

Roseburg District Aquatic Restoration

**Roseburg District
Bureau of Land Management**

**Environmental Assessment
#OR-103-08-09**

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TABLE OF CONTENTS

CHAPTER ONE - PURPOSE AND NEED FOR ACTION	4
I. Introduction	4
II. Purpose and Need for Action	4
III. Conformance.....	6
IV. Decision Factors	6
IV. Issues for Analysis.....	7
CHAPTER TWO - DISCUSSION OF THE ALTERNATIVES	8
I. Alternative One – No Action.....	8
II. Alternative Two – The Proposed Action.....	8
CHAPTER THREE - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES	22
I. Aquatic Habitat & Fisheries.....	22
II. Terrestrial Habitat & Wildlife	34
III. Issues Considered but not Analyzed in Detail	48
CHAPTER FOUR – CONTACTS, CONSULTATIONS, & PREPARERS	52
Agencies, Organizations, and Persons Consulted.....	52
Threatened and Endangered (T&E) Species Section 7 Consultation	52
Cultural Resources Section 106 Compliance.....	52
Public Notification	53
Roseburg District Planning Updates	53
State, County, and Local Government Agencies	53
Public Comment Period	53
List of Preparers	53
Appendix A.....	60
Special Status Wildlife Species Associated with Riparian Habitat Appendix B.	61
Consistency with the 1995 Roseburg District Record of Decision and Resource Management Plan	

CHAPTER ONE - PURPOSE AND NEED FOR ACTION

This chapter provides a brief description of the purpose and need for the proposed action being analyzed in this environmental assessment (EA).

I. Introduction

The Bureau of Land Management (BLM) proposes to perform a variety of aquatic habitat restoration activities on the District within riparian areas, and contribute to other aquatic habitat restoration activities on private land within the boundary of the Roseburg District. Given the checkerboard land ownership pattern, restricted ownership in certain watersheds, and limited resources, the BLM recognizes that aquatic restoration cannot be accomplished exclusively by the BLM. As such, the BLM partners with other federal agencies (such as the Umpqua National Forest and US Fish and Wildlife Service), state agencies (such as Oregon Department of Fish & Wildlife and Oregon Department of Environmental Quality), private timber companies, watershed councils and other non-profit organizations to accomplish watershed restoration. Such partnering may include funding or cost-sharing and/or contributions of expertise, materials, or equipment, and may contribute to aquatic restoration work occurring on non-BLM administered land. This EA considers projects on BLM-managed lands and projects on private lands where the BLM has provided either full funding or partial funding as a partnering agency.

This EA is programmatic in nature, and analyzes the effects of watershed restoration activities within the Roseburg District based upon years of professional experience, review of available literature, and consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Because this analysis is broad-scale in nature and covers a variety of restoration actions, this EA does not list every discrete, site-specific proposed action that may occur. The programmatic analysis limits the amount of site-specific detail within the analysis, instead relying on project design features to reduce or avoid impacts to different resources.

Individual, project-specific decisions would be published as projects are considered by the decision-maker. Should a project be proposed that is beyond the scope of this analysis, subsequent consideration under the National Environmental Policy Act (NEPA) would be required.

II. Purpose and Need for Action

The BLM is obliged to manage lands for healthy watersheds under the Endangered Species Act, the Clean Water Act, and the Federal Land Policy and Management Act (FLPMA), as healthy watersheds protect salmonid habitat, contribute to clean water, and host more productive forests. Stream complexity, stream connectivity and riparian vegetation are all components of healthy, functioning aquatic and riparian systems. In some areas of the Roseburg District, these components have been degraded as follows:

- **Stream Complexity.** Stream Complexity refers to the properties of a stream reach which provide a variety of habitat and flow conditions within the stream.

The presence of large wood in streams is one of the main contributors to stream complexity. It creates deep pools with ample hiding cover for aquatic species and holds gravel in the stream channel which allows a variety of habitats (such as riffles and pools) to develop. Many streams on the Roseburg District have become simplified due to large wood removal and general lack of large wood recruitment within riparian areas. Additionally, many of these streams have been constrained by roads. The gravel in the stream beds in many cases has been eroded down to bedrock. Deep pools with hiding cover and gravel riffles are rare in bedrock stream channels. These simplified channels have very little habitat available for spawning or rearing of stream fishes.

- **Stream Connectivity.** Stream Connectivity refers to the ability of aquatic species to migrate up and down a stream corridor. Poorly designed road crossings, undersized stream crossings, and diversion dams create barriers which prevent aquatic species from freely migrating up and down streams. Barriers to migration reduce the amount of habitat available and increase competition between fish species. Barriers also prevent adult fish from reaching historic spawning areas and prevent juvenile fish from moving into refuge habitats during high winter flows.
- **Riparian Vegetation.** Noxious weed species, such as Himalayan blackberry, dominate many riparian areas. Noxious weed species displace native species resulting in a simplified vegetative community that often consists of a single noxious weed species in the understory (Cronk 1995). A diverse native riparian plant community consisting of annuals, perennials, woody shrubs, and trees, provides a large variety of habitat features. These features include food sources; shade for wildlife and to keep stream temperatures cool; and future large wood for streams. Native species generally have rooting depths which provide stream bank stability.

The BLM proposes a program of aquatic restoration work with the purpose of addressing these components and the resulting resource limitations, as described in Table 1.

Table 1. Potential Restoration Actions to Address Aquatic & Riparian Components

Degraded Components	Resulting Resource Limitations (This list only includes the factors that most commonly limit water quality and aquatic habitat)	Potential Restoration Actions
Stream Complexity	<ul style="list-style-type: none"> - Lack of over-wintering habitat for salmonids & other aquatic organisms - Lack of summer pool habitat for salmonids & other aquatic organisms - Lack of spawning gravels for salmonids - Elevated summer water temperature - Over-widened channels 	<ul style="list-style-type: none"> - Instream structure placement - Channel stabilization using barbs, plantings, and other techniques - Riparian vegetation improvement - Restoration of sinuosity
Stream Connectivity	<ul style="list-style-type: none"> - Barriers to migration for fish and other aquatic organisms - Barriers to flow of gravels and large wood 	<ul style="list-style-type: none"> - Stream crossing replacement - Diversion dam removal - Stream crossing removal
Riparian Vegetation	<ul style="list-style-type: none"> - Elevated summer water temperatures - Loss of channel stability leading to down-cutting and elevated sedimentation - Lack of future source of large wood for the stream channel - Lack of food supply for aquatic organisms 	<ul style="list-style-type: none"> - Eradication of invasive plants in riparian areas - Planting native trees and shrubs - Installation of livestock crossings - Aggradation of stream bed to raise water table

III. Conformance

The 1995 Roseburg District Record of Decision and Resource Management Plan (ROD/RMP), as amended, incorporated the Aquatic Conservation Strategy, a component of the Northwest Forest Plan, to guide the District in meeting watershed restoration objectives, including but not limited to:

- Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
- Maintain and restore the sediment regime under which an aquatic ecosystem evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
- Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian dependent species.
- Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability (1995 ROD/RMP, p.19-20).

The 1995 ROD/RMP also explained that “the most important components of a watershed restoration program are control and prevention of road related runoff and sediment, restoration of the condition of riparian vegetation, and restoration of instream habitat complexity” (p. 21). Management Actions/Directions addressing watershed restoration cited the following priorities: completion of restoration plans prior to restoration activities; focusing restoration on the removal of some roads and, where needed, upgrading remaining roads; applying silvicultural treatments to restore large conifers in Riparian Reserves; and using instream structures to restore stream channel complexity in the short term.

IV. Decision Factors

Factors to be considered when selecting among alternatives include:

- The degree to which restoration objectives would be achieved, including the relative benefits and costs associated with an alternative;
- The nature and intensity of environmental impacts that would result from implementing the alternative and the nature and effectiveness of measures to mitigate impacts to resources including, but not limited to, water quality, fisheries, wildlife and wildlife habitat;
- Compliance with management direction from the ROD/RMP; and
- Compliance with applicable laws including, but not limited to, the Clean Water Act, the Endangered Species Act, and the O&C Act.

IV. Issues for Analysis

While this analysis is broad-scale, the proposed actions are narrow in nature, occurring at a small scale within a limited geography, and affecting specific resources. Considering the type of projects, potential location of projects, resource concerns, and management objectives, the interdisciplinary team determined that several issues must be analyzed to inform decision-making and determine potential significance of environmental impacts.

- How would the categories of proposed restoration activities address degraded processes and conditions of watersheds (stream complexity, connectivity, and riparian vegetation) as described in Table 1?
- Would sediment delivery to streams resulting from aquatic and riparian restoration actions measurably impact water quality?
- What are the potential impacts of sediment delivery from instream work to listed fish species?
- What are the potential impacts of noise disturbance and habitat modification or removal on the marbled murrelet and the northern spotted owl?
- How would the categories of proposed restoration activities alter wildlife habitat within riparian areas?
- What are the potential impacts of the proposed actions on migratory birds of conservation concern?

CHAPTER TWO - DISCUSSION OF THE ALTERNATIVES

This chapter describes the basic features of the alternatives being analyzed.

I. Alternative One – No Action

Aquatic and riparian restoration proposals would not be undertaken at this time, though limited restoration work may be analyzed and accomplished as part of other programs of work, such as the timber management program.

II. Alternative Two – The Proposed Action

The Roseburg District proposes to conduct and/or contribute to a program of aquatic and riparian restoration work in the Roseburg District. Table 1 presents the potential restoration activities that would address the key water-quality and habitat limiting factors found in the Roseburg District. Table 2 describes the categories of actions (not specific projects) the BLM could undertake or fund to achieve restoration objectives.

The District has prioritized certain watersheds for restoration work based on several factors, including the percentage of BLM ownership, the amount of high intrinsic potential habitat for key aquatic species such as coho salmon (ROD/RMP p. 36), the interest among key landowners and partners in the watershed, and the availability of certain sources of funding for restoration projects. In some instances, the BLM would participate in or contribute to restoration work in areas with limited BLM ownership, but such projects would likely be led by one of BLM's partners. Table 3 shows the BLM ranking of watersheds, which emphasizes areas for restoration and the role the BLM may take in those efforts. A ranking of "1" indicates that the BLM would play an important role in planning, funding, and implementing restoration efforts in the watershed. A ranking of "2" indicates that the BLM would work closely with partners to plan, fund, and implement restoration projects, but is less likely to take a leadership role. A ranking of "3" indicates that the BLM would participate opportunistically in restoration projects in these watersheds by contributing technical expertise and/or funding; however, the BLM would likely rely on partners to serve as project leaders.

Table 3 does not reflect all of the fifth-field watersheds on the Roseburg District; generally, due to marginal ownership, the BLM does not anticipate engaging in restoration efforts in watersheds not listed here. However, the BLM may undertake restoration activities watersheds not listed as opportunities arise.

In addition to the general types of restoration activities described in Table 2, the BLM is considering several site specific restoration activities at this time. Table 4 outlines several of restoration activities included in the proposed action (as described in Table 2), and where those projects may occur based upon known conditions and aquatic/riparian restoration priorities. These existing proposals are discussed in more detail than the general categories of restoration actions in order to provide examples of actions that could occur in the future.

Table 2. Description of proposed aquatic and riparian restoration activities. Under each type of activity, several assumptions are made regarding the amount of work that could be accomplished. The *Annual Maximum* is the assumed limit of activity to be performed in a single year, listed for both the district and any single 5th field watershed. The *Typical Year* is the average assumed amount of this activity performed in a single year. The *Total Maximum* is the assumed limit of activity for the lifetime of this analysis.

Proposed Action	Description of Work
<i>Acquisition of Restoration Materials</i>	
<p>Acquisition of Wood <u>Trees <20" Diameter at Breast Height (DBH)</u> <i>Incidental removal only as needed.</i></p> <p><u>Trees 20-36" DBH</u> <i>Total Maximum (spanning this analysis):</i> <i>5th Field Watershed: 900 trees</i> <i>Typical Year:</i> <i>2 projects in 2 different 5th field watersheds totaling 300 trees</i></p> <p><i>No more than 2 trees/acre between 20"-36"DBH would be removed from stands providing suitable nesting habitat for marbled murrelet or northern spotted owl.</i></p> <p><u>Trees > 36"DBH</u> <i>Total Maximum (spanning this analysis):</i> <i>5th Field Watershed: 40 trees</i></p> <p><i>No more than 2 trees/acre > 36"DBH would be removed from stands providing suitable nesting habitat for marbled murrelet or northern spotted owl.</i></p>	<p>The large wood used in restoration activities would be acquired on a limited basis from different land use allocations, in accordance with the Roseburg District Resource Management Plans. Wood may include bucked logs, cut trees, and whole trees including root wads.</p> <p>(1) In Riparian Reserves, trees may come from selective removal projects designed to improve habitat. Most trees removed for instream use are anticipated to come from this land use allocation.</p> <p>(2) In Late-Successional Reserves, trees may come from small-scale selective removal projects designed to improve habitat within the stand.</p> <p>(3) Trees may be acquired opportunistically from other land use allocations. Removal of those trees would be in conformance with the management direction for that land use allocation.</p> <p>Generally, trees felled or pulled for restoration work would be between 20"-36" DBH, however, a few projects (particularly in larger stream systems) would require larger trees, exceeding 36" DBH. For functional and operational reasons, most of these trees would be taken from the RMA. Additionally, some trees < 20" may also be useful, either in smaller stream systems or to supplement large wood in certain projects. The use of small trees is anticipated to be incidental, and does not contribute to the thresholds established for tree removal (see left). Individual tree selection would be made in accordance with project design features listed on pages 15-19.</p> <p>Wood may also be acquired through other means, such as purchase from outside sources, byproduct from timber sales, and salvage operations (harvesting bug kill, wind throw, fire, etc). These opportunities are difficult to predict, and are driven by factors beyond the BLM's need to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands. Because these actions stem from a different purpose and need for action, they would be subject to their own NEPA compliance.</p>

<i>Instream Habitat Restoration</i>	
<p>Cable placement of instream large wood & boulders <u>Annual Maximum:</u> District: 20 stream miles 5th Field Watershed: 10 stream miles <u>Typical Year:</u> 3 projects in 3 different 5th field watersheds totaling 4 stream miles</p>	<p>Large wood (acquired per direction above) and/or boulders would be staged on or adjacent to roads and placed in stream channels using a cable yarding system. Yarding equipment would generally remain on existing roads. Large wood and boulders would be dragged through riparian areas into the stream channel. Large wood and boulder projects would be designed to allow fish passage through or over structures at all stream flows. Logs and boulders would be hauled to the site using trucks on established roads.</p>
<p>Excavator/Skidder Placement of instream large wood & boulders <u>Annual Maximum:</u> District: 20 stream miles 5th Field Watershed: 10 stream miles <u>Typical Year:</u> 3 projects in 3 different 5th field watersheds totaling 4 stream miles</p>	<p>Large wood (acquired per direction above) and/or boulders would be staged on or adjacent to roads and placed in stream channels using a tracked excavator or skidder. This machinery would access stream channels and riparian areas through use of temporary access trails. Upon completion of wood or boulder placement, machinery would restore temporary access trails as it exits the project area. Restoration of access trails would include surface scarification, scattering of branches and organic material, and seeding and mulching where necessary. Large wood and boulder projects would be designed to allow fish passage through or over structures at all stream flows. The heavy equipment used to complete these activities may be in the stream channel, on banks, or on the road. Logs and boulders would be hauled to the site using trucks on established roads.</p>
<p>Helicopter placement of instream large wood <u>Annual Maximum:</u> District: 20 stream miles 5th Field Watershed: 10 stream miles <u>Typical Year:</u> 1 project totaling 2 stream miles</p>	<p>Large wood (acquired per direction above) would be staged on or adjacent to roads and placed in stream channels using large helicopters. Large wood projects would be designed to allow fish passage through or over structures at all stream flows. Logs would be hauled to landings using trucks using established roads.</p>
<i>Riparian Habitat Restoration</i>	
<p>Noxious weed eradication in riparian areas <u>Annual Maximum:</u> District: 10 stream miles or 100 acres 5th Field Watershed: 5 stream miles or 50 acres <u>Typical Year:</u> 5 projects totaling 3 stream miles or 40 acres.</p>	<p>This proposed action involves the cutting, pulling, and spraying noxious weeds within riparian areas. All activities would follow the direction provided in the Records of Decision for the Northwest Area Noxious Weed Control Program EIS (1987), BLM Handbook H-1740-2 <i>Integrated Vegetation Management</i> (2008), and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (2007), or the most current NEPA analysis and handbooks for use of herbicides and noxious weed control.</p>

