United States Department of the Interior

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

MAR 06 2014

IN REPLY REFER TO:
1792 (ORM010)

Dear Neighbor and Interested Citizen:

The Environmental Assessment (EA) for Aquatic and Riparian Habitat Enhancement is available for public review. This programmatic EA analyzes the effects of a suite of watershed enhancement activities needed to improve aquatic habitat. The broad purpose of the EA is to expedite watershed restoration and improve aquatic habitat. The Medford District RMP identified watershed restoration as a key component to the Aquatic Conservation Strategy. Specifically, the RMP identified restoration of poorly functioning riparian conditions, control and prevention of road sediment production, and increasing in-stream habitat complexity as priority restoration activities.

As specific restoration needs are identified by project teams, watershed analysis, or public input, the projects will be evaluated against the activities and effects identified and assessed in the programmatic EA. The EA covers projects located on both private and federal lands within the Medford District Area (see attached map). A Decision Record is expected to be signed in mid to late April; projects consistent with the stipulations in the EA would then be implemented under a Determination of NEPA Adequacy. These project-specific documents would be posted on the Medford District website (see below). If a proposed project is not consistent with the EA, the project would either be modified or would require additional National Environmental Policy Act (NEPA) analysis prior to implementation.
Projects will also be consistent with consultation with the National Marine Fisheries Service (NMFS) Biological Opinion for Fish Habitat Restoration Activities in Oregon and Washington (ARBO II).

Comments that clearly articulate site specific issues or concerns would be most useful to us. Copies of the EA will be available for public review in the Medford Interagency Office, 3040 Biddle Rd, Medford OR 97504 and the Grants Pass Interagency Office at 2164 NE Spalding Ave., Grants Pass, OR 97526. A formal 30-day public comment period will be initiated by publication of the EA on the Medford District website: http://www.blm.gov/or/districts/medford/plans/index.php. If you would like a copy of the EA, please stop by the office or contact Tony Kerwin, District Planning and Environmental Coordinator, at (541) 618-2402. Written comments should be addressed to Bureau of Land Management, 3040 Biddle Rd, Medford OR 97504 to the attention of Tony Kerwin. E-mailed comments may be sent to: *BLM_OR_MD_Mail@blm.gov*. Please send any comments by April 11, 2014. If you would like more information regarding this project, please contact Tony Kerwin (541-618-2402), Medford District Planning and Environmental Coordinator.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment including your personal identifying information may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so. We will make all submissions from organizations or businesses, available for public disclosure in their entirety.

Sincerely,

Dayne Barron
Medford District Manager

Attachment

Environmental Assessment

for

AQUATIC AND RIPARIAN HABITAT ENHANCEMENT

NEPA#: DOI-BLM-OR-M000-2013-0004-EA

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

MEDFORD DISTRICT

March 2014

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

EA COVER SHEET

EA# DOI-BLM-OR-M000-2013-0004-EA

ACTION/TITLE: Aquatic Habitat Enhancement

LOCATION: The Project covers all lands within and adjacent to the Medford District Bureau of Land Management

FOR FURTHER INFORMATION CONTACT: Anthony Kerwin
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Table of Contents

1.0 Purpose and Need

Introduction

The Bureau of Land Management (BLM), Medford District, plays a key role in aquatic and riparian enhancement activities presently underway in the Rogue, Umpqua and Klamath River Systems. Because of the interspersed, checkerboard ownership pattern of the revested Oregon & California Railroad lands, the District works closely with public and private partners to plan aquatic and riparian enhancement projects that benefit resources across ownership boundaries.

This Programmatic Aquatic Habitat Enhancement Environmental Assessment (EA) addresses a suite of activities to maintain and restore watershed conditions, establishes the scope and sideboards of the activities, and provides an analysis of the environmental consequences of the typical projects. All proposed activities are consistent with actions identified by NOAA Fisheries / National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) in the Programmatic Biological Opinion for Aquatic Restoration Activities in the States of Oregon, Washington and portions of California, Idaho and Nevada (ARBO II). (FWS reference: 01EOFW00-2013-F-0090). The USFWS, NMFS and BLM identified these programmatic activities because they have predictable effects to species and habitat regardless of their location of treatment. Restoration activities that did not have predictable effects (*e.g.*, channel reconstruction projects) or which had uncertainty were not included.

The EA does not include site specific projects, rather the EA identifies a suite, or types of actions that would benefit aquatic and riparian resources. As this EA does not specifically identify each project, future site specific projects would be evaluated for consistency with the effects disclosed in this programmatic EA. If site project effects are not addressed by this programmatic EA then they would require a separate National Environmental Policy Act (NEPA) analysis and documentation.

This EA tiers to the following NEPA and land use planning documents:

- *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl(Northwest Forest Plan FSEIS, 1994 and ROD,1994)*
- *Final Medford District Proposed Resource Management Plan/Environmental Impact Statement, and Record of Decision and Resource Management Plan (EIS, 1994 and RMP/ROD, 1995)*
- *Final Supplemental Environmental Impact Statement: Management of Port-Orford-Cedar in Southwest Oregon(FSEIS 2004) and ROD(2004)*
- *Medford District Integrated Weed Management Plan Environmental Assessment (1998) and*
- *tiered to the Northwest Area Noxious Weed Control Program (EIS, 1985)**
- *Cascade-Siskiyou National Monument Record of Decision and Resource Management Plan (2008) and PRMP/FEIS (2005)*
- *Rogue National Wild and Scenic River: Hellgate Recreation Area, Recreation Area Management Plan (2004) and PRMP/FEIS (2003)*

- *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (FEIS,2000 and ROD,2001)*

* An EA, tiering to the Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS/ROD (2010), is being prepared. If it becomes available for use during the life of this EA, it will replace the 1998 EA. Treatment of invasive weeds would use the methods and design features detailed in the forthcoming District EA if it is finalized during the life of this EA.

This EA also conforms to the following documents:

- National Marine Fisheries Service (NMFS) Endangered Species Act – Section 7 Programmatic Consultation Conference and Biological Opinion (ARBO II) (FWS reference: 01EOFW00-2013-F-0090.
- USFWS - Section 7 Programmatic Consultation Biological and Conference Opinion (01EOFW00-2013-F-0090);
- USFWS – Plant Letter of Concurrence (LOC #01EOFW00-2014-I-0013)

1.1 Purpose

The purpose of the aquatic and riparian enhancement activities proposed in this EA is to maintain or aid recovery of aquatic habitat, riparian habitat, and water quality where a tangible benefit would accrue to resources on public lands. The purpose of the proposed activities is to focus on:

- Controlling and preventing road-related runoff and sediment production through road improvements, and renovation including culvert replacement/removal, and road decommissioning
- Improving the condition of riparian vegetation stands through silvicultural and fuel treatments, including treatments to expedite large conifer development
- Increasing instream habitat and channel stability and complexity, including activities designed to provide or improve unobstructed access to aquatic species

Further, the Aquatic Habitat Enhancement Programmatic EA seeks to establish a process that facilitates partnership developments, leverages funding, and improves watershed condition through reducing duplication of NEPA documentation for similar projects with similar effects.

1.2 Need

Watershed enhancement projects are needed to maintain or restore aquatic habitat. As shown by watershed analyses and monitoring, various streams and watersheds across the Medford District require restoration activities to either achieve or to maintain aquatic health. BLM is responsible for watershed restoration as per the 1995 RMP which has three main components: "control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity" (1995, p. 23). Current conditions in the watersheds provide specific information indicating the need for improving aquatic habitat, which includes:

- Control and prevention of road related runoff and sediment production;

- Maintenance and enhancement of the species composition and structural diversity of plant communities adjacent to streams and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, and reduced rates of sedimentation; and
- Rehabilitation of streams and other waters to enhance natural populations of anadromous and resident fish. Possible rehabilitation measures would include, but not be limited to fish passage improvements; instream structures using boulders and log placement to create spawning and rearing habitat; and placement of fine and coarse materials for over- wintering habitat.

The proposed actions also respond to financial opportunities available for conducting enhancement and rehabilitation projects, both on and off federal lands. Funds for such work are presently available through Title II of the Secure Rural Schools and Community Self- Determination Act (a.k.a. County Payments Act), various grants, annual appropriations and other funding sources. The Watershed Restoration and Enhancement Agreement of 2006 also gives federal agencies the authority to spend federal funds on non-federal lands when there would be a tangible benefit to resources on federal land. Whether from these or other sources, the BLM expects that there will be continued funding for restoration efforts.

The development of community partnerships is always a preferred method to achieve large-scale restoration objectives and is encouraged by the Oregon/Washington BLM 2015 Strategic Plan which provides direction to "protect/maintain and restore aquatic and riparian resources including water and habitat quality and availability" and states that BLM "can significantly expand our capacity by working with partners in prioritized watersheds, thereby achieving greater benefits for aquatic and riparian resources" (USDI, BLM 2010).

1.3 Project Location

The planning area includes all lands within the Bureau of Land Management, Medford District (Map 1). The vast majority of projects would occur within the Riparian Reserve land use allocation on public lands. Private lands that contribute to the health of public lands, typically adjacent to BLM, are also included within the planning area scope.

1.4 Decision to be Made

The information and analysis provided in this EA will assist the Medford District Manager in deciding between the Proposed Action and the No Action Alternative. NEPA regulations require that prior to making this decision the Authorized Officer (the Medford District Manager) must first make a finding of whether the Proposed Action analyzed in the EA has a significant impact. In making that determination, the District Manager will consider both the context of the action and the intensity of the impacts, including the 10 factors outlined in 40 CFR 1508.27(b). If the District Manager determines the proposed action will not likely result in significant effects, then the BLM will issue a "Finding of No Significant Impact" (FONSI).

In deciding between the Proposed Action and the No Action Alternative, the District Manager will consider the extent to which the alternatives:

- Restore and maintain aquatic ecosystems
- Facilitates funding and partnership development
- Generate effects leading to degradation of habitat for threatened, endangered, and sensitive species

1.5 Scoping

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

An interdisciplinary team of resource specialists reviewed the proposal and all pertinent information, including public input received, and identified relevant issues to be addressed during environmental analysis. The following issues served as a basis for the development and comparison of alternatives and to provide information on the decision factors identified in Section 1.4, Decision to be Made, above:

- How would enhancement efforts affect habitat for threatened, endangered, and sensitive plant and animal species?
- How would proposed actions change the rate or distribution of noxious weeds?
- The proposed actions include heavy equipment operation in and adjacent to streams. How would equipment operation affect soil productivity and erosion?
- How would heavy equipment operation affect stream water quality and channel conditions?
- How would riparian vegetation treatments affect stream shade?

1.5.1 Alternatives and Issues Considered but Eliminated from Detailed Analysis

Projects such as mining reclamation and channel reconstruction were considered, but were eliminated from the proposal and analysis. The scope and extent of mining reclamation and channel reconstruction can vary widely, introducing uncertainty regarding environmental effects for which a programmatic assessment is not suited.

Many comments received, while they may be worthwhile goals, are outside the scope of this project, which is focused on restoration of aquatic systems. These are summarized below:*

- Prohibit trapping and shooting of beavers
- Provide public education for a variety of issues (e.g., promote acceptance of beavers, protection of trees with metal fencing, removal of garbage and other waste, rehabilitate damage from other uses)
- Place bird boxes
- Install beaver excluders and dwelling for beavers
- Block mines to prevent human access and eliminate safety hazards
- Withdraw lands where enhancement projects are scheduled from mineral entry
    - While the RMP has management direction for withdrawal of lands with "significant capital improvement" (RMP p. 80), the projects considered under this EA would not generally be considered a significant capital improvement. Projects would be assessed on a case-by-case basis to determine if they met this criterion.

*Note that some of these activities are being implemented under other project NEPA on the District.

Cultural Resources
Prior to any project implementation under this programmatic EA, a cultural resource survey would be completed and site-specific protection measures would be implemented to preserve the integrity of all recorded cultural sites.

Identified cultural sites would be buffered and avoided to prevent degradation. Therefore, no effects are anticipated to cultural resources.

Fuel Hazard
The project team did not identify any actions that would increase fuel hazards. Vegetation management actions in riparian areas are expected to minimally reduce fuel loading and fire hazard in a small area. This is also not expected to be a big part of project activities. Therefore, fuel hazard was not an issue needing further analysis or one that would drive alternative development.

2.0 Alternatives

Introduction
This chapter describes basic features of the alternatives analyzed in this document.

The National Environmental Policy Act (NEPA) requires analysis of a proposed action and other reasonable alternatives, including no action. The No Action Alternative provides a baseline for estimating environmental effects. Two alternatives, including No Action, for the Medford District Aquatic and Riparian Habitat Enhancement Project are considered in detail. The Proposed Action (Alternative Two) was developed to meet the purpose and need.

2.1 Alternative 1 - No Action

Under this alternative, the Medford District Office would not pursue any of the programmatic enhancement actions proposed in this analysis. Instream restoration activities, invasive aquatic species control, pond improvement, native species planting, stream passage improvements, road decommissioning, gating, fencing, and collection of logs for restoration activities would not be implemented. No ground-disturbing activities would take place and aquatic species habitat would not be improved. On-going activities such as road maintenance, recreation use, and noxious weed control, would continue to occur because they are covered by other NEPA. No BLM land management activities would change as a result of the No Action Alternative.

In addition, there would be no process in place to facilitate and expedite implementation of riparian or aquatic enhancement projects. NEPA documentation of enhancement projects would continue to rely on individual environmental assessments for each project. This would likely result in fewer aquatic restoration activities occurring on the District than have occurred during the past 5 years.

2.2 Alternative 2 - Proposed Action

Under this alternative, a range of watershed enhancement actions would be undertaken, grouped into the categories described below—riparian, instream habitat, and roads and culverts. Each project could include one or a suite of these activities. All proposed projects would be consistent with actions identified by the National Marine Fisheries Service (NMFS) under consultation in place at the time of implementation of individual projects and would be designed based on site-specific conditions. Some projects may require additional NMFS review prior to implementation.

The activities identified in this programmatic alternative, as well as those in the programmatic consultation, were selected because they have predictable effects to species and habitat regardless of location. Restoration activities that do not have predictable effects (e.g., channel reconstruction projects) or which have uncertainty are not included in the Proposed Action.

This alternative addresses a suite of activities intended to restore watershed conditions. Site specific projects identified in the future would be assessed for consistency with the scope and effects addressed in this EA. To ensure consistency and to examine site specific conditions and effects, the BLM would determine NEPA adequacy prior to any project implementation. The determination would examine the project's location and proposed activities and identify applicable project design criteria. Projects found to be consistent with the scope and effects found in this programmatic alternative would be implemented; those that do not would be modified to be consistent with the alternative, or would require a separate NEPA analysis.

As this is a District-wide programmatic EA, projects would be prioritized on each Resource Area by resource specialists (e.g., Hydrologists, Fish Biologists) based on their knowledge of sites needing work, and availability of partners and funding.

Best Management Practices and Project Design Features (PDFs) would be selected and implemented in conjunction with actions to avoid or mitigate identified impacts to the environment. Project design features are included in the Proposed Action for the purpose of reducing adverse environmental effects that might stem from project implementation. The PDFs noted below would be considered with each project. However, only those that are appropriate to the location and activity would be selected.

In addition, instream projects require a removal and fill permit from the Army Corps of Engineers and Division of State lands. The Medford District has programmatic permits. These permits and other relevant permits would be obtained as necessary prior to project implementation.

All activities would include an experienced fish biologist and/or hydrologist and other resource specialists as needed in the design of the project.

A. Riparian Vegetation Projects

Objective

The riparian vegetation treatments seek to restore plant species composition and structure that would occur under natural fire regimes in dry forest types. Specifically, the objectives include thinning small diameter material to reduce fuel loads and to protect legacy trees and subsequent reintroduction of low to moderate severity fire, and piling and burning. Improved riparian conditions are intended to increase species diversity and to protect legacy trees that would provide habitat and structure to the stream channels. All riparian vegetation treatments would be designed to be No Effect to Coho, Coho Critical Habitat and Essential Fish Habitat. Essential Fish Habitat (EFH) has been defined by NMFS as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This definition includes all waters historically used by anadromous salmonids of commercial value (in this instance, coho salmon). EFH within the analysis area is identical to Coho Critical Habitat (CCH).

Actions:
Silvicultural treatments in riparian areas would include:

- Fuel reduction activities including: thinning of small diameter vegetation (<8" diameter), handpile and burning, underburning, lop and scatter
- Girdling to create small snags and coarse down wood
- Tree and shrub planting
- Limited fencing to exclude grazing

Understory vegetation (<8 inches) would be thinned using manual techniques (e.g., chainsaw). Actions would include selectively slashing hardwoods, conifers, and shrubs. Species diversity would be maintained by retaining a mix of on-site species. Slash would then be handpiled and burned (HP/B), lop-and-scattered, or chipped. To remove residual fuels, a light underburn may be implemented on select units within the 1-2 years following handpile burning. Underburns would be ignited outside any no-treatment buffers adjacent to creeks but would be allowed to back into the buffered zone.

To ensure protection of water quality a no-treatment buffer would be applied along each side of perennial/fish bearing and intermittent streams, as appropriate, such as when required by a Water Quality or other management plan or by site-specific circumstances. These buffer widths may be expanded when defined in a Water Quality Restoration Plans (WQRP) and based on site-specific conditions.

Native plant species (trees, shrubs, sedges, and grasses) would be manually translocated, collected, propagated and planted. A range of silvicultural treatment options, including choice of species recruited, planted, or removed would be applied to reach desired future conditions.

B. Stream Enhancement Projects

Objective
Stream enhancement projects aim to improve aquatic habitat through increased habitat complexity and improved passage. Through increasing channel complexity and long-term stability, the projects seek to increase spawning and rearing habitat, pool formation, spawning gravel deposition, hiding cover, winter refugia, and low velocity areas. Project activities are also intended to improve hydrologic function of floodplains and stabilize channel banks. Migration barriers would be removed to facilitate and improve passage.

Actions:
Instream Structure
Actions include placement of log structures and boulders to create instream habitat that would benefit fish and other aquatic fauna. Logs, boulders, and gravel, or a combination would be placed instream through cable yarding systems, felling trees from adjacent riparian areas, heavy equipment and/or helicopters. Work would be accomplished during the instream work period unless a variance from Oregon Department of Fish and Wildlife (ODFW) is obtained.

Instream habitat restoration activities include the construction of large wood structures, boulder structures, wood/boulder combination structures, and new pools; and creation of holes needed to seat the rock structures or create pool habitat on exposed bedrock and off-channel habitat. Additionally, maintenance of instream structures, rehabilitation of stream channels, streambanks,

construction sites, materials staging areas, and manual and mechanical noxious weed treatments associated with, or resulting from the implementation of the project may be performed.

Construction of large wood structures may utilize excavator, helicopter, yarding, skylining, tree lining and tree falling, or any combination thereof, depending on the site. Rock structures would be constructed using an excavator and other heavy equipment as needed. Rock for this project would be washed and round river rock from existing quarries, or would be hauled from other locations free of noxious weeds. All rock sources would be weed free. Access for equipment to the stream channel would utilize existing roads where possible. Where sites cannot be accessed by existing roads, equipment would be walked into the site, rather than constructing a temporary road; the route would be determined by consultation with resource specialists. Upon completion or at the end of the instream work period, these access routes would be rehabilitated following an erosion control plan developed for each project site.

The primary source for the large wood needed for this project would be hazard trees along roads within the project area, blowdown, and dead and dying trees from approved areas. Hazard trees may be felled or pulled-over adjacent to roads within Matrix, Late-Succesional Reserve (LSR), and Riparian Reserve land use allocations, for placement in the stream channel. Hazard trees would be identified using the Field Guide for Danger Tree Identification and Response (USDA/USDI 2008). During implementation there may be temporary closures of roads, campgrounds, dispersed campsites and other recreational areas to insure public safety.

