REMOTE CONTROL

ENVIRONMENTAL ASSESSMENT
OR-128-06-06
Coos Bay District
Bureau of Land Management
North Bend, Oregon

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Chapter I Purpose and Need for Action

Background

The Remote Control Timber Sale was sold on August 28, 1998 after the issuance of a Finding of No Significant Impact (FONSI). The environmental impacts of the project were analyzed in the original Sandy/Remote Analysis Area EA (EA# OR128-96-21, revised 7-14-98). Since that time the sale has been part of several lawsuits that have delayed the award of the sale to the high bidder. These lawsuits broadly concern: impacts of projects to Port-Orford cedar (POC), ambiguous language pertaining to the Aquatic Conservation Strategy (ACS), and the removal of the Survey and Manage provision from the Coos Bay District Resource Management Plan (RMP).

The BLM has satisfied the court order concerning POC by completing the POC Supplemental Environmental Impact Statement (SEIS) and issuing a Record of Decision (ROD) in May 2004.

The SEIS to clarify language pertaining to the Aquatic Conservation Strategy was found insufficient. An analysis of the project pertaining to the ACS Objectives is included in Chapter 4.

The issuance of a new Supplemental EIS to remove the Survey and Manage standards and guidelines from the RMP has resulted in a new analysis of impacts.

Prior to issuing a decision to conduct "forest management activities" by awarding the Remote Control timber sale, this new Environmental Assessment is being developed to re-analyze the environmental effects of the Proposed Action and to tier the analysis included in the Supplemental Environmental Impact Statements that amended the current RMP.

Need

The *Coos Bay District Resource Management Plan* and its *Record of Decision* (ROD/RMP), (USDI 1995) responds to two needs: the need for forest habitat and the need for forest products (p.1). These needs are addressed in the RMP through an ecosystem management strategy comprised of building blocks called Land Use Allocations (LUA). "These land use allocations have differing management direction and are located and configured in the landscape to support overall ecosystem function and to meet the vision for management of federal lands in western Oregon"(p.1). The need for forest products is primarily intended to be met by harvesting timber from lands identified as Matrix while at the same time the need for forest habitat is satisfied by the establishment of various reserves including Riparian Reserves and Late-Successional Reserves. The underlying need for this proposal is to provide for a sustainable supply of timber and forest products.

The Coos Bay District is meeting the need for forest products intended to come from commercial thinnings but has not fulfilled its Allowable Sale Quantity (ASQ) commitment for regeneration harvest. The ASQ "refers to the maximum non-declining level of timber harvest sustainable over time." Combinations of harvest methods including regeneration harvests and commercial thinnings are anticipated and necessary to fulfill this commitment. Since the RMP's approval in 1995, the Coos Bay District has sold 112MMbf of timber for regeneration harvest for the decade ending in 2004. This is approximately 40% of the 273MMbf of regeneration harvest volume anticipated in the RMP for the first decade. The District has sold 96% (46.2MMbf) of the commercial thinning volume that was scheduled for the first decade.

Cumulative effects of the Coos Bay District timber management program were assessed within the District ROD/RMP. Based on this analysis, the ROD/RMP (p.ROD-8) anticipated an annual ASQ of

32MMbf of timber in support of the sustained yield assumptions. A Third Year Review, however, resulted in the re-adjustment of this number to 27 MMbf per year.

The Coos Bay BLM has conducted a watershed analysis of the Sandy Creek sub-watershed and identified that it is time for the timber on the Remote Control Timber Sale to contribute to meeting the need for timber production identified in the RMP. These Matrix stands are of the age and condition analyzed for regeneration harvest under the RMP.

Purpose

A reasonable action alternative must meet the objectives provided in the ROD/RMP for projects to be implemented in the planning area. The ROD/RMP and applicable statutes specify the following objectives (and management actions to meet these objectives) to be accomplished in managing lands in the project area.

1. Provide a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability (p.22) by:

- Conducting timber harvest and other silvicultural activities in that portion of the Matrix with suitable forest lands (p.22).
- Scheduling regeneration harvests to assure that, over time, harvest occurs in stands at or above the age of volume growth culmination (i.e., culmination of mean annual increment). This refers to the age range which produces maximum average annual growth over the lifetime of a timber stand (p.53).
- Planning and designing forest management activities to produce a sustained yield of products to support local and regional economic activity (p.45).
- Providing timber sale volume toward the Coos Bay District ASQ as required in the Oregon and California Act (O&C Act) of August 28, 1937. The BLM has a statutory obligation under the O&C Act to manage suitable commercial forest lands revested by the government from the Oregon and California Railroad grant (O&C lands) for permanent forest production in accordance with the sustained yield principle.

2. Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees (p.22) by:

- Providing a renewable supply of large down logs well distributed across the Matrix landscape in a manner that meets the needs of species and provides for ecological functions (p.53).
- Retaining 6-8 green conifer trees per acre after regeneration harvest to provide a source of snag recruitment and a legacy for bridging past and future forests. Retained trees would be well distributed in variable patterns (e.g., single trees, clumps and stringers) to contribute to stand diversity (p.53).
- Retaining snags within a timber harvest unit at levels sufficient to support species of cavity-nesting birds at 40% of potential population levels (p.53).

3. Provide early-successional habitat (p.22) by:

- Maintaining a well-distributed pattern of early and mid-seral forest across the Matrix (p.53).

Location

The Remote Control Timber Sale units are located just outside of Bridge, Or., off of the Sandy Creek County Road. The four units are located in T. 29 S., R. 10 W., Sections 9, 16, 28, and 29. The entire

project area is located within the Sandy Creek sub-watershed (6th field) of the Middle Fork Coquille Watershed (5th field) (Map1).

Decision Factors

In choosing the alternative that best meets the purpose and need, consideration would be given to the extent to which each alternative would:

- Provide cost effective management that would enable implementation of these management objectives while providing collateral economic benefits to society.

- Provide timber resources to the local community and revenue to the government from the sale of those resources.

- Comply with applicable laws and Bureau policies including, but not limited to: the Clean Water Act, the Endangered Species Act, The O&C Act, the Magnuson-Stevens Fishery Conservation and Management Act, and the Special Status Species Program.

Conformance with Land Use Plans, Policies and Programs

Timber management on the Revested Oregon and California Railroad Lands (O&C Lands) managed by the Coos Bay District Office is principally authorized and guided by:

The Oregon and California Act of 1937: Section 1 of the O&C Act stipulates that suitable commercial forest lands revested by the government from the Oregon and California Railroad are to be managed for the sustained production of timber.

The Federal Land Policy and Management Act (FLPMA): Section 302 at 43 U.S.C. 1732(a), directs that "The Secretary shall manage the public lands . . .in accordance with the land use plans developed by him under section 202 of this Act when they are available . . ."

This EA is tiered to and in conformance with the Final: *Coos Bay District Proposed Resource Management Plan/Environmental Impact Statement* (USDI 1994) and its *Record of Decision* (USDI 1995) and the *Final Supplemental Environmental Impact Statement* (FSEIS) *on Management of Habitat for Late Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan [NFP])* (USDA and USDI 1994a) *and its Record of Decision* (USDA and USDI 1994a) as supplemented and amended by:

- *Management of Port-Orford-cedar in Southwest Oregon Final Supplemental Environmental Impact Statement* (USDA and USDI 2004) and its *Record of Decision* (USDI 2004) (POC FSEIS).

- *The Final Supplement to The 2004 Environmental Impact Statement to Remove or Modify The Survey and Manage Mitigation Measure Standards and Guidelines* (USDA and USDI 2007) and its *Record of Decision* (USDI 2007d)

This EA is also tiered to and in conformance with the *Final Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides On Bureau Of Land Management Lands in 17 Western States* (USDI 2007a) and its *Record of Decision* (USDI 2007c) as well as the Coos Bay Integrated Noxious Weed Program (EA OR 120-97-11) (USDI 1997).

This EA will consider the environmental consequences of the alternatives, in light of new information developed since the RMP, in order to determine whether the anticipated impacts would exceed those considered in the Coos Bay District RMP/EIS and require the preparation of a Supplemental Environmental Impact Statement (SEIS).

Additional Documentation Incorporated by Reference

The following documents were used to assist in the analysis of the Remote Control Project and are referenced throughout this EA:

Sandy-Remote Watershed Analysis (USDI 1996)
Remote Control Analysis File

Scoping

The scoping process identified agency and public concerns relating to the proposed project that helped define the issues which are the environmental impacts of concern to be examined in detail in the EA. The general public was informed of the planned EA through letters to those on the Field Offices' mailing and e-mail lists, the Coos Bay Planning Update, and a legal notice in *The World* newspaper. Additional scoping notices were also sent to adjacent landowners, agencies that have requested these documents, and other interested parties on the District NEPA mailing list. The scoping period for the current proposed project ran between January 28, 2006, and February 27, 2006.

Issues

Scoping identified the following major issues that are used to develop and analyze the alternatives:

Issue 1 – Change in the amount, arrangement and quality of late-successional forest cover in the affected environment
Issue 2 – Threatened and Endangered Species (NSO and MM)
Issue 3 – Stand Structure
Issue 4 – Open Road Density
Issue 5 – Special Status Wildlife Species
Issue 6 – Migratory Birds
Issue 7 – Special Status Plant Species
Issue 8 – Stream Flow Changes Associated with Peak Flow, Annual Yield & Low Flow
Issue 9 – Aquatic Species and Habitats
Issue 10 – Noxious Weed Spread
Issue 11 – Port-Orford cedar (POC)
Issue 12 – Forest Fuels and Air Quality

Other Issues Identified but Eliminated from Analysis in the EA

Some of the concerns raised in Project Scoping were eliminated from detailed study, as directed by CEQ regulation §1500.1(b), 1500.2(b) and other sections, because they were determined to be beyond the scope of this EA, do not address the purpose of the action, do not suggest different alternatives, would not influence a Finding of No Significant Impact, or the impacts are not of a sufficient level of concern or of magnitude in intensity or duration on the affected environment. Therefore, they were eliminated from further analysis in this EA document. For more detail and discussion on these issues and their elimination from further analysis, see the Analysis File, Section A.

Impacts to Water Quality

Parameters are: dissolved oxygen, temperature, and instream sedimentation. Due to Riparian buffer widths, adequate riparian tree shade, gentle to moderate slopes, and project design features including

sediment barriers at stream crossings along haul routes the proposed project would: not add any detectable amount of organic solids to adjacent streams, not be expected to increase directly or indirectly water temperature of any streams, and not be expected to have any direct or indirect suspended sediment effects above the current State ODEQ standard for water quality.

Impacts to Slope Stability and Soil Surface from Removal of Tree Canopy, Road Work and other Soil Disturbance Activities

This discussion builds upon the analysis of sedimentation described in Water Quality. Key Indicators are: naturally occurring unstable slopes within and adjacent to the proposed units; and amount of canopy removal and soil disturbance.

Location of historic landslide surfaces, steepness of hill-slopes and the inclination of geologic bedding planes does not indicate naturally unstable sites in the project units or for locations of new construction. Some mobilization of sediment would occur in the short term (1-2 years) from removal of tree canopy and under-story vegetation coupled with post-harvest site preparation, which would expose the soil to the weather elements of wind and rain. The risk of sediment delivery to stream channels, however, from the initiation of slope failures, surface erosion, and increased compaction is negligible because of: Project Design Features, moderate to high soil infiltration rates, gentle to moderate slopes, and effective riparian buffers acting as sediment filters.

Sudden Oak Death (Phytophthora ramorum)

The Annual (July-August) Aerial Mortality Detection Surveys of the forested areas of Oregon conducted by the USFS and Oregon Department of Forestry have not detected Sudden Oak Death infections in Coos County. While more new sites have been identified in 2008, the infection has not spread to the Middle Fork Coquille watershed; the current infected area is located within the Lower Rogue River area including the Chetco River sub-watershed. All sites are being treated to eradicate or slow the spread of the disease.

Cultural Resources

In 1996, a cultural resource clearance was issued for the land included within Sandy Creek sub-watershed. This indicates that significant cultural resources were not found, and are not expected, on land associated with project activities. There has not been any additional information uncovered since this clearance was issued that would warrant its' reconsideration.