<p>Planting native trees & shrubs in riparian areas</p> <p><u>Annual Maximum:</u> District: 6 stream miles or 60 acres 5th Field Watershed: 3 stream miles or 30 acres</p> <p><u>Typical Year:</u> 3 projects in 3 different 5th field watersheds totaling 2 stream miles or 20 acres.</p>	<p>This proposed action involves planting tree seedling and shrubs in riparian areas currently lacking those species. Hand tools would be used to plant container stock or cuttings of native species suitable for each site. Riparian planting would occur in the fall and winter. Plant species may include red cedar, Douglas-fir, big leaf maple, vine maple, nine bark, willow species, and snowberry.</p>
<p>Installation of bio-engineered stream bank stabilization structures</p> <p><u>Annual Maximum:</u> District: 2 stream miles 5th Field Watershed: 1 stream mile</p> <p><u>Typical Year:</u> This type of project is not done in a typical year</p>	<p>This proposed action involves installing stream bank stabilization structures (e.g., rock barbs, tree revetments, and willow fascines (a woven willow mat)) to stabilize stream banks and help riparian vegetation recovery. The stabilization structures would be placed and anchored within the toe and bank areas of stream channels. Stream banks may be contoured to facilitate planting. Heavy equipment may be used to complete these activities, and may be in the stream channel, on banks, or on the road.</p>
<p>Stream Crossing Improvements</p>	
<p>Stream crossing replacement or installation</p> <p><u>Annual Maximum:</u> District: 20 structures 5th Field Watershed: 5 structures</p> <p><u>Typical Year:</u> 2 projects in each of 3- 5th field watersheds totaling 6 structures.</p>	<p>This proposed action involves: 1) replacing stream crossings that are undersized for peak flows or blocking/limiting passage of aquatic species with properly sized stream crossings, or 2) installing new stream crossings in locations where drainage associated with roads impacts water quality. Existing stream crossings would be excavated and the stream channel prepared for the installation of the new stream crossing. Grade control structures (e.g., log or boulder weirs) may be constructed upstream and downstream of a stream crossing within the stream channel to control potential stream channel incision. The stream channel, up to linear distance of 50 feet upstream or downstream of a stream crossing, may be altered (e.g., graded, armored, or realigned parallel to the stream crossing) to allow for improved stream flow into and out of the stream crossing. In some cases, concrete footers may be attached to underlying bedrock and secured with rebar. Heavy equipment may be used to complete these activities, and may be in the stream channel, on banks, or on the road. Materials would be hauled to the project site on established roads.</p> <p>For the purpose of this analysis, a stream crossing is defined as: an open-bottom, multi-plate or squashed pipe arch; embedded culvert pipe; metal railcar bridge; low-water crossing; prefabricated modular bridge; or a prefabricated concrete bottomless arch bridge.</p>

<p>Stream crossing modification <u>Annual Maximum:</u> District: 5 structures 5th Field Watershed: 2 structures <u>Typical Year:</u> This type of project is not done in a typical year</p>	<p>This proposed action involves modifying stream crossings that block or limit the passage of aquatic species. Stream crossing modifications may include the installation of internal baffles to redirect or reduce flow velocities and the construction of boulder-step pool weirs to backwater a stream crossing outlet. Heavy equipment may be used to complete these activities, and may be in the stream channel, on banks, or on the road. Materials would be hauled to the project site on established roads.</p>
<p>Stream crossing removal <u>Annual Maximum:</u> District: 5 structures 5th Field Watershed: 2 structures <u>Typical Year:</u> 1 project totaling 1 structure.</p>	<p>This proposed action involves removing stream crossings that block or limit the passage of aquatic species. The stream crossings would be excavated and removed from stream locations. Stream banks would be graded and shaped, as necessary, to minimize erosion. Stream channels may also be graded or streambed deposition partially removed to control potential steam channel incision. Heavy equipment may be used to complete these activities, and may be in the stream channel, on banks, or on the road. Materials would be hauled to the project site on established roads.</p>
<p>Livestock Control in Riparian Areas</p>	
<p>Riparian fencing – as proposed by our partners. This is not proposed for BLM-administered lands.</p>	<p>This proposed action involves the construction of fences to exclude livestock from riparian areas. Riparian fences will generally be constructed by hand without the use of heavy equipment.</p>
<p>Livestock crossings – as proposed by our partners. This is not proposed for BLM-administered lands.</p>	<p>This proposed action involves the installation of livestock stream crossings (including hardened ford crossings). Heavy equipment may be used to complete these activities, and may be in the stream channel, on banks, or on the road. Materials would be hauled to the project site on established roads.</p>
<p>Off-channel watering facilities – as proposed by our partners. This is not proposed for BLM-administered lands.</p>	<p>This proposed action involves the installation of livestock watering facilities away from the stream channel. These projects are usually completed in conjunction with riparian fencing projects. The watering facilities consist of some form of large container fed from a spring or well. Trenches may be excavated between the water source and the watering facility.</p>

Table 3. Roseburg District Ranking of 5th Field Watersheds for Restoration Emphasis.

This ranking is based on the percent of lands managed by the BLM, the amount of High Intrinsic Potential Habitat (HIP) for Oregon Coastal Coho Salmon, and the availability of watershed-specific funding.

Watershed Name	Square Miles	Percent BLM Ownership	Amt. HIP¹ Habitat (mi)	Percent BLM HIP	HIP Density (mi/mi²)	Specific Funding Available	Emphasis Ranking
Upper Smith River	149	59.2%	97	47.9%	0.65	No	1
Rock Creek	98	45.1%	8	42.5%	0.08	Yes	1
Canton Creek	63	44.1%	5	22.7%	0.08	Yes	1
Upper Umpqua River	265	34.5%	65	20.9%	0.24	No	1
South Umpqua River	211	41.0%	56	15.5%	0.27	No	1
Myrtle Creek	119	40.7%	71	10.5%	0.60	No	1
Lower Cow Creek	160	39.7%	27	21.1%	0.17	No	2
Elk Creek	292	24.0%	172	6.9%	0.59	No	2
Olalla Creek-Lookingglass Creek	161	26.7%	79	5.4%	0.49	No	2
Middle South Umpqua River—Dumont Creek	155	10.7%	9	8.5%	0.06	No	3
Middle North Umpqua River	196	9.4%	2	7.6%	0.01	No	3
Lower North Umpqua River	166	11.5%	75	4.3%	0.45	No	3
Little River	206	14.8%	21	4.1%	0.10	No	3
Middle South Umpqua River	93	12.6%	34	2.0%	0.37	No	3
Calapooya Creek	246	7.5%	127	1.4%	0.52	No	3
Lower South Umpqua River	172	3.8%	84	0.1%	0.49	No	3
Middle Fork Coquille River ²	134	52.9%	31	25.4%	0.23	No	3

¹HIP stands for High Intrinsic Potential habitat for Oregon Coastal Coho Salmon (Burnett et al. 2007)

²Although the East Fork of the Coquille contains HIP habitat, a waterfall creates a natural barrier, preventing coho salmon and other anadromous fish from reaching this habitat.

Table 4. Specific Proposed Restoration Projects within the Roseburg District.

The following projects are being considered by the BLM, or are underway, and at least partial funding has been secured. These are provided as examples of site specific projects.

Planned Restoration Activities			
Proposed Action	Potential Location	Extent	Timing
Acquisition of Large Wood <i>* These projects may require trees greater than 36" in diameter</i>	Rock Creek* T25S, R2W, Sec 15 and 31	40 acre tree pulling 40 trees total	2011 - 2012
	Canton Creek* T25S, R1W, Sec 23 and 25	200 acres 220 trees total	
	T24S, R1W, Sec 24, 25, 26, and 35		
	Upper Umpqua* T24S, R8W, Sec 23 and 27	50 acres 60 trees total	2010
	Upper Smith River* T21S, R7W, Sec 4,5, and 8	150 acres 150 trees total	2011 - 2012
Excavator Large Wood and Boulder Placement	Olalla Creek T30S, R7W, Sec 5	1.0 stream miles 14 sites: 75 logs and and 50 boulders	2010

A. Project Design Features

Project design features (PDFs) are an important component of the proposed restoration actions and are intended to guide project planners and decision makers in reducing impacts to resources. This list on pages 15-19 includes standard PDFs that would be used in the design of all restoration projects as needed.

The PDFs listed come from several sources. Some were developed by BLM resource specialists and are based on their professional expertise and experience. Others come from two Aquatic Restoration Biological Opinions (ARBO) provided to us by the National Marine Fisheries Service (NMFS) (2007) and the U.S. Fish and Wildlife Service (USFWS) (2007) or the ROD/RMP. This list does not include every PDF from these two biological opinions, however. The use of ARBO PDFs would allow use of existing consultation when implementing projects. When it would not be feasible to implement the project using the ARBO PDFs, consultation with the National Marine Fisheries Service and/or US Fish and Wildlife Service would be completed as appropriate.

Resource issues would vary by project, therefore the applicability of these design features would vary (project design features would be applied as appropriate). For example, not all projects would take place near spotted owl or marbled murrelet nest sites; as such, these project design features would not be necessary for those proposals.

To prevent the introduction or spread of noxious weeds:

PDFs suggested in BLM Handbook H-1740-2 Integrated Vegetation Management (2008) for use where necessary and feasible.

1. Before ground-disturbing activities begin, inventory weed infestations. If weeds are present, focus treatments along access routes.
2. Locate and use weed-free project staging areas.
3. Clean all equipment before entering public lands
4. Use native seed that is free of noxious and invasive weeds, as determined and documented by a seed inspection test by a certified seed laboratory.

To minimize impacts to soils:

Direction from the 1995 ROD/RMP for achievement of Clean Water Act objectives.

5. Limit the season of operation for ground disturbing activities by heavy equipment to the dry season to reduce the degree and area extent of soil impacts in riparian and upland areas. The dry season is normally May 15th to October 15th, or until the onset of regular autumn rains.
6. Designate equipment access routes and yarding corridors prior to implementation in order to minimize soil displacement and compaction and to minimize weed germination and establishment. Minimize equipment entry points between staging area and stream. Utilize existing entry points where possible. Identify sensitive areas (such as unstable slopes) to be avoided whenever possible.
7. Minimize use of heavy equipment on slopes exceeding 35%.
8. Scarify (loosen) the top 10-12 inches of compacted soil in the access routes to help ameliorate soil compaction from equipment treads.
9. Where soil is disturbed or compacted, take appropriate measures to revegetate the area, control erosion and improve bank stability. This may include topsoil replacement, planting or seeding with native species, fertilization, and weed-free mulching, as necessary.

To reduce impacts to aquatic resources:

Direction from the 1995 ROD/RMP for achievement of Clean Water Act objectives.

10. Limit the number and length of equipment access points through riparian areas.
11. Design access routes for individual work sites to reduce exposure of bare soil and extensive streambank shaping.
12. Use waterbars, barricades, seeding, and mulching to stabilize bare soil areas along project access routes prior to the wet season.
13. In well armored channels that are resistant to damage (e.g. bedrock, small boulder, or cobble dominated), consider conducting the majority of the heavy equipment work from within the channel, during low streamflow, to minimize damage to sensitive riparian areas.
14. Rehabilitate and stabilize disturbed areas where soil will support seed growth by seeding and planting with native seeds mixes or plants, or using erosion control matting.
15. When using heavy equipment in or adjacent to stream channels during restoration activities, develop and implement an approved spill containment plan that includes having a spill containment kit on-site and at previously identified containment locations.
16. Inspect all mechanized equipment daily for leaks and clean as necessary to help ensure toxic materials, such as fuel and hydraulic fluid, do not enter the stream.

17. Refuel equipment, including chainsaws and other hand power tools, at least 100 feet from water bodies to prevent direct delivery of contaminants into a water body.
18. Do not store equipment in stream channels when not in use.
19. When replacing stream crossings, install grade control structures (e.g. boulder vortex weirs or boulder step weirs) where excessive scour would occur.
20. Adhere to the in-water work window as defined by the Oregon Department of Fish and Wildlife (ODFW) (July 1-September 15). Projects outside of this work window would require waivers from ODFW and National Marine Fisheries Service (NMFS).

Design feature from the NMFS Aquatic Restoration Biological Opinion. Required unless new consultation is completed.

21. Prior to stream crossing replacements or installations, remove fish from the vicinity of project area and dewater construction area.

Internally generated PDFs to be used whenever feasible and necessary to minimize impacts to aquatic resources.

22. Place sediment control devices such as hay bales and other silt trapping devices in areas determined to have high potential for sediment input into the stream.
23. Minimize damage of hardwoods within 50 feet of stream bank.
24. Minimize pulling or felling of trees from within 60ft of streams.
25. Where appropriate, pull or fell trees from the north or east side of a stream rather than the south or west side to minimize the reduction in shade.

To minimize the risk of placed logs and boulders moving downstream during flood events:

Oregon Department of Fish and Wildlife suggested PDF to be applied as necessary.

26. At each restoration site, use one or more key logs that are 1.5 times the active channel width and at least 24" in diameter.

Internally generated PDFs intended as guidelines to be used where appropriate.

27. Key logs would be wedged between trees on banks to prevent movement in high flow events.
28. Key boulders would be at least one cubic yard in size.

To protect objects of cultural value:

Internal standard operating procedure for compliance with Section 106 of the National Historic Preservation Act and conformance with direction from the 1995 ROD/RMP.

29. If any objects of cultural value (e.g. historic or prehistoric ruins, graves, fossils, or artifacts) are found during the implementation of the proposed action, operations would be suspended until the site has been evaluated to determine the appropriate mitigation action. Mitigation might include avoidance or systematic excavation of a portion of the site.

To reduce impacts to BLM Special Status Species & other species of concern:

Use of PDFs for special status species (not including federally listed species) is at the discretion of the decision maker and will be evaluated on a site by site basis.

Internally generated PDF.

30. Evaluate for potential habitat for BLM Special Status Species. If present, protect key habitat components where feasible. See Appendix A for details on wildlife Special Status Species.