The ODFW's Guide to Placement of Wood, Boulders and Gravel for Habitat Restoration (2010) and Oregon Aquatic Habitat Restoration and Enhancement Guide (1999) would guide project designs and construction. Construction could involve use of heavy equipment, such as excavators, backhoes, front-end loaders, dump trucks, and bulldozers.

Large wood may be secured by bracing or wedging between existing riparian trees or other riparian vegetation, or keyed into the banks as necessary to protect downstream infrastructure (e.g., bridges, culverts). Existing access to creeks would be preferred but removal of brush and understory vegetation for vehicle and equipment access may occur.

The projects would target priority streams that provide habitat for anadromous fish or in streams occupied by native, resident fish species, or anywhere that aquatic habitat objectives (e.g., Aquatic Conservation Strategy objectives) are not being met. High priority areas would also be identified through one or all of the following:

- Watershed Analysis (All projects require that a watershed analysis be completed)
- Resource Area or District level stream prioritization projects
- Aquatic habitat or stream survey findings
- Oregon Department of Environmental Quality's list of water quality limited streams
- Professional knowledge of fish populations, habitat conditions, and hydrologic function
- Sufficient availability of large trees near the riparian corridor to complete the project without degrading wildlife habitat or water quality

Foster et al. (2001) recommend one large piece of instream wood per 100 meters, equal to 48 per mile, as the desired condition. NMFS Fisheries considers >25 pieces per mile (Siskiyous East) and > 40 pieces per mile (Siskiyous West) properly functioning for southern Oregon (USDC NMFS 1996). Large wood is defined as > 24 inches in diameter and greater than or equal to 50 feet in length. NMFS also recommends that when available trees with rootwads should be a minimum of

1.5 times bankfull channel width, while logs without rootwads should be a minimum of 2.0 times bankfull width. ODFW Habitat Benchmarks recommends 48 pieces per mile of the dimension 24 inches in diameter and 32 feet in length (1997). Actual treatments would take these numbers into consideration in addition to site-specific goals and objectives.

Whole trees from the adjacent riparian area or off-site would be used for instream large wood. The action could remove single trees or groups (<5), selected within the first two lines of trees adjacent to existing openings such as roads, young stands, and clear cuts. Trees would be felled directly into the creek, onto existing roads/skid roads, or lined to existing roads. Trees selected from the riparian area would not remove primary shade to the creek and would be selected from fully stocked riparian stands.

Removal of small dams and legacy structures:
During the 1980s and early 1990s, many habitat-forming structures such as log weirs, boulder weirs, and gabions were placed in streams to create pool habitat. Many of these structures, also known as legacy structures, were placed perpendicular to stream flow or placed in a manner that interfered with natural stream function, creating undesirable habitat conditions. This alternative proposes to remove or enhance these structures to restore natural stream function and improve passage for aquatic species.

Small dams and legacy structures may also be removed to restore aquatic connectivity. Dams <10 feet tall would be removed to improve connectivity and restore natural flow conditions. Instream structures that impound substantial amounts of contaminated sediment would be evaluated by specialists prior to removal, or would not be removed. Legacy structures including large wood and boulders, and other in-channel structures would be removed to improve fish passage and increase connectivity. Construction could involve use of heavy equipment, such as excavators, backhoes, front-end loaders, dump trucks, and bulldozers. Sediment retained behind these dams may be removed and placed in a stable off-site location prior to structure removal. If the structures are composed of material typically found in the stream system, that material may be reused in habitat improvement projects. However, if the material is comprised of material that is not typical of the stream system then the material would be moved off site, outside the 100-year flood plain.

Streambank Restoration:
Unstable banks delivering fine sediment or that threaten infrastructure may be stabilized using boulders, large wood, or erosion control fabric. These structures would be designed to also enhance fish habitat through instream cover and velocity breaks. Similarly, the Proposed Action includes stabilizations of gullies and headcuts to reduce erosion. Native vegetation would be planted in riparian areas to improve shade, provide future large wood, stabilize banks, and provide cover.

Off- and Side-Channel Habitat Restoration:
Reconnecting side channels or floodplain areas offers another opportunity to reduce bank shear stress and may be implemented to improve floodplain function and off channel habitat. Actions to restore side channels and floodplains could include the removal of sediment plugs which block water movement through side channels and alcoves. Construction could involve the use of heavy equipment, such as excavators, spyders, backhoes, and dump trucks.

C. Road and Culvert Projects

Objective
Road improvement projects reduce erosion from existing road surfaces, cut banks and fill slopes, and reduce the probability of failure through improvement of road surface stability and drainage. Culvert projects seek to reduce sediment production, increase aquatic and hydrologic connectivity and improve passage for aquatic species.

The objectives of road and culvert projects include: improve water quality by reducing short- and long-term, road-related sediment; restore hydrologic processes modified by water routing and compaction; reduce road maintenance cost; and reduce impacts to aquatic and wildlife resources.

Project locations would include roads delivering chronic sediment to streams or locations that have road or culvert failure potential. Other priority areas for road and culvert improvements or decommissioning include watersheds with high habitat potential or water quality restoration plans (e.g., Total Maximum Daily Load, Water Quality Restoration Plans).

Actions:
Road projects identified and selected for implementation would meet at least one of the following criteria:

- A recommendation in Watershed Analysis or Water Quality Restoration Plan
- Protection/improvement of instream beneficial uses (anadromous/resident fish, water supply etc.)
- BLM or public identified the road as a chronic sediment source or areas with potential for road failure

Construction would involve use of heavy equipment, such as excavators, backhoes, front-end loaders, dump trucks, and bulldozers.

Road surface improvement
Specific road improvements would depend on the site conditions. Typical road surface improvements would include placing rock aggregate that is resistant to erosion on natural surfaced roads, or additional aggregate surfacing on rocked roads. In many cases, road blading would precede aggregate placement, which would be compacted to prevent off-site erosion or rutting. Project-related exposed cut banks and fill slopes would be seeded and mulched. Road work would be completed during the dry season (generally October 15 to May 15) unless conditions are such that no rutting, off-site erosion, or road-related sediment would enter stream channels (i.e., during dry periods during the "shoulder periods" at either end of the dry season).

Drainage improvements would be designed to disperse runoff across the landscape, reducing both concentrated water and entrained sediment. This could be accomplished by reshaping road crowns; installing additional cross-drain structures (i.e. water dips, relief culverts, water bars); repair/replace existing culverts; cleaning and regrading ditches; and out-sloping road surfaces. Energy dissipaters may be installed as necessary at the outfall of cross- drain culverts to prevent erosion of fill slopes.

Road Decommissioning and Obliteration
Subject to the agreement of the Oregon and California Counties and private parties holding access rights under reciprocal rights-of-way agreements, selected roads would be decommissioned.

Selected roads would either be closed for the long term (>five years), decommissioned, or obliterated permanently.

For long-term closure, roads would be closed to vehicular use, but would be retained for potential future use. They would be placed in an "erosion-resistant" condition by providing ample cross-drainage, eliminating diversion potential at stream crossings, and stabilizing or removing fill materials.

Permanent or full decommissioning could include: removal of all cross-drain and stream- crossing culverts; partial or full recontouring; pull-back of fill material at stream crossings; removal of unstable fills; sub-soiling of the road bed; seeding and mulching of disturbed areas; placement of erosion control material; and re-establishment of native vegetation and trees.

Culvert Replacement
Stream-crossing culverts that restrict aquatic connectivity of resident and anadromous fish and other aquatic fauna would be replaced, upgraded, or removed. Improperly functioning culverts crossing perennial, intermittent or ephemeral, non-fish bearing streams would also be included.

Criteria used to select culverts for replacement would include:
- The existing culvert blocks access to habitat or prevents migration of anadromous and resident fish species
- The culvert is aged and/or at risk of failure
- The culvert is improperly functioning, leading to flow interruption and road runoff, creating a threat to public safety, increased sedimentation, and infrastructure loss

Existing culverts would be replaced with pre-cast concrete spans, bottomless pipes, and arch, or round culverts set at or below the level of the stream bed. Where necessary to prevent channel down-cutting or provide a gradient sufficient to insure fish passage, grade control structures such as weirs may be incorporated into the project designs. Culvert replacements would be designed to accommodate 100-year flow events.

2.3 Project Design Features

Project design features (PDFs) are included in the Proposed Action for the purpose of reducing adverse environmental effects that might stem from project implementation. The PDFs noted below would be considered for each project and relevant PDFs would be incorporated during project implementation. These PDFs do not prevent recommendation or implementation of additional PDFs or Best Management Practices (BMPs) (RMP pp. 149-177; and updated BMPs: http://www.blm.gov/or/districts/medford/plans/files/bmp.pdf).

Fish, Water Quality and Wildlife
- PDFs incorporate, as appropriate, the Project Design Criteria identified in the consultation documents in effect at the time of project implementation
- PDFs incorporate, as appropriate, BMPs identified in the Medford District Resource Management Plan and the updated BMPs referenced above
- No refueling of chainsaws or heavy equipment would occur within 150 feet of any stream or wetland area

- Maintain all snags > 16 inches DBH, except those that need to be felled for safety reasons. Those snags felled for safety reasons would be left on-site.
- Coarse woody debris retention levels would adhere to the requirements for the particular land use allocation in which it is located as per the 1995 Medford District RMP (RMP pp. 27, 33, 34, 39, 44, 47). A minimum of 120 linear feet of logs per acres ≥ 18 inches in diameter and 16 feet long in all land use allocations would be retained. In the Late-Successional Reserve (LSR) land allocation, retain coarse woody debris at higher levels if determined to be inadequate by an interdisciplinary review to meet LSR objectives.
- The Resource Area or District Wildlife Biologist would be notified prior to implementation to ensure raptors would be protected from disturbance. If reasonable, seasonal restrictions would be implemented to avoid disturbance to nesting raptors.
- Prescribed burns would occur in the spring and fall when fuel moisture and relative humidity are high.

Port-Orford-Cedar (POC)

- Port-Orford-cedar in the planning area would be managed according to the May 2004 BLM POC-FSEIS/ROD. Mitigation measures would be implemented if uninfected POC are in, near, or downstream of the activities (USDA-USDI 2003). Prior to entering a POC area or leaving a *Phythophthora lateralis* (PL) area, all heavy equipment would be washed according to Management Guidelines in the Port-Orford Rangewide Assessment (USDA-USDI 2003).

Botany

Federally Listed Plants

General and project-specific conservation measures would be applied per the direction in the Medford District's 2014 programmatic Biological Assessment for endangered plant species and critical habitat and respective Letter of Concurrence (USFWS LOC #01EOFW00-2014-I-0013), (See BA pp 24-34 for further explanation of conservation measures), and as summarized below:

- Unless otherwise noted, conduct one year of pre-disturbance clearance surveys for project activities in designated critical habitat or in suitable habitat within the known ranges of listed plant species, following protocols in the BA (See BA pp.24-25 for further explanation and BA Appendix A for the protocol).
- Conduct a second year of surveys for pile burning where vegetative fritillaria leaves were located in year-one surveys or if there is documented Gentner's fritillaria occurrence within 1,500 feet of the pile-burn area.
- Surveys are not required for actions restricted to within a road prism or stream channel.
- For all projects involving the use of heavy equipment, protect plant sites with a 100-foot radius no-entry buffer. Pick-up trucks, all-terrain vehicles (ATVs), utility terrain vehicles (UTVs), and similar soft-wheeled vehicles may be permitted within a plant site on a limited basis in dry conditions in the dormant season, if authorized by the project botanist.
- Clean all heavy equipment used within critical habitat or near listed plant sites prior to entering BLM lands. Remove all dirt and vegetation from the equipment exterior, including any unattached accessory equipment, such as augers, scoops, and blades.
- Projects involving heavy equipment in Cook's desert parsley critical habitat must be evaluated by a hydrologist prior to implementation. The hydrologist would evaluate potential effects of the proposed actions on site hydrology and prescribe appropriate conservation measures, which may include (1) seasonal entry restrictions, (2) limiting the

extent of disturbance, (3) temporary engineered solutions to reduce compaction and erosion, and (4) restoration of vegetation and hydrologic function.
- Restrict broadcast burning within plant sites to the dormant season.
- Pile material from thinning, brushing, and pruning at least 25 feet away from plant sites, regardless of whether the pile would be burned.
- Rehabilitate pile burn scars with native seed and mulch when adjacent to listed plant sites or in critical habitat as early as reasonably possible to prevent establishment of weedy species.
- For manual thinning, maintain 25-foot no-treatment buffers around plant sites during the growing season. Treatment inside of buffers would be allowed in the dormant season.
- For Gentner's fritillary, retain 40 % combined canopy coverage of trees and shrubs within 25-foot plant site buffers.
- Do not plant trees or shrubs in suitable dispersal or germination habitat for Cook's desert parsley.
- Do not plant trees or shrubs within 100 feet of plant sites.
- Do not apply fertilizer within 25 feet of plant sites.

Bureau Sensitive Plants
- Conduct pre-disturbance surveys for project actions that have the potential to disturb habitat of Bureau sensitive plant species.
- Generally, buffer known occurrences of Bureau sensitive plant species to minimize disturbance. The project botanist would prescribe an appropriate buffer based on species' habitat requirements and site conditions. For species that may benefit from disturbance, the project botanist may permit project activities without implementing buffers.

Noxious Weeds
- Project areas would be surveyed for noxious weed populations prior to implementation.
- Noxious weeds within areas of proposed heavy equipment operation including road maintenance and ingress and egress routes would be treated prior to operation with methods analyzed in the Medford District Integrated Weed Management Plan and Environmental Assessment (USDI, BLM 1998). Treatments would primarily consist of herbicide application, hand pulling, and mechanical cutting.
- Roads to be decommissioned or culverts replaced would be treated for noxious weeds prior to decommissioning and revegetated, as necessary.
- Seed and straw used for restoration, replanting of bare soil, and post treatment throughout the project area would be native species and weed free to prevent the further spread of noxious weeds.
- All heavy equipment, including brushing machinery, would be pressure washed to remove all dirt and debris prior to entering BLM lands and when moving from infested to non-infested areas within the project area.

Cultural
- Cultural resource specialists (archaeologists) would be contacted 14 days prior to project implementation to review project and conduct cultural resource surveys as necessary.
- All eligible or potentially eligible (unevaluated) sites within a proposed treatment area would be flagged for protection prior to project implementation, unless a formal Determination of Eligibility (DOE) establishes a site as Not Eligible for inclusion on the National Register of Historic Places (NRHP) with written concurrence from the State

Historic Preservation Office (SHPO). The flagged area would include a 25- foot buffer around the site. No disturbance would occur in the buffered areas.

- In the event that unrecorded archaeological or historical sites or artifacts are discovered during project implementation, they would be left intact and undisturbed and all work in the area would stop pending notification of the resource area or district archaeologist. The project may be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the archaeologist(s) and concurrence by the Resource Area Field Manager and SHPO.

3.0 Affected Environment and Environmental Consequences

Introduction

This chapter of the EA presents the affected environment, including existing conditions and future anticipated conditions if the No Action Alternative is selected, and the anticipated effects to the environment if the proposed activities are implemented. Given the landscape variability, the following discussions describe conditions across the landscape and acknowledge that site-specific conditions vary. Further, given the large geographic scale, data presented represents readily available data. The interdisciplinary team determined the available data sufficient to present existing conditions across the landscape. Further detailed data would be incorporated as site-specific projects are identified.

The environmental effects portion of this chapter considers the anticipated direct, indirect, and cumulative impacts. Because specific actions in specific locations are not identified, the effects determinations represent the typical effects associated with the activity. As site specific projects are planned, they would be individually evaluated to determine if the typical effects described in this EA adequately analyze the site specific project effects. In addressing cumulative effects of proposed activities the assessment assumes compliance with USFWS and NMFS's guidelines included in the Biological Opinions (BO) regarding number and type of actions within a watershed.

Specifically, USFWS and NMFS, in their Biological Opinions (NMFS p. 6; USFWS p. 9), identified Group 1 projects, those with direct channel disturbances such as bank stabilization, log and boulder placement, irrigation dam removal etc. be limited to 10 projects within a 5th field watershed. The agencies did not place a limit on Group 2 projects, those without direct channel disturbance, such as road work and riparian planting/thinning. Both NMFS and USFWS, given the number of projects limitation, concluded that these actions would not generate cumulative effects.

3.1 District Affected Environment

Medford District watersheds, located in the Klamath-Siskiyou and Cascade Ranges in southwestern Oregon, drain into the Rogue, Umpqua, and Klamath River basins.

Rugged terrain, complex geology, and strong moisture gradients create a complex mixture of valleys, foothills, and mountains. Major mountain ranges border the region on the east, south, and west. Elevations typically range from 150 meters to more than 2,400 meters within the region; Soils are very diverse, with more than 50 series identified (Stearns-Smith and Hann 1986).

The near-Mediterranean climate is characterized by winter rains and dry, hot summers; the land within the Medford District has a range of hydrologic patterns within a relatively small geographic area. Peak flows vary by year and are dependent on annual rainfall, which ranges from an average annual precipitation of 150 inches in the northwest portion of the Grants Pass Resource Area to below 20 inches near Ashland. Large peak flows of record such as 1955, 1964, 1974, and 1997 resulted from rain on snow events. Summer low flows are much lower than average winter flows largely due to precipitation patterns in the Pacific Northwest; a majority of precipitation occurs between November and March.

This physiographic diversity created a diversity of habitats and species distributions. Habitats are varied and range from wet coastal temperate rainforests to inland forests dominated by Douglas-fir, ponderosa pine, and sugar pine mixed with hardwoods. Drier oak forests and savannas lie in the lower elevation areas.

Rivers and streams of Southern Oregon support a distinctive fish fauna, including anadromous and resident species. Water courses throughout the Medford District also support a variety of beneficial uses including water supply, recreation, boating, aesthetics, navigation and hydroelectric power.

3.1.1 Fish Species and Habitat

Of the approximately 3,910 miles of streams within the Medford District planning area, 529 miles support fish. Of those 529 miles, 264 miles support a combination of anadromous fish and resident trout (RMP/EIS 1994). Salmonid species found in the Medford District include chinook salmon, Coho salmon, steelhead trout, resident rainbow trout, and resident cutthroat trout. Table 1 displays Special Status Species and the Resource Area in which they are present.

Table 1. 2007 Special Status Species (SSS) present in Medford District.

Scientific Name	Common Name	ESU	Species Status	Resource Area
Oncorynchus kisutch	Coho salmon	S.Oregon/N.California Coast	Federally Threatened	Grants Pass, Butte Falls, Ashland
Oncorynchus kisutch	Coho salmon	Oregon Coast	Federally Threatened	Grants Pass
Oncorynchus mykiss	Steelhead trout	Klamath Mountains Province	BLM Strategic	Grants Pass, Butte Falls, Ashland
Oncorynchus mykiss	Steelhead trout	Oregon Coast	BLM Strategic	Grants Pass
Oncorynchus mykiss	Redband trout	Jenny Creek	BLM Strategic	Ashland
Oncorynchus tshawytscha	Chinook salmon	S.Oregon/N.California Coast	BLM Strategic	Grants Pass, Butte Falls, Ashland
Catostomus rimiculus	Jenny Creek sucker	All	BLM Strategic	Ashland
Oregonichthys kalawatseti	Umpqua chub	All	BLM Sensitive	Grants Pass

The Southern Oregon/Northern California (SONC) Coho ESU (Evolutionarily Significant Unit), which was listed as threatened on May 6, 1997 (Fed. Reg./Vol. 62, No. 87). The Oregon Coast Coho (OCC) ESU was listed as threatened on February 11, 2008 (Fed. Reg./Vol. 73, No. 28).