American Indian Rights

The Sandy Creek sub-watershed is within the territory occupied by the Upper Coquille Indians in the past, according to ethnographic information. Today, it still is within the area of interest of the Coquille Indian Tribe. The Coquille Indian Tribe is being provided the opportunity to evaluate and comment on the proposed alternatives.

Environmental Justice

The proposed areas of activity are not known to be used by, or disproportionately used by, minority or low-income individuals for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed area.

Hazardous Materials

A field review of the proposed project area was conducted by the District Hazardous Materials Coordinator in March 2006. Small amounts of roadside solid waste rubbish were all that was noted. All Action Alternatives are subject to Federal and State regulatory guidelines for petroleum product use and storage. Spill Prevention, Control and Countermeasure Plans (SPCC) are required under the Oregon

Forest Practices Act (Rule OAR 629-57-3600) and by Department of Environmental Quality (Rule OAR 340-108, inclusive). Spill containment capabilities on equipment sites are recommended. Spills shall be reported and actions taken under guidelines set forth in the District Spill Plan and ODEQ OAR 340-108.

Resources that Would Remain Unaffected by Either Alternative

The following resources would remain unaffected by either alternative because they are absent from the project area: Areas of Critical Environmental Concern (ACEC); prime or unique farmlands; floodplains; and Wild and Scenic Rivers.

CHAPTER II ALTERNATIVES

This chapter contains a description of each alternative and summarizes the environmental consequences of the alternatives.

Contained within this EA is an analysis of a no action alternative and a proposed action alternative. Analysis of the no action alternative is required under CEQ regulation §1502.14. For an action alternative to be considered it must meet the purpose and need while not violating any minimum environmental standards. The alternatives developed are consistent with the RMP and satisfy the purpose and need of implementing the RMP.

For harvest unit locations refer to Maps 1-7. Appendix D of the RMP ROD describes the Best Management and Conservation practices for harvest related activities while Appendix E outlines the silvicultural systems and harvest methods to be used in implementing the RMP.

All quantifications (i.e. acreages, mileages, etc.) are based on estimates obtained from geographic information systems (GIS). Final numbers could vary slightly as the plans are translated to the ground. Harvest volumes came from actual cruise plots.

Alternative I - No Action

The No Action Alternative will be a baseline for the comparison of the alternatives. This alternative describes the existing condition and the continuing trends. Selection of this alternative would not constitute a decision to reallocate these lands to non-commodity uses. Future harvesting in this area would not be precluded and could be analyzed under a subsequent EA.

The project area would not receive the treatments described in this document in the foreseeable future. Ongoing activities would continue to occur. These include silvicultural activities in young stands, compliance with Oregon fire control regulations, construction of roads across BLM land under existing right-of-way agreements, routine road maintenance, control of noxious weeds, and projects covered by earlier records of decision. Timber harvest on adjacent private lands would occur and would be guided by Oregon Forest Practices Act.

This alternative would not meet the need of conducting regeneration harvest on Matrix lands to satisfy the ASQ, nor would it meet the RMP objective of providing early successional habitat. Other areas would need to be proposed for forest management activities and addressed under separate analysis to meet these objectives.

Alternative II - Proposed Action

Remote Control

Adopting the proposed action would contribute to fulfilling the need for forest products by providing approximately 8.5 million board feet (MMbf) of timber through regeneration harvest. This volume would count toward the Coos Bay District's annual ASQ of 27 MMbf and would also incrementally diminish the disparity between the actual decadal regeneration harvest volume and the District's ROD anticipated decadal regeneration harvest volume.

The Myrtlewood Field Office proposes to regeneration harvest 193 acres of Matrix-designated forest stands. The RMP/ROD designated the General Forest Management Areas to provide this volume; Matrix lands are a large component. These stands were identified in the Sandy-Remote Watershed Analysis as

potential Priority 1 harvest units and were selected for regeneration harvest because they are of suitable age and condition in the Matrix, their location away from mapped and un-mapped Late-Successional Reserves, and their location on stand edges to reduce landscape fragmentation. The following table summarizes the main components of the proposed action.

Table II-1 Summary of Activities of the Proposed Action - Remote Control.

Activity		Total	
Timber Harvest	Regeneration Harvest acres (GFMA)	193 acres	
	Regeneration Harvest Volume	8.5 MMbf	
Timber yarding	Cable yarding	100%	
	Ground based yarding	0%	
Timber hauling	Wet Season/Gravel Roads	0.9 miles	
	Wet Season/ Paved Roads	6.5 miles	
	Dry Season/Dirt Roads	0.6 miles	
	Dry Season/Gravel Roads	5.3 miles	
	Dry Season/ Paved Roads	0.0 miles	
Fuel Treatments	Broadcast Burn	160 acres	
	Hand Pile and Burn	40 acres	
Road Activities	Construction	1.2 miles	
	Renovation	1.8 miles	
	Improvement	0.2 miles	
	Decommissioning (Total)	1.1 miles	
	Haul Route Maintenance	6.3 miles	
	Haul only	3.9 miles	
Open Road Density on BLM (miles/mile^2)	Sandy Creek sub-watershed (6th field)	No Action	Proposed Action
		2.95 miles/sq.mile	2.98 miles/sq.mile
	Middle Fork Coquille Watershed (5th Field)	No Action	Proposed Action
		4.33 miles/sq.mile	4.34 miles/sq.mile

Harvest Activities

Regeneration Harvest The proposal consists of harvesting 4 timber sale units totaling approximately 193 acres through regeneration harvest. The timber stands are 120-130 years old. Estimates for harvest volume of the individual units are shown in Table II-2. No harvesting would take place within the Riparian Reserves.

Table II-2 Harvest Units and volumes

EA Unit #	Unit Acres	Unit Volume[2] (Mbf)	Volume/ Acre	Stand type	Stand Age
Unit 1	48	2877	59.9	D4D3-=1880	130
Unit 2	17	1027	60.4	D4D3-=1880	130
Unit 3	27	1346	51.8	D4D3-=1880	130
Unit 4[3]	101	3218	29.8	D4=1890	120
Total	193	8468			

[2]Unit volume is original timber sale volume/acre + 2.5 Mbf/acre for in-growth times the number of Unit acres.
This EA unit contains almost 40% hardwood species. There are forest type islands within this unit that are not reflected in the FOI type symbol. Examples of these type islands would be FHD RA3=1940, FHD RA2=1970, FHD=1900

Defined in the RMP as stands ≥ 200 years old, "old-growth" would not be harvested as part of the proposed action. For the purpose of clarity within this EA, the terms "late-successional forest" and "late-successional habitat" are used. Late-successional forest is defined in the Coos Bay RMP as "forest seral stages that include mature and old-growth age classes, 80 years and older." "Late-successional habitat" also refers to conifer stands that are 80 years old and greater. This definition is not synonymous with "Late-Successional Reserves," which is a Land Use Allocation designation and does not imply a current structural stage. **Appendix B, Table-1** includes a comparison of different stand structural definitions used in this document.

Riparian Reserves

This alternative adjusts interim Riparian Reserve widths on seven intermittent stream segments adjacent to (or included within) proposed harvest units 2, 3, and 4. Riparian Reserves (RRs) on these intermittent streams were analyzed and adjusted to 110 feet each side of the stream channel. This adjustment is a reduction of the interim width used in the RMP of one site-potential tree height for each side of the stream channel. In the Sandy-Remote Watershed Analysis, the site-potential tree height was calculated at 220 feet within the Sandy Creek sub-watershed. These RRs were adjusted in accordance with the *Riparian Reserve Evaluation Techniques and Synthesis* module, detailed within the *Supplement to Section II of Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (REO 1997). The purpose of the module was to help managers implement direction in the Northwest Forest Plan, that requires watershed analysis prior to the final delineation and management of the Riparian Reserve network in a watershed (REO 1997). The module addresses the physical and biological elements that are necessary to both meet the Aquatic Conservation Strategy (ACS) objectives (USDA and USDI 1994a) and provide habitat benefits to terrestrial species within an integrated Riparian Reserves system (REO 1997).

The Forest Plan ROD (page B-13) states that "[t]he prescribed widths of Riparian Reserves apply to all watersheds until watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for finale RR boundaries is presented through the appropriate NEPA decision making process." The Sandy-Remote WA included a Riparian Reserve Evaluation (RRE) performed at multiple scales and using multiple variables to determine riparian reserve widths necessary to meet ACS objectives. The RRE identified potential adjustment for specific intermittent streams associated with the current Remote Control EA analysis area. Site-scale investigations were conducted both during the original Sandy-Remote EA, and during the current Remote Control NEPA analysis.

The difference between the interim Riparian Reserve width of 220 feet and the adjusted Riparian Reserve width of 110 feet for this alternative totals roughly 22 acres (Table II-3). The Interdisciplinary Team determined that the adjustments meet the ACS objectives. All perennial non fish-bearing streams would retain Riparian Reserve widths of 220 feet on each side of the stream channels. All fish-bearing streams would retain Riparian Reserve widths of 440 feet on each side of the stream channels.

Table II-3 Riparian Reserve Adjustments

EA Unit #	Stream Segment	[1]Flow	Fish Presence	Riparian Width	[2]Adjustment in Riparian Acres	[2]Stream Length Affected by Adjustment (feet)
Unit 1	1a	P	No	220	None	0
Unit 2	2a[3]	I	No	110	-4.59	650
	2b	P	No	220	None	0
	2c	I	No	110	-4.23	700
Unit 3	3a	P	No	220	None	0
	3b	I	No	110	-3.43	540
Unit 4	4a	P	Yes	440	None	0
	4b	I	No	110	-5.10	1000
	4c	I	No	110	-2.92	500
	4d-I	I	No	110	-.86	150
	4e-I	I	No	110	-1.31	300
					-22.4 acres	3840 feet

[1]P = perennial stream, I = intermittent stream
[2]Taken from Sandy-Remote EA
[3]Not identified in original Sandy-Remote EA/Sandy-Remote WA

Legacy components
Management actions/directions in the RMP include that 6-8 green trees per acre be retained in the GFMA portion of the Matrix when conducting regeneration harvests. These trees would generally be representative of the size and species of the stand. Existing snags would be retained and where snags are deficient, additional trees may be left for snag creation to support cavity nesting birds at 40 percent of potential population levels (USDI 1994:p.22). The total number of green trees proposed to be retained, including the number of additional trees for snag recruitment, ranges from 7-10 trees per acre. The RMP minimum of 120 linear feet per acre of down wood post-harvest would be retained in all harvest units.

Site Preparation
Following regeneration harvest, residual vegetation and logging debris would be treated to reduce fire hazard, provide room for planting of tree seedlings, lessen initial competition from other vegetation, and limit the cover for seedling–damaging rodents. A pre-harvest assessment of the harvest units has been done. To meet the stated objectives, it is expected that approximately 149 acres (Units 1 and 4) would be treated using broadcast burning; 44 acres (Units 2 and 3) would be treated by hand piling and burning.

Transportation Management

New road construction, road renovation, and road improvement are needed to provide the access necessary to implement the proposed harvest activities (Map 2). The proposed action also contains road decommissioning that would block roads no longer needed. Roads would be managed according to the following RMP objectives: 1) Develop and maintain a transportation system that serves the needs of users in an environmentally sound manner. 2) Correct problems associated with high road density by emphasizing the reduction of minor collector and local road densities where those problems exist. 3) Manage roads to meet the needs identified under other resource programs.

New Construction
All new construction would occur on BLM lands; no new construction would take place within the Riparian Reserves. Newly constructed roads (1.2 mi.) would either receive a lift of rock or remain dirt with seasonal restrictions on haul. Some roads would receive a lift of rock but haul would remain restricted to the dry season. Table II-4 lists these with further details.

Renovation and Improvement
Renovation (1.7 mi.) of existing roads may include reconditioning the road bed, cleaning and reshaping ditches, trimming roadside vegetation, cleaning, repairing, and replacing drainage structures, and generally restoring the original condition of the road. Spur 3 (0.2 mi.) would be improved by adding culverts to facilitate drainage.

