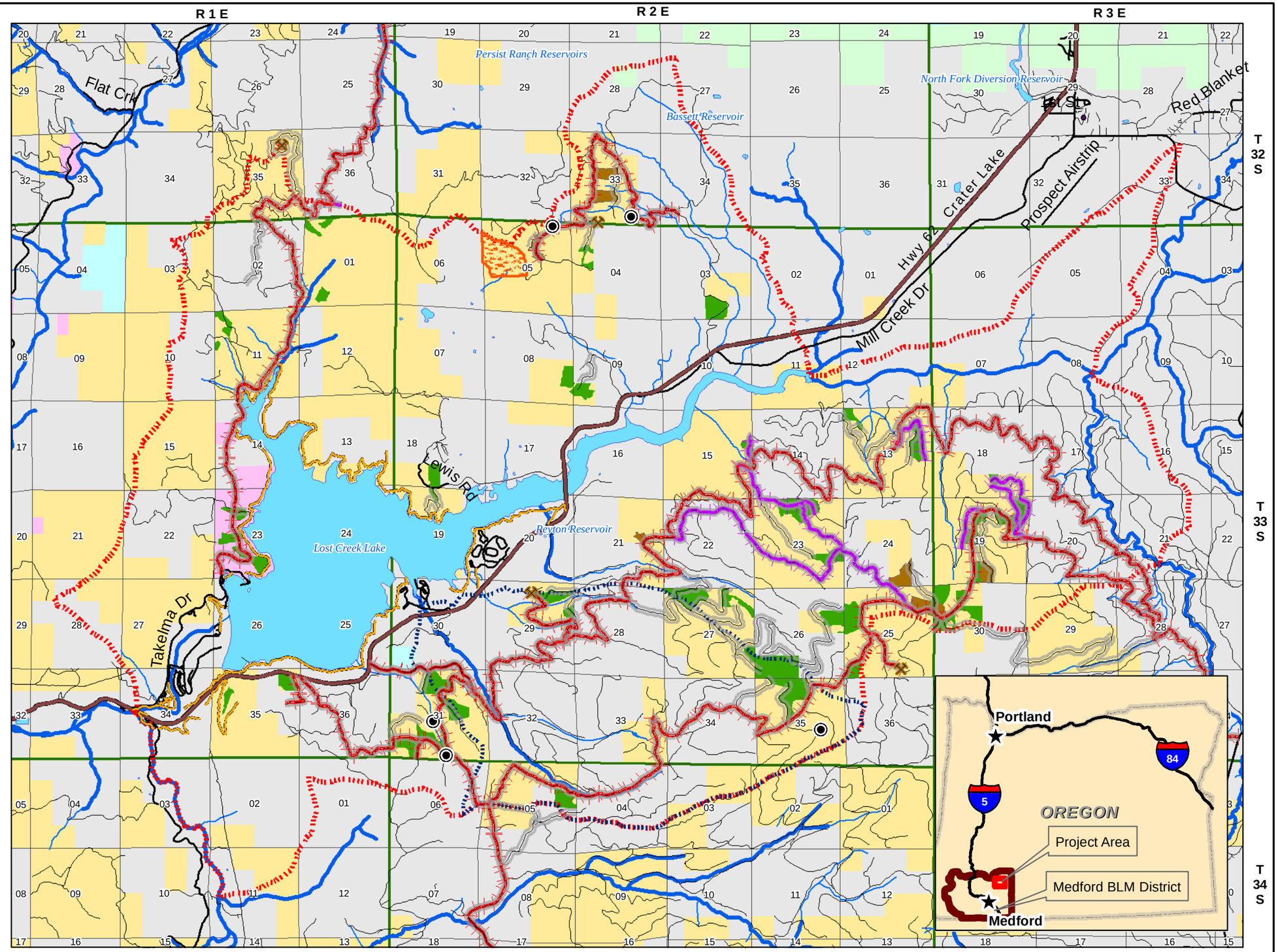

Legend

- Haul Route network
- Winter Haul Route network
- Additional Winter Haul Route, if rocked
- Timber Harvest Unit
- Small Diameter Thin
- Pump Chance Restoration
- Meadow Restoration
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- U.S. Forest Service
- Corps of Engineers
- State
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Quarry
- Highway
- Paved Road
- Existing Road
- Lost Creek Trails

MEDFORD DISTRICT
June 2016

Lost Creek Forest Management Project
Environmental Assessment

Map 2: Haul Route Map

0 0.5 1 2 3
Miles

N W E S

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Lost Creek Alternative 2
Map 3

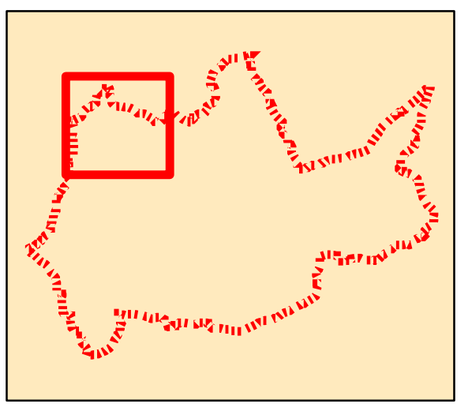
Alt2 Treatment
- Selective Thinning / DF
- Selective Thinning / MC
- Density Management

Logging System
- Helicopter

Existing Landing
- heli

Proposed Landing
- heli
- Proposed Full Decommissioning
- Proposed Partial Decommissioning
- Haul Route network
- Project Boundary

- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Existing Road
- Lost Creek Trails