Washington Office Instruction Memo 2008-050 on suggested management practices for migratory birds.

31. Generally, do not commence vegetation removal activities between May 15th and July 15th, to provide for critical nesting periods of migratory birds.

Management direction from the 1995 ROD/RMP (pp. 39, 49).

32. Protect raptor nest sites.
33. If raptors (golden eagles, red-tailed hawk, goshawk, etc.) are found nesting in the project area, generally activities within ¼ mile of nest sites will not occur during the critical nesting period (generally March 1-July 15th or March 1 to August 30th for the osprey, golden eagle and northern goshawk).
34. Avoid disturbance to active bald eagle nest sites their critical nesting period, as described in Table 5.

PDFs from the USFWS ARBO to be used as necessary to meet the objectives and recommendations of the National Bald Eagle Management Guidelines (USDI USFWS 2007).

35. Do not remove the largest trees from stands in bald eagle management areas, known territories, or within 1 mile from large streams or water bodies.
36. Minimize tree felling in suitable nesting habitat for the bald eagle during their critical nesting period or winter roosting period, as described in Table 5.
37. When projects are located in active bald eagle foraging areas work will begin two hours after sunrise and will cease two hours before sunset.

Internally generated PDF designed to meet the intent of the objectives and recommendations of the National Bald Eagle Management Guidelines (USDI USFWS 2007)

38. Avoid removing snags and trees with cavities.

To reduce impacts to federally listed species:

Internal standard operating procedure for compliance with the Endangered Species Act.

39. Determine if federally listed species or their suitable habitat is present within the project area.

Wildlife (Northern Spotted Owl & Marbled Murrelet)

The following PDFs are from the USFWS Aquatic Restoration Biological Opinion and are required unless separate consultation is completed.

40. When selecting trees, avoid removing the only large conifers present in the stand.
41. When selecting trees, try to remove trees along the periphery of existing openings, such as roads or harvest units.
42. When selecting trees, try to remove trees with the least complex (dense canopy, epicormic branches) canopy.

43. Design projects to avoid spotted owl and/or marbled murrelet nest trees such that it would not be necessary to remove a nest tree that posed an overhead hazard.
44. The unit wildlife biologist will determine whether an active nest (or unsurveyed, suitable spotted owl or murrelet habitat) is within the species-specific disturbance/disruption distance of the project as described in Table 5. If within threshold distances, minimize noise related impacts as described in Table 5.
45. Projects that remove or degrade suitable murrelet habitat that have been surveyed but fall within 0.25 miles of an occupied site or unsurveyed suitable habitat will be seasonally restricted from April 1 to September 15.
46. When marbled murrelet DORs are in place, projects would not begin until two hours after sunrise and would end two hours before sunset.
47. Removal of individual trees that qualify as habitat for the spotted owl will not occur within 0.25 miles of any unsurveyed suitable habitat, known nest sites, or estimated sites from March 1- September 30. This seasonal restriction may be waived until March 1 of the following year if current calendar year surveys indicate: 1) spotted owls not detected, 2) spotted owls present, but not attempting to nest, or 3) spotted owls present, but nesting attempt has failed.

Management direction from the ROD/RMP (p. 48).

48. Should surveys indicate that murrelet habitat is occupied, all contiguous suitable habitat and recruitment habitat (i.e., stands capable of becoming marbled murrelet habitat within 25 years) within a 0.5-mile radius will be protected.

Standard PDFs from USFWS ARBO or used in consultation with local USFWS (USDI USFWS 2009) for compliance with the Endangered Species Act.

49. Projects will not occur within the appropriate disruption threshold distance of:
 - a. any *known* occupied murrelet sites or unsurveyed suitable habitat in *Zone 1* during the critical nesting period (April 1 - August 5), and/or
 - b. within the 1.3 mile seasonal restriction corridors in *Zone 2* during the critical nesting period (April 1 - August 5).

In these areas, Daily Operating Restrictions (DORs) would be applied between August 6 and September 15.

50. For unsurveyed murrelet suitable habitat outside of the 1.3 mile seasonal restriction corridors in *Zone 2*, apply DORs within the appropriate disruption threshold distance or less from April 1 until August 5.

Internally generated PDFs designed to meet the intent of the USFWS ARBO. If the following PDFs cannot be applied at a site, the project would be evaluated on a site by site basis to determine if new consultation with the USFWS is necessary.

51. Projects would not remove suitable habitat trees from within designated occupied marbled murrelet sites.
52. The BLM will not affect a stand such that it would impact the ability of that stand to continue functioning as suitable or dispersal habitat for the spotted owl. This includes maintaining a canopy closure at or above the 60-80% threshold necessary to maintain suitable habitat, and maintaining the canopy closure at or above the 40% necessary to maintain dispersal habitat.
53. Interdisciplinary team will evaluate project locations when an occupied spotted owl site is within 300 meters of a project. Evaluation would determine if the proposed action may

negatively affect the function of dispersal or suitable habitat within the 300 meters distance. If the function of suitable or dispersal habitat, or the use of the area by the spotted owl is compromised then the project may be reduced in scope or not done.

Kincaid's Lupine

Internally generated PDF required unless consultation with USFWS is completed.

54. If Kincaid's lupine is present, the project will be modified as necessary to avoid effects to the plants and their habitat.

To prevent or minimize the spread of Port-Orford-cedar root disease:

PDFs from the Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-Cedar in Southwest Oregon, Coos Bay, Medford, and Roseburg Districts (USDI BLM 2004).

55. Utilize the Port-Orford-cedar risk key to identify the need for additional management considerations.
56. Clean all equipment before entering public lands.
57. Restrict restoration activities to the dry season (May 15th to October 15th)
58. Designate equipment access routes and yarding corridors in order to minimize exposure to *Phytophthora lateralis*. Minimize equipment entry points between staging area and stream. Identify areas to be avoided whenever possible.
59. Schedule operations in uninfested areas prior to work in infested areas
60. When planting seedlings in riparian areas, plant resistant Port-Orford-cedar in low-risk areas.

Table 5.
Disturbance & Disruption Threshold Distances from Nest Sites for Northern Spotted Owl, Marbled Murrelet, & Bald Eagle^{1,2}.

Activity	SPOTTED OWL			MARBLED MURRELET			BALD EAGLE	
	Disturbance Distances for Entire Breeding Period (March 1-September 30)	Disruption Distances for Entire Critical breeding Period (March 1-July 15)	Disruption Distances for remainder of Breeding Period (July 16-September 30)	Disturbance Distances for Entire Breeding Period (April 1-September 15)	Disruption Distances for Entire Critical breeding Period (April 1 – August 5)	Disruption Distances for remainder of Breeding Period (August 6-September 15)	Disruption Distances During the Critical Breeding Period (February 15-August 31) ³	Wintering Communal Roost Sites and Key Foraging Areas (November 15 - March 15)
Use of chainsaws	440 yards (0.25 mile)	65 yards	0 yards	440 yards (0.25 mile)	100 yards	0 yards	440 yards (0.25 mile) out of line of sight or 880 yards (0.5 mile) line of sight	440 yards (0.25 mile) out of line of sight or 880 yards (0.5 mile) line of sight
Use of heavy equipment, tree climbing	440 yards (0.25 mile)	35 yards	0 yards	440 yards (0.25 mile)	100 yards	0 yards	Same as above	Same as above
Impact pile driver, jackhammer, or rock drill	440 yards (0.25 mile)	60 yards	0 yards	440 yards (0.25 mile)	100 yards	0 yards	Same as above	Same as above
Type I helicopters	880 yards (0.5 mile)	440 yards (0.25 mile)	440 yards (0.25 mile)	880 yards (0.5 mile)	440 yards (0.25 mile)	440 yards (0.25 mile)	880 yards (0.5 mile)	880 yards (0.5 mile)
Type I helicopters (Hovering)		166 yards above canopy			166 yards above canopy			

Activity	SPOTTED OWL			MARBLED MURRELET			BALD EAGLE	
Type II, III or IV helicopters ² Use of fixed wing aircraft	440 yards (0.25 mile)	120 yards	0 yards	440 yards (0.25 mile)	120 yards	0 yards	880 yards (0.5 mile) (see winged aircraft below)	880 yards (0.5 mile) (see winged aircraft below)
Motorized activity							110 yards if out of line of sight	220 yards if in line of sight

1. Disturbance/Disruption Associated with noise-A **disturbance** distance is the distance within which the effects to listed species from noise, human intrusion, or mechanical movement associated with an action would have a low to discountable likelihood of adverse impact (NLAA) on a species. The **disruption** distance is the distance within which the effects to a listed species from noise, human intrusion, or mechanical movement associated with an action would have a high likelihood of adverse impact (LAA) on a species. Generally NLAA and LAA are known as “not likely to adversely affect” and “likely to adversely affect” (within the context of the Endangered Species Act (ESA) of 1973 as amended).
2. The bald eagle was delisted in 2007 and currently is in the monitoring period.
3. Management direction established in the ROD/RMP (p. 49).

CHAPTER THREE - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This chapter discusses the specific resources potentially affected by the alternatives and the direct, indirect and cumulative environmental effects¹ of the alternatives over time. The discussion is organized by individual resource in response to the issues for analysis, thereby providing the basis for comparison of the effects between alternatives.

I. Aquatic Habitat & Fisheries

Affected Environment

Aquatic Habitat

Past management activities on both public and private lands have degraded aquatic and riparian conditions and contributed to declines in fish populations (USDI BLM 2008a, p. 366). Most physical habitats in rivers and streams throughout the Roseburg District have been altered, simplified, and degraded by human activities. This has resulted in bedrock as the dominant substrate in most streams rather than gravel and cobble substrate.

Large wood is an important component of aquatic habitats and is responsible for many functions including: providing cover for fish, sediment storage for food supply and spawning grounds, nutrient retention, pool formation, and formation of off-channel habitat (USDI BLM 2008a, p. 373). Large wood refers to logs, limbs, or root wads that intrude into a stream channel (wood greater than 20 inches in diameter). The majority of stream reaches in federal, state, and private forest land are considered large wood “depleted” (Oregon Plan 1999). Stream habitat is considered “undesirable” when it contains less than 160 pieces of wood and/or less than 16 large logs per mile (Foster et al. 2001). This deficiency in large wood is most often the result of clearing of riparian forest in lowlands for agricultural purposes, road building, stream cleaning, splash damming, and timber harvest in riparian areas that has reduced the amount of wood available for stream recruitment (Figures 1 and 2). Stream cleaning was one of the most detrimental undertakings for smaller streams and is described in this quote from Bisson et al 1987:

Interest in promoting the migration of anadromous fishes to inaccessible spawning and rearing areas led post-World War II fishery managers to give more attention to debris removal in smaller streams. All along the Pacific coast, logjams were removed with the intention of opening new reaches of stream to anadromous salmonids. . . . The combination of debris removal for fish passage in headwater areas of watersheds, historical splash damming, and removal of snags and logjams from large rivers has led to situations where whole drainage systems no longer possess the debris load present in pristine, undisturbed river basins.

¹ Cumulative effects are the impacts of an action when considered with past, present, and reasonably foreseeable future actions (40 CFR 1508.7).



Figure 1: A stream being cleaned on the Roseburg District, circa 1970.



Figure 2: A splash dam similar to those used within the Roseburg District (from J.R. Sedell)

While “stream cleaning” activities can mimic natural disturbances resulting in simplified stream channels, the extensive nature of cleanout activities (i.e. occurring in virtually all fish bearing streams) has resulted in a much greater extent of simplified streams than would be expected naturally. The simplified stream habitat resulting from the activities mentioned above has resulted in a considerable decrease in high quality fish habitat throughout the Northwest (Gregory, 2003).

Locally, streams tend to follow this same trend with many channels being bedrock dominated and lacking gravels necessary for successful adult spawning (Figure 3). This same lack of gravel is also resulting in aquatic insect populations in the Umpqua that are not as healthy as those seen in other coastal basins along the mid and North Coast regions of Oregon (ODEQ, 2008).

Numerous streams also lack deep, complex pools that provide cover to juvenile fish from predators and refuge during high winter flows. Where bedrock is exposed, streams may have warmer temperatures, as bedrock absorbs solar radiation. These conditions have resulted in a decrease in spawning and rearing habitat that has likely resulted in basin-wide reductions in all salmonid populations (McKernan 1950).



Figure 3: Photo depicting a bedrock dominated channel with simplified stream habitat resulting from splash damming and stream cleaning efforts. Note the lack of stream complexity features, such as large woody debris, gravel substrate, or deep pools with hiding cover.

The clearing of riparian forest has also affected stream habitat. Riparian vegetation (including trees, shrubs, and forbs) influences aquatic habitat in several ways. Riparian vegetation (particularly size, abundance, and overall stand composition) governs the input of light and nutrients to stream channels (USDI BLM 2008a, p. 366). The amount of light reaching the stream channel also influences nutrient production within stream channels. Riparian vegetation provides organic matter to stream channels when leaves, needles, woody debris, and insects fall into the stream channel (USDI BLM 2008a). Currently the riparian areas along many streams are in poor condition. They lack native vegetation, especially trees, necessary to provide shade, bank stabilization, food for aquatic organisms, and large wood for future stream complexity.

Many man-made structures prevent or restrict the passage of aquatic species. Diversion and water-impoundment dams create some of these barriers. However, road stream crossing structures are by far the most common barrier to aquatic species. A variety of structures serve as barriers, the most common of which are stream crossings that are undersized for peak stream flows. During high flows, the stream is constricted by these undersized structures and flows through them at a high velocity, creating a scour pool and lowering the stream at the downstream end of a stream crossing. Over time, the outlet of the culvert winds up being higher than the ordinary stream level. A height of as little as a foot between a stream crossing and a stream can be a barrier to juvenile salmonids. As the height difference increases, the stream crossing can even become a barrier to adult salmonids. The Douglas Soil and Water Conservation

District, in cooperation with the BLM and other partners, has inventoried many of these barriers on both private and BLM-managed lands and ranked them for the degree to which they create a barrier (Partnership for the Umpqua Rivers 2007).

Fisheries

A variety of native anadromous and resident fish species are found on the Roseburg District. Anadromous fish are born and reared in freshwater, migrate to the ocean to grow and mature, and then return to freshwater to reproduce. Table 6 summarizes those species known to be present. While most of these fish populations exhibit substantial variability in their populations from year to year, several species have shown consistent downtrends in their overall numbers. These fish have been identified with an asterisk and will be discussed in further depth throughout this document.

Table 6: Native fish found on the Roseburg District

Native Fish Found on the Roseburg District	
*Denotes species that have shown consistent downtrends in their overall numbers.	
Anadromous Fish	Resident Fish
Spring and Fall Chinook salmon	Coastal cutthroat trout
Oregon Coast Coho salmon*	Rainbow trout
Winter and Summer steelhead trout	Sculpin spp.
Coastal cutthroat trout*	Dace spp
Pacific Lamprey*	Redside shiner
	Northern Pikeminnow
	Brook lamprey
	Umpqua chub*

Of particular importance, the Oregon Coast coho salmon (*Oncorhynchus kisutch*) is currently listed as a threatened species under the Endangered Species Act (ESA), and critical habitat for this species has been designated. The Oregon coast coho salmon is the only fish species on the Roseburg District currently listed under the ESA. As such, the majority of the District’s aquatic management emphasis is focused on restoration of coho populations and their critical habitat. In addition, any habitat supporting coho salmon (and/or Chinook salmon) is also considered Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act, and subject to the protective requirements of that act.