Habitat

Table 2 displays aquatic habitat indicators and conditions across the Rogue Basin within the Medford District, incorporating both federal and private lands. The data, compiled by Rogue Basin Coordinating Council (2006), represents ODFW and U.S. Forest Service stream surveys, Watershed Analyses, watershed council monitoring results, and professional judgment.

Table 2. Habitat Indicators and Stream Habitat Conditions

Indicator	Rating[1]	% of streams	Criteria
Temperature	Adequate	8	42-65°F
	Moderate	5	65-70°F
	Limiting	87	>70°F
Chemistry	Adequate	66	Meets DEQ Standards
	Moderate	13	Marginally Meets DEQ Standards
	Limiting	21	Does not meet DEQ Standards
Sediment	Adequate	27	<5% Fine Sediment
	Moderate	29	6-15% Fine Sediment
	Limiting	44	>15% Fine Sediment
Instream large wood	Adequate	18	>20 Pieces/100 meters
	Moderate	11	10-20 Pieces/100 meters
	Limiting	71	<10 Pieces/100 meters
Spawning gravel	Adequate	74	>35% of Area
	Moderate	18	15-35% of Area
	Limiting	8	<15% of Area
Pool/riffle ratio	Adequate	58	>35/65
	Moderate	16	20/80-35/65
	Limiting	26	<20/80
Stream complexity	Adequate	48	Mixture of habitat providing variety of stream velocities
	Moderate	11	Between the above and below definitions
	Limiting	40	Uniform habitat and flow velocity
Aquatic barriers	Adequate	37	No barriers
	Moderate	35	Restricted passage part of the year
	Limiting	27	Block migration
Channel Modification	Adequate	27	Natural Channel
	Moderate	23	Some modification, simplifying channel
	Limiting	50	Stream channelized

[1]-Limiting: the watershed health factor is unhealthy and a significant amount of restoration activities are needed to improve watershed conditions.
- Moderate: the watershed health factor is less than desired and moderate to significant levels of restoration activities are needed to improve existing conditions.
- Adequate: the watershed health factor is functional and minimal restoration activities are needed to maintain existing condition.

The data indicate that water temperature, stream complexity, and migration barriers limit fish distribution and productivity. While water quantity is not displayed, studies have documented water quantity as a limiting factor to aquatic health (Jackson County Water Resources (2002), DEQ (2008)).

Stream habitat and riparian area degradation have been linked to road construction, timber harvest, urbanization, agricultural activities, mining, grazing, flood control, "stream cleaning", and construction of dams (Hicks et al. 1991; FEMAT 1993, Conservation Biology Institute (2001)). Road construction has increased the drainage network of watersheds, created fish passage barriers at road-stream crossings, and increased delivery of fine sediments. Timber harvest has removed shade-providing trees, decreased recruitment of large woody debris, and increased delivery of fine sediments to streams. Mining of gravel and precious metals removed natural stream substrates, created tailing piles in riparian areas, and altered stream channels. Flood control projects straightened stream channels. Stream cleaning severely degraded steam channels by removing habitat elements such as boulders and large woody debris and increasing stream width-to-depth ratios. Construction of dams has blocked fish passage, altered natural hydrologic cycles, and interrupted bedload movement.

Roads

Research indicates that roads are a major contributor of fine sediment to streams. These sources derive from both annual chronic delivery as well as from failures during flooding events. Roads compact soil and have the potential to route surface water and sediment to streams, particularly at stream-road crossings. However, many roads are often isolated by grasses, brush, trees and down logs, greatly reducing surface flow routing. Additional compaction created through management history is highly variable due to recovery since implementation, local equipment techniques, slopes, and soils. Soil compaction also reduces soil pore space, reducing plant growth and productivity.

There are approximately 4,455 miles of BLM-administered roads in the planning area (Table 3). Historically, roads were constructed, improved, and maintained to support timber management activities. In addition to timber management, roads now provide access for removal of other forest products, recreational use, mineral exploration and development, and access to rural homes. Each year, approximately 1,250 miles of road are maintained by BLM and another 300 miles are maintained by purchasers of timber sales.

Currently, 415 miles of road are closed to public use year around; another 365 miles are closed seasonally (winter and early spring). Closed roads usually include short, dead-end roads and local roads constructed for individual timber sales, and represent approximately 20 percent of the BLM-administered transportation network. The roads are normally gated or barricaded and closed to reduce maintenance costs or to protect other resource values such as wildlife. Many other roads are closed by natural vegetation regrowth.

Roads that are decommissioned or closed for indefinite periods would usually have culverts and cross drains removed to facilitate natural drainage. Removing these structures would create short term sediment but would reduce sediment in the long term.

Existing roads occupy approximately 24,000 acres of BLM-administered land in the planning area. Easements and/or reciprocal right-of-way agreements provide physical access to approximately 90 percent of BLM-administered land in the planning area for management activities. An integral part of the transportation system is the 72 bridges and 97 major culverts located at road crossings of larger streams.

Table 3. Road Inventory by Road Type[1] (miles)

Surface	Arterial[2]	Collector[3]	Local[4]
Natural	1	31	1,075
Pit Run	28	105	626
Grid Rolled	1	19	342
Screened Base	0	0	17
Aggregate base	18	146	626
Aggregate	89	366	626
Bituminous	203	83	53
Total	**340**	**750**	**3,365**
		Grand Total	**4,455**

In addition, Jackson and Josephine County support approximately 6,000 miles (Josephine and Jackson county GIS databases) of road comprised of city, county, and state roads. Conditions and uses for roads vary across the county. It is assumed that numerous smaller roads cross forest land in both counties that are not captured in the county's GIS databases. Douglas and Klamath County roads also lie within the planning area.

3.1.2 Riparian Habitat and Conditions

Riparian areas are the vegetated areas immediately adjacent to rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows. The vegetation and microclimate conditions in riparian areas are a function of the combined presence and influence of perennial or intermittent water, water tables, and soils moisture content.

Riparian areas in the planning area occur throughout drainage systems, from the smallest intermittent headwater streams to the largest rivers such as the Rogue, Illinois, and Applegate. Riparian areas are not limited to an arbitrary, uniform distance from a water body but vary in width

[1] Source: Medford District Resource Management Plan (1994 EIS). Includes BLM-controlled roads and privately controlled roads with improvements.
[2] Arterial roads provide service to large land areas and usually connect with public highways or other arterial roads to form an integrated network of primary travel routes.
[3] Collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives.
[4] Local roads connect terminal facilities of: trailheads, landings, viewpoints, wayside stops, parking spurs, or comfort stations to collector or arterial roads or public highways.

and shape. The size and extent of riparian areas depend on topography, soils, rainfall, water quality and quantity, stream conditions, and width of floodplains.

Riparian areas provide streambank stability, filter overland flow, store water, and insulate streams from summer and winter extremes. Standing riparian vegetation helps regulate water temperature through shading. Also, they are the source of coarse woody debris which dissipates flood energy and creates aquatic habitat. For terrestrial species riparian vegetation supports nesting, roosting, cover habitat, and food sources (Brown 1985).

In western Oregon, riparian habitat with mature trees greater than 21 inches in diameter provides the greatest plant and structural diversity, a high level of animal diversity, and a high level of woody debris (Brown 1985). Mature riparian zones contribute to a high level of aquatic diversity and provide corridors for wildlife species.

In determining condition class, the method used average tree size derived from the timber inventory database. From the records, approximately 18 percent of riparian areas are in minimal condition, 30 percent are in fair condition, and 52 percent are in good or optimal condition (RMP EIS 1994) (see Table 4).

Table 4. Riparian Stand Conditions

Riparian Habitat Conditions*			
Minimal	**Fair**	**Good/Optimal**	**Total**
12,345	21,187	35,823	69,355

* Minimal – 0-11 inches tree diameter
Fair – 11-21 inches tree diameter
Good/optimal – 21 inches and larger tree diameter

Typically, riparian conditions rate higher in the smaller, higher elevation streams and decrease along larger, lower gradient rivers. Riparian shade provided to larger tributary streams and mainstem rivers, occurring predominately within private lands, averages 55-65% of potential (DEQ 2008, 2007, 2004). DEQ identified that low stream flow and lack of riparian shade has elevated summer water temperatures, limiting aquatic beneficial uses. Currently, DEQ lists 2,300 miles of stream within the planning area as limited due to water temperatures; 440 miles occur within BLM managed lands.

3.1.3 Botany

The vegetation of southwestern Oregon and adjacent Northern California is one of the most biologically diverse areas in the United States. Floristically, the region combines elements of the Northern California Klamath Mountains, the Southern Oregon Cascades, and the western Oregon Coast Range and has a large number of endemic species.

The BLM policy is to conserve federally listed and Bureau Sensitive Species, to initiate proactive measures that reduce or eliminate threats, to determine the distribution, abundance, and condition of sensitive species, and to consider site-specific methods in implementation planning to conserve species (BLM Manual 6840). The objective of the Medford RMP is to conserve listed and sensitive species, and it directs the BLM to: a) managed listed species following recovery plans; b), manage sensitive plants and fungi to maintain or restore populations and habitat consistent with

conservation needs; and c) implement conservation plans and agreements. To meet policy and the RMP, the BLM surveys an area where actions could affect identified populations of listed and sensitive populations and then mitigates, if necessary, proposed activities to reduce significant adverse effects to the species.

Surveys of suitable habitat are conducted for the listed and sensitive plants prior to project initiation. Methods to reduce effects may include full protection (installing variable radius no disturbance buffers), changing the timing (treatments in the spring or fall), changing the intensity of disturbance (e.g., leaving certain canopy requirements, or leaving shrubs over the population), or even the duration (e.g., only allow a quick burn over the top of a sensitive plant population).

Two federally listed and 91 Bureau Sensitive plant species are known to occur on the Medford District, including 75 vascular plants, 12 non-vascular plants (lichens, mosses, and liverworts), and four fungi species. An additional 40 Special Status plant and fungi species occur on adjacent federal and non-federal lands and are suspected, but have never documented, to occur on the district. If populations of suspected special status plants are documented in surveys, they would be managed the same as known species. Appendix B provides the list of known and suspected Special Status plant species and their associated habitat and status.

Threatened and Endangered (T&E)

ENDANGERED PLANTS

There are 2 plants listed as endangered by the U.S. Fish and Wildlife Service that are known to occur on the Medford BLM in riparian zones, Gentner's fritillary (*Fritillaria gentneri*) and Cook's desert parsley (*Lomatium cookii*). One federal candidate species also exists on BLM lands in the sub-basin, Siskiyou mariposa lily (*Calochortus persistens*). This species is known from adjacent Siskiyou County in Northern California and is disjunct here. However this species is known from rocky- ridgelines well away from the riparian zones and would not be affected by the Proposed Action.

Gentner's fritillary (*Fritillaria gentneri*) - *Endangered*

This lily is a long lived perennial endemic to the Rogue River basin in Jackson and Josephine County, and in the upper drainages of the Klamath basin in the Cascade-Siskiyou National Monument, Jackson County, Oregon. Gentner's fritillary was listed as federally endangered on December 10,1999 (USDI, UFWS 1999). Critical habitat was not designated. A final recovery plan was published in 2003 (USFWS 2003).

Gentner's fritillary is known from a wide variety of habitats and soil types across its range. The recovery plan (USDI, USFWS 2003) identifies over 25 soil types and about 16 different plant communities that this species can occupy. This species prefers situations where it can receive at least partial light (Brock and Callagan 2002). It is rarely found under a dense conifer canopy; although it has been found in riparian habitats and ecotones with a high cover of mixed conifer and deciduous trees. It has been found growing on the edges of grasslands and chaparral, and in partially open mixed evergreen forest and oak woodland openings. It is most often found in forest ecotones or transitional areas, especially along upper slopes, ridgelines or aspect changes. It appears to have a moisture requirement in that it has not been found in fully exposed rocky, skeletal soil types (e.g. open grasslands), but prefers a level of soil moisture that is also capable of supporting trees and shrubs.

There are 192 known sites on BLM, which make up the large majority of all known sites. Flowering is limited at most occurrences. Of 57 sites monitored annually on Medford District since 2008, most sites included fewer than 10 flowering plants, including 22 sites with zero flowering plants. Reproduction is mostly asexual by bulblets breaking off of a mother bulb. Recent fertility studies by the Oregon Department of Agriculture, have found that Gentner's fritillary is not sterile, and produces capsules and seed best when pollen from another population is used. This suggests that a genetic self-incompatibility exists, and as most populations or patches are clonal, or very closely related, sexual reproduction is non-existent or very low.

Populations of Gentner's fritillary could occur in areas affected by the Proposed Action.

Cook's desert parsley (*Lomatium cookii*) – *Endangered*
This member of the carrot family was listed as a federal endangered candidate for listing in 1990 and the State of Oregon listed it as State Endangered in 1995. Cook's desert parsley was federally listed as endangered in November of 2002 (Federal Register 67:68004-68015, November 7, 2002). Critical habitat was designated in 2010 (Federal Register 75: 42490-42570). Recovery actions are detailed in the Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems (USDI, USFWS 2012a).

The distribution of the plant is disjunct; it was originally discovered in 1981 in the Agate Desert, Jackson County, Oregon, on the edge of vernal pools, and subsequently described by J. Kagan in 1986. At this site just north of the Medford airport, 13 occurrences exist within the historical flood plain of the Rogue River on non-federal land, on the edge of vernal pool complexes.

Additional populations were found in 1988 about 40 air-miles to the southwest in the Illinois River valley in seasonally wet grassy meadows, shallow sloped meadows along creeks, and in and adjacent to oak woodlands and serpentine influenced meadow and shrub habitats. Thirty-three (33) occurrences are now known in the Illinois River valley, mostly on federal lands. The most northerly occurrence in the Illinois valley is near Selma. The largest is at French Flat Area of Critical Environmental Concern (ACEC) which is estimated to have 146,356 plants (Kaye and Thorpe, 2007). The smallest documented location is 1 plant. The median population size is 250 plants, and the total amount of occupied habitat is about 50 acres.

No populations have ever been found between the Illinois valley and Medford Agate desert populations either along the Rogue River or in alluvial areas along the lower Applegate River. Most of the habitat between these populations is on non-federal lands, and have been heavily modified by rural development. Little likelihood exists that undiscovered populations occur between the Agate Desert and the Illinois valley occurrences; these two major populations segments are disjunct and are not interbreeding.

The habitats of the species are slightly different between the Agate desert and Illinois valley sites. In the Agate desert, its habitat is along the margins and bottoms of vernal pools. These pools, within swale and mound topography, form during the winter rains in shallow clayey- gravelly soils over an impervious hardpan. The Illinois valley habitats are mostly alluvial silts and clays within serpentine soils and riparian flats / meadows. The soils consist of flood plain bench deposits that also have a clay hardpan 60-90 cm below the soil surface. This creates seasonally wet areas similar to vernal pools in the Agate desert, but lacks the swale and mound topography (*i.e.*, no pools). The Illinois valley sites are alluvial in nature within serpentine substrates and are within the serpentine valley bottom communities. The meadows are dominated by California oat-grass and occur within Oregon

white oak–ponderosa pine/Jeffery pine savanna. An open shrub layer comprised of wedge-leaf ceanothus and white-leaf manzanita is interspersed with native and introduced grasses and herbs. One known site occurs in Oregon white oak dominated grassland on a shallow slope (not a meadow). Populations could occur in areas affected by the Proposed Action.

Bureau Sensitive Plants

In order to analyze effects for the Proposed Action, rather than address every plant species one by one, it is useful to place species into one or more plant habitat guilds. For the Proposed Action, only 28 of the 86 sensitive plant species are known to occur on the district that can be found in riparian zones and riparian forests. Only these species are analyzed in this EA as species found in the uplands are unlikely to be significantly affected by the proposed action. In Appendix B, these riparian species are bolded for the reader to see. All other sensitive plants found in other habitats not affected by the Proposed Action are not analyzed any further as impacts from the Proposed Action are unlikely to occur.

Noxious Weeds and Other Non-native Invasive Plants

Noxious weeds are plants growing outside their native lands or habitats that are injurious to public health, agriculture, recreation, wildlife, or public or private property (Oregon Department of Agriculture 2013). The Medford District ROD/RMP states the objectives for noxious weeds are to continue to survey for, avoid introducing or spreading, and contain or reduce infestations on BLM-administered land (USDI 1995). Other non-native invasive plants also occur on the Medford District. Although noxious weeds are the primary targets for control, the Medford District also works to avoid introducing or spreading other non-native invasive plants.

Weeds (noxious weeds and other non-native invasive plants) spread primarily via seeds, which are carried from one location to another by a variety of mechanisms, including air, water, animals, humans, and vehicles. Some weeds also spread when roots or other plant parts break off and resprout to create new plants. Many weeds have reproductive and life cycle characteristics that give them an advantage over native plants in quickly occupying a site following disturbance. These characteristics include high seed production, good dispersal mechanisms, early germination and rosette development, production of long taproots that capture water at different levels in the soil profile, and early or late season growth and bloom times to avoid competition with native species. Some weed species known to occur in the Medford District also have a competitive advantage because they can occupy harsh sites, tolerate drought, or form persistent seed banks that lie dormant until the next disturbance event provides new openings in which to become established. Because they originated from other geographic regions, weeds growing in the Medford District generally lack predators or pathogens that keep them under control in their native habitats.

Newly disturbed areas are most vulnerable to weed establishment. Roads are common avenues of invasion as seeds lodge in tire treads and are carried from occupied areas into newly disturbed unoccupied areas. Activities that introduce or spread weeds include road construction, forest management practices, farming, grazing, recreation, and residential development (Table 5). Natural processes, such as wind, seasonal flooding, and wildlife movement also contribute to the spread of weeds.

Table 5. Factors that Contribute to Weed Spread in the Medford District

Activity	Role in Dispersing Noxious Weed Seed
Private Lands	When left untreated, infested private lands are a persistent source for weed seed, which can be dispersed by people, vehicles, equipment, livestock, pets, wildlife, or natural processes such as wind or flooding.
Farming and Grazing	Farming disturbs soil and creates or maintains open areas that weeds can occupy. Farming equipment may move weed seed from one area to another. Agricultural seed may be contaminated with weed seed and spread during farming activities. Overgrazing of pastures or rangelands removes vegetation leaving bare, open spaces that weeds may invade. If livestock are fed grain or hay containing weed seed or parts, or consume weeds, they may disperse them when they move to non-infested pastures or range.
Logging and other Forest Management Activities	Logging, silvicultural treatments, and hazard fuel reduction activities may disperse weed seeds that attach to mechanized equipment, log trucks, and wood products that are transported from their source to another geographic vicinity. Logging creates openings through canopy removal and disturbs the ground, creating optimal habitat for some weed species. Similarly, pile burning results in disturbed sites that are prone to weed invasion.
Motor Vehicle Traffic	Motor vehicle traffic occurs on BLM-administered roads, which are situated within a checkerboard ownership arrangement. Weed seeds can be transported by motor vehicles and detach on public lands.
Recreational Use	The public often recreates on BLM-managed lands and can spread seed from their residences or other areas to public lands in a variety of ways, including by vehicle tires, recreational equipment, clothing, and pets.
Rural and Urban Development	Because of BLM's checkerboard land ownership, BLM parcels are generally interspersed with private lands, many of which are used for homesites, businesses, or agriculture. Rural and urban development often involves ground disturbance during building or road construction which creates openings for weeds to occupy.
Natural Processes	Wind, flooding, fire, and wildlife movement are a few of the natural processes that contribute to weed spread. Wind, water, or wildlife carry seeds or other plant parts and deposit them at new locations. Wildfire removes ground cover and creates disturbed openings that may be colonized by weeds.