Lost Creek Forest Management Project
Environmental Assessment

MEDFORD DISTRICT
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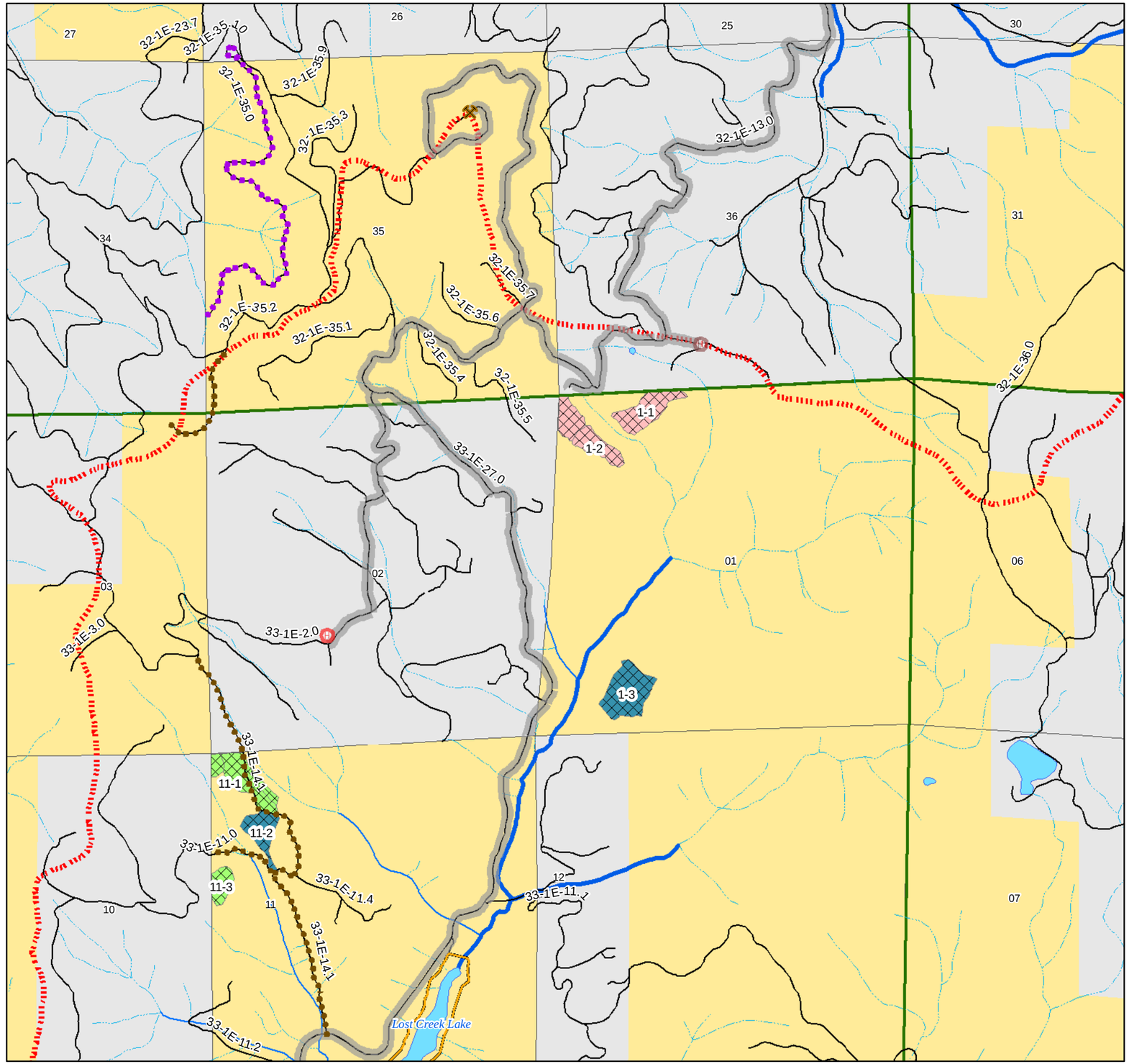


Lost Creek Alternative 2
Map 4

Alt2 Treatment

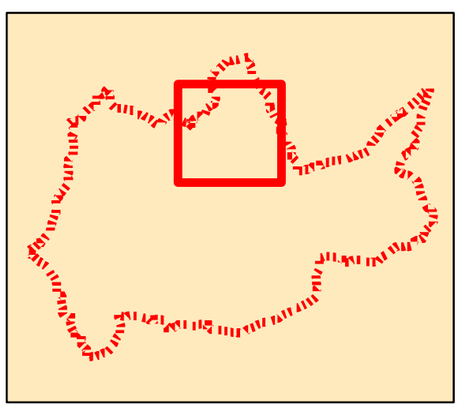
- Selective Thinning / DF
- Density Management
- Regeneration Harvest / Structural Retention
- Small Diameter Thin

Logging System

- Skyline
- Tractor
- Helicopter

Proposed Landing

- heli
- log
- Temporary Route Reconstruction
- Road Reconstruction
- Temporary Route
- Proposed Earth Barricade
- Proposed Mega Gate
- Pump Chance Restoration
- Meadow Restoration
- Proposed Partial Decommissioning
- Roadside Vegetation Maintenance
- Haul Route network
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Highway
- Paved Road
- Existing Road



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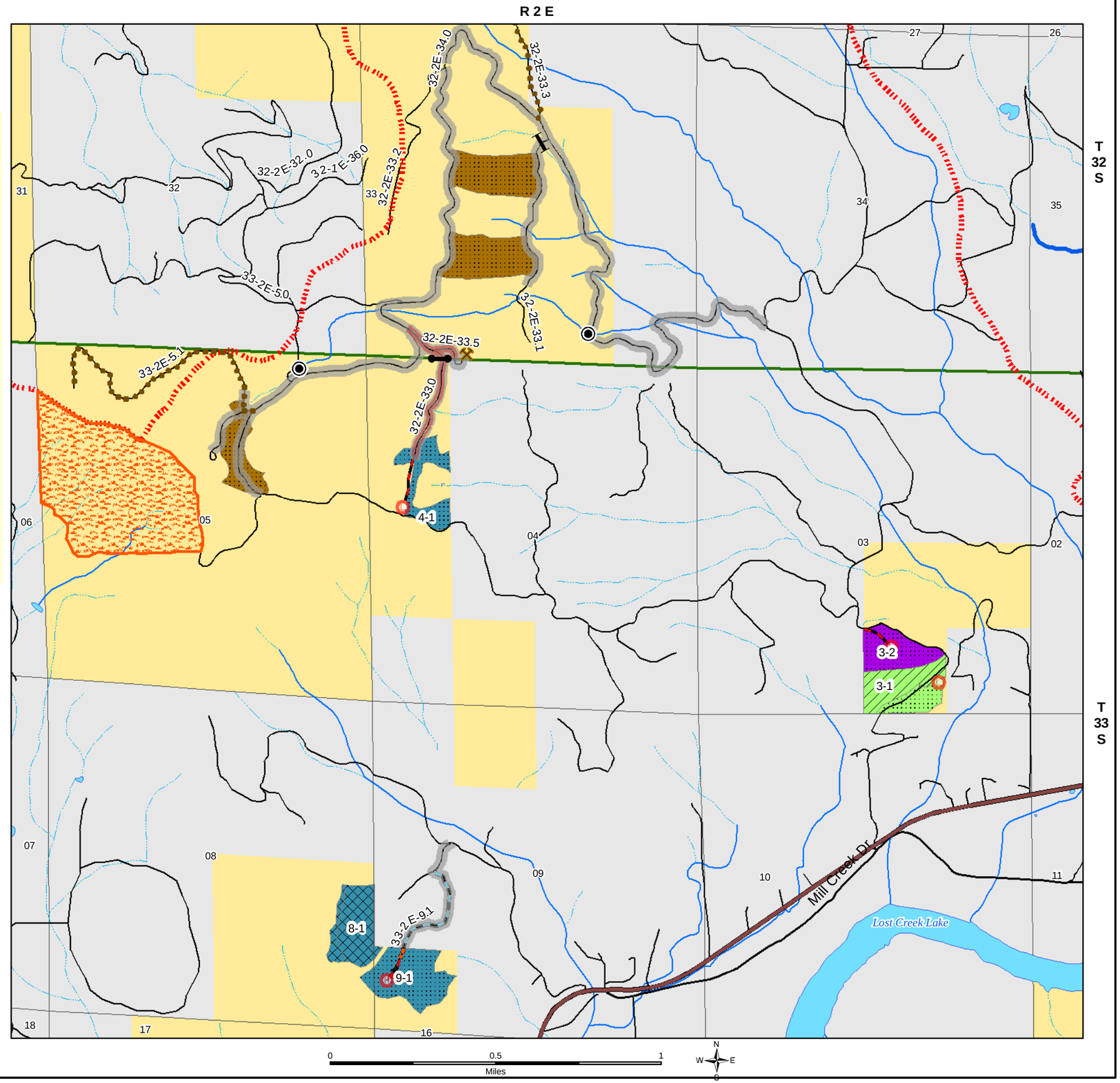