Road Closure
The proposed action contains three types of road closures: temporary, decommissioned, and fully decommissioned (Map 5). Temporary road closures are those that are closed to vehicular traffic but may be open for BLM/Permittee commercial activities. These roads are closed with a gate or barrier and drainage structures are left in place. Temporary closures would equal 1.5 miles.

Decommissioned roads would be closed to vehicles on a long term basis (>5 years) but may be used again in the future. These roads would be left in an erosion resistant condition by blocking, establishing cross drains, eliminating diversion potential at stream channels, and stabilizing or removing fills on unstable areas. Decommissioning would equal 0.2 miles of road.

Roads proposed to be fully decommissioned may involve sub-soiling, water barring, and planting to reestablish vegetation. Cross drains, fills in stream channels, and unstable areas may be removed if

necessary to restore natural hydrological flow. Full decommissioning would equal 0.9 miles. There is one intermittent stream crossing culvert associated with the full decommissioning of Spur 3 that would be removed.

Table II-4 Road Work Activity (excluding maintenance), haul seasons, and closures.

EA Unit number	EA Road number	Road Work Activity	Miles	Surface Type	Haul Season	Closure Type
1	29-10-9.0	Renovation	0.5	Rock	All	-
	Spur 1A	New Cons.	0.03	Rock	All	Decom.
	Spur 1B	New Cons.	0.1	Rock	All	Decom.
2	29-10-9.4	Renovation	0.3	Rock	All	0.25 mi. Full Decom.
3	Spur 3	Improvement	0.2	Dirt	Summer	Full Decom.
4	29-10-21.2	Renovation	0.6	Rock	Summer	Temporary
	29-10-29.1	Renovation	0.3	Rock	Summer	Temporary
	29-10-29.2	New Cons.	0.9	0.5 Rock	Summer	Temporary
				0.4 Dirt	Summer	Full Decom.
	29-10-29.3	New Cons.	0.06	Rock	Summer	Decom.
	Spur 4A	New Cons.	0.07	Rock	Summer	Temporary
	Spur 4B	New Cons	0.03	Dirt	Summer	Full Decom.

Haul Route Maintenance
Routine maintenance would occur on an additional 6.3 miles of existing roads This would include roadside brushing and replacement of drainage features that are in poor or unsatisfactory condition. At a minimum these roads would remain open for limited administrative access and have the following activities occur as needed: maintenance of drainage structures, grading, brushing, and/or grading.

Timber Haul
The proposed haul routes consist of a total of 13.4 miles, which includes 4 miles of the paved Sandy Creek county road. Seasonal restrictions for specific roads are included in Table II-4. The paved portions of the haul route have no restrictions.

Design Features for the Proposed Action

This section describes measures designed to avoid, minimize or rectify impacts on resources and are included as part of the action alternative. Project Design Criteria (PDC's) are site specific measures, restrictions, requirements or physical structures included in the design of a project in order to reduce adverse environmental impacts. Additionally, the RMP (Appendix D) lists "Best Management Practices" (BMP's) and the ROD lists "Standards and Guidelines" (S&G's). BMP's are measures designed to maintain water quality and soil productivity. S&G's are ". . . the rules and limits governing actions, and the principles specifying the environmental conditions or levels to be achieved and maintained" (USDA and USDI 1994a).

Timber Harvest

- All areas (except road right of ways) would be harvested using a skyline cable yarding system capable of maintaining one-end log suspension.
- Cable yarding corridors would be a minimum of 75 feet apart.
- In Unit 4 the use of a "swing yarding system" would be required. This would utilize several existing but non-inventoried roads to facilitate moving yarding and loading equipment from near the end of the -29.2 road down to landing locations on the "swing road." Logs would be cable yarded from the swing landings to locations along the -29.2 road where there is access for log trucks. The southeast portion of the unit, approximately 20 acres, would be harvested by using this method. These swing roads have some grades that exceed 30% and are considered too steep for timber hauling.

- Designated swing roads in Unit 4 would have erosion control and hydrological restoration measures performed immediately following harvest; these measures include sub-soiling, water barring, and seeding and mulching of exposed soil. Tree seedlings would be planted in the prepared road prism at the same time the harvest unit is planted.
- For existing skid trails identified in Unit 4, erosion control and hydrological restoration techniques would be performed **prior** to falling timber. This work may consist of sub-soiling, water-barring, seeding and mulching of exposed soil. Skid trails would be identified by the Interdisciplinary Team soils specialist or the District soil scientist prior to work being done. Planting would occur with the planting of the harvest unit.
- Cable yarding of Units 1, 2, and the west ½ of Unit 3 could be accomplished during any season since they are accessed by all-weather paved or gravel roads.
- Yarding of Unit 4 and the east ½ of Unit 3 would be restricted to the dry season (generally June 1 to October 15). Timber hauling would also be restricted to these dates unless weather supports a longer or shorter hauling period.
- Trees would be directionally felled away from all Riparian Reserves, Green Tree Retention areas, and unit boundaries.
- Logs would be fully suspended across stream channels where feasible so that the logs would clear both stream banks.
- Skyline cable corridors through Riparian Reserves would be no more than 12 feet wide. The locations would utilize natural openings if possible. Trees felled in Riparian Reserves to provide clearance for skyline cables would be felled toward the stream channel and retained on site.

Legacy components

Structural legacies would be maintained at or above NFP minima by: a) minimizing damage to existing snags and downed wood; b) creating new snags and downed wood from retained green trees soon after site preparation; and c) retaining additional green trees to provide future legacy structures. The specifics of this protection, retention and creation, are detailed in the following table.

Table II-5 RMP Legacy Retention and the Remote Control Retention Requirements.

Unit Number	Structure Type	NFP/RMP Minimum (per acre)	Remote Control Proposed Action
1	Snags	2; avg. stand diameter	3.5 GT
	Green Conifers	6	6
	Down Wood	120 ft	2 GT[1]
2	Snags	2; avg. stand diameter	3.5 GT
	Green Conifers	6	6
	Down Wood	120 ft	2 GT
3	Snags	2; avg. stand diameter	2 GT
	Green Conifers	6	6
	Down Wood	120 ft	2 GT
4	Snags	2; avg. stand diameter	2 GT
	Green Conifers	6	6
	Down Wood	120 ft	2 GT

GT= Green Trees

[1]Depending on size/form class, only 1 GT may be needed to provide for 120' down wood

- All existing snags and down wood would be left except where doing so would create a safety hazard. High quality snags and down logs (Decay Class 1 and 2, DBH > 24", 16 ft. long) would be additionally reserved from burning through pull back of slash material. Pull back provisions would apply to only a few (estimated < 10) snags/down wood pieces per unit
- Green Tree retention (GTR) would approximate the conifer tree species mix in the treatment units and would (where possible) be placed to protect existing snags.

- Unit 1 and Unit 4 would retain one hardwood per acre after the completion of harvest activities, favoring hardwood species other than red alder.
- Roughly 60%-80% of the GTR would be in clumps 0.5-2.5 acres in size or greater. The remaining Green Trees would be scattered throughout the units. Clumps would be used to protect existing snags and down logs where feasible. Areas predicted to be highly susceptible to wind throw would be avoided to the extent practical. Areas within 100 feet uphill and 50 feet downhill of open roads would be avoided for GTR areas to reduce theft.
- Snag creation would involve tree topping, and would be implemented within two years of completion of harvest.
- Two green trees would be left per acre, in addition to those left for GTR and snag retention, for the purpose of downed wood creation after site preparation.
- Outside of, and adjacent to, Units 1 and 2, 14 snags would be created in Riparian Reserves.

New Road Construction

New construction would use the applicable "Conservation Practices for Road and Landing Construction" Best Management Practices (p. D3-D4) found in the RMP. These include:

- Road and landing construction activities would be limited to the dry season, generally from May to October.
- Roads would be located on stable locations, such as ridge tops, stable benches or flats, and gentle-to-moderate side-slopes.
- Road drainage would be designed to minimize soil erosion and stream sedimentation. Energy dissipators, culvert down pipes, or drainage dips would be used where water is discharged onto loose material and onto erodible or steep slopes.

Culverts

- Rusted-out stream crossing culverts encountered during road improvement or renovation work would be replaced. The structures would pass the 100-year theoretical storm.
- Stream-crossing culvert replacements would occur during the in-stream operating period (July 01 - September 15).
- When replacing stream-crossing culverts on perennial streams, stream flow would be diverted around the work area, sediment contained (using straw bales and/or filter fabric), turbid water pumped from excavation site onto vegetated terrace or hill slope (as needed), and physically unobstructed passage provided for aquatic-dependent species where feasible.
- Culvert replacements on intermittent streams would occur after cessation of flow or treated as if perennial.

Road Closures

- Roads would be closed according to the Transportation Management Objectives (TMO) plan.
- For roads to be less than fully decommissioned (unless otherwise specified) water bars would be installed to route surface runoff to vegetated areas and roads would be blocked to traffic by use of an earthen berm or rock boulders. Water bars would be installed as back up drainage features near culverts to prevent diversions. Water bars should tie into ditch lines where possible to route flow from ditch lines as well as road surfaces.
- Fully decommissioned roads would have removal of fill and culverts on stream crossings, banks restored to stable grades, road surfaces de-compacted, mulching and seeding, and blockage to traffic by use of an earthen berm or rock boulders as necessary.
- The 21.2B road would be gated on the property line between Sections 20 and 21.

- Spurs 1A, 1B, and 3 would be blocked. A portion of the -29.2 road would be blocked at the junction with Spur 4A.

Winter Haul

- All roads designated for winter use would be surfaced with an approved lift of rock or asphalt.

For winter haul on gravel roads, the following additional BMPs would be implemented. These sediment prevention measures would be in place before winter haul begins:

- An additional lift of rock would be applied to the area of road that can influence the stream if rill erosion is evident in the road tread near live stream crossings.
- Any offsite movement of sediment from the road or ditch flow near streams would be contained with silt fencing or sediment entrapping blankets. Such control measures would allow for the free passage of water without detention or plugging. These control structures and applications would receive frequent maintenance, and may be removed at the completion of haul.
- Winter haul would be suspended if the ground is already saturated from winter rains and more than one inch of precipitation is predicted in the project area within the next 24 hours. Operations may resume after the 24-hour suspension, except when another storm (exceeding 2 inches) is forecasted. Currently, precipitation predictions are based on the Quantitative Precipitation Forecast (QPF) maps from The Hydrometeorological Predication Center internet site: http://www.hpc.ncep.noaa.gov/html/fcst2.html. A similar predictive model internet site may be used if this site should become unavailable.

Site Preparation & Silviculture

Site preparation would include broadcast burning and pile, cover and burn. Broadcast burning would be conducted during the winter and spring seasons to provide for a low severity burn. Ignition timing and patterns would be used to reduce and/or pull heat away from forest boundary structures, green tree retention areas, snags and down wood. All burned areas would be mopped up in compliance to the local protection association seasonal requirements. Hand constructed fire lines would be located on or near the unit boundaries and would receive water barring during or after construction as needed.

- Hand piling and burning would be used for site preparation on Units 2 and 3, and would be conducted during the rainy season. Piles would be distributed throughout the treated area to provide opportunity for micro-site planting.
- Landing and hand piles would be located away from snags, leave trees and coarse woody debris to ensure they remain undamaged from direct or radiating heat.
- Slashing would be used in areas where dense woody vegetation could impede planting seedlings at 9’ X 9’ spacing.
- POC would only be planted in Low Risk Sites. Resistant stock would be used if available.
- To protect the Bureau Sensitive species found in Unit 1, the five host trees would be completely encircled by a no-harvest buffer of trees. The buffered site would include trees both below the road and on the ridgeline across the road. This site would be approximately one acre in size. Areas below this buffered site would be post-harvest hand piled to prevent buffer tree scorching during burning operations.

Non-native species

- All heavy equipment, especially track mounted, and road building equipment would be washed prior to entry on BLM lands.
- All equipment would be exit-washed prior to leaving the project area, except as follows: log trucks, pickups, and utility vehicles hauling during the dry season or which do not leave hard

surfaced roads during the wet season, and road construction equipment which does not leave a hard surfaced road. During the wet season, if trucks are loaded from an un-surfaced area they would be washed prior to leaving the project area.