To date, 36 noxious weeds species have been documented on BLM-managed lands in the Medford District (Table 6). Many of these species can occur along waterways or in riparian habitats, particularly along disturbed open floodplains. Himalayan blackberry, Scotch broom, Canada thistle, and meadow knapweed are the most abundant and widely distributed noxious weed species occurring in Medford District riparian areas. Other riparian associates, including garlic mustard, Japanese knotweed, purple loosestrife, and yellow flag iris are known to occur on fewer than 2 acres each in the District, primarily along the Rogue River. The submerged aquatic species, Eurasian watermilfoil, is documented in recreational lakes (Howard Prairie Lake, Lake Selmac) and boat launch sites on the Illinois River. A second submerged aquatic species, Parrot's feather, may also occur in Medford District waterbodies; however, it was not detected in surveys conducted in 2010 and 2011 (Sytsma et al. 2011).

The BLM treats noxious weed populations on their lands under the *Medford District Integrated Weed Management Plan and Environmental Assessment* (EA #OR-110-98-14) (USDI 1998). The BLM treats weeds using an integrated pest management approach that includes manual, mechanical, chemical, and biological methods. From 2009-2013, the Medford District treated approximately 1,500 acres of noxious weeds per year.

Table 6. Noxious Weeds documented in the Medford District
Species likely to occur in riparian or aquatic habitats are in bold.

Common Name	Scientific Name	Habitat
Annual ragweed	*Ambrosia artemisiifolia*	Along ditches, in waste areas
Barbed goatgrass	*Aegilops triuncialis*	Rangeland, dryland pastures
Bull thistle	*Cirsium vulgare*	Pastures, rangeland, newly logged sites
Canada thistle	***Cirsium arvense***	Cultivated fields, riparian areas, pastures, rangeland, forests, lawns, gardens, roadsides, and waste areas.
Diffuse knapweed	***Centaurea diffusa***	Any open ground including riparian areas, sandy river shores, gravel banks, rock outcrops, rangelands, roadsides
Dyers woad	***Isatis tinctoria***	Sandy, gravelly soils, marginal farmlands, rangeland, grain fields, pastures, waste areas, roadsides, fencerows, orchards, rows of cultivated crops
English ivy	*Hedera helix*	Forests, woodlands, old homesteads
Eurasian watermilfoil	***Myriophyllum spicatum***	Waterways, irrigation ditches, drainage canals, rivers, lakes, ponds
False brome	*Brachypodium sylvaticum*	Wide variety of habitats, including forest understories and oak savannas
French broom	***Genista monspessulana***	Disturbed areas, forestlands, rights-of-way, roadways, powerlines, private property
Garlic mustard	***Alliaria petiolata***	Forest opening edges, roads, streamsides, trails, agriculture land, partial shade of oak savanna; along the Rogue River in Josephine and Jackson Counties
Himalayan (Armenian) blackberry	***Rubus armeniacus (R. discolor, R. procerus)***	Riparian habitats, right-of-ways, agricultural lands, parks, forests
Houndstongue	*Cynoglossum officinale*	Rangeland, pastures, forests
Japanese knotweed	***Fallopia japonica (Polygonum j.)***	Riparian areas, roadsides, waste areas, streams, ditch banks, scoured shorelines, islands, adjacent forest lands
Leafy spurge	*Euphorbia esula*	Disturbed sites, prairies, savannas, pastures, abandoned fields, roadside areas
Medusahead rye	*Taeniatherum caput-medusae*	Clayey soils, open rangeland, oak savanna, oak woodlands
Meadow knapweed	***Centaurea pratensis***	Native prairie, oak savanna, moist roadsides, sand or gravel bars, river banks, irrigated pastures, moist meadows, forest openings, industrial sites, tree farms, grasslands

Old man's beard	***Clematis vitalba***	River margins, roadsides, river banks, gardens, hedges, shelter belts, disturbed forest, forest edges
Parrot's feather	***Myriophyllum aquaticum***	Freshwater lakes, ponds, streams, canals, rivers; adapted to high nutrient environments; colonizes slow moving or still water
Perennial peavine	***Lathryrus latifolius***	Rights-of-way, forested regions, natural areas
Poison hemlock	***Conium maculatum***	Pastures, streams, irrigation ditches
Puncturevine	*Tribulus terrestris*	Pastures, fields, ditches, roadsides
Purple loosestrife	***Lythrum salicaria***	Wetlands, streambanks, shorelines of shallow ponds
Rush skeletonweed	*Chondrilla juncea*	Rangeland, cropland, roadsides, open dry disturbed areas
Scotch broom	***Cytisus scoparius***	Disturbed sites, natural areas, dunes, public and private forest lands, rights-of-way, facilities, parkland
Spanish broom	***Spartium junceum***	Dryer sites, disturbed areas, roadsides
Spotted knapweed	*Centaurea stoebe (C. maculosa)*	Any open ground including rangelands, pastures, roadsides
Squarrose knapweed	*Centaurea virgata*	Rangeland, pastures
St. Johnswort	*Hypericum perforatum*	Disturbed, well drained sites such as roadways, trails, overgrazed range, logged areas
Sulfur cinquefoil	*Potentilla recta*	Disturbed areas such as roadsides, pastures, old fields, cultivated fields, open natural grasslands
Tansy ragwort	*Senecio jacobaea*	Pastures, clearcuts, disturbed roadside areas
Tree of heaven	*Ailanthus altissima*	Roadsides, fencerows, urban interface
Yellow flag iris	***Iris pseudacorus***	Riparian areas, waterways, wetlands, irrigation canals, ditches, marshes
Yellow star-thistle	*Centaurea solstitialis*	Canyon grasslands, rangelands, pastures, edges of cropland, roadsides, disturbed areas
Yellow toadflax	*Linaria vulgaris*	Roadsides, arid rangelands, pastures, railways
Yellowtuft	***Alyssum murale, Alyssum corsicum***	On serpentine soils in open areas in the Illinois Valley, including along the Illinois River and its tributaries

3.1.4 Wildlife

Only federally listed, Bureau Sensitive, and Survey and Manage species known or suspected to be present within the planning area and impacted by the proposed actions are addressed in this EA. Appendix A provides additional information on Special Status species known or suspected to occur within the Medford District. Impacts to wildlife from the proposed actions are measured by changes to stand structure in different habitat types or potential noise disturbance.

Threatened and Endangered (T&E)

The Medford District is within the range of various Listed or Candidate Species. However, only the following Listed or Candidate T&E terrestrial wildlife species could be impacted by the Proposed Action: northern spotted owl, marbled murrelet, and Pacific fisher. All three of these species are known to use riparian areas.

Northern Spotted Owl - *Threatened*

Northern spotted owls are closely associated with old forests for nesting, foraging, and roosting throughout most of their range (Forsman et al. 1984; Carey et al. 1990; and Solis and Gutierrez 1990). Suitable spotted owl nesting, roosting, and foraging habitat (NRF) habitat is characterized by forested stands with older forest structure, multiple canopy layers, and a canopy closure of 60 percent or greater. The best quality NRF habitat has large old trees with cavities, broken tops or mistletoe platforms, large branches, large dead standing and fallen decayed trees, and multiple canopies of shade tolerant hardwoods and conifers that support prey base. NRF habitat also functions as dispersal habitat. "Dispersal-only" habitat for spotted owls is defined as stands that have a canopy closure of 40 percent or greater, and are open enough for flight and predator avoidance. Unsuitable habitat does not currently meet the NRF or "dispersal-only" habitat criteria. Spotted owl NRF and "dispersal-only" habitat, as well as unsuitable habitat exists in a mosaic pattern across the Medford District.

Northern spotted owls are known to use riparian areas, either as roost locations during hot summer months or for foraging. Northern spotted owls generally nest in the lower third of slopes, therefore some nests could be adjacent to proposed riparian treatment locations. The Medford BLM has identified approximately 595 owl sites in within the District from historic information, protocol surveys, or incidental observations. Very few of the sites within the Action Area have been surveyed recently on a regular basis, so history for most sites is lacking. However, sites within the Klamath Demography Study area (Grants Pass Resource Area) have received extensive protocol surveys since the late 1990s.

Critical Habitat for the northern spotted owl was designated in 1992 in Federal Register 57, and includes the primary constituent elements that support nesting, roosting, foraging, and dispersal. Designated critical habitat also includes forest land that is currently unsuitable, but has the capability of becoming NRF habitat in the future (57 FR 10:1796-1837). Critical habitat was revised for the northern spotted owl and the final designation was published by the USFWS in the Federal Register (signed on August 12, 2008, 73 Federal Register 157:47326) and became effective on September 12, 2008. The 2008 USFWS's Critical Habitat delineations were challenged in court and the 2008 designation of northern spotted owl CHU was remanded. The USFWS was ordered to revise the CHU designation. On February 28, 2012, the Service released the proposed critical habitat in the form of maps and the draft form of the Federal Register publication. The proposed rule was published in the Federal Register on March 8, 2012 (77 Federal Register 46:14062-14165).

The final CHU rule was published in the Federal Register on December 4, 2012 (77 Federal Register 233:71876-72068) and became effective January 3, 2013.

The 2012 designated critical habitat is divided into 11 critical habitat units and 60 sub-units. Three critical habitat units and 9 sub-units, totaling approximately 452,907 acres, are within the Medford District. See Appendix C for a summary of habitat within these critical habitat units.

Marbled Murrelet - *Threatened*

Suitable habitat for marbled murrelet consists of forest stands that provide nesting opportunities. Generally this habitat is 80 years of age or older (i.e., a stand birthdate prior to 1932), contains multiple canopy layers, contains suitable platforms or nesting branches ≥ 5.9 inches (15 centimeters) in diameter (Burger 2002, Nelson & Wilson 2002: 24, 27, 42, 97, 100), and is within 50 miles of the coast. In Washington, Oregon and California, nests continue to be found below 2,625 feet (800 meters) in elevation (McShane et. al 2004). Murrelets nest in one of four tree species: western hemlock, Douglas-fir, Sitka spruce, or western red cedar (Nelson and Wilson 2002). Nest trees are ≥19.1 inches DBH and greater than 107 feet in height, have at least one platform 4 inches or more in diameter, contain nesting substrate (e.g., moss, epiphytes, duff) on that platform, and have an access route through the canopy that a murrelet could use to approach and land on the platform (Burger 2002; Nelson and Wilson 2002). Nest trees have a tree branch or foliage, either on the tree with potential structure or on a surrounding tree, which provides protective cover over the platform (Nelson and Wilson 2002).

Marbled murrelets use large riparian areas for travel and they fly up rivers from the sea to the forest sites where they nest (Richardson 2004). Approximately, 83,250 acres located within the Grants Pass Resource Area of the Medford district are within Zone 1 of the potential range of the marbled murrelet. This is the zone most likely to have murrelets in SW Oregon. Extensive protocol surveys have been done in the past, but there have not been any observations of marbled murrelets or murrelet nests within the Grants Pass Resource Area or elsewhere on the Medford District.

Critical Habitat for the marbled murrelet was designated by the USFWS on May 24, 1996 (61 FR 26256), and includes the primary constituent elements that support nesting, roosting, and other normal behaviors that are essential to the conservation of the marbled murrelet. The Service published the revised Critical Habitat for marbled murrelets on November 11, 2011 (Federal Register Vol. 73, November 11, 2011, 61599-61621). The designated critical habitat for the marbled murrelet was revised by removing approximately 189,671 ac (76,757 ha) in northern California and southern Oregon from the 1996 designation. The change was based on new information indicating that these areas do not meet the definition of critical habitat. The areas removed from the 1996 designation in northern California are within Inland Zone 2, where we have no historical or current survey records documenting marbled murrelet presence. Intensive surveys in southern Oregon indicate the inland distribution of the marbled murrelet is strongly associated with the hemlock/tanoak habitat zone, rather than distance from the coast. Accordingly, the areas removed in southern Oregon are limited to those areas not associated with the hemlock/tanoak zone. The areas removed are not considered essential for the conservation of the species. There are approximately 32,091 acres of marbled murrelet CHU within the Medford District

Fisher – *Candidate*

The Pacific fisher was petitioned for listing as endangered or threatened under the Endangered Species Act on three occasions. In 2004 and 2006, the USFWS determined that listing fishers as

threatened was warranted, but was precluded by higher priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). In their 2006 update on the status of the Pacific fisher, the USFWS defined the reasons for listing as: "Major threats that fragment or remove key elements of fisher habitat include various forest vegetation management practices such as timber harvest and fuels reduction treatments. Other potential major threats include: stand- replacing fire, Sudden Oak Death, *Phytophthora lateralis*, urban and rural development, recreation development, and highways" (Federal Register Vol. 71, No. 176, Sept. 12, 2006, 53777). The USFWS also states that the three remaining fisher populations "appear to be stable or not rapidly declining based on recent survey and monitoring efforts." (Id.) The species remains a USFWS candidate species (USDI, USFWS 2004, 2006). On March 19, 2013, the USFWS announced a Status Review of the West Coast Distinct Population Segment of the Fisher and Endangered or Threatened (Federal Register / Vol. 78, No. 53 / Tuesday, March 19, 2013, 16828-16829).

Fishers are closely associated with low to mid elevation (generally <4,000 feet) forests with a coniferous component, large snags, or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2003). Powell and Zielinski (1994) and Zielinski et al. (2004) suggest that habitat suitable for denning and resting sites may be more limiting for fishers than foraging habitat. Suitable fisher denning and resting sites include the following key habitat requirements: high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor. Several studies have shown that fishers use riparian areas (Jones 1991; Aubry and Houston 1992; Seglund 1995; Dark 1997; Zielinski *et al.* 1997). According to Seglund (1995), riparian areas are important to fishers because they provide important habitat elements, such as broken tops, snags, and coarse woody debris (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792).

Suitable fisher denning and resting habitat exists on BLM lands within the Medford District. Suitable spotted owl NRF habitat described above can also adequately describes suitable fisher denning and resting sites as they have similar key habitat requirements (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Based on the current Medford District spotted owl NRF baseline analysis, approximately 44% of the Medford District could be considered suitable fisher denning and resting habitat. However, all of these acres may not provide optimal fisher habitat because past harvest practices and land ownership patterns have fragmented this habitat within the project. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994). Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted in all resource areas in the Medford District. Fishers have been detected in 15 of the 44 fifth field watersheds within the Medford District.

Oregon Spotted Frog – *Proposed*

The Oregon spotted frog is the most aquatic native frog in the Pacific Northwest. It is almost always found in or near a perennial body of water that includes zones of shallow water and abundant emergent or floating aquatic plants, which the frogs use for basking and escape cover (Leonard et al. 1993, Corkran and Thoms 1996, McAllister and Leonard 1997, Pearl 1997, Pearl 1999). Oregon spotted frogs seem to prefer fairly large, warm marshes (approximate minimum size of 4 hectares (9 acres)) that can support a large enough population to persist despite high predation rates (Hayes 1994) and sporadic reproductive failures. There is one known Oregon spotted frog location on the Medford District, within the Cascade Siskiyou National Monument.

Bureau Sensitive

The most recent update to the Bureau Special Status Species list was on December 21, 2011. The list is divided into Sensitive and Strategic species (USDI, BLM 2011). Riparian areas throughout the Medford District along streams, rivers and wetlands provide habitat for a variety of BLM sensitive birds, reptiles, amphibians and mammals. Bureau Sensitive species known to inhabit or use riparian areas include: bald eagle, foothill yellow- legged frog, Northwestern pond turtle, Siskiyou Mountain salamander, Oregon spotted frog, terrestrial snails, and a variety of bat species. Large green trees, snags, coarse woody debris, and talus are often associated in riparian areas and provide key habitat features for these Bureau Sensitive species. Riparian habitats also provide a key role in maintaining linkages or wildlife movement corridors between low and high elevation habitats. Appendix A displays Bureau Special Status species and their specific habitat requirements.

Bald Eagles

Bald eagles are usually associated with large bodies of water and primarily nest in forested areas near rivers, lakes and reservoirs. Nest trees are usually large and prominent, with an average diameter of 42 inches DBH for Douglas-fir and 43 inches DBH for ponderosa pine. These large old trees have large limbs and open structure required for eagle access and nest support, and provide a view of the surrounding territory. Suitable nesting habitat is present within the project area. There are approximately 19 known bald eagle sites within the Medford District.

Bats

Bats use live tree and snag cavities, as well as rock crevices, mines, caves, stumps, loose bark, bridges, buildings, and other protected sites for roosting (Verts and Carraway 1998). Bats are known to forage within vegetated riparian corridors and open water sources. Aquatic habitat can provide two key resources for bats: drinking water and insect prey (pers. Comm. J. Hayes, 2003). Townsend's big-eared bats (*Corynorhinus townsendii*) are an Oregon State listed and BLM Sensitive species (USDI 2011) and hibernate in caves and mines during winter. The fringed myotis (*Myotis thysanodes*) and pallid bat (*Antrozous pallidus*), also Bureau Sensitive bat species that occur on the Medford District, are associated with late-successional habitat. Three additional bat species (the silver-haired bat, long-eared myotis, and long-legged myotis) are listed in the NWFP as protection buffer species (USDA/USDI 1994) and are also associated with older stands. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure, and less clutter.

Foothill Yellow-Legged Frog

Foothill yellow-legged frogs are associated with permanent streams with rocky, gravelly bottoms. They occur in streams at elevations from sea level to approximately 6,000 feet. Habitat requirements are closely linked to seasonal variation in stream habitats and can be divided into three main categories: breeding and rearing habitat, non-breeding habitat, and overwintering habitat. Breeding and rearing habitat is generally located in gently flowing, low-gradient stream sections, with variable substrate, predominated by cobbles and boulders (Kupferberg 1996, Van Wagner 1996, Yarnell 2005). Foothill yellow-legged frogs use terrestrial riparian and riverine habitat adjacent to the wetted channel during the non-breeding season (Bourque 2008, Kupferberg 1996, Lind et al. 1996, Moyle 1973, Van Wagner 1996, Zweifel 1955). Very little data are available relating to overwintering habitat; however, Van Wagner (1996) observed frogs in both the water and along the stream-edge habitat beneath rocks and leaf litter.

Northwestern Pond Turtle
Northwestern pond turtles inhabit the slow or slack water areas of rivers, ponds, and lakes on the Medford District. The northwestern pond turtle requires both aquatic and terrestrial habitats. The species moves onto land for nesting, overwintering, dispersal, and basking. Overwinter sites typically include terrestrial refugia, burial in the substrate of aquatic habitats, or in undercut banks along streams. Nesting typically occurs within 200 meters of aquatic habitat in areas with compact soil, sparse vegetation, and good solar exposure.

Salamanders and Mollusks
There are several Bureau Sensitive salamanders and mollusk species (See Appendix A) that use habitat features associated with riparian areas. Generally habitat includes forested areas, moist talus streamside areas, down logs, and talus slopes.

Survey and Manage
Riparian areas throughout the Medford District along streams, rivers and wetlands provide habitat for a variety of BLM Survey and Manage species, such as terrestrial snails, red tree voles, and great gray owls. Large green trees, snags, coarse woody debris, and talus are often associated in riparian areas and provide key habitat features for these Survey and Manage species.

Land Birds (Neotropical Migrants and Year-Round residents)
A number of bird species utilize riparian habitat through the year or seasonally. Many of these species are generalists that also occur as breeders in other habitat types. However, others are obligate or near obligate to riparian habitat. Most species are primarily insectivores that take advantage of the high insect productivity that occurs in riparian habitats. Other riparian associated bird species are tied to unique features such as nesting cavities provided by snags, nectar of flowering plants in the understory, fruit from berry producing plants in the understory and sub-canopy, or a dense, diverse shrub layer. Riparian areas also provide movement corridors for some species. Many species of birds follow drainages during migration (Altman 2000).