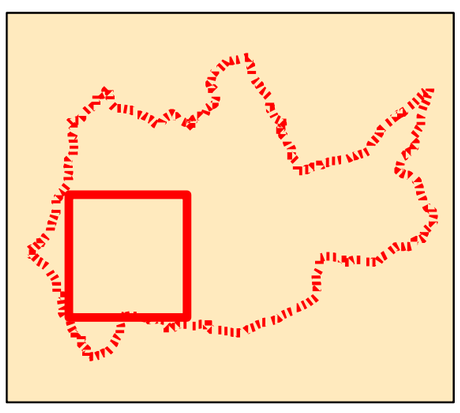
Lost Creek Alternative 2
Map 5

Alt2 Treatment
- Selective Thinning / DF
- Selective Thinning / MC

Logging System
- Skyline
- Tractor
- Helicopter

Existing Landing
- heli
- log
- service

Proposed Landing
- heli
- log
- Temporary Route
- Pre-Designated Skid Trail
- Proposed Mega Gate
- Pump Chance Restoration
- Proposed Full Decommissioning
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Corps of Engineers
- State
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Highway
- Paved Road
- Existing Road
- Lost Creek Trails



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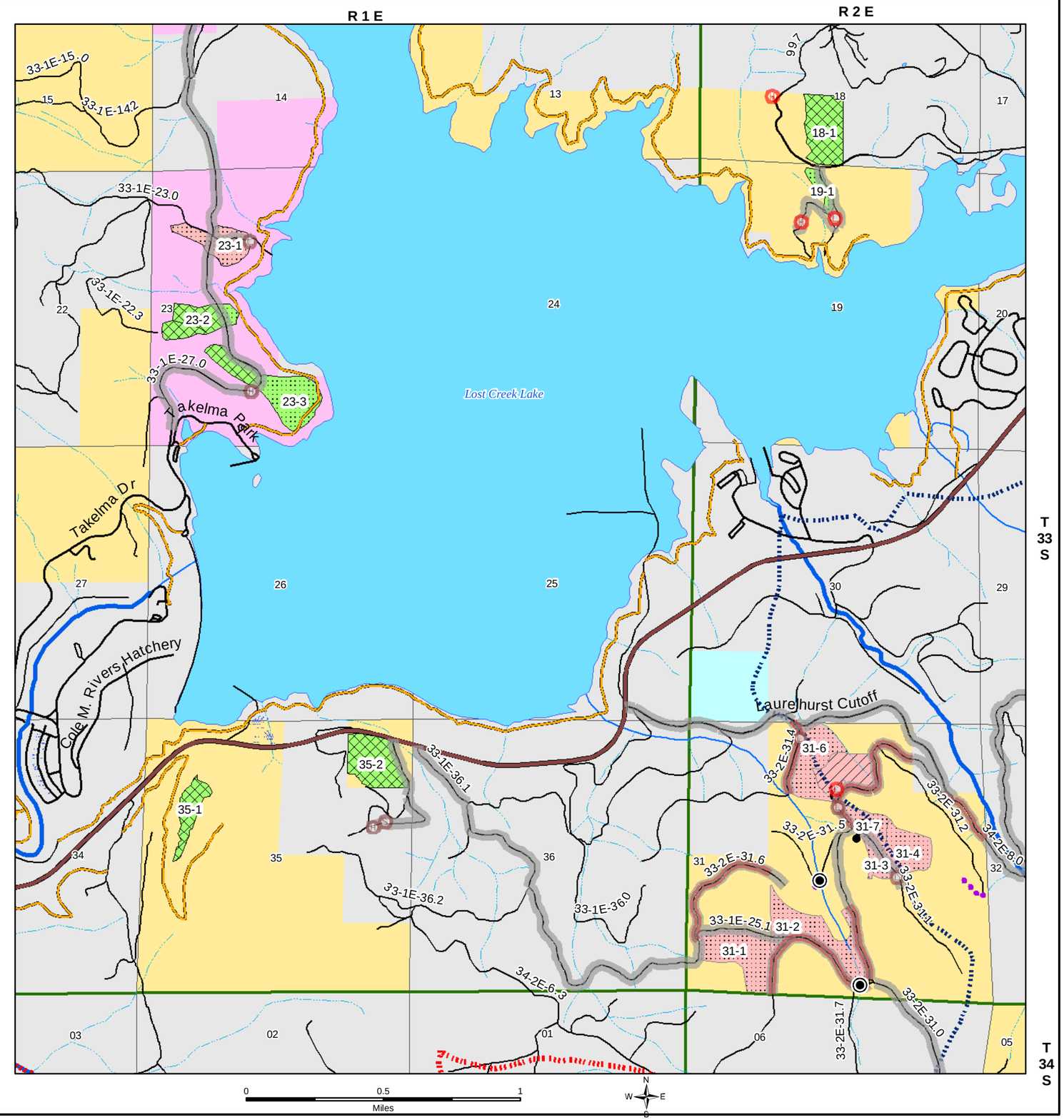


Lost Creek Alternative 2
Map 6

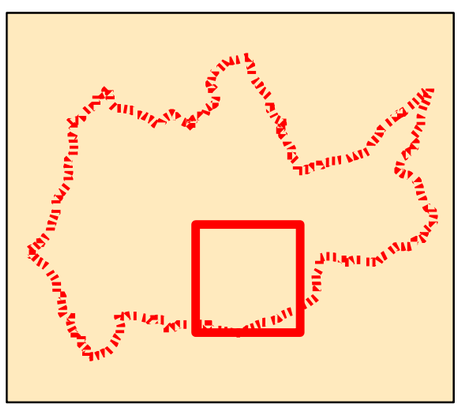
Alt2_Treatment
- Selective Thinning / MC
- Density Management
- Small Diameter Thin

Logging System
- Skyline
- Tractor
- Helicopter

Existing Landing
- log

Proposed Landing
- heli
- log
- service
- Temporary Route Reconstruction
- Temporary Route
- Pre-Designated Skid Trail