Umpqua chub (*Oregonichthys kalawatseti*) are a small minnow species that utilize quiet water areas along the banks of larger rivers and streams. These fish are only found in the Umpqua Basin. Due to widespread declines in their presence and total abundance throughout the Umpqua Basin over the last 20 years (Simon and Markle, 1999), they are considered to be a Bureau sensitive species. Under Bureau policy, these fish require special management consideration to avoid potential future listing under the ESA.

Other species in the Umpqua that have shown substantial and consistent population declines include the anadromous version of the coastal cutthroat trout (*Oncorhynchus clarki*) and the Pacific lamprey (*Lampetra tridentata*). These fish have habitat needs very similar to the coho salmon.

In addition to native fish species, there are numerous non-native fish species found on the Roseburg District. Many of these non-native fish interact with native fish and wildlife populations, yet very little is known about their overall impact on the native species. Impacts may come in the form of direct predation, competition for available food and habitat resources, interbreeding, or disease introduction. Further study is necessary to better understand the cumulative impacts of these non-native species introductions. Table 7 below summarizes those non-native species known to be present.

Table 7: Non-Native fish found on the Roseburg District

Non-Native Fish Found on the Roseburg District	
Striped Bass	Brook trout
Smallmouth Bass	Brown Trout
Largemouth Bass	Gambusia (Mosquitofish)
Yellow Perch	Sunfish spp.
Brown Bullhead	American Shad
Tui chub	Kokanee
Golden shiner	Flathead minnows

Environmental Consequences

How would the categories of proposed restoration activities address degraded processes and conditions of watersheds (stream complexity, connectivity, and riparian vegetation) as explained in Table 1?

No Action Alternative

Aquatic and riparian habitat would recover slowly or not at all. Recovery of aquatic habitat depends partly on the recovery of riparian vegetation, which provides and food, stabilizes banks, and serves as source of large wood. Where native vegetation is already established, riparian areas would slowly recover on their own, as the vegetation matures and begins to provide all of its functions. The rate of recovery would depend on the condition and age of the existing riparian vegetation. Some functions could recover more quickly than others. For example, a young riparian stand could start providing the stream with shade within in a decade or two. However, it might take a century before it could serve as a source of large wood. In other cases, these riparian areas would not recover without active management. Invasive species, livestock grazing, lowered water tables, and other factors can prevent native plants from becoming established.

Stream connectivity would not improve under this alternative. The many man-made structures that serve as barriers to fish migration would not be removed or replaced. Aging stream crossings

on the District would remain as fish barriers and the risk of failure would remain; should they fail, they could potentially contribute large amounts of sediment to stream channels.

Action Alternative

Acquisition of Restoration Material

The acquisition of restoration materials would have no direct impacts on the degraded processes and conditions of watersheds, because acquisition of materials alone, such as cutting trees, has no mechanism to change stream complexity or stream connectivity. These activities would indirectly affect watershed and stream conditions by providing materials to accomplish restoration work requiring the use of large wood and boulders (see effects below). In cases where acquisition of restoration materials occurs in riparian areas, individual selection of trees used for restoration purposes would be made in accordance with PDFs #23-25 to prevent measurable changes to riparian vegetation or habitat functions.

Instream Habitat Restoration

Instream habitat restoration would include placement of large wood and/or boulder to increase stream complexity (Figures 4 and 5). Placing structure in streams affects channel morphology, the routing and storage of water and sediment, and provides structure and complexity to stream systems. Effects of large wood in streams have been well documented; large wood is often the most important pool-forming agent in smaller streams, (Bisson et al. 1987); it stores gravel, fine sediment, and organic matter (Beschta 1979); and it dissipates the energy of flowing water (Heede 1976).

Complex pools and side channels created by instream wood provide overwintering habitat to stream salmonids and other aquatic organisms. They also provide cover from predators during summer low flow periods when predation is at its highest. Studies in Washington have shown that juvenile coho densities were 1.8 to 3.2 times higher in stream reaches with large wood than without (Roni 2001). Studies on Oregon coastal streams have shown that overwinter survival increased substantially in stream reaches that were treated with wood (Solazzi 2000).



Figure 4: This is an example of a bedrock dominated, simplified stream channel needing restoration. This photo was taken just after logs were placed as part of a restoration project in Cleghorn Creek (Upper Smith River watershed) in 2006.



Figure 5: This is an example of simplified stream habitat recovering after a restoration project. Gravel and sand are accumulating on the bedrock dominated channel. This photo was taken from the same location as Figure 4, but two years later (2008).

Instream restoration projects have been implemented within the Upper Smith River Watershed of the Swiftwater Resource Area of Roseburg District BLM over the last ten years. Monitoring data has shown measurable changes to the stream channel over a six year period following log placement. Detailed stream mapping surveys were done in 1998 immediately following the placement of eighteen logs along a 2500-foot segment of the South Fork Smith River. Surveys were repeated on the same segment of stream in 2000 and again in 2004.

Survey data found that after six years, stream length increased by 8 percent (implies increased stream sinuosity), bankfull cross-sectional area has decreased by six percent (implies a decrease in width to depth ratio, which means the stream has gotten narrower and deeper), the area of channel dominated by gravel has increased by 88 percent and the area in sand has increased by 115 percent. Other observed improvements include more captured natural woody debris, formation of new vegetated gravel bars, increases in cobble deposits, increased side channel development, formation of pools, and improved flood plain connectivity. These results indicate this reach of stream now has more complexity and improved aquatic habitat conditions as a result of large wood placement (Figures 4 and 5).

Placing large wood or boulders in a stream slows the velocity of flowing water and creates opportunities for the suspended sediment and gravels carried by the stream to form substrate deposits in the stream channel. The structures also tend to shift the force of the flowing water to other parts of the channel and change the existing pattern of erosion and deposition. Stream channels naturally meander back and forth across the valley bottom and have alternating periods of aggradation (channel builds up) and degradation (channel scours down) which are driven by episodic disturbance events (fires, floods, wind storms, etc.) followed by periods of recovery. Providing more channel structure encourages these natural processes to develop again, creating channel complexity and a variety of stream habitat conditions often lacking in a simplified channel. This results in better over wintering habitat, improved summer pool habitat, and more abundant spawning gravels.

Instream habitat restoration projects elsewhere on the Roseburg District are expected to have similar effects to stream complexity as those observed in Upper Smith River.

The Olalla Creek project would place logs and boulders in the stream channel with an excavator in 14 sites. About 12 to 14 access paths would be created through the riparian area. This reach of Olalla Creek is bedrock dominated, so the excavator would work predominately from the stream channel (PDF #13). The logs and boulders placed in Olalla Creek are expected to increase stream complexity similar to the effects seen in the Smith River watershed (discussed above). This project would not affect stream connectivity (discussed below) and would have short term (less than a year) impacts on riparian vegetation from the excavator access trails. A few (2-4) hardwoods may be removed to create each access trail. There may be some longer term (5 to 20 years) effects to the riparian vegetation as a result of tree removal.

Future instream restoration projects on the Roseburg District would be similar in scope and scale to the projects discussed above, and are anticipated to have similar effects. In sum, instream habitat work would restore some measure of stream complexity. These projects may temporarily impact riparian vegetation, which may be disturbed as materials are moved into place in the stream. By the very nature of the project, these projects would not affect stream connectivity.

Riparian Habitat Restoration

Riparian habitat restoration includes control of noxious weeds, planting native trees and shrubs, and installation of bio-engineered stream bank stabilization structures. These projects directly affect riparian vegetation, but would not directly affect stream complexity or connectivity. Control of noxious weed species and planting native trees and shrubs would increase the health of riparian areas by promoting species diversity. A diverse native riparian plant community consisting of annuals, perennials, woody shrubs, and trees, provides a large variety of habitat features including food sources, shade, and large wood, and rooting depths which provide stream bank stability. Diverse, healthy vegetation has a major influence on stream channel shape and size; well-vegetated streams tend to be narrow and deep due to the binding nature of plants and their root systems (Comfort 2005).

Indirectly, the stabilization of stream banks would enhance stream complexity over time by providing overhanging banks and in-channel root systems. As roots of vegetation along streambanks increase, the velocity of the stream and erosion decreases (Comfort 2005). Overhanging banks and vegetation both provide shade to the stream system, providing thermal cover, which may help moderate water temperatures and prevent or reduce algae blooms. Stream bank stabilization projects would minimize or prevent stream bank erosion and provide stable locations for native plants and shrubs to establish.

Stream Crossing Improvements

Stream crossing replacement would directly improve stream connectivity and habitat for aquatic species by immediately restoring access to formerly inaccessible habitats. Indirectly, these projects would reduce potential sediment levels in the long term by decreasing the potential for road failure. Stream crossing projects also reduce stream velocities by increasing stream crossing sizes, eliminating flow restrictions and allowing passage to additional reaches of habitat by removing barriers to aquatic species.

When there is a risk of channel bed erosion as a result of stream crossing replacement, stream grade control structures below a stream crossing are necessary (PDF #19). In these cases, boulder weirs would create step-pool habitat which would provide cover for aquatic species, capture sediments, and provide passage through stream crossings for all life stages of fish and amphibians. Stream crossing replacements and removals would provide a direct benefit to aquatic systems by increasing stream connectivity which improves access to spawning and rearing habitat and allows unrestricted movement throughout stream reaches during seasonal changes in water levels (Hoffman 2007). Stream complexity is improved slightly in cases where grade control structures are added downstream of the stream crossing projects.

While stream crossing improvements often improve stream connectivity, these projects are focused in the stream channel so there is often no mechanism to affect riparian vegetation. In some limited cases, one or two trees may need to be removed to facilitate the replacement of the stream crossing. However, this would occur to such a limited extent, that it would not have a measurable effect.

Livestock Control in Riparian Areas

Excluding livestock access from the stream channel and riparian area would improve ecological conditions within the riparian areas. Livestock tend to congregate in riparian areas due to the presence of water and green vegetation and cooler temperatures throughout the drier months. Livestock trample and graze riparian vegetation, resulting in stream bank erosion and loss of biological diversity (Belsky 1999). Excluding livestock from the riparian area would allow vegetation to reestablish and increase the likelihood of success of noxious weed treatments and native shrub and tree plantings (Sarr 2002).

Livestock exclusion projects directly affect riparian vegetation, but since there is no work in the stream channel they have no mechanism to affect stream complexity or connectivity. Livestock stream crossings, when needed, would be designed to have no measurable effect to stream complexity or connectivity.

Livestock control projects would not be conducted on Roseburg District lands and would occur as they are proposed by our partners.

Would sediment delivery to streams resulting from aquatic and riparian restoration actions measurably impact water quality?

No Action Alternative

Aquatic and riparian restoration work would be delayed or not happen at all. There would be no measurable changes to existing water quality, suspended sediment levels, or sediment transport function in streams in the near future. Over time, episodic disturbance events such as wildfire, floods, and landslides may create some pulses of sediment moving through the stream systems. Many streams would remain dominated by bedrock channel bottoms and lack the structure to capture and hold sediment entering the streams from these events or other existing sources. This condition impacts water quality by maintaining high stream temperatures. Stream crossing

improvement work would also be delayed, increasing the risk of failure in old or inadequate stream crossings during large storm events; should a failure occur, it could contribute large amounts of fine sediment to the stream systems or create a constant source of suspended sediment, reducing water quality. Livestock control in riparian areas would also be delayed resulting in potential for continued disturbance to the streambed and banks where livestock are present, which would also reduce water quality by increasing turbidity and fine sediment.

Action Alternative

Acquisition of Restoration Materials, Riparian Habitat Restoration, and Livestock Control in Riparian Areas

These groups of aquatic restoration activities would not measurably impact water quality. While potential for sediment delivery to streams exists as a result of hauling restoration materials, PDFs associated with these projects would prevent or reduce sediment entering the stream channel to a level compatible with water quality goals. Haul could occur in both the dry and wet seasons, although wet season haul would be limited to surfaced roads. Hauling during the dry season would not deliver road-derived sediment to live stream channels, because without precipitation there would be no mechanism for the transport of fine sediment into streams.

During the first seasonal rains, there could be a flush of sediment from the roads near stream crossings. However, the amount of sediment contributed from these crossings during the first seasonal rains would be negligible (so small that it could not be meaningfully measured) when compared to the amount of sediment that has accumulated within the stream network from all natural sources during the dry season (personal observation, Dammann 2004). Following the first seasonal rains, erosion rates would stabilize and sediment delivery would be indistinguishable from background levels, resulting in no measureable change to water quality.

Stream Crossing Improvements and Instream Habitat Restoration

These activities have the potential to increase suspended sediment in streams as a result of heavy equipment use or the dragging of materials (e.g. logs) in the stream channel. Short term (lasting 2-4 hours following instream work) impacts to water quality would occur in the form of suspended sediment and turbidity increases during instream implementation. However, no lasting measureable effect to water quality would occur as any sediment plume created, would quickly dissipate as soon as instream activities stop (personal observation, Dammann 2004). Long term (lasting years to decades) improvements in water quality would be expected as a result of instream habitat restoration and stream crossing improvements, for reasons discussed below.

Stream crossing improvements often replace old, deteriorating, and/or undersized stream crossings with new, larger structure allowing passage of aquatic species. Larger structures would also accommodate a wider range of stream flows and associated debris and substrate; this reduces the potential for road failures during large storm events. When roads fail, large amounts of fine sediment can enter streams, reducing water quality until repairs are made (Hoffman

2007). Improving these stream crossings before they fail would prevent the potential for that influx of sediment to the stream.

By placing large wood and/or boulder structures in streams, the ability of streams to capture and store sediment increases, which affects water quality in several ways. First, these structures would slow the velocity of flow and allow more suspended sediment to drop out and form deposits within the channel (Bisson 1987). In turn, this would improve water quality by reducing the amount of suspended sediment carried by the stream, reducing turbidity.

Second, structures placed in the channel would also capture and hold gravels moving through the system, increasing the diversity of substrate (channel material) present in these streams. Reducing bedrock exposure would reduce the amount of solar radiation penetrating the stream and being absorbed by the bedrock substrate. This reduction would help control stream temperatures, as solar radiation absorbed by bedrock substrate heats the water.

Lastly, as bedload material increases, instream structures force more of the stream flow through the finer substrate material (hyporheic flow) which tends to have a cooling effect on the water. This would result in improved stream temperature conditions (Grant 2006). By restoring some of the natural processes currently lacking in these stream systems (especially sediment routing), overall improvements in water quality are expected.

The installation of livestock crossing would be expected to reduce water quality impacts from sediment related to livestock crossing streams by providing a structure for crossing streams in a controlled area. This would focus trampling effects of hoof action in areas where trampling would not damage stream banks or cause fine sediment to enter the stream.

What are the potential impacts of sediment delivery from aquatic and riparian restoration work to listed fish species?

No Action Alternative

Aquatic and riparian restoration work would be delayed or would not happen at all. As such short-term impacts (see below) such as increased suspended sediment levels in the stream from restoration would not occur. The risk of old or inadequate stream crossings failings during large storm events would persist. Should they fail, they could contribute large amounts of fine sediment to the stream systems or create a constant source of suspended sediment that would reduce water quality. Livestock control in riparian areas would also be delayed, resulting in the potential for continued disturbance to the streambed and banks where livestock are present, in turn reducing water quality by increasing turbidity and fine sediment.