- Noxious weeds (gorse, scotch and french broom) would be removed along roads (within 12 feet slope distance from edge of the running surface, or the top of the cut slope and the bottom of the fill; whichever is less) designated for haul on BLM-administered lands.
- Grass seeding would be in accordance with District Native Plant Restoration Policy.
- Dirt spurs should be closed or gated during the wet season for the life of the timber sale contracts.

Port-Orford cedar

- POC would be pulled, cut, or girdled below the lowest live limb for a slope distance of 30 feet on each side of the road, prior to log haul on the -15.2 road from the junction of the -15.3 road to the junction of the -21.2A road.
- Resistant POC would be planted in upland sites away from roads and streams in units, at the percentage stocking that existed prior to harvest.

CHAPTER III AFFECTED ENVIRONMENT

This chapter describes the current (baseline) condition of specific resources affected by the alternatives analyzed by issue in Chapter 4. It is the predicted effects of an action that create an issue (Freeman and Jenson 1998).

Current baseline conditions for the Affected Environment reflects intensive management on a 60-80 year rotation on federally managed GFMA/Connectivity lands and Coquille Tribal areas, and intensive management on a 40-year rotation on private forests.

Analysis Area
The Analysis Area of the Affected Environment is resource dependent, and is chosen for the consideration of the appropriate geographical scale for which impacts to the resource disappear or become negligible. Impacts will be analyzed as appropriate with more detail at the site or stand scale, and more broadly with less quantitative detail for larger areas like the Middle Fork Coquille Watershed or the Coast Range Province.

Concurrent and Future Actions

The following actions have a reasonably foreseeable likelihood of implementation or are currently being implemented in the Middle Fork Coquille Watershed (MFC), and will be used to analyze the cumulative effects:

The BLM has planned timber sales in the King Myrtle (EA#OR128-08-02) and Slater Rocks (EA#OR-128-07-01) analysis areas of the Middle Fork Coquille Watershed. The projects include an estimated 1,377 acres of commercial thinning on Matrix lands, 654 acres of Density Management in Riparian Reserves, and 76 acres of Density Management within Late-successional Reserves.

The Coquille Tribe has scheduled timber harvests within this watershed. Approximately 270 acres are proposed for Regeneration Harvest and 30 acres for Commercial Thinning. Harvest of all Coquille Tribal Forest lands managed similarly to federal Matrix allocations has been assumed in long-term modeling estimates of cover change.

The US Forest Service (USFS) manages roughly 1,500 ac. in the southern portion of the MFC. No USFS proposed actions are considered reasonably foreseeable; it is assumed that USFS matrix holdings would be managed intensively and that reserved areas would undergo succession.

The State of Oregon does not directly manage any terrestrial forest in the MFC.

Relevance of Past Actions
The Council on Environmental Quality (CEQ), provided guidance on June 24, 2005, as to the extent to which agencies of the Federal government are required to analyze the environmental effects of past actions when describing the cumulative environmental effect of a proposed action in accordance with Section 102 of the National Environmental Policy Act (NEPA). CEQ noted the "[e]nvironmental analysis required under NEPA is forward-looking," and "[r]eview of past actions is required only to the extent that this review informs agency decision-making regarding the proposed action." The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. Guidance further states that "[g]enerally, agencies can conduct an adequate

cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions."

Review of past actions is discussed in Chapter 4, only as needed, to assess the present effects of past actions on a particular resource for a cumulative effects analysis, or to illuminate or predict the direct and indirect effects of the Proposed Action.

Scoping for this project did not identify any need to exhaustively list individual past actions or analyze, compare, or describe the environmental effects of individual past actions in order to complete an analysis which would be useful for illuminating or predicting the effects of the proposed action.

Forest Ecology

Issue 1: Change in the amount, arrangement and quality of late-successional forest cover in the affected environment

Those aspects of the forest ecology of the affected environment which could be altered by the Alternatives are discussed. Descriptions of forest ecology portions of the affected environment below include: a) characteristics of the action area pertinent to Issue 1, presented as average stand-scale conditions; and b) characteristics of the analysis area pertinent to Issue 1, presented as forest ecology indicators. Forest ecology (baseline conditions) in the action area will be discussed and quantified at the stand-scale; forest ecology of the analysis area will be discussed and quantified at the sub-watershed (6^{th} field), and watershed (5^{th} field) scales. Conditions at Provincial and Plan-level scales will be discussed broadly and qualitatively, as appropriate.

Project area (Units 1-4) environmental baseline

The project area (action area) analyzed for Issue 1 includes portions of BLM-managed forest stands included in Units 1-4. Description of within-stand conditions in the project area will include individual stand structures, microclimatic conditions, vegetation and entire stand structure.

Individual (within-stand) forest structures

Large overstory trees are common in the project area, but have not developed height or decadence-related structures associated with old-growth stands; Douglas-fir trees of this age have typically only achieved 65% of their eventual heights (Franklin *et al.* 2002). The density of large Douglas-fir trees (>37 in. DBH) in the action area is higher than in average *Maturation*-stage[1] forests (Table 4)[2]. Large (>15.8 in. DBH) shade-tolerant trees (e.g., western hemlock, western red cedar) are absent or uncommon in Units 1-3, but are common in Unit 4. Fire and harvest disturbances have modified overstory tree densities, and in Unit 4 left shade-tolerant species and decreased densities of Douglas-fir, compared to less disturbed *Maturation* stands. An average of 8 trees per acre (TPA) in the project area support some developed structures (Table 3); "structures" are defined as branches > 6 in. diameter 30 ft. above the ground, or large deformities such as brooms. This modest level of structures is consistent with the developmental stage of these stands (Franklin and VanPelt 2004).

The project area currently supports relatively few large, competent snags (Decay Class 1, 2 or 3) or downed wood pieces due to structural stage and disturbance history (fire and repeated salvage) effects. Large downed wood pieces are < 10% of those expected from unmanaged *Maturation*-stage stands; large competent snags are < 25% of expectations from unmanaged *Maturation*-stage stands (Table III-3). The majority of downed wood and snag volume includes hard but failing (decay class (DC) 3) and soft (DC 4

[1] Forest structure classes follow Franklin and Spies (2002). Structural classes are compared in Appendix A, Table 1

[2] All of the Tables used in this analysis are found in Appendix A except for Table III-3 in Chapter 3.

and DC 5) pieces. These pieces provide some ecological functions (e.g., microclimatic buffering, support of invertebrates), but lack bark and provide limited foraging/cavity nesting opportunities for a range of forest species (Johnson *et al.* 2001).

Within-stand microclimates/edges

The project area (Units 1-4) supports a range of microclimatic conditions in soil and air temperatures, relative humidity, and wind speeds, including conditions similar to large old stands (interior conditions), conditions comparable to adjacent young stands, and areas with transitional edge conditions. The transition from edge conditions to interior conditions varies by microclimatic variable. Depth-of-edge influence on some microclimatic variables is $\geq$ 400 m (Chen *et al.* 1999). Considering edge effects of 400 m, the project area would support no interior habitat. Considering a 200 m depth-of-edge influence, the project area would support < 2 acres of interior forest; for a 100 m depth-of-edge influence, which might be reasonable for some microclimatic variables (e.g., soil temperature), the project area would support roughly 94 acres of interior forest. Response of species to changes in these microclimatic conditions depends on the autecology (species ecology) of the species in question. Species requiring high relative humidity conditions comparable to old forest interiors or complex horizontal/vertical cover or concealment conditions would be predicted to be absent or rare in the project area.

Project area vegetation and stand structure

Overstory tree species richness is low in Units 1-3. Douglas-fir and western hemlock are the most common overstory species, with tanoak, chinquapin, red alder, California laurel and some Port-Orford-cedar as primary understory species. Unit 4 has greater tree diversity including grand fir in its overstory (Table 2). The Sandy Creek sub-watershed and its surroundings have been characterized as part of the Port-Orford-cedar (*Chamaecyparis lawsoniana*) variant of the western hemlock zone (USDI 1996). Series identified in the project area include western hemlock, tanoak and Port-Orford-cedar series.

Units 1-3 have been classified as "well-stocked large sawtimber" with an 1880 birth date; Unit 4 has been typed as "large sawtimber" with an 1890 birth date[3]. Units have moderate vertical and horizontal structural development, generally consistent with 120 year old forest. These units support two-story stands with well-developed, >120 ft. tall overstory canopies[4] and developing, weakly-expressed understories; mean canopy height diversity is 4.8 (Table 2, FE Technical Report). Historic salvage/harvest, stand-modifying fire disturbance, and hardwood invasion have created horizontal variability within stands including dense suppressed patches, canopy gaps, and (in Unit 4) some hardwood patches (Table 3). This horizontal variability is consistent with *Maturation*-stage conditions in Units 1-3; Unit 4 is slightly more variable.

Based on overstory tree age (roughly 120 YO), low densities of legacy structures, and predominance of a single, moderately dense, even-aged overstory of intolerant pioneer trees, Units 1-4 are best-described as being in the *Maturation*-stage of stand development (Franklin *et al.* 2002). For summarization and mapping purposes, stands 80 to 120 years old (Unit 4; roughly 116 YO), and un-aged stands with similar characteristics have been typed as "mature late-successional" forest. Stands over 120 years old (Units 1-3; roughly 126 YO) and un-aged stands with similar characteristics have been typed as "old late-successional" forest. These classifications are somewhat arbitrary; actual within-stand conditions (as described above and in Table III-3) are far better descriptors of unit structural conditions. Table 1 includes a comparison of different stand structural definitions used in this document.

[3] Forest Operational Inventory (FOI) type for units 1-3 is D4D3=1880. Unit 4 has been typed as D4=1890.
[4] Douglas-fir trees of this age have typically only achieved 65% of their eventual heights (Franklin and Spies 2002).

Analysis area (watershed and sub-watershed) environmental baseline: Issue 1

The amount, arrangement, and quality of late-successional forest cover in the analysis area have been quantified using three indicators: the amount of late-successional cover (FE1), late-successional interior area (FE2), and late-successional quality (FE3). Late-successional patch arrangement and patch size distribution in the analysis area were also quantified, but did not change markedly between the Alternatives; these analyses are described in the FE Technical Report (Analysis File) and summarized in descriptions of late-successional quality in the analysis area. In order to determine significance of changes in the environmental baseline, specific thresholds have also been identified for each indictor. Detailed definitions and rationale for use of these indicators and thresholds is provided in the FE Technical Report.

Indicator FE1: Amount of late-successional forest cover

The amount of late-successional forest cover was measured using acreage amount and % total cover at the watershed and sub-watershed scales. The amount of mature and old forest structure was used to contrast different alternatives in the PRMP (USDI 1994 p4-39), and set thresholds for minimum late-successional retention in a watershed. Thresholds in the amount of late-successional cover have been identified in the Northwest Forest Plan and through theoretical modeling (Franklin and Forman 1987, MELP 2000).

The current cover of late-successional forest in the analysis area reflects the historic range in conditions modified by modern management activities. Like much of the Coast Range, the Middle Fork Coquille watershed analysis area (MFC) was characterized by infrequent, large, high intensity stand-replacing fires and occasional, smaller stand-modifying fires previous to European expansion. By the 1930s, following turn-of-the-century fires (mostly in the western portion of the MFC) and minimal harvest, > 60% of the watershed supported late-successional conditions (Harrington 2003), including roughly 40% old-growth (structurally complex) forest cover (Table 6). Estimated total late-successional cover for the watershed in the 1930s cover map is close to pre-logging old forest estimates by (Ripple *et al.* 2000); old-growth cover estimates in this map are close to modeled historic range in old-growth cover for the Oregon Coast Range (Wimberly *et al.* 2000).