All neotropical migrants go to Mexico, Central and South America each year. They are addressed here due to widespread concern regarding downward population trends, and habitat declines. The USFWS in the Migratory Bird Program Strategic Plan 2004-2014 (USDI, USFWS 2008) includes a list of "Western BLM Bird Species of Conservation Concern" (Migratory Birds of Concern) and "Game Birds below Desired Condition" and are suggested birds to include in NEPA analysis. Medford BLM biologists conferred with local bird groups and knowledgeable individuals to identify which birds on the list in our region (Bird Conservation Region 5, USFWS Region 1) are present within Medford BLM lands. Fifteen of the birds on these lists are known to occur on the Medford District BLM:

- Band-tailed pigeon - Game Birds below Desired Conditions (GBBDC)
- Flammulated owl – Birds of Conservation Concern (BCC)
- Grasshopper sparrow - BCC
- Lewis' woodpecker - BCC
- Mallard - GBBDC
- Mourning dove - GBBDC
- Olive-sided flycatcher - BCC
- Peregrine falcon - BCC

- Prairie falcon - BCC
- Purple Finch - BCC
- Red-naped sapsucker - BCC
- Rufous hummingbird - BCC
- White-headed woodpecker – BCC
- Williamson's sapsucker - BCC
- Wood Duck – GBBDC

3.2 Environmental Consequences

3.2.1 Soil, Water and Fish

Alternative 1– No Action
Current and future restorative actions underway on private and federal land are increasing in-stream structure and reducing surface erosion from roads. In some riparian areas on private lands, through watershed council efforts, replacing blackberries with conifers and hardwoods is expected to increase over the next several decades. Further, fish access continues to improve as state and federal agencies replace fish passage barriers and Oregon Department of Fish and Wildlife work with land owners to install and maintain fish screens at diversion ditches.

On federal land, a long term improvement in water quality and aquatic habitat is expected as a result of implementation of riparian management areas and Best Management Practices (BMPs). Active and passive riparian restoration on federal lands will create an upward trend in stream shade and large wood recruitment potential as riparian stands mature. While an improving trend is expected, the time for riparian vegetation to mature and input wood into streams may require 40-100 years.

Currently, each action requires individual EAs. Under the No Action Alternative, individual EAs would continue to be required for each project, delaying or preventing project implementation, and adding additional costs. Thus, the number and extent of enhancement activities would be reduced compared to the Proposed Action. Partnerships are particularly important for watershed improvements on the Medford District due to the checkerboard ownership pattern. Therefore under the No Action Alternative, there would be reduced opportunities to enhance production and survival of aquatic species.

Alternative 2 -Proposed Action
It is anticipated that through increased planning efficiencies under this project, partnerships and funding opportunities would also increase.

Alternative 2 proposes three categories of projects: Riparian vegetation treatments, in-stream enhancement, and road improvements to protect or improve water quality and aquatic habitat conditions. This section identifies the physical effects to soil, streambanks, water quality, and stream channels from implementation. Following the description of effects to the environment or habitat, effects to aquatic species are identified.

A Species Effects analysis considers how the actions proposed would affect fisheries and aquatic resources, assessing the potential magnitude, duration, and nature of the effects. The actions are evaluated on how they would change fish habitat, and for this reason, the fisheries analysis is linked

closely to the soil and water effects analysis. The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival. The majority of the analysis focuses on salmonids. However, because salmonid production and survival is based on habitat condition, other fish species would be affected similarly.

Riparian Projects

1. Soils and Water Effects

Riparian Vegetation Thinning: Alternative 2 proposes to implement non-commercial thinning to enhance plant species composition and structure. Thinning dense conifer or alder stands would promote the development of large trees through reduced competition. This activity would be implemented to reduce small tree density for fuels hazard reduction and to facilitate growth of large diameter conifers.

A no-thinning buffer would be applied on perennial and intermittent channels in accordance with established WQRPs and thinning in the riparian areas outside the buffer would not reduce canopy closure to a point where peak flows would be enhanced. Project Design Features also include no new road construction; only existing roads and skid trails would be used.

Short-term effects may include minor reductions in riparian canopy cover that would be expected to rebound to post-treatment levels within 10 years. However, the no-thinning stream buffers would maintain primary shade to the creek.

Due to maintenance of primary stream shade and light thinning of the understory, riparian thinning would not affect stream temperatures (*Northwest Forest Plan TMDL Implementation Strategy, 2012).* In the long term, increased stream shade and large wood debris recruitment potential would result in increased stand health and vigor, and development of large tree structure.

In stands dominated by a single species, diversity is expected to increase as increased light and growing space would facilitate hardwood and shade intolerant species development. The gaps between the crowns would allow indirect sunlight to penetrate the thinned stand similar to natural disturbances, leading to opportunities for hardwoods and shade intolerant species to establish.

Single tree selection for in-stream large wood would remove canopy cover at localized sites. Trees would only be removed in fully stocked stands and would not change the stand's canopy cover. Further, NOAA-Fisheries Project Design Critera require the retention of full canopy between trees selected for removal, thereby, preventing gaps in the canopy cover. The individual tree crowns removed may provide shade to the creek for a portion of the day. However, this level of canopy cover removal, isolated to single trees in fully stocked stands, would maintain stream temperatures and protect water quality.

To avoid potential detrimental compaction and erosion, riparian thinning would use existing roads and skid trails; no new roads would be constructed. Rather, vegetation would be lined to an existing skid trial or road. To prevent a build-up of ground fuels, thinning may include whole tree falling and yarding. Soil disturbance would be expected in areas where trees are lined to the road. However, compaction would seldom occur due to dry season operation and no heavy equipment off of existing roads.

Disturbed soils would rarely move off site as soil infiltration would be retained and areas of disturbance would be isolated and surrounded by undisturbed soil and vegetation. Riparian thinning activity would not create a soil or water-routing mechanism to the channel network. Further, on most sites woody and plant material would either remain or be placed in the lined corridor. Therefore, neither soil productivity nor water quality would be affected by riparian thinning activities.

***Riparian Vegetation Treatment (controlled burning and small diameter thinning)*:**
Controlled burning would be planned and implemented to result in low intensity burns as defined in the National Fire Plan (2002).

The primary beneficial effect of reducing fuel loads in riparian areas is the reduced risk of high intensity wildfire. Riparian areas frequently differ from adjacent uplands in vegetative composition and structure, microclimate and fuel characteristics (Dwire and Kauffman 2003).

Although fire can have a wide range of effects on aquatic ecosystems ranging from minor to severe (Reiman et al. 2003), prescribed burns would occur in the spring and fall when fuel moisture and relative humidity are high. Under these conditions, burns in riparian areas tend to occur in a mosaic pattern, leaving considerable unburned area and resulting in low tree mortality. Effects from low to moderate intensity prescribed fire in riparian areas would maintain stream shade and large wood recruitment. Due to inherent mortality from burning, large woody debris levels may increase in some cases.

In a recent study on controlled burns conducted in the Sierra Nevada Mountains of California, Bêche *et al.* (2005) concluded that low to moderate intensity prescribed fire actively ignited in the riparian area had minimal effects on a small stream and its riparian zone during the first year post-fire. The controlled burn left a mosaic pattern of intensity and fuel consumption with the highest burn severity in areas of large debris accumulations. There was no measurable decrease in riparian canopy cover, no increase in fine sediment, and little to no macro-invertebrate response. Similarly in southwest Oregon inputs of fine sediment to streams are unlikely due to the surrounding vegetation, stream buffers and maintenance of soil porosity and infiltration.

Small diameter thinning would be implemented to assist with fuels reduction activities. It may also be implemented to improve stand structure and diversity. Material generated by small diameter thinning activities would be piled and burned.

Pile burning, in the Proposed Action for treatment of activity fuels and fuel treatments, would leave bare soil areas on less than 10% of the treated area. Bare soil conditions would be discontinuous, with the surrounding unburned ground preventing concentrated runoff. This disturbance would be localized and thus, have no effect on off-site conditions. Therefore, very low, immeasurable rates of erosion would occur as a result of this treatment. It is expected that one year after treatment grasses, forbes, understory plants, and forest litter would return, preventing any off-site erosion.

Riparian Vegetation Planting:
This proposal is to plant naturally occurring riparian vegetation, which may occur as a stand-alone action or as an action to stabilize disturbed areas.

Riparian planting is utilized to increase shade, hiding cover, future potential woody debris, streambank stability, and species diversity. Planting riparian vegetation decreases areas of bare soil and provides a sediment filtering buffer. As plantings and riparian vegetation matures, width-to-

depth ratios of disturbed channels and fine sediment delivery would decrease. In the case of conifers, which need at least 80 years to mature, the results of planting would not be evident for several decades.

Site preparation and planting is not expected to result in stream sedimentation or erosion. Riparian fencing may require vegetation removal along the fence line. No overstory trees would be removed and no roads would be created. Therefore, fencing would not affect water quality, channel substrate or bank conditions. In areas previously disturbed, fencing would exclude the disturbance (dispersed camping, OHVs, livestock), resulting in an increase in diversity and abundance of riparian vegetation and a decrease in sediment.

2. Effects to Species and Habitat

Increased riparian vegetation structural and habitat heterogeneity would increase future potential large wood. Increased large wood would increase shade, hiding cover, pool and gravel bar formation, and stabilized banks, thus improving habitat for fish. Associated with an improvement of aquatic habitat, survival of yearling and other juveniles is expected to increase by providing appropriate substrate for fry and cover from predators and high flows. Beneficial effects also include enhanced vigor through improved conditions for forage species and improved reproductive success for adult salmonids because of increased pools, spawning substrate, cover and holding areas. Retention of stream shade would not increase stream temperatures protecting water quality.

Effects from low to moderate intensity prescribed burns would be much less severe than the effects of intense wildfires, and expected benefits would result in improved riparian vegetation and eventually, stream habitat. Individual fish behavior would not be affected directly by the patchy low-intensity fires caused by controlled burning. The low-intensity of the fire would minimize any changes in abundance of macro-invertebrates and would not cause a measurable change in survival.

Stream Enhancement Projects

1. Soils and Hydrology Effects

Effects common to all Stream Enhancement Projects

In-stream enhancement activities would require the use of heavy equipment, including but not limited to, excavators, dumps trucks, and bulldozers within stream channels and riparian areas. Due to in-stream and near stream equipment operation, stream enhancement projects may have short-term adverse effects including disturbance to riparian vegetation, exposure of bare soil, stream turbidity, fine sediment input, channel bed disturbance and increased risk of chemical contamination from fuel and lubricants. These effects can be minimized or eliminated through successful application of PDFs and BMPs as described below.

Chemical spills: When heavy equipment is operating in or near the stream, there is always the potential for fuel or other contaminant spills. PDFs (outlined in the NOAA-Fisheries Biological Opinion and BMPs) would include measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). Namely, hydraulic fluid and fuel lines on heavy equipment would be in proper working condition in order to minimize potential for leakage into streams. Some contractors use biodegradable, water-soluble oils that minimize effects if a spill occurs. Further, no refueling of heavy equipment would occur within 150 feet of streams. Equipment would be properly maintained

and cleaned of excessive fluid accumulation prior to operations; therefore, chemical spill risk is reduced to the lowest degree possible.

Soil and erosion: Access to construction sites may require removal of riparian vegetation and the creation of temporary access routes. In addition, access to stream channels may disturb bank vegetation and topsoil. The combination of disturbed soil and proximity to streams increases the potential for sediment delivery to streams.

Bank disturbance such as creating anchor points for in-stream structures, removal of diversion dams and legacy habitat structures, and channel access could release sediment directly into the channel environment. In-channel equipment operation would disturb the channel bed, releasing fine sediments. Release of fine sediments from riparian areas, streambanks, and channel substrate into streams would cause elevated turbidity and increased fine sediment.

However, these impacts can be minimized by the application of site specific PDFs and BMPs. Removal of riparian vegetation would be minimized, limited to the work area, and ground cover would be replaced by the application of native mulch, weed free straw, or erosion blankets. Additionally, straw wattles or other perimeter control BMPs would be applied as necessary. It is expected that where disturbance occurs, vegetation would reestablish within two years. Similarly, bank disturbances would be limited to the site of equipment activity; bank conditions up and downstream of the activity would remain stable.

Plantings, mulch or organic debris, and other sediment trapping material (e.g. straw bales) would be placed on ingress and egress access routes, staging areas, and other disturbed areas prior to the onset of winter rains, thus preventing/minimizing sediment input. Furthermore, actions would occur during low flow or dry conditions when the probability of soil detachment and transport are low. Given the limited area and duration of disturbance, seasonal restrictions, and application of other PDFs and BMPs, in-stream turbidity and sediment delivery would be minimized.

Sediment depositions and turbidity would be short term. Project duration, in almost all cases would be less than 2 weeks. Inputs of fine sediment would typically be limited to the time of activity and would not be expected to be measureable beyond a few hundred feet downstream from a project site (Jonas Parker personal observation 2009-2013). It is expected that any introduced fine sediment would be transported, sorted and/or deposited in the first high flow of the season and would become a small, immeasurable percentage of the stream's sediment load. Project-generated sediment would not affect downstream gravels or pool volume. Similarly, any increases in turbidity would cease upon completion of instream equipment operation. Expected long-term benefits of improved channel complexity, aquatic connectivity, and bank stabilization to aquatic habitat and species would far outweigh potential short-term adverse effects.

Large Wood and Boulder Installation: Large wood and boulder complexes would be designed to reduce and deflect flow velocity. These actions would occur in areas such as instream reaches that are deficient in large wood and boulders. Large wood and boulders can be the dominate mechanism responsible for velocity breaks and pool formation. As flows diverge, velocity decreases, leading to deposition and sorting of stream sediment. Flow convergence focuses flow velocity, creating scour and pool formation. Large wood and boulders placement in moderate gradient reaches would improve and promote course sediment deposition, decrease flow velocities, and increase low-flow pool volume. Boulders and large wood provide channel structure and valuable habitat for macroinvertebrates and fish. Coarse sediment is important for providing spawning substrate.

Flow in a meandering stream follows a highly sinuous line and has lower gradients, hence less stream power, which reduces the sediment transport capacity. Complexity in meandering streams is enhanced by the amount of obstructions within the channel. In general, large woody debris tends to increase the sediment storage capacity of a reach. Large wood also sorts sediment sizes through velocity breaks; stabilizes gravel bars; induces local bed and bank scour, and increases pool formation and channel complexity favorable to aquatic species.

Head-cut Stabilization: Headcuts are abrupt changes in bed surface elevation at the head of channel networks where intense, localized erosion takes place (Brush and Wolman, 1960; Gardner, 1983). The migration of headcuts is commonly associated with a substantial change to the stream's dynamic equilibrium, usually resulting from increases in sediment yield or a sudden break and change of elevation in the stream network. It can take decades for channels to re-establish their dynamic equilibrium (i.e., a balance of flow, gradient, substrate, and erosion rates). Stabilization of headcuts greatly reduces erosion potential and meadow degradation, and slows channel incision compared to untreated or existing conditions.

Headcut stabilization may require excavation within active stream channels. It is expected that localized sediment levels would increase during excavation and the first high flow. However, sediment transport would be minimized as instream work would be completed during low flow conditions. There would be short-term increases in sediment, but sediment yield would be much lower over the long term (>2yrs) as the headcuts stabilize.

Bank stabilization: While streambank erosion is a natural process, landscape changes can decrease bank stability and accelerate rates of bank slumping and erosion. This action uses boulders, large wood, and plant materials (e.g., dormant cuttings of willows and other plants that root easily) in a structural way to reinforce and stabilize eroding streambanks. Streambank vegetation increases the sheer stress of a stream by increasing the surface area of the substrate it flows over. Increased sheer stress would result in reduced stream velocity which in turn can lead to sediment deposition and/or the creation of refugia by biota.

Long-term beneficial effects of stabilizing eroding streambanks include reductions in fine sediment inputs and subsequent stream turbidity. Placement of wood and vegetation would also increase aquatic habitat complexity, providing cover and velocity refugia during high flow events.

Restore Floodplain/Side Channel Connection: Reconnecting floodplains and side channels includes removing accumulated sediment or other obstructions that restrict flow access, and using boulders and large wood for flow deflection. Boulders and large wood would also be placed in the side channel to increase complexity and habitat structure while preventing erosion beyond the natural sediment regime.

In unconfined river reaches, side channel habitat and connectivity is dynamic, changing with river migration and sediment transport and deposition, and seasonal variations in flow. Floodplains and side channels reduce the flow energy within the active channel by functioning as an energy dissipater for the stream during high flow periods. Furthermore, during a flood, when streams exceed bankfull width and overflow onto the floodplains, stream energy and flow velocities are reduced, allowing sediment to deposit. This channel-floodplain interaction develops the conditions for a healthy riparian-floodplain plant community, builds banks, shapes channel geometry, and encourages nutrient cycling.

Functioning side channels have inlet and outlet connections to the main channel and often flow during flood events. Functioning alcoves provide back-water channels that typically contain water during both low and high flows. This provides important rearing habitat and refugia for fish and other aquatic species.

Removing obstructions to side channels would directly increase connectivity, thus increasing flow frequency through the channel. Wood and boulder deflection in the mainstem, similarly, may increase flow frequency in side channels. These channel obstructions create a backwater effect, deflecting a greater percentage of flow toward the side channel.

In the both the long and short term, reestablishment of side channel and floodplain connectivity would decrease mainstem flow velocities, reducing bank erosion potential. Increased storage of fine sediment on the floodplain reduces in-channel fine sediment and provides a nutrient-rich substrate for vegetation establishment. Further, reconnection of side channel and alcove habitat increases refugia for juvenile fish during high flows.

Irrigation Diversion and Legacy Structure Removal: This action includes the removal of diversion structures that are less than six feet high, or that impound less than 15 acre-feet of water. Additionally, existing in-stream habitat structures that were constructed to improve fish habitat but were installed in a manner that was, and continues to be, inappropriate for the given stream type would be removed. These legacy structures and diversion structures can increase width: depth ratios due to aggradations. In some cases, the jump height over the structures interferes with aquatic species migration.

In addition to the effects identified above, sediment retained behind irrigation diversion dams and legacy structures would release downstream. This could be minimized by the application of site specific PDFs and BMPs such as partial or complete removal of stored material prior to removal. Any released sediment represents redistribution of existing in-channel sediment. The sediment, rather than being stored behind the structure, would be transported to downstream reaches. The stored material would likely contain elevated levels of fine sediment which would also increase turbidity. However, sediment has also been shown to provide needed substrate and nutrients for development of healthy floodplain vegetation communities.

Given the isolated source (immediately behind the dam), release of sediment would occur within one to two years following removal, depending on the magnitude and frequency of high flows. Flows, at or greater than the 2-year return interval, may transport all material downstream within hours. With lower peak flows, mobilization and transport may take an additional high water event or more than two years. Similar to the time required to mobilize the stored sediment, the distribution and resident time of the sediment in downstream habitat units would likely be short term (1 to 2 years) depending on flow magnitude, channel structure and stream gradient.

Regardless of the transport rate, the released sediment represents a small percentage of the suspended annual sediment regime or bedload of the channel network. Therefore, following the initial release and transport, long term effects to downstream channel conditions are not expected. The release of any material would be a one-time source and any adverse effects would likely be offset by the anticipated long term benefits, including permanent removal of the mechanisms responsible for adverse channel conditions, restricted access, and degraded habitat conditions.

2. Species and Habitat Effects

In and near-stream enhancement activities
Beneficial effects result from the addition of habitat features such as large wood and boulders by increasing hiding cover, aiding in the formation of pools, and retain spawning substrates. Increased retention of spawning gravel would increase the total amount of spawning habitat available to adult salmonids. Pools, large wood, and boulders also provide eddies and areas of slower water velocity, which in turn provides improved feeding efficiency. Bank stabilization using methods such as placement of large woody debris and riparian plantings would increase aquatic habitat through overhead cover for fish and reduce sediment inputs.