- Proposed Earth Barricade
- Proposed Mega Gate
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Highway
- Existing Road



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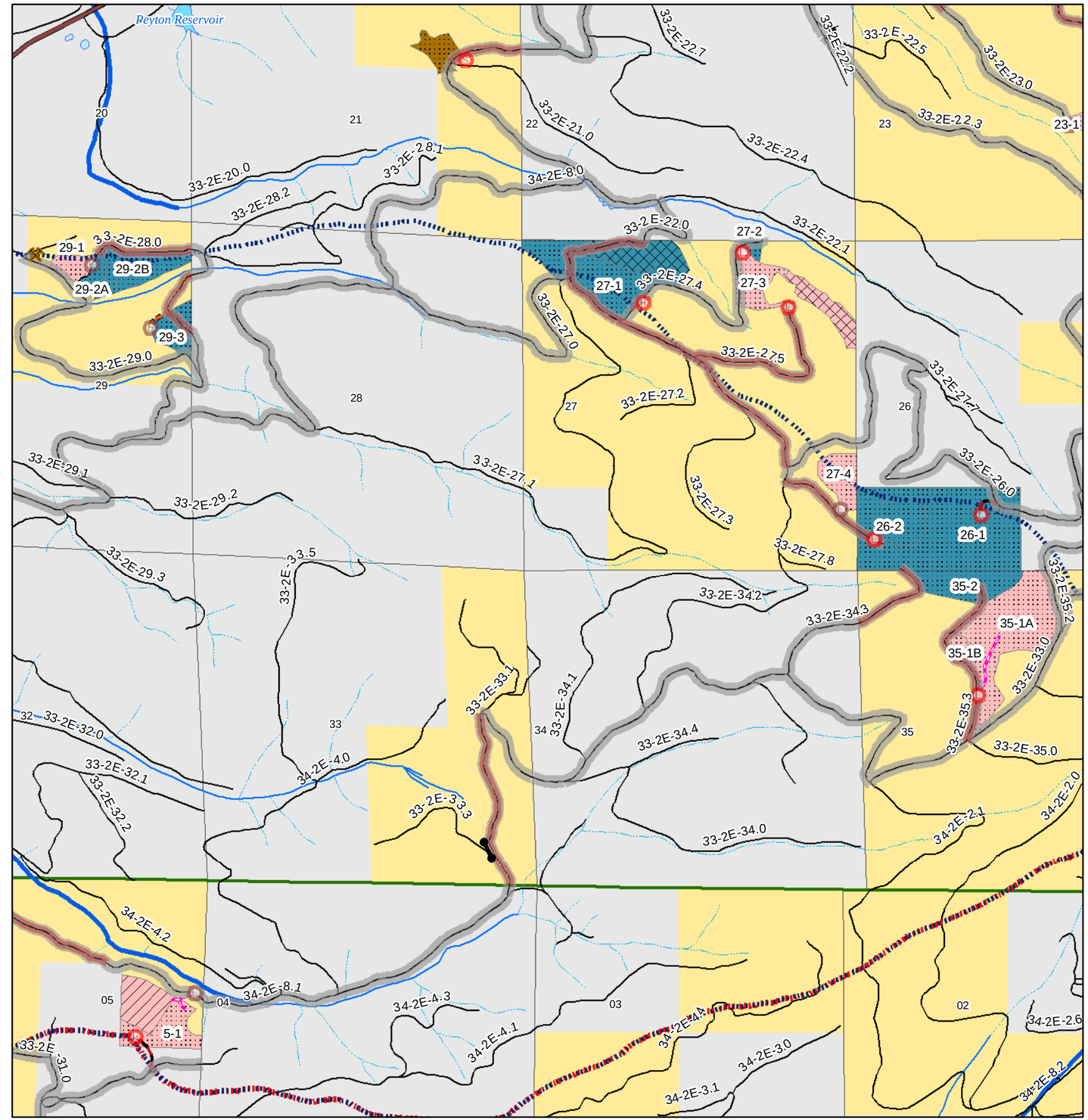


Lost Creek Alternative 2
Map 7

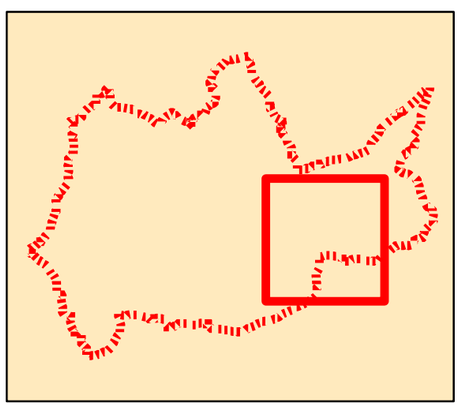
Alt2_Treatment
- Selective Thinning / MC
- Density Management
- Regeneration Harvest / NGFMA
- Small Diameter Thin

Logging System
- Skyline
- Tractor
- Helicopter

Existing Landing
- log

Proposed Landing
- log
- service
- Temporary Route Reconstruction
- Temporary Route
- Pre-Designated Skid Trail

- Proposed Earth Barricade
- Proposed Mega Gate
- Pump Chance Restoration
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Perennial Stream
- Intermittent Stream
- Quarry
- Existing Road