While short-term impacts to the stream would be prevented, stream recovery would also be delayed. Stream habitat would continue to be simplified with a lack of large wood, complex pools, and spawning gravels. Adult fish would continue to have limited spawning habitat and juvenile fish would have limited cover during winter flows, resulting in decreased survival rates. Stream recovery would happen slowly (decades or centuries, depending on riparian stand age and the frequency and intensity of natural disturbance events) as riparian trees age and fall into

the stream. These trees would eventually collect gravels, decrease stream energy, and create deep complex pools that would create high quality fish habitat.

Action Alternative

Aquatic and riparian restoration activities have the potential to increase suspended sediment in the stream due to heavy equipment (excavator, skidder, etc.) use in the stream channel or riparian area. Some actions would not use heavy equipment in the channel or riparian areas but could have similar impacts from dragging logs through the stream channel (e.g. cable log placement). The proposed actions using heavy equipment (or having similar impacts) in or near the stream channel are listed in Chapter 2, Table 2.

In some cases, concrete footers may be attached to underlying bedrock and secured with rebar. In these cases, there would be a short-term indirect affect to water quality. Drilling of bedrock would occur above the waterline and while the affected project area was dewatered. As flow returns to the site, fine sediment generated from drilling and any increase in turbidity would be short-lived and would quickly be dissipated within several hundred feet downstream from the site. Direct effects to fish would be negligible as fish would be removed from the site prior to the start of construction work.

Activities that do not use heavy equipment in the stream are usually accomplished utilizing hand tools in the riparian areas, such as riparian planting. Experience has shown that the small scale of the soil disturbance by hand tools does not measurably increase suspended sediment in the stream channel. The acquisition of large wood and placing wood by helicopters does involve falling or dropping trees or logs into the stream channel. Experience has shown that these actions do not measurably increase suspended sediment in the stream channel. As such, proposed actions not involving heavy equipment (or with similar impacts) will not be discussed further because they have no mechanism to impact fish habitat.

PDFs #5-7, 9-12, 14 and 15 would help limit sediment input into streams, but they cannot eliminate it. Heavy equipment use would result in short-term localized increases in suspended sediment to streams (see below), because of stream channel and stream bottom disturbance. Increases in suspended sediment or turbidity (a measure of suspended sediment) would occur during actual installation activities and through the first winter following installation. Summer turbidity plumes have the potential to increase stress levels on juvenile salmonids, but rarely result in mortality (personal observation, McEnroe 2005). A prolonged increase in stress in salmonids has been shown to decrease growth rates and survival (Suttle 2004). Turbidity plumes during the first winter would cause an immeasurable increase in turbidity above background levels. After the first winter, sediment inputs would be immeasurable as disturbed areas stabilize and revegetate.

Based on observations from the field, turbidity plumes from instream equipment use generally dissipate within an hour or two after the equipment leaves the stream channel (personal observation, McEnroe 2005). Past restoration projects have shown that turbidity increases for a project are usually less than 8 hours a day for no more than 14 days. Instream work is done during summer low flow periods when turbidity plumes are an infrequently occurring event.

Additionally, instream work is typically accomplished with only one piece of heavy equipment, so only a short reach of stream (< 200 meters) is impacted at any one time. Salmonids and other fish at project sites will experience short term increases in stress from elevated turbidity levels, but they will not be exposed to long term stress which would decrease survival rates. The PDF's discussed above will prevent any indirect effects to salmonids and other stream fish from project related sediment.

The Olalla Creek project would place logs and boulders in the stream channel with an excavator at 14 sites. About 12 to 14 access paths would be created through the riparian area. This reach of Olalla Creek is bedrock dominated, so the excavator would work predominately from the stream channel (PDF #13). Generally, excavator projects are completed more quickly than cable yarder projects. Olalla Creek would experience heavy equipment in the channel and suspended sediment plumes for 4 to 8 hours per day for up to three days. Juvenile fish in Olalla Creek would experience stressful conditions during this time, but mortality is expected to be low (< 10 fish). Mortality rates are based on monitoring conducted during past cable yarder and excavator log placement projects. Future projects on the Roseburg District are similar in scope and scale to the projects discussed above, thus the effects to juvenile fish should be similar.

While there would be some short term impacts (hours to weeks), the long term effects would benefit fish. Instream structures would provide benefits to fish during the first winter flow and continue to develop more complex habitat each winter. Juvenile and adult fish populations would be expected to stabilize and increase in areas where restoration projects occur, as instream habitat projects trap gravels and increase the amount of spawning areas. As discussed previously, replacing old or undersized stream crossings would prevent road failures, averting the potential for those failures to introduce large amounts of fine sediment to the system, potentially causing stress and mortality to juvenile and adult fish.

II. Terrestrial Habitat & Wildlife

Affected Environment

The Roseburg District BLM manages approximately 426,000 acres of land, mostly forested, in a variety of forest age classes. These forests provide habitat for two federally listed (as threatened) species, the northern spotted owl (*Strix occidentalis caurina*) and the marbled murrelet (*Brachyramphus marmoratus*) (USDI USFWS 1990; USDI USFWS 1992).

The spotted owl is found in all of the ranked fifth-field watersheds (Table 3) in the Roseburg District, where the owl would generally use older forested habitats with characteristics required for nesting, roosting, foraging, and dispersal. Forests that provide suitable habitat for nesting, roosting and foraging are typically older than 80 years of age, include trees that are > 20" DBH, and have a multi-layered, multi-species canopy dominated by large overstory trees; moderate to high canopy closure (60-80%); a high incidence of trees with large cavities and other types of deformities; open space within and below the upper canopy; numerous large snags; and abundant amounts of large size dead wood on the ground (Thomas *et al.* 1990, USDI USFWS 1990, USDI USFWS 2008b).

Generally, the greater the average tree diameter, the greater the quantity and quality of the suitable habitat characteristics. The amount of suitable habitat in the ranked watersheds (Table 3) is 215,000 acres (Table 8).

Dispersal habitat for the spotted owl generally consists of conifer-dominated forest stands with canopy closures of 40 percent or greater and an average DBH of 11” or greater (Thomas et al. 1990). These stands provide structural components such as snags, coarse woody debris and prey species that allow spotted owls to move between blocks of suitable habitat and juveniles to disperse from natal territories (USDI BLM 2009). Dispersal habitat (forest stands under 20” DBH) tend to have an average of 200 trees per acre (Roseburg District-local thinning plot exams) and the available acres of dispersal habitat in the ranked watersheds is 76,001 acres (Table 8).

Dispersal habitat within 300 meters of a spotted owl nest is important to spotted owl nest sites because it can provide foraging and roosting areas when suitable habitat is limited (USDI BLM 2009). Similarly, suitable habitat within 300 meters of a nest site is important to the function of spotted owl site selection. The U.S. Fish and Wildlife Service has concluded that thinning of suitable or dispersal habitat within 300 meters of a nest site may cause harm to the northern spotted owl if the action removes or downgrades suitable habitat or alters the function of dispersal habitat (USDI USFWS 2008a). Given that the Roseburg District has 162 known spotted owl sites (Roseburg Survey Data 2008) with a documented pair or suspected pair/single status, the potential exists that a restoration project may fall within 300 meters of a spotted owl nest site.

The U.S. Fish and Wildlife Service published the most recent final rule on critical habitat for the spotted owl on July 13, 2008 (USDI USFWS 2008). The final rule designated a total of 150,837 acres in the Roseburg District but 56 percent (83,944 acres) is currently suitable habitat for the spotted owl (USDI BLM 2009). Critical Habitat for the spotted owl, as designated, describes the Primary Constituent Elements or physical and biological features essential for the conservation of the northern spotted owl. These features include forest types (e.g. mixed conifer forest) that support the spotted owl and nesting, roosting, foraging and dispersal habitat (USDI USFWS 2008b) previously discussed. Although critical habitat is present in four of the ranked watersheds (Table 3) only the projects proposed in the Upper Smith River watershed (Table 4) are inside a critical habitat unit at this time.

Older forests also provide habitat for the marbled murrelet. This robin sized seabird generally nests in Oregon forests within 28 miles of the coast (Lank et. al. 2003), where they use forests with canopies dominated by large overstory trees, trees with large diameter mossy branches (generally > 5.9” in diameter) that can serve as platforms for egg laying, or other platform forming conditions like branch deformities from dwarf mistletoe infections, branch overcrowding, natural depressions on large limbs, limb damage, or old stick nests, (Lank et. al. 2003, Hamer and Nelson 1995). The availability of trees with platforms is critical to habitat suitability for the marbled murrelet (McShane et al. 2004) and forest stands greater than 80 years old will have trees with platforms, but the quality (greater diameter, moss and lichen substrates) and quantity (number of trees with platforms and number of platforms per tree) is more apparent in older stands (>150 years of age) within the proposed action area.

While typically found near the coast, marbled murrelets are documented on the Roseburg District, 29-49 miles from the Oregon coast. To date, there are 16 sites considered occupied by murrelets and one documented location of a nest tree on the Roseburg District. Like other areas in Oregon and Washington (Burger 2002) the known sites are in stands dominated by Douglas-fir and western hemlock, and are generally in forest stands 32 to 300+ acres in size. Although murrelets appear to select forest stands greater than 125 acres for nesting (Burger 2002), they have also been found nesting in stands as small as one acre (Nelson and Wilson 2002).

The murrelet sites are located within two management zones (Zone 1 and Zone 2) (USDA and USDI 1994). Zone 1 extends 35 miles from the Oregon coast and Zone 2 continues from 35 miles to 50 miles inland. Eight of the Roseburg District fifth-field watersheds are partially within one or both management zones. The amount of suitable habitat for the murrelet in each zone within the ranked watersheds is variable (300+ to 17,000+ acres) (Table 8). The potential loss of suitable murrelet habitat within the watersheds is a concern, because declining numbers of murrelets have been linked to removal and degradation of available suitable habitat (reviewed in USDI USFWS 2007).

There is a possibility that proposed actions may occur in the vicinity of a murrelet nest tree. Murrelets are known to nest throughout a forest stand, including near both natural edges (e.g. streams, forest gaps, wetlands) and near man-made edges like roads, clear-cuts, and young regenerating forests (McShane et al. 2004). Data from tree climbing and radio telemetry indicates that most (76%) murrelet nest trees are found near an edge, most commonly near a natural edge (McShane et al. 2004).

The U.S. Fish and Wildlife Service designated critical habitat for the marbled murrelet in 1996 (USDI USFWS 1996) and described Primary Constituent Elements that support nesting, roosting, and other normal behaviors essential to the conservation of the marbled murrelet. The Primary Constituent Elements include: 1) individual trees with suitable nesting platforms, and 2) forested areas within 0.8 kilometers (0.5 miles) of nest trees with a canopy height of at least one-half the site-potential tree height (61 FR 53843). The U.S. Fish and Wildlife Service proposed to remove from designation approximately 254,070 acres of murrelet Critical Habitat in Zone 2 (73 FR 44678-44701), but final rule is not yet published. Given the status of marbled murrelet critical habitat and the programmatic nature of this EA, the analysis focuses on impacts to primary constituent elements of habitat for the marbled murrelet.

Table 8. Approximate amount of Spotted Owl and Marbled Murrelet Habitat in the Ranked Fifth-field Watersheds, Roseburg District BLM.

Fifth-field Watershed	Spotted Owl Suitable Habitat (Acres)¹	Spotted Owl Dispersal Only Habitat (Acres)²	Marbled Murrelet Habitat in Zone 1 (Acres)³	Marbled Murrelet Habitat in Zone 2 (Acres)⁴
<i>Upper Smith River</i>	11,237	6,757	5,124	6113
<i>Rock Creek</i>	13,756	5,274	0	0
<i>Canton Creek</i>	12,188	1,076	0	0
<i>Upper Umpqua River</i>	29,027	11,004	11,301	17,705
<i>South Umpqua River</i>	32,630	8,065	0	0
<i>Myrtle Creek</i>	16,819	4,295	0	0
<i>Lower Cow Creek</i>	25,190	2264	0	15,433
<i>Elk Creek</i>	16,605	13,890	1,309	13,622
<i>Olalla-Creek Lookingglass Creek</i>	15,023	3,624	0	15,023
<i>Middle South Umpqua River-Dumont Creek</i>	5,270	1,541	0	0
<i>Middle North Umpqua River</i>	7,757	1,941	0	0
<i>Lower North Umpqua River</i>	6,070	1,369	0	0
<i>Little River</i>	8,046	2,814	0	0
<i>Middle South Umpqua River</i>	3,006	2,001	0	854
<i>Calapooya Creek</i>	3585	3812	0	1134
<i>Lower South Umpqua River</i>	1,555	1,052	0	369
<i>Middle Fork Coquille River</i>	7,346	5,222	340	6,480
Totals	215,110	76,001	18,074	70,622

1-habitat used by spotted owls for nesting, roosting, and foraging for food (NRF). 2-Forest stands 40-79 years that allows spotted owl movement between blocks of habitat; 4-Murrelet Zone 1 extends from the Oregon coast to 35 miles inland; 4-Murrelet Zone 2 extends from 35-50 miles inland from the Oregon coast (USDI and USDA 1994).

As stated previously, both the spotted owl and marbled murrelet prefer older forest habitat with large, overstory trees; these stands are also potential sources of large wood for use in restoration projects. In stands greater than 150 years of age, the weighted average number of trees/acre (> 36" DBH) is 6-10, depending on the site class (classification of an area's relative productive capacity) (Kintop, personal communication, 2009).

Tables 9 and 10 demonstrate that on a per acre basis, as tree diameter increases, the relative abundance of trees in that size class decreases. This means that larger diameter trees potentially providing nesting habitat components for the murrelet or spotted owl represents a lower proportion of the total trees present in any one acre of forest. Table 11 demonstrates the wide range of available trees with suitable habitat features at a watershed scale and within the watershed's riparian area (the likely source area for most large wood for restoration projects).

Table 9. Average Live Conifer Trees/Acre (by 10” DBH Class) in Stands 40-80 Years Old (Northern Spotted Owl Dispersal Habitat) (Graham, personal communication, 2009).

Size Class	Average No. Trees/Acre	Percent of Trees in each Size Class Potentially Affected per Acre (2 trees)
3-9”	165	--
10-19”	60	--
20-29” DBH	7	29%
30-39” DBH	1	100%
40” DBH +	0.5	100%
Total >20”DBH	8.5	24-47% (based on 2-4 trees being removed)

Table 10. Average Live Conifer Trees/Acre (by 10” DBH Class) in All Stands 80+ (Northern Spotted Owl Suitable Habitat) (Graham, personal communication, 2009).

Size Class	Average No. Trees/Acre	Percent of Trees in each Size Class Potentially Affected per Acre (2 trees)
3-9”	74	--
10-19”	36	--
20-29” DBH	17.5	11%
30-39” DBH	7.8	25%
40” DBH +	4.7	50%
Total >20”DBH	30	7-13% (based on 2-4 trees being removed)

Table 11. Potential change of forest stands from tree removal at various scales and locations.