Immediate beneficial effects of floodplain connectivity include periodic delivery of water, nutrients, sediment to floodplains, flood attenuation, and reduced stream energy. Ultimately, floodplain reconnection would result in more functional fish habitat. Streams with overhead cover and undercut banks provide protection for juvenile fish. Low width-to-depth ratios provide cool and deep refugia for migrating juveniles. Healthy riparian plant communities provide primary and secondary productivity that drive the food base that juvenile salmonids consume when rearing and migrating to the ocean. Reconnection of side channels would provide important refuge habitat and improve spatial structure.

Seasonal restrictions imposed by in-stream work windows would prevent heavy equipment effects to salmonids and critical habitat such as smothering or crushing eggs. The in-stream restrictions would also reduce potential increases in turbidity or disruption in over-wintering behavior.

In-stream construction activities may increase fine sediment up to a few hundred feet below construction sites, but is expected to be short term (during project work and the first high flow). Minor reductions in macro-invertebrate forage may occur but would not have observable detrimental effects on salmonid survival and production.

In-stream structure removal
Removal of poorly constructed legacy structures and small diversion dams would directly benefit aquatic species by removing migration barriers, thus increasing available habitat. Localized habitat is also expected to increase by re-establishing favorable channel geometry. In the long term, spawning habitat and fish distribution would increase. Increasing access to all habitat types is likely to increase fish populations.

In the short term, sediment released behind diversion dams and legacy structures could increase fine sediment in downstream gravels, depending on the duration and flow magnitude the first year following activity. High flows are likely to mobilize the stored sediment and become a very small percentage of the streams sediment load. In this scenario, given the small volume compared to the channel's total sediment load, it is unlikely that downstream deposition would be noticeable. In years with below average runoff, sedimentation may be observable for one year following activity. It is not anticipated that these effects would extend beyond one year. In either case, given the short duration and limited extent, when compared with increased access to upstream habitat, short term spawning and rearing success would be similar or greater than existing conditions.

Chemical Contamination
Operation of heavy equipment requires the use of fuel and lubricants, which if spilled into the channel or the adjacent riparian zone can injure or kill aquatic organisms. Petroleum-based

contaminants (such as fuel, oil, and some hydraulic fluids) contain toxins, which can be toxic to aquatic organisms. Development and implementation of the required pollution and erosion control plan would reduce contaminants from entering stream channels and limit any potential adverse effects of a toxic material spill.

Road and Culvert Projects

1. Soils and Hydrology

Roads identified as unnecessary and/or roads causing or having the potential to cause adverse impacts to streams or watershed function would be identified for drainage improvement or decommissioning. Stream crossing replacements would focus on culverts that are at risk of failure, are not properly designed for the stream, or are a passage barrier to aquatic organisms.

Roads and associated ditch systems increase watershed drainage networks, intercept overland flow, and alter timing of peak flows (Wemple et al. 1996). During precipitation events, fine sediment from roads can be delivered to streams. Roads constructed in close proximity to streams constrain the stream channel and may eliminate the stream's access to its floodplain in addition to acting as a potential source of fine sediment. Deteriorating or undersized culverts reduce water conveyance, leading to potential road fill failure or stream diversion. In these cases, large volumes of sediment can be introduced into the stream network.

Road decommissioning and road upgrades may result in short-term, construction-related increases in sediment. In particular, road decommissioning, including culvert removal, and culvert replacement pose a risk of introducing sediment into streams. Sediment can be minimized or eliminated through the application of PDFs and BMPs. Bare soil conditions would be mulched and/or planted. As appropriate, silt fences, straw bales, straw wattles, or other sediment containment structures would be installed. Ground cover and perimeter containment BMPs prevent and capture soil erosion thereby greatly reducing or eliminating sedimentation. For in-channel construction such as culvert replacement or removal, the site would be isolated and dewatered with coffer dams and pumping equipment. These practices effectively prevent turbidity and sediment transport as flowing water is routed around the site and downstream structures (e.g. straw bales) capture any mobilized sediment.

The goal is to achieve zero discharge of sediment; however, not all sediment in all cases would be prevented from entering a stream channel. Any sediment input would likely be minimal, immeasurable, and generally be limited to the first storms or runoff following the project. This effect would decline with time (<2 years) as the surface stabilizes and re-vegetation occurs. Similarly, there is also potential for short term increases in turbidity, limited to time of operation if occurring in a flowing stream or if not, the first rainstorms of the season. Following the first high flow of the year, sediment may be entrained in the water column, becoming a fraction of the channel's sediment load. In most cases, based on past actions, there would be no effects to channel conditions or water quality.

In the long term, road improvements reduce both chronic and episodic erosion and sedimentation. Drainage improvements such as outsloping the road surface and installing rolling dips reduce or eliminate chronic sources of road erosion and fine sediment delivery. Road closures, particularly during the wet season, prevent road rutting and subgrade piping known to deliver sediment to adjacent streams. Stream crossing upgrades can provide for aquatic passage and reduce the risk of

catastrophic failure and associated impacts on aquatic ecosystems. Decommissioning reduces both chronic sediment sources and eliminates or reduces the potential for episodic sedimentation. The proposed road activities would decrease watershed drainage density (miles of road/square mile), and eliminate channel obstructions.

The project also proposes road maintenance associated with road drainage upgrades. Associated with road maintenance is ditch clearing. Luce and Black (1999) found no significant increase in erosion when only the road tread was treated; however statistically significant increases in erosion occurred when road ditches were bladed. Sediment delivery to streams from road-ditch renovation would primarily occur at road-stream crossings in years one and two following activity. Luce and Black (2001) observed an 87% decrease in erosion and sediment transport in year one and two following road maintenance activities. While project-generated sediment would occur, road conditions would improve due to drainage improvements, leading to an overall immediate reduction in erosion and sedimentation.

2. Species and Habitat Effects

In the long term, the proposed road activities would decrease watershed drainage networks, eliminate stream-road crossings, reduce soil compaction, and substantially remove both chronic and episodic sources of sediment. These beneficial impacts to the landscape would reduce scour-related mortality of eggs and alevins, reduce involuntary downstream movement of juveniles during freshets, and increase substrate interstitial spaces used for refuge by fry. Also decreases in sediment/ turbidity have proven to be correlated with increased survival and growth of aquatic organisms.

Decommissioning roads in riparian areas would decrease delivery of fine sediment to streams. Eliminating sediment sources would help to increase the diversity and density of aquatic macro-invertebrates, maintain or increase the amount of interstitial cover available, reduce or eliminate suffocation of fry and entombment, and improve feeding abilities through increased light penetration.

Culvert replacements, which restrict passage, would increase population range extension; fish populations that are well distributed spatially are at a lower risk of detrimental effects from stochastic events. In addition to improved spatial structure, the additional available spawning and rearing habitat would result in increased population abundance and productivity.

Where necessary, fish relocation during culvert replacement in flowing streams may result in increased stress and possible mortality for a small number of fish. The stress of relocation would last only a few hours and would only occur once. Road work would have short-term increase in erosion and sediment deposits. Erosion and sediment would be minimized by project design and would be small in scale and short in duration. Therefore, there would not be any observable detrimental effects to survival.

Cumulative Effects

The NOAA-Fisheries and USFWS Biological Opinions include a limit to the number of projects that may occur within a 10^{th} field watershed (previous terminology referred 10^{th} field as 5^{th} field) to avoid potential cumulative effects generated by implementation of multiple projects. Specifically, a limit of ten Group/Type 1 activities is authorized in a 10^{th} field watershed per year. Type 1 activities include in-stream actions such as culvert replacement or removal, wood and boulder placement, irrigation dam removal, bank stabilization. This threshold was selected to ensure that

short-term adverse effects associated with beneficial actions would not collectively compromise watershed function or integrity. Neither NOAA-Fisheries nor USFWS limit the number of low impact activities such as road improvements, riparian thinning and fuel reduction, and riparian fencing. With these limitations and the beneficial nature of projects, the project team concurred with the opinions that no adverse cumulative effects are expected.

Likewise, interactions with other land management activities occurring on private and public land are not expected to generate cumulative adverse impacts. All actions are designed to maintain or restore aquatic conditions. While potential short term impacts are identified, all actions were determined to provide both short and long-term benefits to aquatic habitat and species.

However, there may be local situations where potential short term activity impacts, which cannot be avoided or mitigated by project design features, may add long-term effects to existing adverse conditions. These instances could include streams listed by DEQ for sediment or where road building and logging are expected to deliver levels of sediment sufficient to alter spawning and rearing habitat. In these instances where PDFs or mitigation is not sufficient to limit project effects to the short term, projects would not be implemented under this programmatic EA.

This assessment acknowledges that potential cumulative benefits may occur if associated with other federal or private enhancement activities such as migration barrier removal and increased channel complexity through wood and boulder placement. Cumulative benefits would greatly improve aquatic conditions and potential for increase species populations and distribution. These effects are consistent with the purpose and objectives of this EA.

3.2.2 Botany

Because the presence of rare plants and noxious weeds are not currently known for all project areas, the analysis of effects of the Proposed Action on these species is described in general terms of potential effects to species that occur in the riparian and aquatic habitats that would be treated.

Alternative 1 -No Action

A. Listed and Sensitive Species

The No Action Alternative would not include treatments to improve riparian habitat conditions for rare plant species associated with open habitats, edges, or forest gaps; therefore, encroaching vegetation and overtopping conifers would reduce available light and other resources for species that depend on more open canopies. In addition to increasing competition for resources, increases in vegetation density and biomass would also result in greater susceptibility of some rare plants to fire. In the absence of periodic low-intensity burns or treatments designed to simulate those effects, accumulated live and dead fuels could produce severe fires that greatly reduce the forest canopy and eliminate the duff layer. Some rare plant species associated with forest understories, such as clustered lady's slipper (*Cypripedium fasciculatum*), are tolerant of low-intensity fires. However, survivability of clustered lady's slipper is reduced when fires (1) alter light regimes and microclimate by removing too much forest canopy and understory vegetation and (2) burn through duff and organic soil layers, damaging underground plant rhizomes (Seevers et al. 2005, Thorpe et al. 2011).

Although the No Action Alternative would not improve habitat conditions for some rare plant species, no management actions would occur that could directly injure or kill rare plants within the

project area. This alternative would not adversely affect federally listed plant populations or increase the probability that sensitive plant species would need to be listed. Plant and fungi species associated with late successional forests would continue to persist.

B. Noxious Weeds

Under the No Action Alternative, the BLM would continue to survey, treat, and monitor noxious weeds and other priority non-native invasive plant infestations throughout the District. However, because Medford District conducts pre-disturbance weed surveys for projects, the absence of aquatic restoration projects diminishes the probability of detecting weed infestations and conducting subsequent weed treatments within riparian or aquatic sites. Furthermore, because no projects would occur to reduce the potential for failure and erosion of stream banks, road cut banks, and road fill slopes, these disturbed sites would be susceptible to weed invasion. On the other hand, no disturbances from restoration activities would occur that could introduce or spread weeds within riparian or aquatic sites.

Alternative 2 -Proposed Action

A. Listed and Sensitive Species

Because the habitat enhancement activities proposed in this EA were designed to improve riparian plant community health and resiliency, the treatments would also improve habitat conditions for most rare plants and their habitats. While the ultimate outcome would be beneficial to populations in the long term, some treatment methods create risks to specific plant species and populations and there may be short-term negative effects.

To avoid negative impacts, the project botanist would evaluate the proposed treatments for each project to determine what surveys are needed and what protection measures would be implemented for the species occurring in the treatment areas. Conducting pre-project surveys to determine what species are present in the treatment units and designing protection measures for each species and site would minimize direct or indirect impacts to rare plant populations. Each species has different habitat requirements and habitat conditions at each site are unique. Protection measures would be determined on a site-specific basis and would be based on known management recommendations, site conditions, and proposed treatment prescriptions. Methods to reduce potential effects of the treatments on rare plants may include full protection (installing variable-radius, no disturbance buffers), changing the timing of treatments (e.g., fall or winter burning versus spring burning), changing the intensity of disturbance (e.g., minimum canopy requirements for overstory or understory layers over a population), or duration of the treatment (e.g., only allowing a quick burn through a population).

Thinning small diameter trees from riparian sites would benefit rare plants that depend on more open canopy conditions, such as Gentner's fritillary, California globe mallow, red-rooted yampah, western sophora, and stipuled trefoil. Treatments in or around wet riparian openings or meadows could benefit rare sedges, Oregon willowherb, Waldo gentian, purple flowered rush lily, large flowered rush lily, slender meadowfoam, western bog violet, and Cook's lomatium. In the absence of fire, through-growth and other methods of Douglas-fir recruitment in some of the region's mixed evergreen forests and oak woodlands is associated with rapid habitat changes that reduce available light on the forest floor and affect other resource dynamics (Hunter and Barbour 2001). Removing some young trees would provide more light to the forest floor. Broadcast burning would also remove grass thatch and other heavy litter that has accumulated in the absence of regular fires, increasing the vigor of herbaceous plants. Long-term monitoring of Gentner's fritillary populations

on the district suggests that accumulation of forest-floor litter may impede plant growth and reduce their vigor and reproductive output (Carey 2013).

Project activities may also negatively impact rare plants unless protection measures are applied. Heavy equipment can displace soil, compact soil, and damage or kill plants. Small no-treatment buffers around populations would prevent damage to above- or below-ground plant parts from heavy equipment during stream enhancement, road, and culvert projects. Radiant heat from prescribed burning can penetrate upper soil horizons, causing damage to below-ground plant parts, particularly beneath or immediately adjacent to burn piles. Requiring slash piles to be located away from rare plant populations and broadcast burning when plants are dormant and not vulnerable to damage would reduce impacts to those populations.

Disturbances—including those caused by restoration activities—promote non-native invasive plants by altering resource availability (D'Antonio and Myerson 2002). Thinning, pile burning, and underburning, for example create open disturbed areas that are susceptible to weed invasion. Increases in weeds as a result of ground disturbance can increase competition for resources, potentially resulting in diminished rare plant population size or vigor. The implementation of PDFs, including washing equipment that travels off system roads, treating noxious weeds before some project activities, and seeding disturbed areas as needed with native species, would minimize the risk of weeds being introduced or persisting in the project area.

Some rare plants, such as clustered lady-slipper, require more closed canopy conditions with more shade and cooler, moister environmental conditions. Protection measures for these species would focus on preventing direct and indirect effects and retaining microclimate conditions. Establishing no-treatment buffers around populations would prevent damage to above or below ground plant parts from equipment during harvest or road or landing construction and from heat or flames during post-harvest underburning or slash pile burning. Buffers would maintain environmental conditions at the site and retain trees that have mycorrhizal associations with plants or fungi. Some plants and most fungi rely on mycorrhizal connections for food sources. Plant buffers would also provide untreated areas that provide heterogeneity to stand structure. Timing underburns when plants are dormant would also reduce direct impacts. Because the proposed vegetation treatments would be designed to protect legacy trees and improve their resiliency to disturbance, these actions would also provide long-term benefits for non-vascular plants and fungi associated with late-successional stand conditions.

B. Noxious Weeds

Project activities that disturb soil, stimulate weed seed banks, reduce forest canopy, reduce native plant cover, or otherwise alter environmental conditions are likely to promote the invasion or encourage the persistence of non-native plants, including noxious weeds. Thinning, pile burning, broadcast burning, and heavy equipment use for example create open disturbed areas that are susceptible to weed invasion.

Project activities that stabilize soil, reduce erosion, or improve the resiliency of riparian plant communities to severe fire would reduce the probability of weed invasion or long-term weed persistence within these sites. For example, stabilizing gullies and headcuts and planting these areas with native vegetation reduces the chance of more severe disturbance events, such as streambank failures that expose soil to weed invasion and promote weed invasion downstream.

The implementation of PDFs, including washing equipment that travels off system roads, treating noxious weeds before some project activities, and seeding disturbed areas as needed with native species, would minimize the risk of weeds being introduced or persisting in the project area. Proposed treatment areas would be surveyed for noxious weeds during the project planning stage. Populations detected during surveys would be targeted for treatment before aquatic restoration treatments are implemented. PDFs and other actions would be implemented to minimize the risk that the proposed treatments would result in an increase in noxious weeds in the project area.

Cumulative Effects

A. Listed and Sensitive Species

The BLM does not have data on the presence or abundance of rare plants in the district prior to botanical surveys conducted over the past 20 years. Rare plants have likely been impacted by past activities on both private and public lands. Activities that have altered conditions on the land and may have affected rare plant species and their habitat include road building, mining, timber harvest, livestock grazing, wildfire, fire suppression, rural development, diversion dams, and other changes to hydrological processes.

The BLM anticipates that present and foreseeable future actions in the District would include timber harvest, silvicultural treatments, fuels reduction, wildfire suppression, grazing, recreation, and other on-going activities. Many of these activities would occur on private lands, BLM-managed lands, and Forest Service lands. Added to past, present, and foreseeable future activities in the district, the aquatic restoration activities proposed in the action alternative would not add cumulative negative effects to rare plants or their habitats because the BLM would survey treatment areas before project implementation and would protect sites from direct and indirect effects through buffers or other PDFs. Riparian vegetation projects would improve outcomes for many rare plant species associated with riparian areas by making them more resilient to high-severity fires. The activities would not reduce the amount of late-successional forests in the district that provide habitat for some plant and fungi species associated with late-successional forests.

B. Noxious Weeds

Past activities on the District that have contributed to the introduction and spread of noxious weeds on both private and public lands include road building, vehicular traffic, timber harvest, livestock grazing, wildfire, fire suppression, agriculture, rural land development, mining, recreation, and other ground disturbing or vegetation removal activities. In addition, weeds have spread through natural processes such as transportation by wind, water, birds, and other animals.

The BLM expects that other present and reasonably foreseeable future activities in the district on BLM-managed and/or private lands will include timber harvest, road building, silvicultural treatments, fuels reduction, vehicular traffic, livestock grazing, wildfire, fire suppression, agriculture, rural land development, mining, recreation, and other ground disturbing or vegetation removal activities. In addition, weeds will continue to spread through natural processes such as transportation by wind, water, birds, or animals. Because weeds spread across ownership boundaries, actions that introduce or spread noxious weeds on private lands can potentially affect BLM-managed lands and vice-versa.

These human-caused activities and natural processes will continue to present risks of introducing new and spreading existing noxious weed populations on the district. Implementing PDFs would minimize the risk that aquatic restoration projects would increase noxious weeds and other non-

native invasive plants in the district. The Medford District also has an ongoing program of inventory and treatment of noxious weeds that are not restricted to specific projects. Added to past, present, and reasonably foreseeable future actions, implementing the proposed treatments in Alternative 2 would not contribute additional cumulative effects to noxious weeds in the District beyond existing and anticipated future conditions because of the use of PDFs, project-specific design, and on-going weed treatments.

3.2.3 Wildlife

The proposed actions only included projects identified and analyzed in the USFWS biological opinion (BO# 01EOFW00-2013-F-0090). The BO identifies project design criteria to ensure that covered actions will not adversely affect listed species and their habitat. Key project criteria to ensure minimal to no effects include:

1. Actions will not remove or reduce function of suitable T&E species habitat.
2. No removal of spotted owl, marbled murrelet, or bald eagle nest trees.
3. A biologist input on site specific projects, including nest surveys if suitable habitat is present.
4. Apply and modify as necessary disturbance and disruption distances for listed species as per Table 7 BO# 01EOFW00-2013-F-0090.