Since the turn of the 19th century, historic late-successional forest stands have been harvested, disturbed by fire, or have undergone succession. The current condition for the watershed includes about 14% late-successional forest cover in federal management and 3-4% in private ownership (Table 5). The largest portion (10% of the 14%) of Federal late-successional forest[5] cover is mostly 80-200 years old; < 4% is 201-566 years old. There is less than 200 ac. of forest that has been identified as > 300 YO. The closest location of this *Vertical Diversification*-stage old-growth is approximately 0.6 mi. from Unit 4. It is unlikely that any of the private late-successional forest in the analysis area includes old-growth forest.

Current late-successional cover in the Sandy Creek sub-watershed is almost 30% (Table 10). This more extensive cover is attributable to the sub-watershed's distance from European settlements and (more recently) federal land use allocations. Late-successional forest cover in the Coast Range Province was approximately 18% in 2004 (Wimberly and Ohman 2004), similar to the MFC and far lower than in the Sandy Creek sub-watershed.

Indicator FE2: Late-successional interior area

Interior patch area is that portion of a late-successional patch not influenced by edge effects. Interior patch covers and patch sizes are meaningful comparators to total late-successional patch cover and sizes (measured in FE1). There are mechanistic reasons why some species would be predicted to be associated with interior late-successional habitat, including the need for complex horizontal/vertical concealment cover (e.g., marbled murrelet) or a buffered microclimate (some fungi, bryophytes). Measures of late-

[5] Coquille Tribal lands and USFS holdings have been lumped with BLM-managed areas for the purposes of analysis.

successional interior area discussed include: total interior area (ac.), cover by interior (% of watershed/ sub-watershed), mean interior patch size (ac.), and number of isolated interior patches. Depth-of-edge influence used for these landscape level measures is 200 meters. Regulatory thresholds for late-successional interior patch size have not been quantified; in the absence of these thresholds, and considering that different functions and species have very different edge-to-interior change responses (Chen *et al.* 1999), comparison can be made to historic conditions and to predicted responses from some species and functions.

Historic conditions supported both very large late-successional patches and large interior patch areas in the MFC. Analysis of 1930s forest type maps suggests that 85% of the late-successional area was interior habitat; mean interior patch size was almost 7,000 ac. (Table 7)[6]. The amount of Interior late-successional forest cover in the current analysis area has changed radically from historic conditions, and has been reduced more dramatically than total late-successional cover. Considering a 200 meter depth-of-edge, interior late-successional forest currently covers slightly less than 2% of the watershed (Table 7). Mean interior patch sizes are $1/10^{th}$ the mean late-successional patch size (about 4.2 ac.) with 15% of interior late-successional patches existing as fragmented-type islands. The majority of late-successional patches in the current landscape have no interior area.

Mean interior patch size in the sub-watershed (20.4 ac: Table 11) is larger than in the watershed (MFC). This is due to historic disturbance patterns which left larger late-successional patches and current land use/land allocation patterns retaining these larger patches. The environmental baseline for mean interior patch size in the Sandy sub-watershed is still only 2% of historic interior patch sizes. At a larger scale, in 1994 the BLM Coos Bay District holdings included 123 blocks of interior old-growth habitat[7]. This constitutes almost 25% of all of BLM-managed old-growth, < 4% of all Coos Bay District holdings, and < 1% of cover in the Southwest Oregon Province. At the province-scale, LSRs in the analysis area (LSR 260, 261) represent large-scale disjunct interior areas. LSR 261 is considered the most isolated LSR in the province, with only 29% of potential dispersal azimuths reaching another LSR within 12 miles; LSR 260 is considered moderately isolated (USDA and USDI 1998).

Indicator FE3: Late-successional quality (landscape-scale)

Quality components for the analysis area (MFC) landscape include the structural stages of late-successional forest present in the analysis area, and the size and arrangement of these older patches in the landscape. At the landscape-scale, just over 75% of the late-successional forest in the MFC is in the *Maturation*-stage; 24% is in the *Vertical diversification*-stage; < 1% is in the *Horizontal diversification*-stage[8]. Forests in the *Maturation*-stage across the watershed would be predicted to have late-successional stand qualities similar to Units 1-4. These include moderate densities of large trees with few well-developed structures, limited secondary canopies, and few legacies. Forests in the MFC in the *Vertical diversification*-stage would be predicted to have many large trees with extensive numbers of large structures, well-developed secondary canopies, and many legacy structures. Forests in the *Horizontal diversification*-stage would be predicted to include multiple smaller structural units, with a greater variability in structural conditions including hardwood patches, dominant tolerant species, and highly variable distribution of structural legacies including large structures.

The analysis area is currently dominated by stands < 500 ac. in size (Table 8), which is roughly 70% of all MFC cover. Current landscapes support far fewer large (> 2,000 ac.) late-successional patches than historic landscapes (FE Tech Report; Table 8). Historic large-scale fires often created very large patches dominated by a single structural stage, isolated from patches with similar structure. This led to a

[6] Due to the large grain size of this 1930s type map, it likely under-represents small gaps in these large patches, however the general trend of large late-successional patches with significant interior area is probably correct.
[7] "Interior" was defined as > 400 feet from adjacent young stands.
[8] See Appendix B, Table 1 for structural class comparison.

landscape with very low connectance (<1%) and high clumpiness for late-successional patches for functions operating on scales of hundreds (Table 7) to a few thousand meters (FE Tech Report).

Current late-successional patches remain clumped, due to these same historic influences (fire) and the subsequent retention of late-successional patches principally in federally managed areas. Changes from historic conditions in patch size and patch arrangement are qualitatively apparent in the Sandy Creek sub-watershed. The sub-watershed was dominated by a single large late-successional patch in the north ½ of the sub-watershed in the 1930s. Harvest in the north and succession in the southern portion of the sub-watershed have produced a pattern of smaller, less connected late-successional patches in the current landscape (Table 11; Map 6). Similar patterns of decreased late-successional patch size and clumped late-successional patch arrangement are present at larger scales. Over 50% of the mature and old forest cover in the BLM Coos Bay District is in blocks > 600 ac. in size[9]; the bulk of old forest in historic landscapes occurred in patches > 200,000 ac. in size (Wimberly 2002). At the province-scale, late-successional forest habitat is clumped in federal ownership, generally in the middle of the Coast Range Province, removed from population centers.

Wildlife Resources

For purposes of this discussion the analysis area is defined as the Middle Fork Coquille 5th field Watershed. Discussions will also focus on the smaller 6th field Sandy Creek sub-watershed and the proposed harvest units (site level) where appropriate.

Issue 2: Threatened and Endangered Species

Two wildlife species listed as federally threatened under the Endangered Species Act (ESA) are known to occur or have habitat present within the analysis area. These species are the marbled murrelet (*Brachyramphus marmoratus*) and the northern spotted owl (*Strix occidentalis caurina*).

Marbled Murrelets – Although the stands are located within nesting range of the ocean (26-31 air miles), the proposed units do not qualify as suitable marbled murrelet habitat. These stands are in the age range and have remnant large trees, but field verifications have determined the limbs and moss growth in these trees have not developed sufficiently to provide platforms. Trees must have enough moss covered limbs in the top third of the tree that are a minimum of four inches in diameter to be considered nesting habitat. Adjacent cover from surrounding trees is also desirable to reduce vulnerability to predation.

As these stands are not typed as suitable habitat, a complete set of protocol surveys to detect presence was not conducted in the proposed harvest units. However, multiple surveys were performed as part of field verifications of the sites (Table III-1). No murrelets were detected. Adjacent suitable habitats were surveyed to avoid disturbance effects; there are none within 120 yards of Units 1, 2, and 3. Surveys were conducted adjacent to Unit 4 during the 2005 and 2006 breeding seasons. This habitat was also surveyed in 1995, 1996 and 1997. No murrelets displaying nesting behavior were observed in 34 surveys. Murrelet occupancy was documented in a small stand several miles from the proposed units and at another location in an adjacent sub-watershed, approximately 0.1 miles west of Unit 1.

[9] RMP data based on 1988 inventories. "Block" definition may be different than patch definitions produced using other delineation techniques.

Table III-1 Summary of Marbled Murrelet Surveys Completed in the Sandy Creek Survey Area

Site	Year	No. of Stations	Total Surveys Completed	Protocol Surveys		Number of Detections	Most Significant Behavior Detected
				Completed	Required		
Units 1,2,3	2006	0	0	0	0	0	Dropped Not Habitat
U[2]	2006	6	6	5	5	0	None
Units 1,2,3	2005	3	3	3	0	0	Dropped Not Habitat
U[1]	2005	6	8	7	5	0	None
U	1997	6	5	5	5	0	None
U	1996	4	4[2]	4[2]	4	0	None
U	1995	9	4[2]	4[2]	4	0	None
Units 1,2,3	1995	9	4[2]	4[2]	4	0	None

[1] Site adjacent to Unit 4 [2] Individual unit data was unavailable, minimum requirements were met

There are 18 known occupied murrelet sites in the Middle Fork Coquille Watershed; two of these overlap into adjacent watersheds. Sites range in size from 21 to 330 acres.

None of the proposed harvest units are designated as Critical Habitat. Not all lands on the Coos Bay District have been field-verified; stand age (>80 years) will be used for this analysis as a potential predictor of murrelet habitat. The Sandy Creek sub-watershed contains about 3,757 acres (29.5 %) of potential murrelet habitat with 2,186 of these acres designated as Critical Habitat. The Middle Fork Coquille Watershed has an estimated 33,833 acres (17.2 %) of potential murrelet habitat with 10,894 of these acres designated as Critical Habitat.

Northern Spotted Owl (NSO) – The final Recovery Plan for the Northern Spotted Owl was approved in May 2008 (USDI 2008). This plan designated Managed Owl Conservation Areas (MOCA) and Conservation Support Areas (CSA). The project area is not included in a MOCA, but does fall within an unmapped CSA, Coquille OCSA-04. These CSAs are described as "areas between or adjacent to MOCAs where habitat contributions by private, State, and some Federal land managers are expected to increase the likelihood that spotted owl recovery is achieved." Contributions for recovery for these areas are "where private, State, or Federal management regimes support owl habitat (for example, Section 10 Habitat Conservation Plans, State forest practices rules, certain Federal adaptive management areas)." The Remote Control units are not located within any special federal adaptive management areas as they are designated as Matrix, and are not expected to contribute to the recovery of the northern spotted owl; "CSAs recognize existing management compatible with spotted owl conservation such as Habitat Conservation Areas under the ESA, State parks and other Federal lands." Additionally, none of the proposed units are located in NSO Critical Habitat.

Nest Sites

There are no known NSO nests in the proposed units. Telemetry data from an ongoing National Council for Air and Stream Improvement (NACSI) study shows that there were four visits to Unit 4 by a male NSO between January and April 2005. There could have been more unaccounted for visits as later in the season the radio had failed. Also, in July 2006 an NSO sighting was reported in Unit 4 (Irwin *et al.* 2000). A barred owl (*Strix varia*) was observed in Unit 4 in April 2006 (Heaney 2006). The NACSI study also documented other sightings of barred owls in the general vicinity.

One of the proposed units (Unit 4) is located within the 1.5 mile home range of two spotted owl nest site centers, but is not located within the 100-acre core areas around nest sites. A NSO site center is based on home range requirement of a 1.5 mile radius from the nest site (a total of 4,501 acres). The Slide-Remote site is currently active although it is below the accepted threshold target for viable nesting habitat. For successful reproduction, the USFWS suggests home ranges contain at least 40% suitable habitat. The Slide-Remote nest site is currently being used at a level of 14% suitable habitat. At this level, the habitat is considered marginally viable and successful nesting would not be expected.

The Remote site contains a level of suitable habitat at 24%. This is higher than the other nest site, but is unoccupied. This nest site is also below the 40% threshold for successful reproduction. The Remote Nest Site is approximately 0.8 miles away and the Slide-Remote Alternate Site is 0.4 miles from the sub-watershed boundary and 0.85 miles from Unit 4.

At the watershed scale, the Middle Fork Coquille contains 15 northern spotted owl site centers, including several alternate sites. Seven sites are in General Forest Management Areas; one is in a Connectivity block; six are in Late Successional Reserves; one is on private land.