Scale	Acres of Stands greater than 80 years old	No. of Trees >20"DBH	No. of Trees >20"DBH Potentially Removed	Percent of Trees >20"DBH Removed	Acres of Stands greater than 150 years old	No. of Trees >36"DBH in Stands greater than 150 years old	No. of Trees >36"DBH Potentially Removed ^c	Percent of Trees >36"DBH Removed
<i>Acre</i>	-	30	4	13	-	6-10 ^d	2	20-33
<i>All 17 Watersheds</i>	215,110	6,453,300	15,980 ^b	0.25	143,616	861,696	680 ^b	0.07
<i>Average Watershed</i>	12,654	379,620	940 ^a	0.25	10,258	61,548	40 ^a	0.06
<i>Range</i>	1,555-32,630	46,657-978,900	940	2.0-0.09	718-23,632	4,308-141,792	40 ^a	0.02-0.9
<i>Riparian Areas(4-8 Stream Orders)</i>	11,912	357,360	940	0.3	8253	49,518	40 ^a	0.08
<i>Marbled Murrelet Zone 1</i>	44410	1,332,300	940 ^c	0.3	23482	140,892	40 ^a	0.02
<i>Marbled Murrelet Zone 2</i>	79382	2,381460	940 ^c	0.2	43158	258,948	40 ^a	0.01
<i>Marbled Murrelet Riparian Area Habitat</i>	6,631	198,930	900	0.4	3,805	22,830	40 ^a	0.17

a-refers to potential 940-or 40 trees per watershed; b-number of trees per watershed times the number of ranked watersheds; c-assumes that all watershed are completely in the mentioned zone but many watersheds are bisected by the zone boundary. The distribution of 940 trees relative to the outside and inside the zones is not known; d- minimum weighted average number of trees/acre (>36"DBH) is 6-10 in stands 150 years of age (Kintop- personal communication 2009); e-the two trees >36"DBH that may be removed are a subset of the 940 total trees >20"DBH in the fifth-field watershed.

Instruction memorandum 2008-050 provides guidance for the BLM to meet responsibilities under the Migratory Bird Treaty Act (MBTA) and Executive order 13186 “Responsibilities of Federal Agencies to Protect Migratory Birds”. The guidance provides a list for “Birds of Conservation Concern” and “Game Birds below Desired Condition” to be addressed by federal agencies during environmental analysis of agency actions and plans.

Game birds listed that may be affected by the proposed projects includes the harlequin duck, the wood duck, and the band-tailed pigeon. The harlequin duck is a Bureau Sensitive Species that nests (April-June) on the ground or tree cavities near fast-flowing streams reaches with mature and old-growth forest cover (Lewis and Kraege 1999). The wood duck utilizes tree cavities (6-66 feet above ground; Lewis and Kraege 1999) for nesting in the vicinity of wooded swamps, flooded forests, marshes, or ponds (Ehrlich et al.1988). The band-tailed pigeon in Oregon nests primarily in Douglas-fir trees within a closed canopy (>70%) (Leonard 1998).

The latest list of “Birds of Conservation Concern 2008” (USDI USFWS 2008d) identifies 37 Bird Conservation Regions (BCR) in North America and the bird species in each region. Thirty two species are identified in BCR 5(North Pacific Rainforest), the region that includes the Roseburg District BLM. Eight species (bald eagle, peregrine falcon, marbled murrelet, rufous hummingbird, Allen’s hummingbird, olive-sided flycatcher, willow flycatcher and purple finch) are documented in the Roseburg District.

The peregrine falcon is unlikely to be present at project sites since they are generally associated with cliffs and rocky outcrops. However, a project may be in the vicinity of suitable peregrine falcon habitat.

The olive-sided flycatcher is strongly associated with natural or man-made openings where tall trees or snags are available for perching and singing (Altman 1999). These habitat characteristics are present throughout the proposed project area.

Similar to habitat associations documented in the Pacific Northwest, the rufous hummingbird is found throughout the Roseburg District along “forest edges and openings with a diversity of flowering plants for feeding and open space for aerial displays of courtship” (Altman 1999). This habitat is readily found in early-seral conditions dominated by shrub species and “late-successional habitats which have a highly developed and diverse understory of herbaceous plants and shrubs, particularly within large openings (e.g., tree fall gaps, wind throw, blowdown) that naturally occur in these forests (Altman 1999). The limiting factor for the rufous hummingbird is nectar and territories with sufficient flowers to meet energy needs, shrubs and trees for nesting, and presence of insects for feeding young and dispersing juveniles (Altman 1999).

Environmental Consequences

What are the potential impacts of noise disturbance and modification or removal of dispersal habitat on the northern spotted owl and its dispersal habitat?

No Action Alternative

Not implementing the proposed action would result in spotted owl dispersal habitat remaining at present levels (Table 8) until habitat is modified or removed as a result of future management actions or natural events like tree growth, wind throws, fire, bug kill, etc. Noise from implementation of the proposed actions (Table 2) would not occur, hence, there would be no potential for disturbance from this noise. Noise would remain at the normal levels associated with management activities or the use of forest roads and trails by people.

Action Alternative

Acquisition of Restoration Materials

As described in Chapter 2, the proposed action provides for the removal of some trees less than 20" DBH, though most trees sought for restoration work would be greater than 20" DBH. Often, trees < 20" DBH utilized would be from dispersal habitat – stands between 40 and 79 years old. Table 9 illustrates the abundance of trees by size class in dispersal habitat. On average, dispersal habitat is comprised of smaller trees – with approximately 225 trees <20" DBH per acre and approximately 8.5 trees > 20" DBH per acre.

Because PDF #40 would prevent removal of the only large conifers from a stand, the BLM anticipates using smaller diameter (<20" DBH) trees for aquatic restoration within dispersal habitat. The impacts from this tree removal are examined at both a local (acre) and fifth-field watershed scale.

Local scale

Removal of some trees from stands that function for dispersal is less likely to modify the structure and function of dispersal habitat than with suitable habitat. Dispersal habitat has a larger number of trees per acre than suitable habitat; dispersal habitat generally averages more than 200 trees per acre. While the BLM does not quantify a specific number of trees < 20" DBH for potential use, if one assumed the use of 10 trees per acre for a given project that would result in removing only 4% of the trees < 20" DBH from that acre. When considering the incidental removal of trees < 20" DBH along with the use of PDF #52, the stand would continue to function as dispersal habitat.

Tree removal within 300 meters of a spotted owl site is especially sensitive given the potential impacts on the spotted owl. PDF #53 would provide for evaluation of site specific intensity and distribution of tree removal; in the event potential tree removal would change the function of the habitat the action would be modified or not conducted within 300 meters of a known occupied spotted owl site. However the small scale of the removal and potential wide distribution of tree removal would likely not affect the overall function of this important area around spotted owl sites.

Use of PDF #44 would eliminate the possibility that noise associated with the removal or transportation of trees may disrupt any nesting spotted owl or marbled murrelet in the vicinity of any local project area.

Watershed Scale

As discussed above, given the abundance of trees < 20" DBH in dispersal habitat (Table 9) and the PDFs, the removal of trees would not affect the function of dispersal habitat at a stand scale. Because the proposed action is not expected to impact the overall ability of individual stands to function as spotted owl dispersal habitat, it is unlikely that the proposed action could cumulatively affect the function of dispersal habitat at a broader, watershed scale.

What are the potential impacts of noise disturbance and habitat modification or removal of suitable habitat components on the northern spotted owl and marbled murrelet?

No Action Alternative

Not implementing the proposed action would result in murrelet or spotted owl suitable habitat remaining at present levels (Table 8) until habitat is modified or removed as a result of future management actions or natural events like growth, wind throws, fire, bug kill, etc. Noise from implementation of the proposed actions (Table 2) would not occur, hence, there would be no potential for disturbance from this noise. Noise would remain at the normal levels associated with management activities or the use of the forest roads and trails, by people.

Action Alternative

Acquisition of Restoration Materials

The proposed action would potentially remove habitat components for the northern spotted owl and marbled murrelet by taking trees, especially trees > 20" DBH, from stands for use in restoration work. The Roseburg District established assumptions on the amount of large wood that could be used on an annual basis, based upon experience doing similar projects (see Table 2). In sum, up to four larger trees (two between 20"- 36" DBH, two > 36" DBH) could be removed per acre for use in restoration work. This would be limited at the fifth-field watershed scale to no more than 900 trees 20-36" DBH and no more than 40 trees > 36" DBH removed per fifth-field watershed for the life of this analysis. The impacts from this habitat removal are examined at both a local (acre) and fifth-field watershed scale.

Local scale

Table 10 illustrates the abundance of trees by size class in suitable habitat. On average, there are approximately 110 trees < 20" DBH per acre in suitable habitat. The incidental removal of individual trees in these smaller diameter sizes would not change the overall canopy closure, would not remove primary habitat components and so would not alter the function of suitable habitat for the spotted owl.

The removal of trees exceeding 20" DBH would reduce canopy closure and canopy complexity at the acre and project scale. The removal of trees > 36" DBH would cause the loss of nesting and roosting structure for the northern spotted owl. Tree removal within 300 meters of a spotted owl nest site may impact the species by removing components of suitable habitat used for

nesting. The 300 meters surrounding a nest site are particularly important to nesting owls. PDF #53 would provide for evaluation of site specific intensity and distribution of tree removal; in the event potential tree removal would change the function of the habitat the action would be modified or not conducted within 300 meters of a known occupied spotted owl site.

Use of PDF #53 would avoid removing suitable habitat components in the vicinity of a known site thus maintain suitable habitat function and reduce the potential to harm the spotted owl. Removal of trees (>20" DBH) could modify the canopy closure (60-80%) typical of spotted owl habitat. PDF #52 would maintain the higher levels of canopy closure in the project area to ensure that suitable habitat would continue to function.

In marbled murrelet zones 1 and 2, the removal of trees > 36" DBH would cause the loss of nesting platforms for the murrelet because older, taller, and larger diameter trees tend to have more platforms per tree (reviewed by McShane 2004) an important component of murrelet nesting habitat (Nelson 2006).

Given an assumed average of 6-10 trees > 36" DBH per acre, the removal of two trees per acre could result in a 20-33% reduction those trees per acre. However, PDFs would prevent removal of the only large conifers in a stand (PDF #40). Additionally, PDFs would guide the selection of trees that provide the least relative habitat for the spotted owl and marbled murrelet, by focusing on trees with the least complex canopy at the periphery of openings, such as harvest units. Under PDF #51, no suitable habitat trees would be removed from occupied murrelet sites.

While habitat function at the acre scale would be affected through the removal of habitat components, the overall function of the surrounding stand would remain. When considering the limited scope of tree removal with the PDFs restricting when and how large trees are selected and removed, the stand would continue to function as suitable habitat for the northern spotted owl and marbled murrelet after the removal of large trees. Direct impacts to the murrelet or spotted owl from removal of trees from suitable habitat would be mitigated by implementing surveys (PDF #44, 45, 47, 48, 53) to determine use and occupancy of the project area by the spotted owl or marbled murrelet and imposing seasonal restrictions as necessary.

The removal of trees has the potential to create noise disturbance that could affect spotted owls or marbled murrelets. Use of seasonal restrictions, threshold distances (Table 5) and PDFs #44, 48-50, 52-53 would reduce impacts from noise associated with tree felling, tree pulling, and yarding of trees. The noise would be reduced to a level that avoids disruption of spotted owl nesting efforts and avoids potential failure of successful reproduction (USDI USFWS 2007). Should nesting murrelets be in a project area, the threshold distances and daily operating restrictions established in PDFs #46, 49-50 would permit murrelets to successfully select platforms and feed young by focusing disturbance outside the critical nesting period and outside critical daily periods.

Watershed scale

Because the proposed action is not expected to impact the overall ability of individual stands to function as suitable spotted owl habitat, it is unlikely that the proposed action could affect the function of suitable habitat at a broader, watershed scale. The same PDFs that would be

effective at limiting impacts at a site scale would reduce or avoid impacts at a larger scale. However, there is value in examining the impacts at this scale to understand the impacts in relation to available habitat and how resources may be affected cumulatively over time. To illustrate this, Tables 8 through 11 provide the broader context for evaluating effects of the site-specific removal of large trees (20-36" DBH and > 36" DBH).

As demonstrated in Table 8, habitat for the spotted owl is present in all the ranked watersheds and about 50 percent of the watersheds have habitat for the murrelet. Similarly, Table 11 shows that the proposed project would potentially remove a relatively small number (15,980) of trees from the total 6,453,300 trees > 20" DBH from the ranked watersheds. Table 11 also shows that removing 40 trees per watershed amounts to a total of 680 trees > 36" DBH across the District. The 680 trees come from an estimated 861,696 trees > 36" DBH, removing 0.07 percent of the large trees at the watershed scale.

For the murrelet the impact on habitat from tree removal at the watershed scale would be low. Table 11 shows that in the riparian areas and the murrelet zones, the percent of the trees removed from the watershed is less than 1.0 percent. Given the low number of trees removed at the watershed scale, and use of the PDFs, tree removal would not change the overall function of the forests as suitable habitat or appreciably change the overall function of critical habitat for the spotted owl or the murrelet. The availability of the primary habitat components in these critical habitat units would remain relatively unchanged and the function of the critical habitat would continue.

Instream Habitat Restoration

The placement of restoration materials in the stream by using cable systems, excavators, etc. would create noise that could disturb both the spotted owl and marbled murrelet during their critical nesting periods. The use of large helicopters to transport logs to the stream would have the greatest potential for impact to both the spotted owl and marbled murrelet or their habitat. Large helicopters are louder than other types of heavy equipment, and create a down draft strong enough to break branches or tree tops (personal communication, Espinosa 2009).

Using the PDFs #46, 47, 49-50 and Table 5 would focus disturbance outside the critical nesting period and beyond critical distances for both the spotted owl and marbled murrelet. These PDFs would reduce impacts from noise to a level that would permit a nesting pair of spotted owls to successfully reproduce, and the PDFs would reduce potential impacts to a level such that behavior of adult murrelets feeding sessions would not be modified or cause disturbance to a nestling murrelet.

Riparian Habitat Restoration

The proposed projects for riparian habitat restoration could create noise disturbance (heavy equipment or groups of people) within habitat for both the spotted owl and marbled murrelet. Using the PDFs #46, 47, 49-50 and Table 5 would focus disturbance outside the critical nesting period and beyond critical distances for both of these species. Following the PDFs would reduce the likelihood of disturbance to a level that would permit a nesting pair of spotted owls to

successfully reproduce and stay in its territory. Implementing PDFs would also reduce the likelihood of disturbance to a level that would prevent modification of murrelet feeding cycles of young during the critical nesting period.

Riparian habitat restoration work could further affect the spotted owl. Generally the projects proposed (e.g. eradication of noxious weeds, bank stabilization, planting native trees and shrubs) would impact spotted owl habitat at the shrub, grass, and forb layers. The change from a plant community dominated by a single weed species or a few weed species to a more diverse, multi-species plant community could increase the population levels of small mammal species (i.e. rodents). Research showing a cause and effect relationship between these types of restoration projects and prey species eaten by the spotted owl is lacking. However, research does show that riparian areas are disproportionately important to mammals in Oregon and Washington because of their high structural diversity (many plant species and sizes) (Kauffman et al. 2001). Therefore it's not unreasonable to expect a beneficial long term indirect effect on some of the spotted owl prey base as a result increasing the plant community diversity along the riparian areas.