The following discussion describes the typical effects anticipated from project activities. As described in the Proposed Actions a site specific analysis would occur at each project site to determine if activities are consistent with the anticipated effects identified. Only federally listed, Bureau Sensitive, and Survey and Manage species known or suspected to be present within the project area and impacted by the Proposed Action are addressed in this EA. Impacts to wildlife from the Proposed Action are measured by changes to stand structure in different habitat types.

Threatened and Endangered

Northern Spotted Owl - *Threatened*

Alternative 1 -No Action
Under Alternative 1, management activities would not alter suitable habitat within the project area and habitat would continue to develop along current successional pathways. The development of large tree structure comparable to that of remnant trees used by spotted owls is not likely to occur in riparian areas proposed for thinning. This is because current stand conditions are too dense and trees are not developing the diameter to height ratio required to develop this structure. This ratio was historically created through frequent fire events that reduced stem densities and competition that created open grown conditions. Current stand conditions would likely develop into less complex stand structures and species compositions than that of old growth stands (Sensenig 2002). As a result, these dense riparian areas would be at greater risk for loss through stand replacing fires. Wildfire would remain the most immediate hazard to spotted owl habitat within riparian areas under the No Action Alternative.

Alternative 2 -Proposed Action
Proposed in-stream habitat actions and road improvements, such as large woody debris, boulder, and gravel placement, and culvert repairs would not affect suitable spotted owl habitat. Riparian thinning, single tree removal for in-stream log material and heavy equipment access through riparian areas for culvert replacement, dam removal, and habitat placement would remove some

riparian vegetation. However, light thinning or single tree removal, such as proposed for riparian areas would still maintain spotted owl NRF or dispersal habitat and would not remove or downgrade northern spotted owl habitat. Additionally, since no known nest trees or suitable nest trees would be removed, no direct effects to individuals are expected. Even though scattered hazard trees may be removed for in-stream restoration, residual trees, snags, and down wood retained in the stands would provide some cover for prey species over time and would help minimize impacts to some prey species, such as dusky-footed woodrats. Therefore, northern spotted owl (NSO) sites are not expected to be negatively affected from the Proposed Action.

Riparian thinning may benefit spotted owl dispersal by reducing fire hazard within riparian areas and improving late-seral conditions across the landscape. Further, riparian planting and thinning may add habitat complexity by increasing species diversity as well as promote/maintain late-seral trees. Even though riparian thinning may affect spotted owl habitat, the scope would be relatively small at the project level compared to the amount of suitable NRF and dispersal habitat existing across the landscape.

There is a potential that heavy equipment and chainsaw activity associated with the proposed activities could cause disturbance effects to spotted owls. However, since PDFs would be followed around known sites, the expected disturbance effects to nesting spotted owls are limited and would only be expected when projects are in or adjacent to unsurveyed suitable habitat. These activities may cause flushing of individuals, missed feeding attempts, or premature fledging.

The Proposed Action would not change the function of any of the designated critical habitat units within the Medford District. No Primary Constituent Elements would be removed as a result of the Proposed Action.

The Proposed Action was consulted at the programmatic level. The above general effects discussed above are described in more detail in the Biological assessment and Biological Opinions, which have more detailed effects information.

Cumulative Effects
Consistent with the USFWS findings these activities would not likely jeopardize the continued existence of the northern spotted owl. Since the Proposed Action would not remove suitable habitat, even when combined future foreseeable projects, the projects would not preclude spotted owls from dispersing through or nesting within the Medford District.

Marbled Murrelet - *Threatened*

Alternative 1 -No Action
Under Alternative 1, management activities would not remove or alter suitable habitat within the project area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions in riparian areas proposed for thinning would be the same as described above for the northern spotted owl. Particularly to marbled murrelets, the greatest risk of no action is the potential wildfire related loss of large live remnant conifers within riparian areas important for marbled murrelet nesting habitat.

Alternative 2 -Proposed Action
No project activities would modify or remove key habitat elements for marbled murrelet. Key habitat elements include large trees with multi-canopies and moderate canopy cover. Large trees

with platforms would be retained for nesting. Therefore, there would be no effects to habitat. Additionally, no direct impacts to marbled murrelets are expected because there is a low likelihood of murrelets occurring within the project area.

Similar to NSOs, noise and visual disturbance during the breeding season would adversely affect nesting birds. While effects to murrelets from noise, human intrusion and smoke from proposed activities are not well documented, observations have documented flushing of birds and missed feeding opportunities (USDI, USFWS 2007). However, these effects are not anticipated with the implementation of seasonal restrictions and disturbance distance buffers.

The Proposed Action was consulted at the programmatic level. The above general effects discussed above are described in more detail in the Biological Assessment and Biological Opinion (BiOp) have more detailed effects information. The Medford EA would not go beyond the proposed activities consulted on in the BiOp. However, if we exceed this amount, new consultation would occur prior to project implementation.

Cumulative Effects
Consistent with the USFWS findings these activities would not likely jeopardize the continued existence marbled murrelets within the Medford District. Since the Proposed Action would not remove suitable habitat, even when combined future foreseeable projects, the projects would not preclude marbled murrelets from nesting within the Medford District.

Fisher – *Candidate*

Alternative 1 -No Action
Under Alternative 1, management activities would not remove or alter suitable habitat within the project area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions in riparian areas proposed for thinning would be the same as described above for the northern spotted owl. Particularly to fishers, the greatest risk of no action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood within riparian areas important to fisher natal and denning habitat.

Alternative 2 –Proposed Action
Proposed activities, such as large woody debris, boulder, and gravel placement, and culvert repairs would not affect suitable fisher habitat. Riparian thinning, single tree removal for in-stream log material and heavy equipment access through riparian areas for culvert replacement, dam removal, and habitat placement would remove riparian vegetation. However, light thinning, such as proposed for riparian areas would not remove fisher habitat, since only trees $\leq$ 8 inches DBH would be treated. Untreated areas within the project area would continue to provide forage habitat while canopy cover in the treated stands increases. Additionally, all treatments would retain large snags and coarse woody debris (CWD) to provide future habitat for fishers, and reduce potential impacts.

Project activity disturbance effects to fishers are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987; Powell 1993). Disturbance from project activities would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Telemetry studies have determined that fishers are wide-ranging animals (Zielinski et al. 2004). Seasonal restrictions listed as Project Design Features for other resources would benefit fishers by restricting project activities until young are approximately six weeks old, approximately the age when fisher move young from natal dens

and become more mobile. Fishers have large home ranges and would be able to move away from the action area while the disturbance is occurring, without impacting their ability to forage and disperse within their home range.

Cumulative Effects
The Proposed Action would not contribute to the need to federally list the fisher as threatened or endangered because suitable habitat would not be removed. Even when combined future foreseeable projects, the Proposed Action would not preclude fishers from dispersing through or reproducing within the Medford District. Anticipated benefits to forest health from proposed treatments have the potential to contribute to the persistence and recovery of the fisher population.

Oregon Spotted Frog – *Proposed*
The proposed actions are not likely to impact the Oregon spotted frog because the actions are unlikely to be proposed at the one Oregon spotted frog site on the district. Potential treatments needed to improve riparian habitat at this location would be beyond the scope of this EA and addressed in site-specific NEPA.

Bureau Sensitive Species

Alternative 1 -No Action
Management activities would not remove or alter Bureau Sensitive Species habitat within the project area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Particularly to sensitive species, the greatest risk of no action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood within riparian areas, important habitat to a variety of species. Additional effects to bats would include reduced access to snags in dense stands due to cluttered flight paths in dense riparian areas, which causes echolocation interference (pers. comm. J. Hayes 2003).

Under Alternative 1, no disturbance to Bureau Sensitive Species would occur from equipment and associated noise.

Alternative 2 –Proposed Action
A small percentage of Bureau Sensitive Species habitat may be removed within the project area through riparian thinning, single tree removal for instream log material and heavy equipment access through riparian areas for culvert replacement, dam removal, and habitat placement. However, this loss would be negligible due to the large amounts of suitable habitat to be retained on adjacent land. The Proposed Action may disrupt some individuals of sensitive species due to disturbance. However, disturbance from project activities would be temporally and geographically limited and most species would be able to move away from the action area while the disturbance is occurring, without impacting their ability to forage and disperse within their home range. Heavy machinery access to proposed stream projects may directly affect individuals of sensitive species when the ingress/egress routes are routed through occupied habitat. However, the number of access points would be minimized and would affect only a small area of suitable habitat.

Bald Eagles
The Proposed Action is unlikely to result in removal of potential bald eagle nest trees, roost trees, or suitable habitat because much of the work would occur near or along roadways, away from typical nesting locations. Trees removed for single tree selection or thinning within riparian areas would

not be nest trees or lead to reduced function of habitat. Aquatic enhancement activities are expected to improve riparian habitat, potentially benefiting bald eagles, including increased fish runs and food supply. Additionally, many of the vegetation treatments would be designed to promote or maintain late-seral trees, which could, overtime, provide additional habitat.

There is a potential that heavy equipment and chainsaw activity associated with the proposed activities could cause disturbance effects to bald eagles. However, since PDFs would be followed around known sites, the expected disturbance effects to nesting bald eagles would be limited to projects adjacent to unknown sites or projects where PDFs could not be followed. Disturbance may cause flushing of individuals, missed feeding attempts, or premature fledging. As stated above, the Proposed Action was consulted at the programmatic level. The Medford EA would not go beyond the proposed activities consulted on in the BO. However, if we exceed this amount, new consultation would occur prior to project implementation.

Bats
Riparian thinning treatments may benefit bat species by reducing echolocation interference and cluttered flight paths, and improve access to snags (pers. comm. J. Hayes 2003).

Foothill Yellow-Legged Frog
Culvert installation, road decommissioning, and road renovation may have an adverse short term impact on foothill yellow-legged frog habitat. Foothill yellow-legged frogs are adversely affected by high water temperatures and excessive sedimentation. They require clean, silt free, gravelly substrate. However, sediment delivery to streams due to project activities would be highly localized, minimal, and of short duration. Additionally, PDFs that minimize sedimentation (e.g., filter fabric, seasonal restrictions) would minimize these impacts. Long term benefits from this project would include sediment reduction and improve stream connection, allowing for easier movement within the stream system.

Northwestern Pond Turtle
Most projects associated with the Proposed Action would not affect northwestern pond turtles. However, removal of small dams and legacy structures, stream bank restoration, and Off- and Side-Channel Habitat Restoration projects may have short term adverse effects to northwestern pond turtles. The removal of small dams may remove slack water utilized by turtles. The stream bank and channel restorations projects may affect adjacent nesting habitat. However, the potential impacts will be low because the majority of these actions would occur in small streams and not large bodies of water where turtles are more likely to be found.

Salamanders and Mollusks
Indirect effects, such as changes to habitat are not expected due to retention of canopy cover, which would prevent warming or drying of microsites. Further, Project Design Criteria include retention of down coarse wood debris and snags, although limited removal may occur for safety or where unavoidable.

Bureau Sensitive salamanders and mollusks may be harmed if located within heavy equipment ingress / egress routes to project sites. Similarly, individuals may be affected if, during thinning operations, logs are dragged over inhabited locations. However, these instances would be rare as project activities are very limited spatially, occurring in isolated patches across the landscape. Additionally, when feasible at the project level, steps would be taken to avoid key habitat features (talus, coarse woody debris, hardwood patches, etc.). Therefore, while there may be isolated

instances of direct effects to immobile species, such as salamanders and mollusks, the occurrence would be minimal across the Medford District and would not affect species population persistence.

Cumulative Effects
The Proposed Action is not expected to affect long term population viability of any species known to be in the area or lead to the need to list sensitive wildlife species as threatened and endangered. Actions would not change the function of habitats at the stand level. Most actions would avoid disturbance to species by establishing seasonal restrictions and disruption distance.

Cumulatively, continued replacement of culverts with updated fish and amphibian friendly designs would aid in widespread dispersal and improved conditions for amphibians and other riparian species. The project would not exacerbate the effects of actions on private and other non- federal lands. Riparian habitat is expected to continue to improve on federal lands (BLM and Forest Service) and likely remain in its current state on non-federal lands.

Survey and Manage Species

Alternative 1 -No Action
Management activities would not remove or alter Survey and Manage species habitat within the project area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Particularly to Survey and Manage species, the greatest risk of no action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood within riparian areas important habitat to a variety of species. Under Alternative 1, no disturbance to Survey and Manage species would occur from equipment and associated noise.

Alternative 2 –Proposed Action
A small percentage of Survey and Manage species habitat may be removed within the project area through riparian thinning, single tree removal for in-stream log material, and heavy equipment access through riparian areas for culvert replacement, dam removal, and habitat placement. However, this loss would be negligible due to the large amounts of suitable habitat to be retained on adjacent land. The proposed actions may disrupt some individuals of sensitive species due to disturbance. However, disturbance from project activities would be temporally and geographically limited and most species would be able to move away from the action area while the disturbance is occurring, without impacting their ability to forage and disperse within their home range. Heavy machinery access to proposed stream projects may directly affect species when the ingress / egress routes are routed through occupied habitat. However, the number of access points would be minimized and would affect only a small area of suitable habitat.

Cumulative Effects
The Proposed Action is not expected to affect long term population viability of any Survey and Manage species known to be in the area or lead to the need to these species as threatened and endangered. Actions would not change the function of habitats at the stand level. Riparian habitat is expected to continue to improve on federal lands (BLM and Forest Service) and likely remain in its current state on non-federal lands.

Land Birds (Neotropical Migrants and Year-Round residents)

Alternative 1 -No Action

Management activities would not remove or alter riparian habitat within the project area used by a number of bird species. Riparian habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Birds that favor dense conditions may benefit from the No Action Alternative because these dense riparian understories would continue to build within the project area.

Alternative 2 –Proposed Action

A small percentage of neotropical bird habitat may be removed within the project area through riparian thinning, single tree removal for instream log material and heavy equipment access through riparian areas for culvert replacement, dam removal, and habitat placement. However, this loss would be negligible due to the large amounts of suitable habitat to be retained on adjacent land and the loss of site specific habitat would be short-term until the disturbed area is re-vegetated (3 to 5 years). Additionally, existing large diameter snags and down wood found in older seral stands would be retained in the project area, and would continue to provide nesting, roosting, or foraging opportunities for species dependent on these key habitat structures. Green-tree retention may also help maintain connectivity of habitats for some species between treated and untreated stands (Bunnell et al. 1997).

Some individual birds may be displaced during project activities. However, untreated areas adjacent to the treatment areas would provide refuge and nesting habitat, minimizing short term loss of habitat. Activities occurring during active nesting periods could cause some nests to fail. However, seasonal restrictions / Project Design Features for other species would also protect most nests from disturbance during project activities. Thinning occurring during the critical nesting periods may cause some nests to fail. However, the failure of a nest during one nesting season would not be expected to reduce the persistence of any bird species in the Medford District because sufficient habitat of all types would be retained throughout the planning area to support the wide diversity of bird species in the area. Additionally, even though BLM does not know the precise number of individual birds on the district, the potential failure or loss of some nests would not be measurable at the regional scale because of the small scope of the project in relationship to the regional scale. Partners in Flight support the ecoregional scale, as appropriate, for analyzing bird populations (http://www.partnersinflight.org/description.cfm).

Cumulative Effects

The proposed actions are not expected to affect long term population viability of any bird species known to be in the area or lead to the need to these species as T&E. Actions would not change the function of habitats at the stand level. Riparian habitat is expected to continue to improve on federal lands (BLM and Forest Service) and likely remain in its current state on non-federal lands.

4.0 Public and Agencies Contacted

4.1 Public Involvement

The BLM extended an invitation to the local and regional communities and other state and federal agencies, private organizations and individuals to develop issues and resources important to local, state, national, and international economies.

Public scoping for the Medford District Aquatic Enhancement Environmental assessment was initiated in June 2008, when BLM mailed sent scoping letters to landowners and others who have asked to be kept informed about upcoming BLM projects. The letter described the intent and purpose for the project, treatment options and acres, the needs of the landscape and contact information to submit comments or questions. In addition, comment letters provided public input for BLM consideration.

Letters in response to scoping solicited the following general input that is relevant to, and incorporated into this project:

- Maintain integrity of riparian zones
- Maintain stream health (temperature, sediment regimes, water quality)
- Maximize road decommissioning within Riparian Reserves
- Coho salmon are a priority for stream enhancement activities
- Pacific lamprey are a priority for stream enhancement activities
- Disconnect roads from stream networks
- Encourage Partnerships
- Use an interdisciplinary approach to project development, particularly for vegetation treatments in Riparian Reserves
- Encourage fish passage improvements

4.2 Agencies Consulted

The following agencies were contacted during the planning process: USDA Forest Service, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife. In addition, BLM mailed letters to the Confederate tribes of Siletz and Grand Ronde as well as the Cow Creek Band of Umpqua Tribe of Indians. One comment was received from the Cow Creek Band of Umpqua Tribe of Indians requesting consideration of Pacific lamprey. Pacific lamprey are not addressed directly, but riparian enhancement projects that benefit other fish species are expected to provide similar effects to lamprey.

4.3 Availability of Document and Comment Procedures

Copies of the EA will be available for public review in the Medford Interagency Office, 3040 Biddle Rd, Medford OR 97504 and the Grants Pass Interagency Office at 2164 NE Spalding Ave., Grants Pass, OR 97526. A formal 30-day public comment period will be initiated by publication of the EA on the Medford District website: http://www.blm.gov/or/districts/medford/plans/index.php. If you would like a copy of the EA, please stop by the office or contact Tony Kerwin, District Planning and Environmental Coordinator, at (541) 618-2402. Written comments should be addressed to Bureau of Land Management, 3040 Biddle Rd, Medford OR 97504. E-mailed comments may be sent to: *BLM_OR_MD_Mail@blm.gov*

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Appendix A: Medford District Special Status Wildlife Species

On December 21, 2011 a new Special Status Species list went into Effect and the list is divided into Sensitive and Strategic species (IM No. OR-2012-018). This new list has two categories, Sensitive and Strategic. According to BLM Special Status Species Management (6840), only Sensitive species are required to be addressed in NEPA documents. All Sensitive species were considered and evaluated for this project, and only those that could be impacted by the proposed actions are discussed in more detail in the EA.

The table below lists the Bureau Sensitive species that are documented or Suspected on lands within the Medford District. Project specific assessments would indicate if the project is within the range of each species.

SPECIAL STATUS SPECIES - Medford District			
SPECIES	**12/21/11 STATUS**	**Project within RANGE (Y/N)**	**Habitat Requirements**
Birds: Bureau Sensitive & Federally Threatened			
American peregrine falcon	BSEN	Y	Nests on cliffs. No Effects anticipated.
Bald eagle	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on bald eagles.
Lewis' woodpecker	BSEN	Y	Habitat preference is hardwood oak stands with scattered pine near grassland shrub communities. No anticipated effects.
Marbled murrelet	FT	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on marbled murrelets.
Northern spotted owl	FT	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on northern spotted owls.
Purple martin	BSEN	Y	Possible migrant in Josephine County. No detectable effects from proposed actions.
Streak horned lark	BSEN	Y	Mainly occurs in open fields with short herb-dominated ground cover with patches of bare grounds. Rare or possible migrant on Medford BLM. No Effects anticipated.
Tri-colored Blackbird	BSEN	Y	Tri-colored blackbirds are found in the lowland interior valleys of southern Oregon, near freshwater marshes and crop lands. Oregon breeding colonies occur in hardstem bulrush, cattail, nettles, willows, and Himalayan blackberry. No detectable effects from proposed actions.
White-headed woodpecker	BSEN	Y	Occur in open ponderosa pine or mixed conifer forests dominated by ponderosa pine. No Effects anticipated.
White-tailed kite	BSEN	Y	The kite is a resident in the Rogue, Illinois, and Applegate valleys. They nest in trees in and around open fields and agricultural areas. No anticipated effects.
Amphibians: Bureau Sensitive			
Black salamander	BSEN	Y	Forests, open woodlands, moist talus, and streamside areas with down logs and rock debris.
Foothill yellow-legged Frog	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on the Foothill yellow-legged frog.