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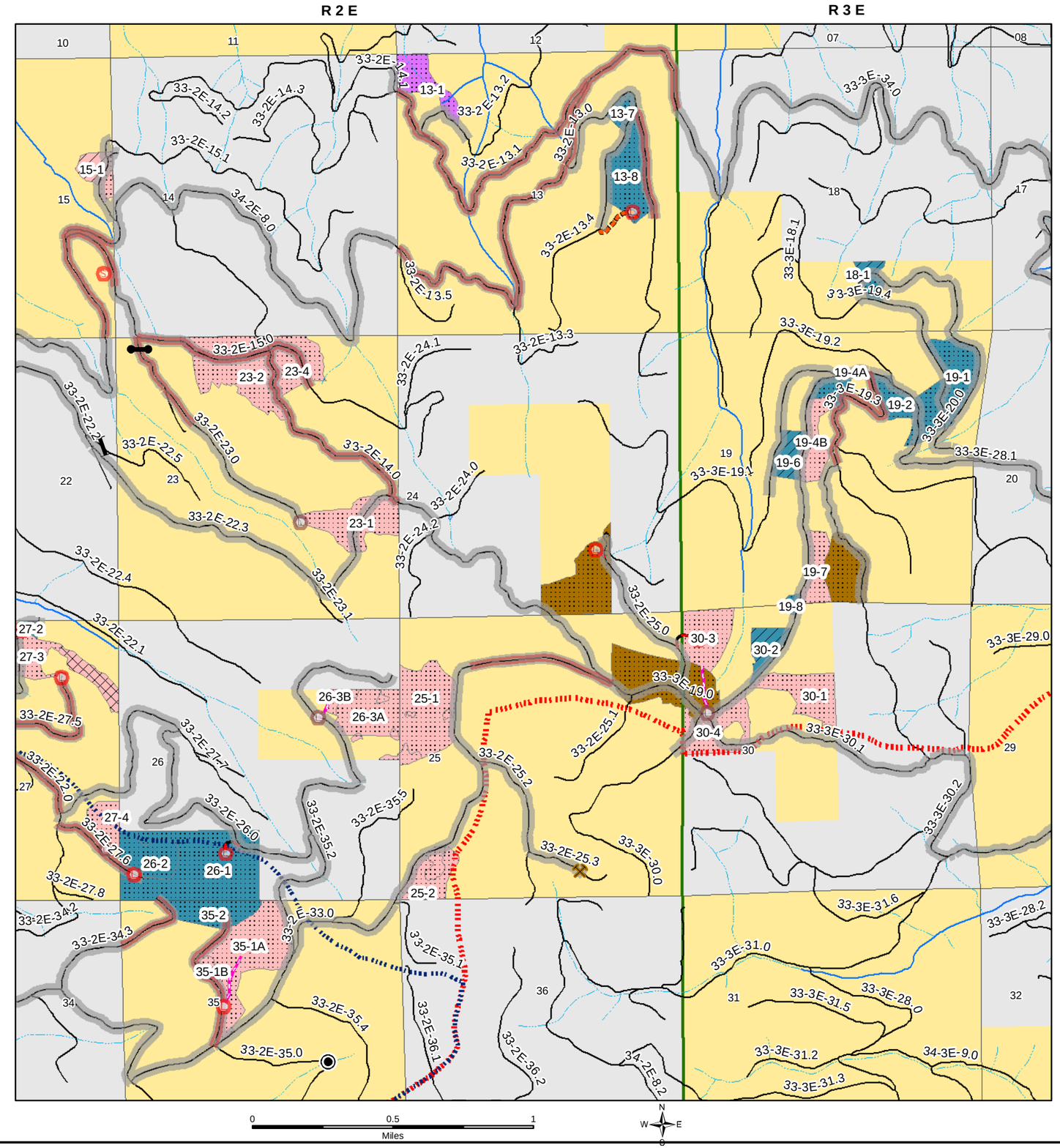


Lost Creek Alternative 3
Map 8

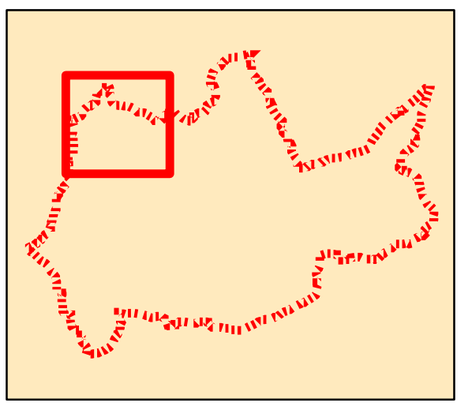
Alt3 Treatment
- Density Management

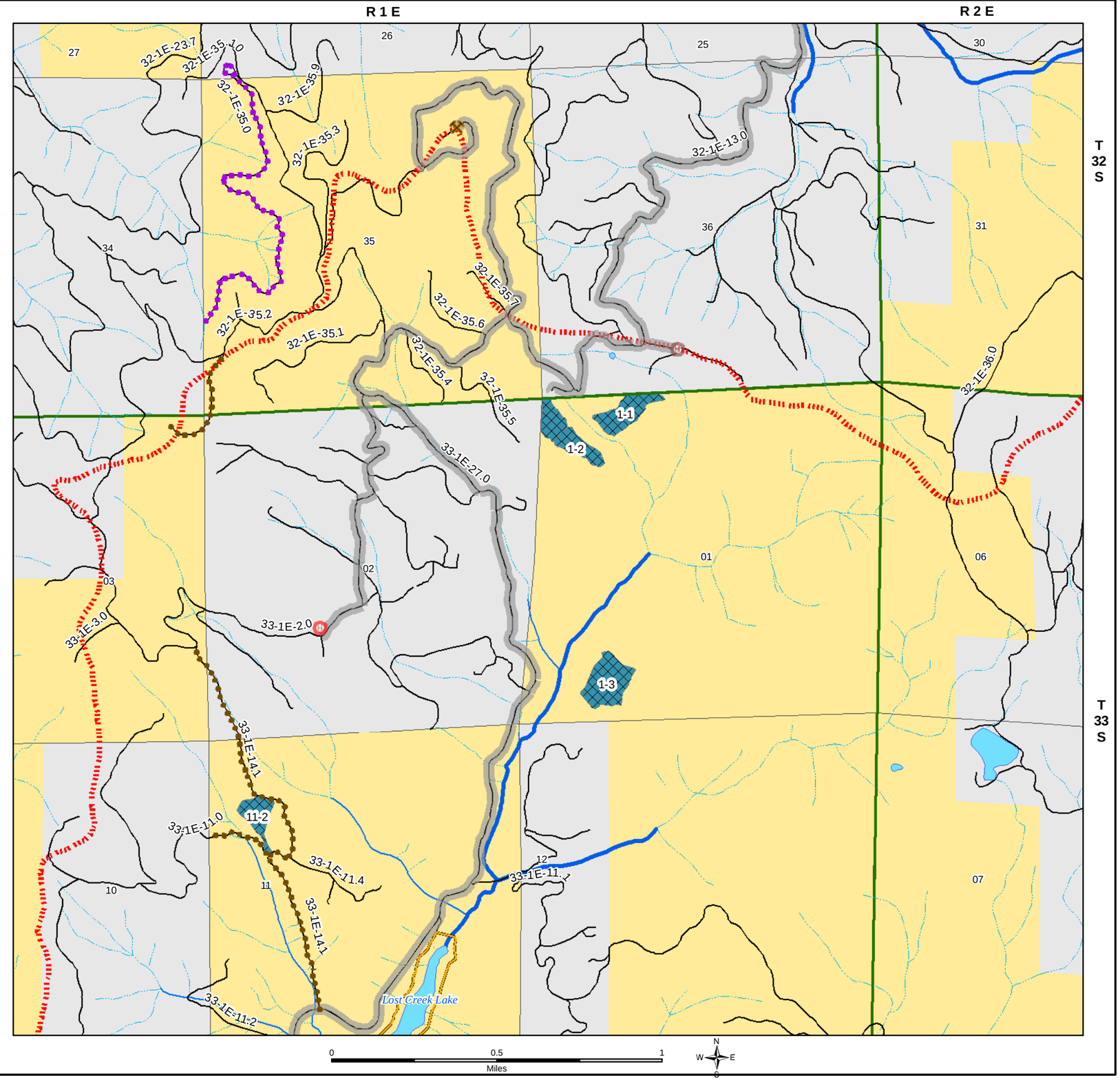
Logging System
- Helicopter

Existing Landing
- heli

Proposed Landing
- heli
- Proposed Full Decommissioning
- Proposed Partial Decommissioning
- Haul Route network
- Project Boundary

- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Existing Road
- Lost Creek Trails





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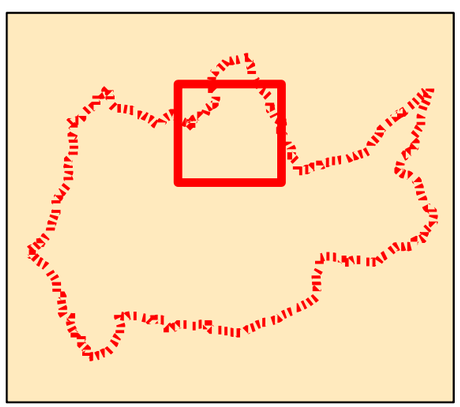
Lost Creek Alternative 3
Map 9

Alt3 Treatment
- Density Management
- Small Diameter Thin

Logging System
- Skyline
- Tractor
- Helicopter

Proposed Landing
- heli
- log
- Temporary Route Reconstruction
- Road Reconstruction
- Temporary Route
- Proposed Earth Barricade
- Proposed Mega Gate
- Pump Chance Restoration
- Meadow Restoration
- Proposed Partial Decommissioning
- Roadside Vegetation Maintenance
- Haul Route network
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Highway
- Paved Road
- Existing Road



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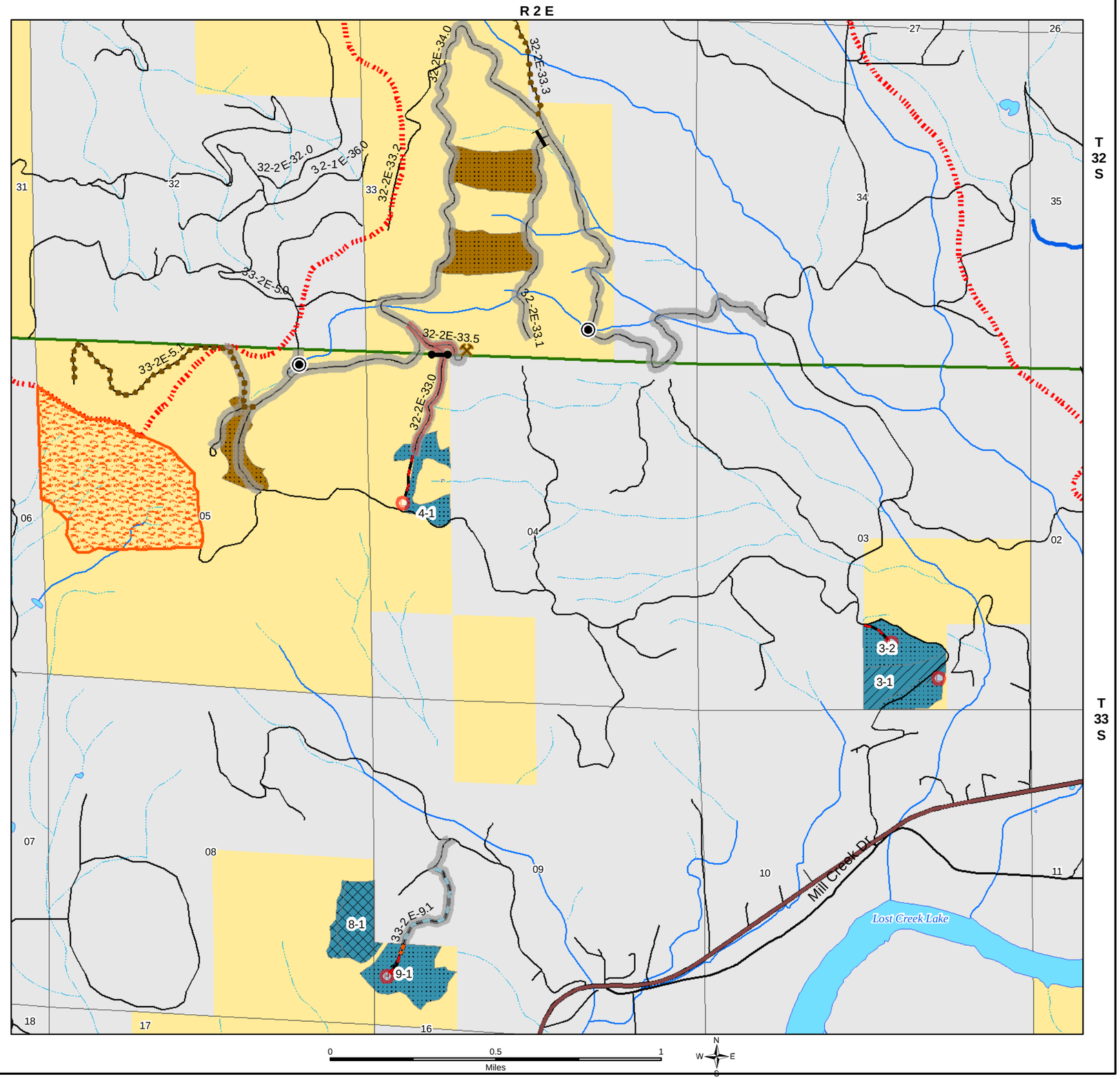


Lost Creek Alternative 3
Map 10

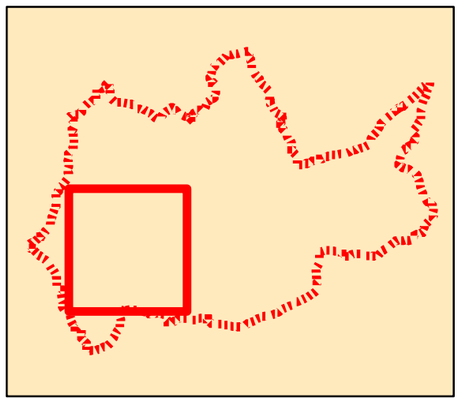
Alt3 Treatment
- Density Management
- Selective Thinning / DF
- Selective Thinning / MC

Logging System
- Skyline
- Tractor
- Helicopter

Existing Landing
- heli
- log
- service

Proposed Landing
- heli
- log
- Temporary Route
- Pre-Designated Skid Trail
- Proposed Mega Gate
- Pump Chance Restoration

- Proposed Full Decommissioning
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Corps of Engineers
- State
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Highway
- Paved Road
- Existing Road
- Lost Creek Trails