Further impacts to the marbled murrelet are not expected from this type of restoration activity because the murrelet feeds in the Pacific Ocean on small fish species (reviewed by McShane et al. 2004) and is not reliant on low layer (i.e. shrub or forb) riparian vegetative communities.

Stream Crossing Improvements

Projects to improve fish passage may include replacing stream crossings, modifying stream crossings or permanently removing stream crossings. Heavy equipment (such as excavators and trucks) would create noise during project implementation. Should these projects occur in areas within or adjacent to suitable habitat for the spotted owl or marbled murrelet, use of PDFs #46, 47, 49-50 and Table 5 would reduce impacts from noise. Impacts from noise would be reduced to a level that would permit a nesting pair of spotted owls to successfully reproduce and stay in its territory. Following the PDFs would also reduce the likelihood of disturbance to a level that would prevent modification of murrelet feeding cycles of young during the critical nesting period.

On occasion, removal or replacement of stream crossings requires cutting trees greater than 20' DBH. This tree removal would be considered part of the tree removal discussed earlier in the Acquisition of Restoration Materials section.

Livestock Control in Riparian Areas

Installation of fences or other devices to control use of riparian areas by cattle may cause disturbance to the spotted owl if suitable habitat is within or adjacent to the project area. Following PDFs #47 and Table 5 would reduce the impact from noise to a level that would permit a nesting pair of spotted owls to successfully reproduce and stay in its territory.

Similarly, installation of fences or other devices to control use of riparian areas by cattle may cause disturbance to the murrelet if suitable habitat is within or adjacent to the project area.

Following PDFs #46, 49, 50 and Table 5 would reduce the impact from noise to a level that would allow murrelets to nest and feed the young during the critical nesting period.

How would the categories of proposed restoration activities alter wildlife habitat within riparian areas?

No Action Alternative

Riparian areas that are currently degraded (lacking down wood in the stream channel, lacking rock and cobble features, lacking pools, or featuring high water velocities or invasive vegetation species) would remain degraded. Riparian areas that lack down wood, a key component (Bisson et al., 1987) of stream system health, would remain at a reduced capacity to afford protection and habitat for birds, amphibians, reptiles, and small mammals (Kauffman et al. 2001).

Action Alternative

Generally speaking the proposed activities would modify the current conditions at the project scale. These changes (restoring native plants, increasing gravel, boulder and down woody debris) would change the small and large scale habitat conditions important to over 300 species of wildlife associated or closely associated with riparian areas (Kauffman et al. 2001). Increasing vegetation diversity generally contributes to restoring habitat for a broad group of animal species including bees, other insects, rodents, bats, and birds (Golet et al. 2008). This is especially true a few (less than ten) years after treatment (Golet et al. 2008). Large wood in the stream channel can greatly influence the biological characteristics (cover, food, nutrient uptake) (Kauffman et al. 2001) in the riparian area. Restoring hydrologic and disturbance regimes can help maintain bird diversity by changing the plant community in riparian and wetland environments (Kauffman et al. 2001).

As such, the proposed action may provide varied benefits to wildlife. For example, the proposed action may increase cover for amphibians, increase shrub species along the flood plains that benefit resident and migrant bird species, increase plant diversity, increase in rodent populations (an important food source for a number of predators), and provide longer water availability for wildlife.

Because these projects are relatively small in regards to the amount of habitat treated, changes and benefits should be expected at a localized scale. At the watershed scale these changes may not be noticeable until enough is done throughout one or many watersheds to create a net benefit to the various systems (hydrology, vegetative, animal).

What are the potential impacts of the proposed actions on migratory birds of conservation concern?

No Action Alternative

Not implementing the proposed action would result in migratory bird habitat remaining at present levels until habitat is modified or removed as a result of future management actions or natural events like growth, wind throws, fire, bug kill, etc. Noise from implementation of the proposed actions (Table 2) would not occur, hence, there would be no potential for disturbance

from this noise. Noise would remain at the normal levels associated with management activities or the use of the forest roads and trails, by people.

Action Alternative

Impacts to the harlequin duck and wood duck would be minimal because PDF #38, retention of snags and other trees with cavities, and #31, implementation of vegetation removal projects after July 15, would likely eliminate direct impacts to these somewhat uncommon species.

Restoration projects that remove trees would remove potential nesting components for the band-tailed pigeon but the remaining stands would retain function for nesting and roosting because various wildlife PDFs would ensure that snags and high canopy closure (60-80%) would remain after tree removal. Additionally, implementing projects after July 15 would reduce direct impacts to nesting band-tailed pigeons. However, the species can nest through the month of September and the possibility exists that nesting band-tails may be directly harmed during tree cutting. The probability of occurrence is not known.

Habitat for the willow flycatcher (hardwood woodland), purple finch (mixed conifer-deciduous forest), and Allen's hummingbird (thicket, brushy slopes) would not be directly modified by the proposed action and these species will not be discussed further.

Noise associated with tree placement, log cutting, or stream crossing replacement could disturb the peregrine falcon during the critical nesting period (Appendix A). However, use of PDFs #33 would reduce the likelihood and degree of impacts to the species to a low level in the project area.

Although this species is declining in Oregon, there is little information on the effect of management activities on the olive-sided flycatcher (Altman 1999). Removal of trees greater than 20" DBH may modify (enlarge) edge habitat conditions or create edge habitat conditions important to the olive-sided flycatcher. Other impacts associated with tree removal would include removal of nesting habitat at the local project scale. PDF # 38 would minimize removal of snags and mitigate potential impacts to the flycatcher by maintaining this critical component in the project area along with the remaining forest stand function. The proposed projects are not expected to have long-term effects on the local or geographic population of olive-sided flycatchers given that projects would happen after the critical nesting period (ending July 15), and the available habitat would continue to function for nesting and perching.

Although this species is declining in Oregon there is little information on the effect of management activities on the rufous hummingbird (Altman 1999). The proposed restoration projects are not expected to have long-term effects on the local or geographic population of the rufous hummingbird given that projects would happen after the main nesting period (which is before July 15), the available habitat would continue to function for nesting and perching, and tree removal would not cause decline in the vegetation important for food production.

III. Issues Considered but not Analyzed in Detail

During the course of planning the proposed action, an interdisciplinary team considered many potential issues for analysis. As this is a programmatic analysis, focused on how to design and implement restoration projects, PDFs listed on pages 15-19 have been developed to reduce or avoid many resource concerns. Therefore, the interdisciplinary team determined that some issues were not necessary for detailed analysis because they are not related to potentially significant environmental effects or because they would not be helpful in informed decision-making. The following are issues considered by the interdisciplinary team, but not carried forward for detailed analysis.

Would restoration activities increase water temperatures by increasing the amount of solar radiation reaching the waterbodies?

Equipment entering streams, tree felling and tree pulling may cause localized reduction of riparian vegetation that shade streams. The short term (5-10 years) reduction in shade resulting by the loss of riparian vegetation would be partially offset by the long term (20-30 years) cover provided by logs, trees, and boulders placed in the stream channel. Over time, the vegetation would re-grow and, in combination with instream structures, would create favorable conditions to maintain cooler stream temperatures. Use of PDFs #23-25 would limit the reduction of shade, thereby reducing the likelihood of an increase in stream temperature.

What are the potential impacts of the proposed actions on BLM Special Status Species (excluding northern spotted owl, marbled murrelet, and Oregon Coast coho salmon)?

Some of the proposed activities, such as tree removal, operation of heavy equipment and instream placements, have the potential to alter key habitat components or impact some BLM Special Status Species. In order to minimize impacts to BLM Special Status Species and their key habitat components, projects would incorporate PDF #29, which requires that the BLM evaluate potential habitat for these species. The BLM would use this information to reduce the impacts that projects may have on these species and their key habitat components by adjusting the project location or timing (for example, avoiding critical breeding periods). These practices conform to the BLM Manual section 6840 which states that Bureau actions may not contribute to the need to list BLM Special Status Species under the Endangered Species Act.

Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) is a federally threatened plant species known from the Willamette and Umpqua Valleys. In Douglas County, Kincaid's lupine is currently known to exist at 14 sites. Of these, six occur on BLM land. The primary habitat for Kincaid's lupine in Douglas County is open woodland and meadow edges, often near roadsides, associated with Pacific madrone, incense cedar, and Douglas-fir trees with a relatively open canopy cover (BLM, USFWS, and USFS 2008). Kincaid's lupine may be found along routes used to access restoration sites or in forest openings. With implementation of PDFs #29 and #54, the proposed actions would not impact Kincaid's lupine. These PDFs require that the BLM determine if federally listed species or their suitable habitat is present and if Kincaid's lupine is present, the project would be modified as necessary to avoid effects to the plants and their habitat.

Wildlife special status species are often difficult to locate and therefore the presence of the species is often determined by locating key habitat components. A list of the Special Status

wildlife species that were considered, their key habitat components and critical breeding periods can be found in Appendix A.

The Foothill Yellow-legged frog is a BLM Special Status Species that is found exclusively in riparian areas along rivers and perennial streams. Particular consideration was given to the yellow-legged frog due to the fact that aquatic restoration projects would occur in and may alter habitat for this species. It was determined that short term and localized impacts to the frog are likely to be offset through the use of PDFs such as #29. Long term, an overall increase in the quality and availability of the key habitat components (Appendix A) at a watershed level has the potential to increase the population and distribution of the yellow-legged frog in the Roseburg District.

Effects on BLM Special Status Species are not being carried forward for detailed analysis because: 1) use of PDFs would reduce the direct effects on the species at the project level, 2) projects would impact only a very small percentage of aquatic and terrestrial habitat across the district in any given year (see proposed action description in Ch. Two) and 3) the diffuse nature of these projects scattered across a wide area would cause effects to be negligible at the scale of analysis.

Will the proposed actions increase the abundance or rate of spread of noxious weeds?

The proposed actions would result in some soil disturbance in areas with known infestations of noxious weeds. Increased human and vehicle traffic in the project sites may spread noxious weed seed and propagules. PDFs #1-4, such as *locate and use weed-free project staging areas*, would minimize the spread of noxious weeds into uninfested areas. In addition the proposed action includes treatment of noxious weeds along the riparian corridor. Therefore the proposed action is not anticipated to increase the abundance or rate of spread of noxious weeds.

What are the potential effects to soil productivity from ground disturbing activities?

Localized soil displacement and compaction may result from activities such as: heavy equipment use, log yarding, and placement of instream structures. Use of PDFs #5-9, such as *limit the season of operation for ground disturbing activities by heavy equipment to the dry season* would reduce the degree and area extent of soil impacts in riparian and upland areas. Reducing the area affected and the degree of impacts would minimize impacts to soil productivity.

What are the potential effects of ground disturbing activities on cultural resources?

Ground disturbance from activities such as log yarding and the use of heavy equipment have the potential to damage and displace artifacts, resulting in the loss of their scientific and heritage values. Pre-project inventories would be conducted for all ground disturbing actions associated with the project. If cultural resource sites are found, appropriate mitigation would be implemented. Sites that are found during project implementation would be mitigated through PDFs such as #29. Conducting pre-project inventories and implementing mitigation measures, if necessary, would ensure completion of BLM's Section 106 responsibilities under the 1997 National Programmatic Agreement and the 1998 Oregon Protocol.

Would the taking of trees <20"DBH affect the marbled murrelet?

The interdisciplinary team considered the potential impacts of removing smaller diameter trees on the federally-listed (threatened) marbled murrelet (*Brachyramphus marmoratus*). The Roseburg District currently uses the Residual Habitat Guidelines (USDI 2004) to identify the minimum standards (i.e. tree diameter, platform size, etc.) of potential nesting structure for murrelets. Under these guidelines, trees ≥ 19.1 " diameter breast height (DBH) with at least one platform ≥ 5.9 " in diameter, with nesting substrate (moss, duff) on that platform, and an access route through the canopy for a murrelet to approach and land on the platform, are considered suitable for use by murrelets. Generally stands dominated by trees < 20 " DBH and lacking residual older and larger diameter trees are not suitable for the murrelet because they lack the key element (platforms) associated with murrelet habitat; as such, removal of trees < 20 "DBH from younger stands would not impact suitable habitat.

It is possible that BLM would remove trees < 20 "DBH from stands > 80 yrs old. However, use of PDFs would often require pre-disturbance surveys and would prevent the removal of suitable nest trees. The use of PDFs #46, 49, 50 would reduce impacts from noise in the vicinity of a project during the breeding period, eliminating foreseeable impacts to the murrelet.

Lastly, given the relative abundance of trees < 20 " DBH on the District and the limited scale of removal, the BLM would not be removing enough of these trees to change the function of a stand. Based upon current vegetation survey (CVS) plot data (1995-2000) and the Roseburg District large wood information compiled for use in the plan revision, in stands older than 80 years of age, the Roseburg District averages approximately 74 trees per acre between 3-9" DBH and approximately 36 trees/acre between 10-19" DBH. In stands 40-80 years of age, the Roseburg District averages 165 trees per acre between 3-9" DBH, and 60 trees per acre between 10-19" DBH.

Based on all of these considerations, the interdisciplinary team determined that further analysis of effects from removal of trees in the < 20 " DBH size class was not warranted.

What are the potential impacts of the proposed actions on Port-Orford-cedar and the spread of *Phytophthora lateralis*?

Port-Orford-cedar (POC) is susceptible to a root disease caused by a non-native pathogen *Phytophthora lateralis*. Mature trees may succumb to the disease within two to four years after exposure and seedlings within as short a time as few weeks. POC and the disease are present in the Lower Cow Creek, Olalla Creek-Lookingglass Creek, and Middle Fork Coquille River watersheds that are identified as emphasis watersheds for restoration. Within these watersheds, POC occurs as individual or scattered groups of trees rather than as continuous stands but is often found associated with riparian areas.

Streams and roads are the primary agents for the spread of the root disease. *Phytophthora lateralis* is highly adapted for spread in water and by the transport of infested soil. Spread occurs primarily in the fall, winter, and spring when the cool, moist conditions are most favorable for the pathogen. Little or no spread occurs in the hot, dry summer months though viable resting spores may survive in infected root systems for 7 years or more (Hansen and Hamm 1996). High risk areas for infection include stream courses, drainages, or low lying areas down slope from

already-present infection centers or below roads and trails where inoculum may be introduced. POC are not usually infected more than 40 feet downslope from roads except where streams, culverts, wet areas, or other roads are present to facilitate dispersal (Goheen, et.al. 1986). Vehicles using existing roads and equipment involved in restoration activities can spread the disease through transport of infested soil and introduction of spores into water courses.

The Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-cedar in Southwest Oregon, Coos Bay, Medford, and Roseburg Districts (USDI BLM 2004) provides direction for assessing risk and controlling spread of POC root disease in order to maintain the species as an integral component of the vegetative communities of which it is a part. When a restoration project is proposed within the range of POC, the risk key would be applied at the site-specific scale based on the locations of healthy and infected POC. One or more of the PDFs (#55-60) to prevent or minimize spread of the disease would be applied if there is a management need indicated by the risk key. Based on these considerations, no further analysis is necessary at this time and a more detailed analysis using the risk key would be completed for site-specific projects.

CHAPTER FOUR – CONTACTS, CONSULTATIONS, & PREPARERS

Agencies, Organizations, and Persons Consulted

The Agency is required by law to consult with certain federal and state agencies (40 CFR 1502.25).