SPECIAL STATUS SPECIES - Medford District			
SPECIES	**12/21/11 STATUS**	**Project within RANGE (Y/N)**	**Habitat Requirements**
Siskiyou Mountains Salamander	BSEN	Y	Habitat is deep talus, especially on forested, north-facing slopes and woody debris near talus slopes during rainy periods. See Wildlife Affected Environment and Environmental Consequences Sections for information on the salamanders.
Oregon Spotted Frog	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on the Oregon Spotted Frog.
Reptiles: Bureau Sensitive			
Northwestern pond turtle	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on the Northwestern pond turtle.
Mammals: Bureau Sensitive and Federal Candidate			
Pacific Fisher	FC	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on Pacific Fisher.
Fringed myotis bat	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on bats.
Pallid bat	BSEN	Y	
Townsend's big-eared bat	BSEN	Y	
Invertebrates: Bureau Sensitive			
Chase sideband snail	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Coronis Fritillary	BSEN	Y	Recent sightings are restricted to the Grants Pass Resource Area on the District. Associated with lower elevation canyons and grasslands as well as mid-montane meadows and forest margins and openings (Pyle 2002). No Effects anticipated.
Crater Lake tightcoil	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Evening fieldslug	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Franklin's Bumblebee	BSEN	Y	Known sightings are restricted to the Ashland Resource Area on the District. This species is associated with open grassland/shrubland where abundant flowering plants occur and serve as a food source. No Effects anticipated.
Gray-blue butterfly	BSEN	Y	Occurs at high elevation wet montane meadows from 5100 ft. to over 6500 ft.. Appropriate habitat is described as "marshy slopes and meadows that are lushly overgrown with deep grasses and dense stands of false hellebore (*Veratrum viride*)"
Western bumblebee	BSEN	Y	Historically in Oregon, but numbers have declined. They visit a range of different plant species and are important generalist pollinators of a wide variety of flowering plants and crops. No Effects anticipated.

SPECIAL STATUS SPECIES - Medford District			
SPECIES	**12/21/11 STATUS**	**Project within RANGE (Y/N)**	**Habitat Requirements**
Highcap lanx snail	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Johnson's Hairstreak butterfly	BSEN	Y	Dependent on conifer mistletoe for egg-laying and for food in its larval stage. It spends much of its lifespan in and near the tops of conifer trees, although it descends to ground level for nectaring and to visit moist muddy areas as a source of water (Pyle 2002). No Effects anticipated.
Mardon skipper butterfly	FC	Y	Grassland and open meadow obligate. The subspecies *P. m. klamathensis* only occurs in a small geographic area to the east of the city of Ashland in the Cascades of southern Oregon. No Effects anticipated.
Oregon Shoulderband snail	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Siskiyou hesperian snail	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Siskiyou short horned grasshopper	BSEN	Y	This species occurs in Grassland/herbaceous habitats and is associated with elderberry plants. Only in the Siskiyou Mountains of Jackson County. No anticipated effects from the proposed action
Travelling sideband snail	BSEN	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on mollusks.
Vernal pool fairy shrimp	FT	Y	See Wildlife Affected Environment and Environmental Consequences Sections for information on Vernal pool fairy shrimp. No anticipated effects from the proposed action.

Status: lists the Oregon BLM

FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
BSSEN - Bureau Sensitive (BLM) - Generally these species are restricted in range and have natural or human caused threats to their survival.

Appendix B. Medford District Special Status Plants and Fungi Species

Bolded names are riparian species potentially to be affected by the proposed action. Source: Final OR/WA State Director Special Status Species List, December 1, 2011

VASCULAR PLANTS		
Species	**Habitat**	**Status**
Fritillaria gentneri **(Gentner's Fritillary)**	Open low-elevation sites in mixed oak-madrone woodlands, ponderosa pine woodlands, open Douglas-fir forests, chaparral, and grasslands 1,000-5,000 ft. Often found in eco-tones between forested sites and more open habitats, including the edges of riparian zones	Federally Endangered
Lomatium cookii **(Cook's Lomatium)**	Vernal pool/patterned ground areas on mounds and moist sites in meadows.	Federally Endangered
Adiantum jordanii (California Maiden-hair)	Moist woods or shaded hillsides, seeps, riparian, and serpentine rock outcrops. Found on damp banks at the base of rocks or trees, 800-1,100 ft.	Bureau Sensitive
Arabis modesta (Rogue Canyon Rockcress)	Rocky walls and bluffs 500-1,500 ft. Damp shaded banks or slopes.	Bureau Sensitive
Arctostaphylos hispidula (Hairy Manzanita)	Dry rocky ridges and gravelly soils that receive direct sun with shrub communities or sparse forests.	Bureau Sensitive
Astragalus californicus (California Milk-vetch)	Dry open areas in shrubland and woodlands, 900-4,000 ft.	Bureau Sensitive
Astragalus gambelianus (Gambel Milkvetch)	Open grassy areas in shrubland.	Bureau Sensitive
Bensoniella oregana **(Bensonia)**	Deep soils in moist meadows, forest openings, and along streamsides, 3,000-5,000 ft. Upper slope sites and ridge saddles with northerly aspects.	Bureau Sensitive
Callitriche marginata **(Winged Water-starwort)**	Often in vernal pools or submersed.	Bureau Sensitive
Calochortus greenei (Greene's Mariposa Lily)	Clay soils of chaparral areas around dry thickets and on rocky slopes and bluffs 2,400-6,500 ft. Margins of white oak and white fir stands.	Bureau Sensitive
Calochortus howellii (Howell's Mariposa Lily)	Dry, open slopes. Rocky, serpentine soils, in Jeffrey pine forests.	Bureau Sensitive
Calochortus monophyllus (One-leaved Mariposa Lily)	Wooded slopes, clay-loam soils 1,200-3,600 ft.	Bureau Sensitive

Calochortus nitidus (Broad-fruit Mariposa Lily)	Grassy hillsides and meadows.	Bureau Sensitive
Calochortus persistens (Siskiyou Mariposa Lily)	Open rocky areas above 3,000 ft.	Federal candidate for listing
Camassia howellii (Howell's Camas)	Dry open slopes in serpentine soils.	Bureau Sensitive
Camissonia graciliflora (Slender Flowered Evening Primrose)	Open or shrubby slopes, grasslands, oak woodlands, less than 4,500 ft.	Bureau Sensitive
***Carex capitata* (Capitate Sedge)**	Generally wet meadows, bogs at high elevations.	Bureau Sensitive
***Carex comosa* (Bristly Sedge)**	Swamps and marshes and other wet areas, sea level to 1,200 ft.	Bureau Sensitive
***Carex gynodynama* (Hairy Sedge)**	Moist meadows, open forests, or seeps.	Bureau Sensitive
***Carex klamathensis* (Klamath Sedge)**	Serpentine wetland areas that dry out in mid-late summer 1,300 1,800 ft.	Bureau Sensitive
***Carex scabriuscula* (Siskiyou Sedge)**	Vernally or perennially wet serpentine above 2,800 ft. in the coast range and 5,000 ft. in the inland ranges. Generally in open, sunny sites with little cover.	Bureau Sensitive
***Carex serratodens* (Saw-tooth Sedge)**	Moist meadows and rocky places near streams and seepages, frequently on, but not limited to serpentine soils, below 6,000 ft.	Bureau Sensitive
Cheilanthes covillei (Coville's Lipfern)	Rock crevices, base of rocks, rocky slopes, and sun to shade.	Bureau Sensitive
Cheilanthes inertexta (Coastal lipfern)	Rock crevices, foothills to mid-montane.	Bureau Sensitive
Chlorogalum angustifolium (Narrow Leaved Amole)	Open, dry places, heavy soil in meadows, and woodlands below 1,500 ft.	Bureau Sensitive
***Cimicifuga elata* var. *elata* (Tall Bugbane)**	White and Doug fir forests. It has been found near springs, drainages, and in clearcuts. North-northeast facing slopes, 4,300-5,400 ft.	Bureau Sensitive
Cryptantha milo-bakeri (Milo Baker's Cryptantha)	Rocky or gravelly slopes, generally coniferous forests.	Bureau Sensitive
Cupressus bakeri (Baker's Cypress)	Dry forested, brushy, or open slopes. Usually rocky ground or serpentine soils 3,800-6,000 ft.	Bureau Sensitive
***Cypripedium fasciculatum* (Clustered ladyslipper)**	Moist microsites in mixed evergreen forests	Bureau Sensitive
Delphinium nudicaule (Red Larkspur)	Open areas on rocky slopes, among shrubs and woods.	Bureau Sensitive
Dicentra pauciflora (Few-flowered Bleedingheart)	Rocky places at higher elevations.	Bureau Sensitive
***Epilobium oreganum* (Oregon Willow Herb)**	Wet boggy sites often serpentine at lower elevations.	Bureau Sensitive
Erythronium howellii (Howell's Adder's Tongue)	Usually in or near serpentine in ecotonal areas. Found in shade of trees and shrubs on forest edge.	Bureau Sensitive

Eschscholzia caespitosa (Gold Poppy)	Dry flats and brushy slopes below 3,500 ft.	Bureau Sensitive
Eucephalus vialis (Wayside Aster)	Coniferous forests, usually on drier upland sites dominated by Douglas-fir and mixed hardwoods, serpentine slopes, and edges between meadows and forest 500 5,100 ft.	Bureau Sensitive
Frasera umpquaensis (Umqua Swertia)	Open woods or at edges of meadows. In mid to upper elevation true fir dominated forests or mixed conifer forests (4,000 6,000 ft.), generally in partial shade or openings.	Bureau Sensitive
Gentiana setigera (*Waldo* Gentian)	Wet meadows and bogs on serpentine soils at lower elevations.	Bureau Sensitive
***Hackelia bella* (Beautiful Stickseed)**	Stream banks, roadsides, open slopes, forest openings 3,000-6,000 ft.	Bureau Sensitive
***Hastingsia bracteosa* var. *atropurpurea* (Purple Flowered Rush Lily)**	Wet meadows on serpentine soil.	Bureau Sensitive
***Hastingsia bracteosa* var. *bracteosa* (Large Flowered Rush Lily)**	Wet meadows on serpentine soil.	Bureau Sensitive
Horkelia tridentata ssp. *Tridentata* (Three-toothed Horkelia)	Dry open coniferous forest on granitic or igneous soils 1,000-8,000 ft.	Bureau Sensitive
***Iliamna latibracteata* (California Globe Mallow)**	Moist sites, streamsides in coniferous forests. Often on shady disturbed ground 200-6,000 ft.	Bureau Sensitive
Lewisia leeana (Quill-leaf Lewisia)	Rocky or gravelly ridges or benches at higher elevations, often on serpentine soils.	Bureau Sensitive
***Limnanthes floccosa* ssp. *bellingeriana* (Bellinger's Meadow Foam)**	Full sun in vernally wet meadows or vernal pools, generally found on basalt scablands at 1,000-4,000 ft.	Bureau Sensitive
***Limnanthes floccosa* ssp. *pumila* (Dwarf Meadow Foam)**	Edges of deep vernal pools which dry up by mid-summer.	Bureau Sensitive
***Limnanthes gracilis* ssp. *gracilis* (Slender Meadow Foam)**	Wet ground, on serpentine soils.	Bureau Sensitive
***Lotus stipularis* (Stipuled trefoil)**	Open forests, stream beds, ditches, chaparral, and logged areas below 4,000 ft	Bureau Sensitive
Meconella oregana (White Fairy Poppy)	Vernally moist openings/prairies on sandy, gravelly, or serpentine soils.	Bureau Sensitive
Microseris howelli (Howell's Microseris)	Dry, rocky areas on serpentine soil.	Bureau Sensitive
Mimulus bolanderi (Bolander's Monkeyflower)	Openings, in chaparral and disturbed areas, especially burned areas 1,000-2,500 ft.	Bureau Sensitive
Mimulus congdonii (Congdon's Monkeyflower)	Oregon white oak-wedgeleaf ceanothus-whiteleaf Manzanita	Bureau Sensitive

	chaparral 1,000-3,000 ft.	
Monardella purpurea (Siskiyou Mondardella)	Rocky, open slopes, chaparral, woodlands, and montane forest on serpentine soils (or related bedrock) 1,400-4,000 ft.	Bureau Sensitive
Navarretia leucocephala ssp. *leucocephala* (White- flowered Navarretia)	Vernal pools.	Bureau Sensitive
Nemacladus capillaries (Slender Nemacladus)	Dry slopes, burned areas 1,200 6,500 ft.	Bureau Sensitive
Pellaea andromedifolia (Coffee Fern)	Rocky or dry areas, rock crevices and under boulders, 100-6,000 ft.	Bureau Sensitive
Pellaea mucronata ssp. *mucronata* (Bird's Foot Fern)	Rocky or dry areas all elevations.	Bureau Sensitive
Perideridia erythrorhiza **(Red-rooted (Red-rooted Yampah)**	Vernally moist depressions in heavy, poorly drained soils. Oak or pine woodlands at lower to mid elevations up to 5,000 ft. Also found in serpentine soils.	Bureau Sensitive
Plagiobothrys austiniae **(Austin's Plagiobothrys)**	Vernally wet areas, wet sites, and along roads and trail edges.	Bureau Sensitive
Plagiobothrys figuratus* ssp. *corallicarpus **(Coral Seeded Allocarya)**	Rocky, open grassland meadows assoc. with vernal pools (wet in spring/dry in summer).	Bureau Sensitive
Plagiobothrys greenei **(Greene's Popcorn Flower)**	Vernally wet areas, and along trails and old roads.	Bureau Sensitive
Poa rhizomata (Timber Bluegrass)	Dry douglas-fir/ponderosa pine forest.	Bureau Sensitive
Rafinesquia claifornica (California Chicory)	Shrubby slopes and open woods (common after fires).	Bureau Sensitive
Ranunculus austrooreganus (Southern Oregon Buttercup)	On damp or dry grassy loam slopes, often among scattered oak 1,500-2,000 ft.	Bureau Sensitive
Rhamnus ilicifolia (Redberry)	Chaparral and oak woodlands below 5,000 ft.	Bureau Sensitive
Ribes divaricatum var. *pubiflorum* (Straggly Gooseberry)	Forest edges and streamside.	Bureau Sensitive
Saxifragopsis fragarioides (Joint-leaved Saxifrage)	Rocky crevices 4,500-9,000 ft.	Bureau Sensitive
***Scirpus pendulus* (Drooping Bulrush)**	Marshes, wet meadows, river terraces, ditches. Sea level to 3,000 ft.	Bureau Sensitive
Sedum moranii (Rogue River Stonecrop)	Rock outcrops in lower canyons. Found on greenstone outcrops on west or southwest slopes.	Bureau Sensitive
Sidalcea hickmanii ssp. *nov* (Hickman's Checkerbloom)	Dry chaparral on ridgelines. Responds well to fire.	Bureau Sensitive
Silene hookeri ssp. *bolanderi* (Bolander's Catchfly)	Oak woodland, rocky knolls and slopes, often on serpentine below 5,000 ft.	Bureau Sensitive
Solanum parishii *(Parish's Horse Nettle)*	Buckbrush chaparral, oak/pine woodlands, meadows and brush land in dry Douglas fir or Oregon oak communities.	Bureau Sensitive

***Sophora leachiana* (Western Sophora)**	Open, sunny, south or west facing slopes, within mixed evergreen-oak woodlands. Sometimes riparian. Requires disturbance occasionally found in clear cuts.	Bureau Sensitive
Streptanthus glandulosus (Common Jewel Flower)	Rocky serpentine in open coniferous and hardwood forests.	Bureau Sensitive
Streptanthus howellii (Howell's Streptanthus)	Dry, rocky, serpentine slopes in open conifer/hardwood forests from 1,000-4,500 ft.	Bureau Sensitive
***Utricularia minor* (Lesser Bladderwort)**	In pond and bogs in shallow, standing, or slow moving water.	Bureau Sensitive
***Viola primulifolia* ssp. *occidentalis* (Western Bog Violet)**	Serpentine wetlands.	Bureau Sensitive
***Wolffia borealis* Dotted water-meal**	Fresh water areas.	Bureau Sensitive
Zigadensus fontanus (Small flowered death camas)	Vernally moist or marshy areas, open hillsides, often on serpentine; < 500 m.	Bureau Sensitive
NON-VASCULAR PLANTS		
Species	**Habitat**	**Protection Status**
Chaenotheca subroscida (Needle Lichen)	Found on conifer bark at lower mid elevations in old growth stands.	Bureau Sensitive
***Leptogium cyanescens* (Dark Blue Skin Lichen)**	Found on bark at the base of trees, rotten logs, and on rocks. Found in mixed conifer stands, mature big leaf maple, and Douglas fir stands 1,400-4,600 ft.	Bureau Sensitive
Peltigera *pacifica* (Pacific Felt Lichen)	Found on rotten logs and humus, occasionally on lower boles of trees in closed canopy old growth stands.	Bureau Sensitive
Porella bolanderi (Liverwort)	Found on bark and rock in drier somewhat exposed rock.	Bureau Sensitive
Bryum calobryoides (Bryum Moss)	Cliffs, rock, and soil covering rock at higher elevations.	Bureau Sensitive
***Codriophorus depressus* (Depressed Codriophorus Moss)**	Granitic rock or soil over rock in moist high elevation areas.	Bureau Sensitive
Ephemerum crassinervium (Ephemerum Moss)	Meadows and rocky moist areas in partial shade at low elevations.	Bureau Sensitive
***Meesia uliginosa* (Meesia Moss)**	Exposed wetlands at various elevations.	Bureau Sensitive
***Tayloria serrata* (Dung Moss)**	Found on dung and other nitrogen enriched substrates.	Bureau Sensitive
Tortula mucronifolia (Mucronleaf Tortula Moss)	Found on rock at high elevations.	Bureau Sensitive
FUNGI		
Species	**Habitat**	**Protection Status**
Boletus pulcherrimus	Found in humus in association	Bureau Sensitive

	with the roots of mixed conifers and hardwoods. Fruiting July-December.	
Gomphus kauffmanii	Partially hidden in deep humus under *Pinus* and *Abies spp*. Fruits in Autumn.	Bureau Sensitive
Leucogaster citrinus	Found in association with the roots of *Abies lasiocarpa*, *Pinus contorta*, *Pseudotsuga menziesii*, and *Tsuga heterophylla* 800-6,000 ft. Fruiting August-November.	Bureau Sensitive
Phaeocollybia californica	Found in association with the roots of *Abies lasiocarpa*, *Picea stitchensis*, *Pseudotsuga menziesii*, and *Tsuga heterophylla*. Fruiting March, May, October and November.	Bureau Sensitive
Phaeocollybia olivacea	Scattered in mixed forests containing Fagaceae and Pinaceae in coastal lowlands. Fruits in Autumn.	Bureau Sensitive
Phaeocollybia pseudofestiva	Scattered under mature mixed conifers and hardwoods. Fruits October-December.	Bureau Sensitive
Ramaria largentii	Fruits in humus or soil and matures above surface of the ground. Fruits in October.	Bureau Sensitive
Rhizopogon ellipsosporus	Found in association with the roots of *Pseudotsuga menziesii*, and scattered *Pinus lambertiana*. Fruits inOctober.	Bureau Sensitive
Sowerbyella rhenana	Fruits in the duff of moist, relatively undisturbed, older conifer forests. Fruits October-December.	Bureau Sensitive