Habitat
Avaiable "nesting, roosting and foraging" habitat is considered to be forests 120 years and older. "Roosting and foraging" habitat is considered forests 81 to 120 years old. However, stand age is not always a positive predictor of owl habitat. GIS classifications of spotted owl habitat are based on stand age and aerial photo interpretation. Classifications are changed when field verifications determine site conditions warrant a new designation. Units 1, 2 and 3 have been changed to "roosting and foraging" habitat from their original designation of "nesting, roosting and foraging" habitat because of the lack of nesting components. Oppositely, Unit 4 was originally classified as "roosting and foraging" habitat, but was reclassified to include nesting suitability. Field reviews found that Unit 4 contained desired nesting characteristics from open, multi-layered canopies and scattered older trees. The habitat is low quality because the stand is less mature with smaller diameter trees than desired for spotted owls. All units provide habitat for dispersing spotted owls.

There are 17,717 acres of potential "nesting, roosting and foraging" habitat out of a total of 59,245 acres (30%) of BLM administered lands in the Middle Fork Coquille Watershed. Suitable NSO habitat was identified using a district GIS layer with "nesting, roosting and foraging" or "roosting and foraging" habitat classifications.

Barred Owls
The 2008 Final Recovery Plan addressed what is currently known about the potential threats to the spotted owl population from the expansion of the range of the barred owl. The USFWS summarizes that the data is showing "a preponderance of evidence suggests barred owls are exacerbating the spotted owl population decline" (USDI 2008). Barred owls have been observed occasionally in and around Unit 4.

West Nile virus has not been documented in Coos County, and implementation of the proposed action is not expected to cause any greater threat to spotted owl recovery by this virus.

Issue 3: Stand Structure

It is commonly accepted that there is greater biodiversity within stands that contain components of snags and down wood. Both features provide a variety of habitats at varying decay levels. The majority of vertebrate species that use snags are birds and bats, while the majority of the use of down wood is by small mammals, amphibians, and reptiles. However, intensive harvest practices and fire prevention have reduced the amount of snags and down wood across the northwest coniferous landscape (Zack *et al.* 2002).

Snags

The RMP has a management objective of retaining snags within harvest units "at levels to support species of cavity-nesting birds at 40 percent of population levels" (USDI 1995). Primary cavity nesters (e.g., woodpeckers, kingfishers, some swallows) are capable of excavating their own cavities and are useful in describing the importance of snag habitats. These birds have minimum snag diameter and state of decay

requirements for nesting and foraging. For example, snags in decay class 4 or 5 will not provide the nesting habitat required by most of these species (Table III-2), but woodpeckers avoid conifers as foraging sites until they have attained a decay class of 3 (Bunnell *et al.* 2002b). Obviously, a snag's decay class is not a static condition. For example, hard snags smaller than 18.8 in. DBH will transition to soft snags within 30 years.

Table III-2 Snag Requirements for Nesting and Roosting for the Primary Excavators

Bird Species	Minimum Snag DBH (with bark) usable by the species	Snag Decay Class usable by the bird species for nesting habitat	
		Hard Snags (decay classes 2-3)	Soft Snags (decay classes 4-5)
Downy woodpecker	11+	X	X
Red-breasted sapsucker	15+	X	
Hairy woodpecker	15+	X	
Northern flicker	17+	X	X
Red-breasted nutchatch	17+	X	
Pileated woodpecker	25+	X	

As part of stand exams, snag and down wood levels were recorded. Table III-3 shows a deficit of snag and downed wood components. Snags >7 in. DBH ranged from 0.4 to 10.4 snags/acre while snags >16 in. DBH ranged from 0.2 to 0.6 snags/acre. Only Unit 4 had a snag above the 20 in. DBH target, and it was a hardwood. The majority of snags in the units are below 16 in. DBH. At these levels, the stands do not appear to provide nesting habitat (25+ inches) for pileated woodpeckers other than from some of the remnant trees. Only Unit 4 appears to have nesting habitat (17+ inches DBH at 0.5 snags/acre) for northern flicker and red-breasted nuthatch.

Table III-3 Existing Down wood and snag densities/cover in the action area, derived from plot aggregation.

n=sample size; DW=down wood; CV=coefficient of variation; DBH=diameter breast height. DW data collected on pieces >7 in. diameter (intersect), >7 ft. in length; snag data collected on snags >7 in. DBH and >10 ft. in height.

		Downed wood[1]				Snags[2]		
Unit	n	pieces/ac. (CV)	% cover (CV)	NFP pieces/ ac.[1] (CV)	NFP ft./ac.	snags/ac. (CV)	Snags>16" DBH/ac.	Target snags/ac.[2]
1	10	76.3 (104.6)	3 (98)	1 (400)	69.8	10.4 (164.2)	0.2	0
2	4	26.9 (74.9)	2.6 (108.4)	2.1(160)	178.6	0.4 (116.5)	0.4	0
3	4	18.5 (122.9)	0.9 (121.4)	0	0	0.4	0.4	0
4	10	57.8 (100.9)	3.8 (103)	2.7 (400)	73.7[3]	8.5 (168.3)	0.6	0.1
Ref values (Spies and Franklin 1991)			Young	25			2.3	
			Mature	35			2.5	
			Old	45			4.9	

[1] NFP DW / NFP ft. include only pieces DC 1-2, ≥ 16 in. DBH, and ≥ 16 ft. in length.
[2] Target snags are ≥20 in. DBH, DC1 and 2, and ≥ 50' in height.

Down Wood

These exams also describe the current condition of down wood within the units (Table III-3). Units 1, 2, and 3 did not have snags greater than 20 inches. The exams found down wood ranged from none in Unit 3 to 179 lineal feet/acre in Unit 2. Unit 4 had the most pieces of "larger" NFP down wood.

Issue 4: Open Road Density

The District RMP sets a goal of 1.1 mi/mi^2 of road with a maximum density of 2.9 mi/mi^2 per watershed within the Oregon Department of Fish and Wildlife Tioga Big Game Management Area. This is because studies have shown that elk move away from motor vehicle activity as that activity increases (ODFW 2008). The proposed units are located entirely within this Management Area. In the Sandy Creek sub-watershed there are 2.95 mi/mi.^{2} (includes BLM and private roads on BLM administered lands only). At

the 5th field scale, the Middle Fork Coquille Watershed currently has 4.33 mi/mi.^{2} (includes BLM and private roads on BLM administered lands only). Many of the private roads have non-negotiable rights-of-way agreements that prohibit decommissioning or removal, and make attainment of RMP standards difficult or impossible.

Issue 5: Special Status Species/Other Wildlife of Concern

Instruction Memorandum No. OR-2008-038, transmitted 2/07/2008, updated the State Director's Special Status Species list for the Oregon/Washington BLM. The new list contains two categories of special status species: Sensitive and Strategic. Strategic Species do not require NEPA analysis. Species listed as threatened or endangered in the ESA are also considered Special Status Species (Sensitive). Special Status Species policy requires that management actions "do not contribute to the need to list any special status species" (USDI 2001) under the Endangered Species Act. This analysis focuses on those species that would be potentially present within the project area.

American Peregrine Falcon - The proposed units contain no peregrine habitat. There are suitable cliffs adjacent and to the west of Sandy Creek sub-watershed but these cliffs are approximately five miles from the units. There are no documented American peregrine falcon nest sites in Middle Fork Coquille Watershed. Peregrine surveys were conducted within the sub-watershed. Staff biologists have also spent time in the area performing general wildlife surveys, specifically looking for peregrine falcon activity.

Bald Eagle - The final ruling to remove the bald eagle (*Haliaeetus leucocephalus*) from the Federal List of Endangered and Threatened Wildlife was effective 8 August 2007 (72 FR 37345). Protections remain in place under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). There are no known bald eagle winter roosts on the Coos Bay District.

There are currently no bald eagle nest sites within the proposed harvest units in neither the Remote Control project area, nor are there any within the larger Middle Fork Coquille watershed. Units 1, 2, and 3 do not contain suitable nesting habitat because they are not within one mile of a large water body. Unit 4 contains approximately 104 acres of suitable bald eagle nesting habitat and is within one mile of the Middle Fork Coquille River.

Purple Martin –These birds are associated with open cavity structures; "Oregon nest sites include snags in forest clearcuts and burns, snags in coastal dunes, old pilings and nestboxes along estuaries and rivers, gourds set on poles in fields" (Horvath 2003,2006). The units do not contain the necessary open areas or large snags these birds prefer.

Pacific Fisher - BLM biologists conducted surveys for fishers in the Coquille, Umpqua and N. Fork Chetco river drainages from 1994 to 1997. No fishers were detected. Definitive conclusions cannot be made because few data points were taken. Protocol surveys were conducted in 2005-06 north of the analysis area in LSR 261 (T26S R10W and T27S R10W). No fishers were detected. Recent fisher surveys conducted on District lands near the California border detected two fishers. Two incidental sightings near Middle Creek (T27S R10, Section 5) and Daniel's Creek (T26S R12W, Section 10) lend support to the possibility that fishers are elsewhere on District (USDI 2006). These sightings are outside of the analysis area; the Middle Creek site is 11 miles and Daniel's Creek is 21 miles from the closest proposed unit.

Although the Middle Fork Coquille Watershed may provide some dispersal habitats, the habitat is poor quality based on the overall low number of snags and down wood, and presence in the area for extended periods seems unlikely.

Townsend's Big-Eared Bat and Fringed Myotis - As both of these bats are found near larger water courses, they may occur within the project area. There are no cliffs or caves within the units, the preferred sites for maternity roosting. The proposed units contain some potential habitat in the form of large trees; but the lack of large snags likely precludes day roosting. No project specific bat surveys were conducted nor required. The nearest documented presence of either species is approximately 0.25 miles from proposed Unit 4, where a Townsend's was observed at the Sandy Creek bridge. There are no known Townsend's bat maternity/winter roosts in the watershed.

Foothill Yellow-legged Frog - Suitable habitat occurs within a quarter mile of the proposed units in the mainstem of Sandy Creek. This species has been documented within the Middle Fork Coquille watershed, but not within the project area. Presence within streams located within the units is unlikely because of smaller channel size and heavy canopy closure.

Western Pond Turtle - Two pond turtles were documented within the mainstem of Sandy Creek below Unit 4. Steep slopes and natural barriers likely preclude western pond turtle presence within the project units themselves.

The following was a previous species of concern and requested in analysis:

Red Tree Vole - Red tree voles (RTV) are most often found in forests dominated by Douglas fir, but also occur in grand fir, Sitka spruce, western hemlock and big leaf maple. Habitat includes second-growth forest, but RTV may be more numerous in mature and old growth stands. Studies have found that red tree voles will nest in younger stands (USDA and USDI 2007).

The analysis area is included in the Mesic Biological Zone, which has the most abundant and stable populations of red tree voles (USDA and USDI 2007). The proposed harvest units are marginal habitat based on stand age and size. Local survey results indicate that RTVs are likely present. District-wide surveys found red tree voles in conifer stands between 25 and 80 years old. These surveys were conducted only in these age classes. A total of 1,269 acres were surveyed for project clearances in 2000. Surveys found 478 confirmed RTV nests (0.37 nests/acre) with 212 of these active (0.16 active nests/acre). Many of the nests were in trees that had forked or multiple tops. Surveys within the analysis area found 402 trees with "active", "inactive", or "undetermined" RTV nests. No RTV surveys were conducted nor required.

Issue 6: Migratory Birds

Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (66 FR 3853), of January 17, 2001, directs federal agencies to conserve migratory birds to meet obligations under the migratory bird conventions and the Migratory Bird Treaty Act. Interim management guidance is provided by BLM Instruction Memorandum No. 2008-050, dated 18 December 2007. This guidance establishes a consistent approach to project level analysis until a Memorandum of Understanding (MOU) is established with the U.S. Fish and Wildlife Service. Western birds on the U.S. Fish and Wildlife Services' *Bird Species of Conservation Concern* and *Game Birds below Desired Condition* are to be addressed when actions could potentially affect those species. These lists are based primarily on North American breeding bird survey data which can be accessed at http://www.mbr-pwrc.usgs.gov/bbs/ . The following species are on one of these lists, could be affected by this project, and have not already been addressed elsewhere in this EA (as T&E or Bureau sensitive species): northern goshawk, olive-sided flycatcher, rufous hummingbird, mourning dove, band-tailed pigeon, and the black-throated grey warbler.