Threatened and Endangered (T&E) Species Section 7 Consultation

The Endangered Species Act of 1973 (ESA) requires consultation to ensure that any action that an Agency authorizes, funds or carries out is not likely to jeopardize the existence of any listed species or destroy or adversely modify critical habitat.

U.S. Fish & Wildlife Service

Programmatic consultation with the U.S. Fish & Wildlife Service for aquatic and riparian habitat restoration was completed in 2007 (TAILS# 13420-2007-F-0055). This consultation covers most of the proposed actions within this EA, and provides extensive project design features to be used in aquatic restoration projects. Should the BLM propose projects beyond those considered in the Aquatic Restoration Biological Opinion, consultation would be needed, and the results of consultation would be disclosed in the project specific decision(s).

NOAA Fisheries Service

Programmatic consultation with the National Marine Fisheries Service for aquatic and riparian habitat restoration was completed in 2007 (NMFS Nos. #2008/03507). This consultation covers most of the proposed actions within this EA, and provides extensive project design features to be used in aquatic restoration projects. Should the BLM propose projects beyond those considered in the Aquatic Restoration Biological Opinion, consultation would be needed, and the results of consultation would be disclosed in the project specific decision(s).

Cultural Resources Section 106 Compliance

As described in Chapters One and Two, the BLM would conduct pre-project inventories and implement necessary mitigation measures to ensure compliance with Section 106 of the National Historic Preservation Act under the guidance of the 1997 National Programmatic Agreement and the 1998 Oregon Protocol. Compliance with Section 106 would be documented on a project by project basis and discussed as needed in project-specific decisions.

Public Notification

Roseburg District Planning Updates

The **general public** was notified via the *Roseburg District Planning Updates* (beginning in the Fall 2008 update) which was published on the Roseburg District BLM Internet website. Electronic notification of the availability of the Roseburg District Planning was sent to approximately 40 addressees. These addressees consist of members of the public that have expressed interest in Roseburg District BLM projects.

State, County, and Local Government Agencies

This EA, and its associated documents, would be provided to certain **State, County and local government** offices including: U.S. Fish & Wildlife Service, NOAA Fisheries Service, Oregon Department of Environmental Quality, and the Oregon Department of Fish and Wildlife. If a decision(s) is made to implement the proposed action(s), it will be sent to the aforementioned State, County, and local government offices.

Public Comment Period

A 30-day **public comment period** will be provided for this EA. A Notice of Availability will publish in *The News-Review*. The public comment period begins with publication of the notice published in *The News-Review* on September 2, 2009 and end close of business August 19, 2009. Comments must be received during this period to be considered for the subsequent decision. If a decision(s) is made to implement the proposed action(s), a notice will be published in *The News-Review* and notification sent to all parties requesting notice.

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**Appendix A.
Special Status Wildlife Species Associated with Riparian Habitat**

Species	Key Habitat Components	Key Time Periods (Breeding, Rearing etc)	Known Populations on District? / Likelihood of Occurrence Near a Project Location?	Likelihood of Impact with PDFs? / Degree of Impact with PDF?
Northern Spotted owl (federally listed as threatened)	Generally large trees with dead tops, epicormic branches that form platforms, dead or live trees with cavities (e.g. hollow stove pipe trees, fire scars, broken tops, etc.).	March 1- July 15	yes/high	low/low
Marbled Murrelet (federally listed as threatened)	Generally large trees with branches >6" diameter, mistletoe clumps, moss or lichen accumulations that form platforms, and trees with complex canopy structure.	April 1- August 5	yes in murrelet zones / medium	medium/low
Bald Eagle	Large trees with large diameter branches, dominant trees, within line of sight and within ½ -1 mile of large water systems, dead top trees, large snags.	February 15- August 31 Nov 15 – March 15 Winter Roosting	yes/ high in known bald eagle management areas and within 1 mile of large water systems	low/low
Foothill Yellow-Legged Frog	Streams with complex system of pebbles, cobbles, boulder components, riffles, shallow water and water velocity. Breeding sites associated with location where tributaries confluence.	March - June	yes/high	medium/low
Harlequin Duck	Snags or trees with low cavities, exposed shelves on root wads or down logs.	April 1- July 1	yes/ low to unknown	low/low
Bat Species (Pallid Bat, Fringed Bat, Townsend's Big-eared bat)	Snags, trees with deeply furrowed or loose bark, live or dead trees with cavities (caused by fire, rot, etc.).	April - August	yes/high	medium/low
Mollusks (Chace sideband snail, Oregon shoulderband snail, Crater Lake tightcoil snail, Rotund Lanx and green sideband snail)	Down woody debris, hardwood leafy material, talus accumulations, wetland edges, seeps, springs, and associated microclimate.	Fall (October) after first rains to January Spring (May-June)	yes/medium to low depending on species and available habitat	low/low
Peregrine Falcon	Cliffs, rocky outcrops with shear vertical structures, often near water.	Jan 1- July 15	yes/low	low/low

Appendix B.

Aquatic Conservation Strategy Consistency Review

Aquatics staff within the Roseburg District Office assessed the effect of the proposed project on the Aquatic Conservation Strategy (ACS) objectives at both the site and watershed scale. The proposed project would not retard or prevent attainment of ACS objectives at the site or watershed scales. Instead, the proposed action would speed attainment of these objectives. Therefore, the proposed action alternative in the Roseburg District Aquatic Restoration EA is consistent with the ACS and its objectives at the site and watershed scales.

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The ACS must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over broad landscapes as opposed to individual projects or small watersheds. (Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, page B-9).

NOTE: The proposed Roseburg District Aquatic Restoration project consists entirely of actions designed to restore habitat conditions within streams and riparian areas. As such, this project is focused entirely on watershed restoration. *Watershed Restoration* is one of the four components of the Aquatic Conservation Strategy, and is the only component that is an action (the others are location-based or process-based).

ACS Components:

1. Riparian Reserves (ACS Component #1)

Riparian Reserves have been established along all streams managed by the BLM. The 1995 ROD/RMP (p. 24) specifies Riparian Reserve widths equal to the height of two site potential trees on each side of fish-bearing streams and one site-potential tree on each side of perennial or intermittent non-fish bearing streams, wetlands greater than an acre, and constructed ponds and reservoirs. The height of a site-potential tree varies by fifth-field watershed, ranges from 160 to 220 feet. The majority of the project area is located within Riparian Reserves. All project components include specific project design features that are intended to avoid or minimize adverse impacts to important Riparian Reserve and aquatic functions (EA pages 15-19).

2. Key Watersheds (ACS Component #2)

Key Watersheds were established “as refugia . . . for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species [1995 ROD/RMP, p. 20].” There are several Key Watersheds on the Roseburg District. Restoration actions are proposed in these areas, as well as other important areas throughout the Roseburg District.

3. Watershed Analysis (ACS Component #3)

In developing the projects, various Watershed Analyses were used to evaluate existing conditions, establish desired future conditions, and assist in the formulation of appropriate alternatives. These analyses are available for public review at the Roseburg District office or can be viewed under “Plans & Projects” on the Roseburg District website at www.blm.gov/or/districts/roseburg/index.htm.

4. Watershed Restoration (ACS Component #4)

As mentioned above, the proposed Roseburg District Aquatic Restoration project consists entirely of actions designed to restore habitat conditions within streams and riparian areas. As such, this project is focused entirely on watershed restoration. *Watershed Restoration* is one of the four components of the Aquatic Conservation Strategy, and is the only component that is an action (the others are location-based or process-based).

Range of Natural Variability within the Watershed:

Based on the dynamic, disturbance-based nature of aquatic systems in the Pacific Northwest, the range of natural variability at the site scale would range from 0-100% of potential for any given aquatic habitat parameter over time. Therefore, a more meaningful measure of natural variability is assessed at scales equal to or greater than the fifth-field watershed scale. At this scale, spatial and temporal trends in aquatic habitat condition can be observed and evaluated over larger areas, and important cause/effect relationships can be more accurately determined.

Natural disturbance events to aquatic systems in the Pacific Northwest include wildfires, floods, and landslides. Due to the dynamic nature of these disturbance events, stream channel conditions varied based on the time since the last disturbance event. This resulted in a wide range of aquatic habitat conditions at the site level at any one time.

Site level habitat conditions can often be summarized by Oregon Department of Fish and Wildlife (ODFW) aquatic habitat surveys. This data can then be compared to ODFW “benchmark” data – which is collected from reference reaches believed to be healthy and fully functioning, with minimal human impact. These relatively unmanaged reaches represent the variability of conditions within natural stream systems as well as characteristics desirable for a variety of fish species (including salmonid habitat). Stream surveys conducted over the last 10 years in the Roseburg District have all had one common thread – virtually all streams lack large woody material when compared to reference streams. This condition is considered typical at any given site scale, but is considered atypical at the larger fifth-field scale, or across a large river basin. Therefore, at these larger scales, aquatic habitat conditions are considered to be outside the range of natural variability due to a lack of large wood.

This lack of large wood throughout streams in the Roseburg District is primarily a result of past management actions. Prior to the 1990’s, the importance of large wood to aquatic ecosystems was not well understood, and it was often physically removed from fish-bearing streams throughout the Pacific Northwest (a process known as stream cleanout).

In addition to this manual removal, there were other factors such as riparian roads, campgrounds, and riparian timber harvest that resulted in a long term reduction in the amount of future large wood available to enter stream systems. The presence of these roads and campgrounds in riparian areas resulted in compacted surfaces that are no longer capable of growing trees. In addition, any trees that fall across these roads or campgrounds are often cut into smaller pieces and removed in order to reopen the sites. Riparian areas that were previously harvested have been recovering for the last 10 to 50 years, depending on original harvest dates. This growth recovery, coupled with cessation of riparian timber harvest, has led to a situation of improving riparian health, and a gradual increase in the amount of large wood available to enter streams. Efforts proposed in this project would speed that recovery.

Table B-1 – Individual ACS Objective Assessment

ACS Objective	Site/Project Scale Assessment	Fifth-field Watershed Scale Assessment
		<u>Scale Description:</u> Individual projects would take place at the 6 th or 7 th field scale, and would be distributed throughout the central portion of the Umpqua Basin.
1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.	While the majority of project components are located within stream channels and Riparian Reserves, specific project design features would minimize or prevent impacts to important functions of these areas. This would result in <i>maintenance</i> of this objective in the short-term, and <i>restoration</i> in the long-term. See the Aquatic Habitat and Fisheries section in the EA for a more detailed discussion.	All proposed actions are designed to restore riparian and aquatic function. The cumulative effect of these treatments would result in <i>restoration</i> of this objective at the watershed scale.
2. Maintain and restore spatial and temporal connectivity within and between watersheds	One of the proposed actions in this EA is the removal of fish passage barriers, and replacement of those barriers with new structures that accommodate passage of aquatic organisms. Therefore, these treatments would <i>restore</i> aquatic connectivity condition at the site scale.	Within the watersheds, replacement of multiple barrier stream crossings would result in restored aquatic connectivity. Therefore this treatment would <i>restore</i> the existing connectivity condition at the watershed scale.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations	As discussed in the Aquatic Habitat and Fisheries section of the EA, project components would not reduce canopy closure to an extent that could potentially influence instream flows. In addition, project design features have been established that would prevent removal of bank rooted trees, and minimize machinery operating within stream channels. Therefore, this treatment	As Riparian Reserves and stream channels respond to the proposed treatments, the integrity of the shorelines, banks, and stream bottoms would gradually improve throughout the watersheds. Therefore, these treatments would result in <i>restoration</i> of this objective at the watershed scale.

	would maintain the physical integrity of the aquatic system at the site scale.	
<p>4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.</p>	<p>Project design features (PDFs #5-25) would ensure that water quality would not be adversely impacted by the proposed actions. These PDF's would minimize disturbance to stream channels, prevent and/or minimize project-related sediment from reaching the aquatic system, and minimize the duration and extent of potential elevated turbidities. Therefore, protective PDF's coupled with the short duration of any potential impacts are expected to <i>maintain</i> the existing water quality at the site scale.</p>	<p>At the larger watershed scale, the cumulative effect of multiple aquatic restoration treatments would be a gradual improvement in water quality. This improvement would be a result of increased gravel deposition in streams and narrowing of wetted channel widths – leading to cooler water temperatures, deposition and storage of fine sediments, and reduction of stream bank/flood plain erosion. Based on this information, this project would result in the <i>restoration</i> of water quality at the watershed scale.</p>
<p>5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.</p>	<p>As mentioned above, PDF's would minimize disturbance to stream channels and stream banks, prevent and/or minimize project-related sediment from reaching the aquatic system, and minimize the duration and extent of potential elevated turbidities. Therefore, protective PDFs coupled with the short duration of any potential impacts are expected to <i>maintain</i> the existing sediment regime at the site scale. The site-scale result of large wood and boulder placements, however, would result in retention and storage of stream sediments. This would result in <i>restoration</i> of the sediment regime at the site scale.</p>	<p>Based on the information discussed at the site scale, this project would result in <i>restoration</i> of the sediment regime when evaluated at the cumulative, watershed-scale level.</p>
<p>6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.</p>	<p>As discussed on Aquatic Habitat and Fisheries section of the EA, project components would not reduce canopy closure or increase compacted surfaces to an extent that could potentially influence instream flows at the site scale. Therefore, this treatment would <i>maintain</i> stream flows within the range of natural variability at the site scale.</p>	<p>At the larger watershed scale, proposed project components would result in the increase deposition and storage of gravel and other sediments. These effects result in the increased water storage capacity within stream channels, and may ultimately result in more stable Summer stream flows. Therefore, at the larger watershed scale, this project would <i>restore</i> stream flows within the range of natural variability.</p>
<p>7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and woodlands.</p>	<p>As discussed in #6 above, this project would <i>maintain</i> stream flows within the range of natural variability at the site scale. Based on the potential for increased gravel retention and storage at individual project sites, there is the potential to raise channel bed elevations and increase the stream's interaction with</p>	<p>For the same reasons discussed at the site scale, this project would also <i>restore</i> stream interactions with the floodplain and respective water table elevations at the watershed scale.</p>

	its floodplain. Therefore, proposed actions would <i>restore</i> stream interactions with the floodplain and potentially elevate respective water tables at the site scale.	
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.	The proposed project includes PDF's that would prevent the introduction and spread of invasive plant species (PDFs #1-4). In addition, proposed actions include noxious weed removal projects and planting of native vegetation. Therefore proposed actions would serve to <i>restore</i> plant species composition and structural diversity at the site scale.	At the watershed scale, the cumulative effect of multiple restoration treatments would be a gradual <i>restoration</i> of plant species composition and structural diversity.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.	As mentioned in the discussions above, habitat functionality for aquatic and riparian habitats would be <i>maintained</i> in the short-term through the use of protective PDFs, and would be <i>restored</i> in the short and long-term by the actual results of the proposed projects.	Since functional riparian and aquatic habitat would ultimately be restored at the site scale, this project would also contribute towards the cumulative <i>restoration</i> of this habitat at the larger watershed scale.

Summary:

Based upon the restorative nature of the proposed actions, and application of protective project design features, the proposed projects would not retard or prevent attainment of ACS objectives. Based upon the information listed above, the proposed actions would meet Aquatic Conservation Strategy objectives at the site and watershed scale, and therefore consistent with the Aquatic Conservation Strategy.