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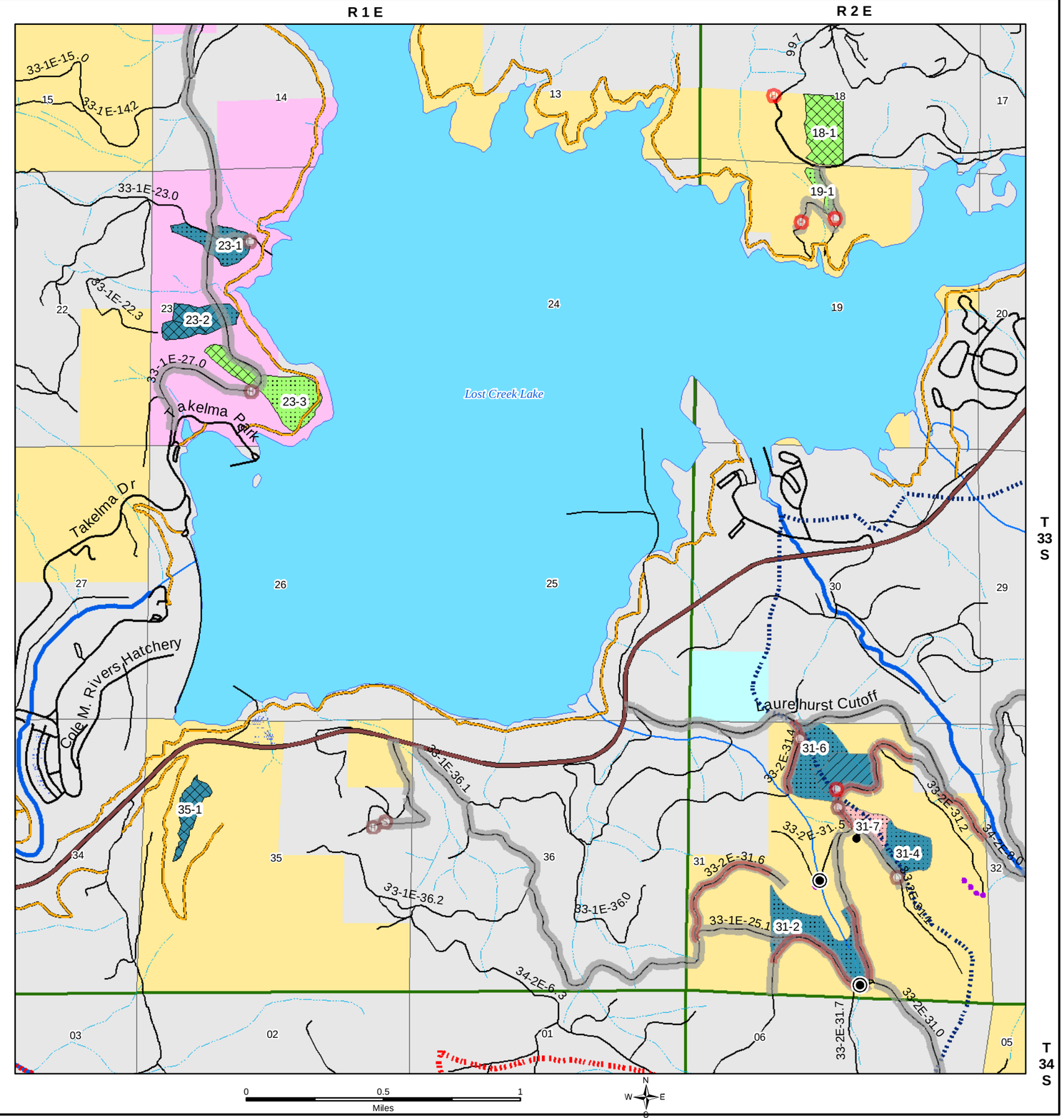


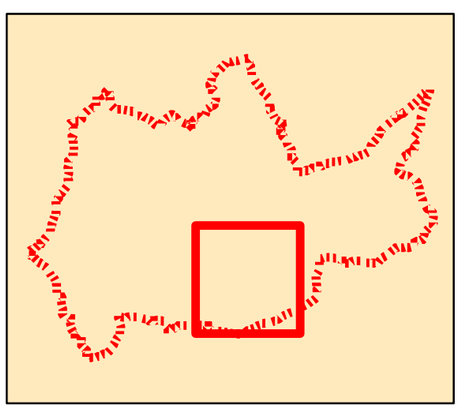
Lost Creek Alternative 3
Map 11

Alt3 Treatment
- Density Management
- Selective Thinning / MC
- Small Diameter Thin

Logging System
- Tractor
- Helicopter

Existing Landing
- log

Proposed Landing
- heli
- log
- service
- Temporary Route Reconstruction
- Temporary Route
- Pre-Designated Skid Trail
- Proposed Earth Barricade
- Proposed Mega Gate
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Quarry
- Highway
- Existing Road



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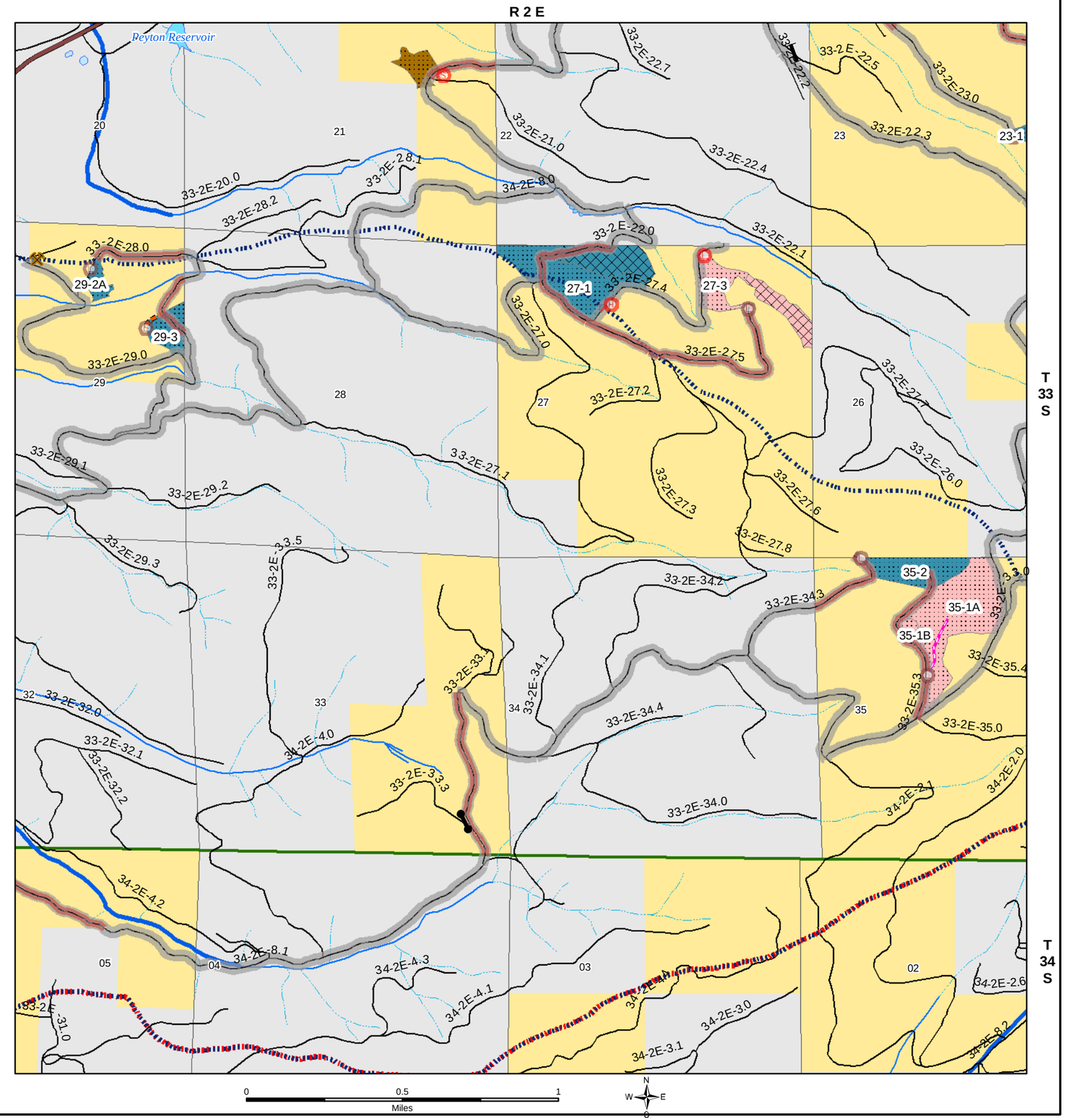