Northern goshawks are associated with late-seral stands which include large trees, snags, down wood interspersed with openings (Marshall 2003,2006). At least three sightings have been documented in the Middle Fork Coquille watershed.

The olive-sided flycatcher is associated with conifer forest, especially where burns have left scattered large snags and live trees (Altman 2003,2006).

Rufous hummingbirds are usually associated with edges and open, brushy areas within coniferous forests. They are the most common and widespread hummingbird in Oregon. Reasons for population declines in the rufous hummingbird are unclear, but habitat fragmentation and degradation along migratory nectar corridors is suspected (ASDM 2006-2008).

Both the mourning dove and band-tailed pigeon are currently game birds in all of Oregon (see: Oregon Game Bird Regulations). Both species are common in western Oregon despite population declines overall. Mourning doves are thought to be currently more numerous than prior to European settlement because of agricultural practices and forest clearing (Kindschy and Marshall 2003,2006). They are nest generalists and will nest on the ground when trees are not available. Band-tailed pigeons nest in closed-canopy forest and forage in open-canopy (Sanders 1999).

In southwest Oregon, black-throated gray warblers are common in mature chaparral which includes a mixture of oak, madrone, and manzanita. They also frequently reside in early-seral habitats and forests which are a mixture of Oregon white oak and conifer (Janes 2003,2006).

Botany Resources

Issue 7: Special Status Species

The following supplements the tree compositions discussion of the Units found earlier in the Forest Ecology section:

Much of Units 1-3 fall into the Western Hemlock-Tanoak/Pacific Rhododendron-Evergreen Huckleberry plant association (White 2001). There is an extremely dense shrub and brush layer in many areas of these stands which is dominated by rhododendron (*Rhododendron macrophyllum*), evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), and an occasional vine maple thicket (*Acer circinatum*). Areas without this dense shrub layer are mostly blanketed with sword fern (*Polystichum munitum*).

In contrast, Unit 4 has a much sparser ground cover in most areas with rhododendron and evergreen huckleberry only dense in scattered patches and sword fern and salal less continuous and absent in much of the unit. There are portions of this unit that basically have no understory shrub or herb layer, particularly in the lower half of the unit where the tan oak and madrone understory tree cover is at its most dense.

In all units, bryophyte diversity is greatest on the widely scattered large decay class 3, 4, and 5 logs. These logs provide excellent habitat for a diverse array of bryophyte species. Bryophytes were also found on the boles of the overstory Douglas-fir and on some of the understory hardwood trees, particularly red alder and big leaf maple. Because of the dense understory present in Units 1-3, bryophyte diversity is limited as little sunlight can penetrate this thick cover. Green algal and alectorioid lichens dominate the macrolichen flora in all units. Cyanolichens were very sparse in all units and were mainly located on red alder trees or on stand edges where light levels were greatest.

Lichen, bryophyte and vascular plant species surveys have been completed and only a single SSS was located - a Bureau Sensitive lichen, *Bryoria subcana*, in Unit #1. Fungi are not considered practical to survey for (USDA and USDI 2007) because they are either difficult to identify and/or their occurrence is sporadic or unpredictable. There are 24 species which are documented within the range of the northern spotted owl; of these 15 are known to occur on the Coos Bay district in habitat similar to that present in the project area.

No threatened or endangered plant species were identified as known or suspected in the project area.

Aquatic Resources

Issue 8: Changes to Stream Flow Associated with Peak Flow, Annual Yield and Low Flow

For this section the analysis area is defined as the 6th field Sandy Creek sub-watershed (HUC 171003050105). The sub-watershed drains 12,730 acres (19 sq. mi.) of land into the mainstem Middle Fork Coquille River. Sandy Creek includes most of T29S, R10W; T29S, R9W, Sections 6 and 7; T28S, R10W, Sections 26, 27, 34, 35, 36; and T28S, R9W, Section 31 (Map 1). The BLM manages 47% of the land base in the Sandy Creek sub-watershed. The remaining 53% is privately owned.

Sandy Creek is one of 10 sub-watersheds within the Middle Fork Coquille Analytical Watershed (HUC 1710030501), an area which spans 305 mi^2 (197,074 acres) and contains 40 miles of the mainstem of Middle Fork Coquille River. Land use in the sub-watershed is predominantly timber production, followed by grazing and agriculture.

The Sandy Creek sub-watershed is influenced by a mild, cool, maritime climate more simply described by wet winters and dry summers. The Transient Snow Zone is located in the area above 2000 feet elevation and consists of approximately 1,934 acres. During winter storms, high pressure centers to the south push moisture eastward/inland. The principal driver of hydrologic processes in the Sandy Creek analysis area is low intensity rainstorms. Annual precipitation ranges from 55-70 inches, and varies strongly with elevation, with greater depths in the higher portions of the drainages. About 80% of the yearly precipitation total occurs between November-March. A high percentage of this rainfall (65% of annual precipitation) ends up as runoff due to the low water storage capacity of the shallow and coarse textured soils and impermeable underlying bedrock. Stream hydrographs (flows) for an individual storm have short lag times behind precipitation, show steep rising limbs, but a more moderate recession. Flooding occurs with very large prolonged storms, since much of the valley bottom stream network is entrenched and lacks floodplain connectivity.

Some of the higher elevations (above 2000 feet) experience a portion of this precipitation as snow. Although the area is not characterized by intense storms, some moderately intense rainfall does occur and can result in soil movement and high soil moisture conditions.

The Sandy Creek sub-watershed has a north-south orientation with a trellis drainage pattern resulting in predominately south, south-east, and south-west aspects on moderate to steep upland slopes. The soils formed in colluvium from deeply weathered marine sand, silt and mudstones of the tertiary age, are heavily textured, well drained, and acidic. The underlying strata are not strongly folded and have a gentle eastern dip which produces a “cuesta ridge” pattern: steep western slopes with exposed sandstone cliffs and gentler eastern dip slopes. Elevation ranges from 1000 ft., at the confluence of Sandy Creek and the Middle Fork of the Coquille River, to 2500 ft. along the eastern ridge.

Tributary drainages consist of narrow canyons with much steeper channel gradients, and drain rugged mountainous landforms. The drainage pattern of the sub-watershed is dendritic with a high stream drainage density of more than 6.25 mi/mi^2. About 283 miles of streams are found in the Sandy Creek sub-watershed. First and second order streams comprise 79% of the total drainage density. These are generally steep headwaters channels draining small headwater catchments. The first order streams and the majority of the second order streams have no or only minute discontinuous stream flows by late summer. The remaining higher order streams (21% percent of the analysis area stream miles) are perennial, and usually have some live flow all year long.

Water Yield

The Water Yields of the Sandy Creek sub-watershed are considered to be within expected ranges of variability. Compared with a fully mature forest watershed, water yields would be expected to be increased due to the timber and agricultural management. The harvest rotation of trees and clearing of floodplains for pasture reduces the maximum potential evapotranspiration but has not been known to have adverse effects on the hydrologic function of the watershed. The stand replacing effects of fire has been mostly eliminated, but would be expected to reduce the vegetative condition below the levels currently managed today.

Increased water yields from forests outside the snow zone occur by reducing the transpiration and interception losses caused by the removal of forest canopies. Relevant research into the effects of intense clear cut harvest with minimum stream buffers on smaller watersheds (175 acres in the Alsea Watershed to 1,168 acres in the Caspar Creek Study) indicate measured increases to controls in annual water yields. Comparatively, the combined size of the Remote Control project units is similar for site scale comparisons, although, the Sandy Creek sub-watershed, identified as the analysis area (12,730 acres), is larger in total area. These studies suggest a direct association between the high evapotranspiration rates of coniferous forests and the deviation in year-to-year water yields following harvest. For instance, the wettest years are followed by the largest increases in annual water yield (Bosch and Hewlett 1982). The largest increases in annual water yield occur in the fall and spring, when maximum differences in water storage exist (Harr 1976). Repeatedly, responses are shown to be proportional to the amount of vegetation removed.

Historically, the effects of timber harvest on water yield was done by studying the effects of harvesting entire small watersheds and involved treatments that went from ridge top to creek edge. Little research has been done in the Pacific Northwest looking at the effect of clearcutting on water yields while retaining streamside buffers. In an overview of several studies, Satterlund and Adams (1992) found that "lesser or non-significant responses occur ... where partial cutting systems remove only a small portion of the cover at any one time." Where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following timber harvest.

Compared with old-growth forests, the evapotranspiration rates of young forests can be over two times greater 40 years since disturbance (Moore *et al.* 2004). As young Douglas-fir stands mature factors such as, stand age, composition, and sapwood basal area put increased demands on the water budget when compared to old-growth stands. Any increases to the Sandy Creek sub-watershed (Analysis Area), would likely be outside the margin of error of discharge measurements and be expected to be undetectable as stream flow at this scale.

Peak Flow

Currently, scientific data specific to the area is limited. Published research conducted in experimental watersheds, such as Caspar Creek and H. J. Andrews, and various other peer reviewed reports include detailed analysis for the effects of timber harvest practices using similar methods, such as: leaving intact

riparian buffers that range from 50 to 150 feet, equipment exclusions, thresholds on canopy retention set at 50 percent, design features for ridgetop road construction, upslope landing locations, and skyline cable logging systems that are mostly analogous to the proposed action.

For example, Lewis *et al.* (2001) examined the peak flow discharge response to clearcutting in the North Fork Casper Creek using 526 observations representing 59 storms on 10 treated watersheds. The report detected an increase to peak flows in 8 out of 10 tributary drainages with clearcut units increasing up to 300 percent, although most increases were less than 100 percent. The highest increases take place during early season storms, but as the antecedent moisture conditions increase, the percentage of peak flow enhancements decline. In a larger, partially clearcut watershed, smaller peak flow increases were observed. Measurements during the wettest antecedent moisture conditions increased, on average, 23 percent in fully clearcut watersheds and 3 percent in partially clearcut watersheds. Ziemer (1998) also found the average storm peak with a 2-year return period, similar to bankfull flows, increased 27 percent in the fully clearcut watersheds and 15 percent in the partially clearcut watersheds. Clearcut units returned to approximate pre-harvest conditions 10 years after treatment, and then demonstrated a new response to pre-commercial thinning. This study includes a documented increase in net precipitation (20 percent annually) within clearcut harvest units, even during the wettest storm events caused by the loss of canopy interception.

Related research and studies on the effects of forest removal have documented increases in annual yield and peak flows (Harr 1983, Ziemer *et al.* 1996) . The research can be difficult to draw conclusions from, since direct comparisons to forest management outside environmental controls are difficult when the close interspersed private and public lands and the relevant regulations guiding timber harvest are present. The quantitative extrapolation of results from experimental sites to other sites is potentially misleading when actual management sites probably encompass terrain conditions and historical circumstances not experienced at the experimental sites. The findings of such peer reviewed literature; however, is currently the best available means by which to determine whether the analysis area is likely experiencing elevated runoff response and annual yields caused by continuous timber harvest.

Vegetative cover of less than 30% is often considered an open canopy condition and thus used during Landsat imagery interpretation as a surrogate for unrecovered stand (conifer) conditions (Jiang *et al.* 2004, Yang *et al.* 2005). GIS data derived from the Interagency Vegetative Mapping Project (IVMP) shows 4.8% of the Middle Fork Coquille watershed contains vegetative conditions with less than 30% cover. In other words, greater than 95% of the Watershed has enough green vegetative cover (trees, shrubs, herbaceous) to project a vertical spread of foliage to create areas greater than 30% over the ground surface (IVMP 2003).

The analysis area, according to IVMP data, has less than 26% of its total area in an open canopy condition across private and public lands. Private industry accounts for 11% (2,532 acres), and BLM land accounts for 8% (1,802 acres) of the unrecovered or lands with <30% vegetative cover. This project would decrease the canopy across the parent Watershed by about 1%.