Lost Creek Alternative 3
Map 12

Lost Rogue Alt 3 treatments

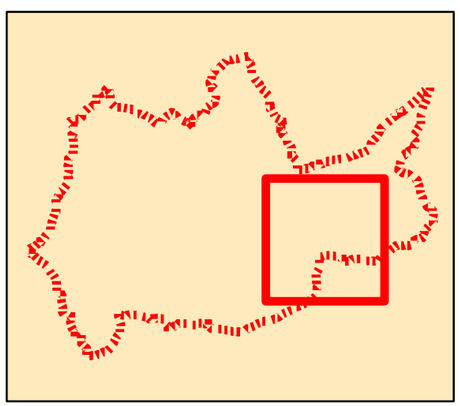
Alt3 Treatment
- Density Management
- Selective Thinning / MC
- Small Diameter Thin

Logging System
- Skyline
- Tractor
- Helicopter

Existing Landing
- log

Proposed Landing
- log
- service

- Temporary Route
- Pre-Designated Skid Trail
- Proposed Earth Barricade
- Proposed Mega Gate
- Pump Chance Restoration
- Roadside Vegetation Maintenance
- Haul Route network
- Special Management Watershed
- Project Boundary
- Bureau of Land Management
- Private Individual or Company
- Perennial Stream
- Intermittent Stream
- Quarry
- Existing Road



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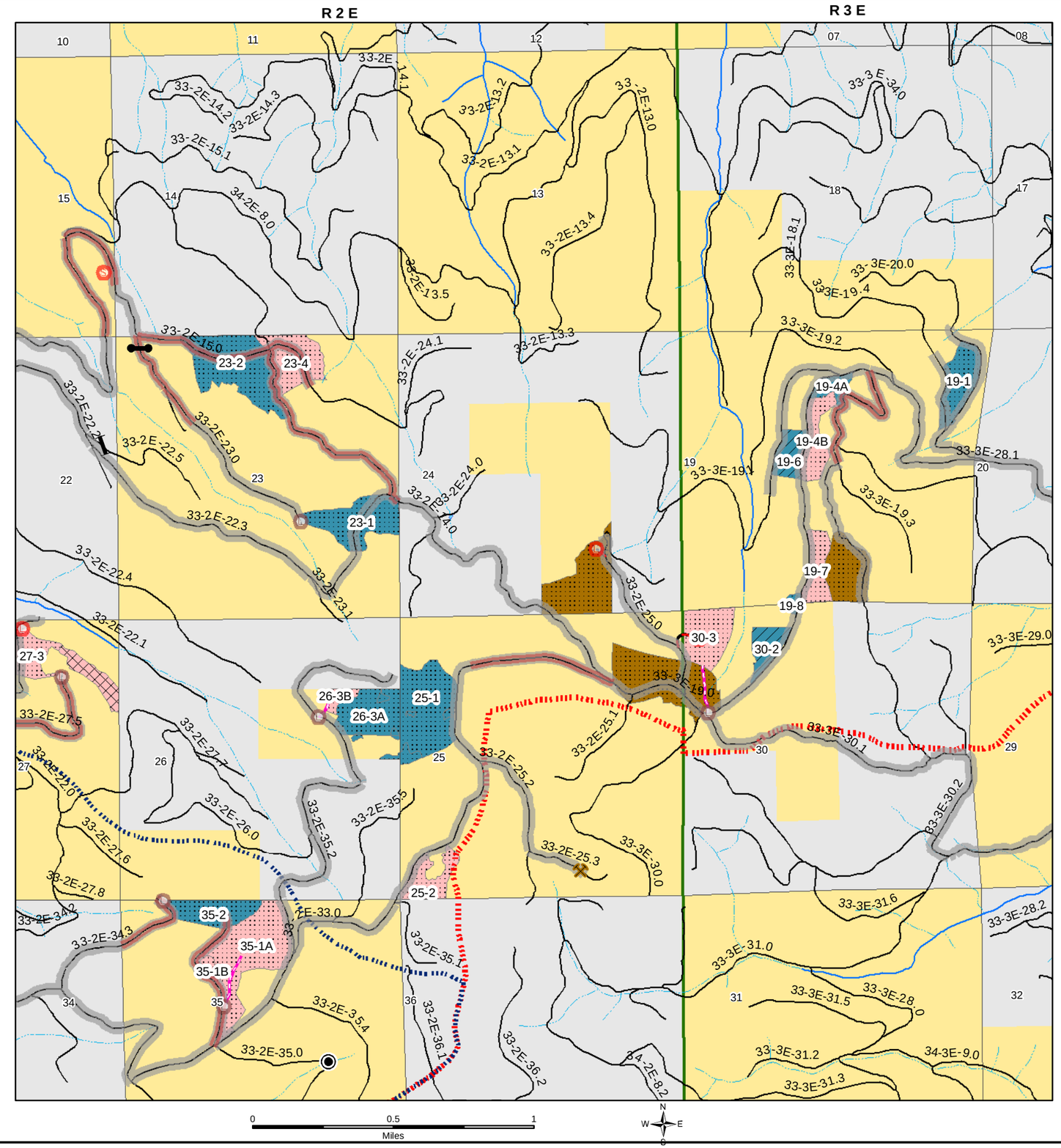
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