Issue 9: Aquatic Species and Habitats

The analysis area used for this analysis includes the lower portion containing the proposed actions of the Sandy Creek 6th field sub-watershed.

Aquatic Habitat

Aquatic habitat has been influenced by human activities within the Middle Fork Coquille Watershed. Many stream channels in the lower valleys are down-cut and are not connected with their floodplains. The Middle Fork Coquille River and portions of many tributary streams are constrained and influenced by

roads. Streams within the analysis area are generally lacking in-stream structure, namely large woody debris (LWD) and channel complexity (USDI 2007b). For a detailed description of aquatic habitat in the analysis area refer to the Sandy-Remote Watershed Analysis (USDI 1996).

Oregon Department of Fish and Wildlife (ODFW) conducted aquatic habitat surveys in Sandy Creek in 2004 (ODFW, 2004). The survey was conducted from the mouth of the stream to the upper extent of fish habitat.

Sandy Creek was overall undesirable in key pieces of LWD and did not meet the desirable level in the category of all pieces of LWD. The pool area and pool frequency habitat indicators were within the desirable range within the majority of the reaches surveyed. The percentage of silt and sand in riffles in seven of the eight reaches was within the desirable level.

There are no streams within the analysis area listed on Oregon Department of Environmental Quality's 2004/2006 303(d) list of water quality limited waterbodies (ODEQ 2006).

Endangered Species Act

The analysis area is located within the Oregon Coast coho, *Onchorynchus kisutch*, Evolutionarily Significant Unit (ESU). The National Marine Fisheries Service (NMFS) published the listing determination for Oregon Coast coho as threatened February 11, 2008 effective May 12, 2008 (73 FR 7816). Streams containing coho and coho Critical Habitat (CCH) within the analysis area include: Sandy Creek and an unnamed tributary to Sandy Creek with the confluence in the northeast ¼ of T29S R10W section 15 (Streamnet GIS Data 2003, USDC 2008a).

Pacific lamprey, *Lampetra tridentatus*, is listed as a species of concern by the United States Fish and Wildlife Service. The Oregon Coast steelhead, *Onchorynchus mykiss irideus*, ESU is currently listed as a species of concern by NMFS. "Species of concern status does not carry any procedural or substantive protections under the Endangered Species Act" (USDC 2008b). Analysis of species of concern is not required under the National Environmental Policy Act.

Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act, in accordance with the Sustainable Fisheries Act of 1996 (Public Law 104-267) designates Essential Fish Habitat (EFH) for coho and chinook salmon (65 FR 63047). The Magnuson-Stevens Act defines EFH as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (67 FR 2343)."

Streams containing EFH within the analysis area include: Sandy Creek and an unnamed tributary to Sandy Creek with the confluence in the northeast ¼ of T29S R10W section 15 (Streamnet GIS Data 2003).

There are no streams within the Units that contain coho, Critical Habitat, or EFH.

Special Status Species

Aquatic Special Status Species (SSS) which occur in the analysis area include Oregon Coast coho (federal threatened), Oregon Coast steelhead (Sensitive), and foothill yellow-legged frog (Sensitive). The yellow-legged frog analysis is covered in the wildlife report. Streams containing Oregon Coast coho and Oregon Coast steelhead within the analysis area include: Sandy Creek and an unnamed tributary to Sandy Creek with the confluence in the northeast ¼ of T29S R10W section 15 (Streamnet GIS Data 2003). Steelhead are also found in the analysis area in two other unnamed tributaries to Sandy Creek: one stream with the confluence in the northwest ¼ of T29S R10W section 27 and the other stream with the confluence in the

northeast ¼ of T29S R10W section 15 (Streamnet GIS Data 2003). Other aquatic Sensitive species on the Coos Bay District, but not within the analysis area are included in the Analysis file.

Noxious Weeds

Issue 10: Noxious Weed Spread

Scotch broom (*Cytisus scoparius*), French broom (*Genista monopessulana*), Himalayan blackberry (*Rubus discolor*), and gorse (*Ulex europaea*) are the primary weed species that are currently tracked through inventory, monitoring, and treatment within the Resource Area, Sandy Creek subwatershed, and the Remote Control proposed harvest area. The brooms are the most common with scattered locations usually averaging 1/10th acre in size. Gorse, although an extremely aggressive noxious weed species, has a very limited population within the Sandy Creek Analysis Area. The vast majority of these plants are found along the road system and rarely within harvest units. Other state listed weeds that are present within the analysis area are tansy ragwort, bull thistle, Klamath weed, and Canada thistle, but:

1.) are not in sufficient numbers to be of management concern;
2.) are managed through biological control efforts, or;
3.) are not expected to increase significantly.

All locations are along roads or in disturbed areas adjacent to roads. The majority of the road systems were inventoried since 1997, and most inventoried BLM locations of brooms have been treated either through hand pulling or chemical applications during the 2002 - 2008 period. Annual inventories are performed, and treatment occurs in the spring. The county is controlling weeds along the right–of–way of the Sandy Creek County Road.

Port-Orford cedar

Issue 11: Port-Orford cedar (POC)

Overview

POC is a regional endemic, occurring only in Southwest Oregon and Northern California. On the Coos Bay District, the northern limit of the species is the coastal dunes north of North Bend, within the Coos Watershed.

POC is affected by an exotic root pathogen, *Phytophthora lateralis* (PL), which is nearly always fatal to the trees it infects. Spread of the pathogen is linked, at least in part, to transport of spore-infested soil by human and other vectors, such as animals. The largest areas of contamination and most likely candidates for spreading the pathogen occur along roadsides and streams. The vast majority of POC and PL on the Coos Bay District lands are in the south half of the district, south of the North Fork Coquille and Coos River drainages.

PL Infections Inventory

The project analysis area is primarily located in the SW corner of the Sandy Creek sub-watershed in the GFMA, which totals of 12,721 acres. PL infections are found throughout the Sandy Creek sub-watershed (6th field watershed) on all land ownerships.

A road system survey for green POC and PL was done in July 1998 and February 2006. Approximately 98% of the roads in the sub-watershed are infected with PL in scattered locations on all ownerships. The 2% of the roads that are uninfected are not near any of the Remote Control units nor on any of the haul routes. All roads on private lands are infected. Generally, roads with heavier concentrations of POC were found to be infected with PL and roads with scattered populations of POC were uninfected.

Roadside infections are similar to other analysis areas (Big Creek, East Fork Coquille, and Lower S.F. Coquille) with the high percentage of infected roadsides on either public or private lands. This is the case because of the high percentage of POC trees and seedlings found along roadsides on disturbed clearing limits, which are readily available to PL spores and disease spread, (POC FSEIS p.3&4-44). The POC stocking in adjacent managed stands is generally lower than road sides because past management practices such as planting and pre-commercial thinning favored leaving Douglas-fir. Natural stands may have similar lower POC stocking than roadsides because of the lack of suitable disturbed ground conditions for POC seedlings to become established.

There are 3.2 acres of PL infections on high risk sites and 10.3 acres in low risk sites on BLM lands that were identified with the aerial photo survey. Infections on low risk sites are directly associated with tractor salvage logging in the 1960's, 1970's, and the early 1980's. It was a common practice during this time period to harvest scattered large sized Douglas-fir throughout standing timber by tractor yarding, which was likely not constrained by seasonal restrictions. This resulted in PL being distributed throughout the landscape.

There are 10.1 acres of PL infections on high risk sites and 26.8 acres in low risk sites on private lands that were identified with the aerial photo survey. Most infections on private lands are associated with tractor yarding in wet soil conditions.

Low Risk Sites are defined as:
Areas not influenced by the wet conditions or periodic water flow that occurs in high-risk sites are low-risk sites. Cedars near streams or bodies of water whose roots do not extend below the high watermark for flooding are at low risk of infection. Riparian Reserve widths along a stream (as defined in the Northwest Forest Plan by site tree heights) often extend well beyond the high-risk widths for POC (POC FSEIS p.3&4-36)

Low risk for PL infection sites, those not near (greater than 50 feet from) streams or roads amount to 78% of the analysis area for all ownerships. Low risk sites amount to 4,724 acres on BLM lands which is also 79% of the BLM lands.

According to the 2004 POC FSEIS, the Coos Bay District is in the North Coast Risk Region.

There is little spread of PL on low-risk sites even when the pathogen is already established nearby. It is estimated that on average, 0.1 percent of the cedars on low-risk sites are infested per year in infested drainage, with much of this likely being offset by regeneration and growth, at least in the smaller size classes. This low level of new infestations on low-risk sites even in the North Coast Risk Region support this conclusion. About 80 percent of the area in the northern coastal portion of POC range, 60 percent in the southern part of the range, and 40 percent in the inland portion of the range are in the low-risk sites (p.3&4-45).

Units with POC
The following units were found to have POC as found on the timber cruise of these units:
Unit 1 135 trees (5% of the total trees/acre)
Unit 3 105 trees (10% of the total trees/acre)
Unit 4 831 trees (15% of the total trees/acre)
No POC was found in Unit 2.

Units with PL in or along roadsides adjacent to unit
Unit 1: Two recent dead POC (8 in. and 11 in. DBH) were found adjacent to a game trail in the north portion of the unit during a March 2006 walk-thru survey. There was evidence of recent bough cutters and historic salvage logging throughout the unit.

Unit 4: 37 trees on six sites were identified on the 1997 aerial photo survey. A walk-thru survey done in February 2006 identified numerous other small disease (2 trees or less) polygons not detected on the 1997 aerial photo survey throughout the unit. Disease polygons identified on the 1997 survey did not become larger. No recent dead POC was seen throughout the unit. The PL seen in the unit is directly associated with old cat trails that are found throughout the unit. This stand was tractor salvaged logged during the mid 1930's, the early 1940's, and the early 1950's; there are numerous "old growth" DF stumps with spring board holes and evidence of fire throughout the stand.

A recent infection was seen in a private plantation adjacent to Unit 4 in Section 29 from bough cutters and another found next to a private log landing on the 29-10-21.2 B road in Section 20.

Forest Fuels and Air Quality

Issue 12: Forest Fuels and Air Quality

Fuel Loadings
Much of the project area lies within an area of intensive use by the public for recreational and work related activities which can occur during periods of high fire danger. To mitigate the possibility of wildfire, the post-harvest fuel loadings, depending on amounts and location along unit boundaries, will require some form of treatment(s) to reduce or eliminate hazardous fuels.

Portions of the Analysis Area lie within the Wildland Urban Interface (WUI) identified in the Southwest Oregon Fire Management Plan (USDA *et al.* 2004). Management actions within the WUI will follow those identified in the RMP for Rural Interface Areas (RIAs) including developing design features and mitigation measures that will minimize the possibility of conflicts between private and federal land management.

Air Quality
The RMP (p. ROD-8) anticipated an average annual site preparation of 760 acres for prescribed burning, consuming 21,000 tons of fuel. The Oregon Smoke Management Plan, (OAR 629-43-043) manages the levels of particulate emissions from fire activities for private and public lands. Prescribed fire activities in the Coos Forest Protective Association district consume approximately 208,000 tons annually or about 35 tons per acre (CFPA 2002).

Fire History
Based on 20 year historical fire information (1985 to 2005) acquired from Coos Fire Protection Association (CFPA 2006), there were 21 fires reported within a 36 square mile (one township) area around the Remote Control timber sale area. The total burned acres were 32 averaging 1.5 acres. More than half of the reported fires were less than 0.1 acres (66 X 66 feet) and the largest fire was 10 acres. Three fires occurred on BLM lands totaling .03 acres with no damage to adjacent ownership. Only 4 fires occurred within second growth forest stands including plantations. Of the 21 reported fires, all but 2 fires were controlled within the first burning period of 24 hours and the remaining 2 fires were controlled within 2 burning periods (48 hours). No structures were lost or directly threatened. In view of a larger picture of fire history, the total area (1.5 million acres) that Coos Fire Protection Association protects, an average for ten years (1996 to 2005) 56 fires were reported and 198 acres burned annually (CFPA 2005).

CHAPTER IV ENVIRONMENTAL CONSEQUENCES

This chapter is organized by resource and describes any potential impacts to a resource by issue. The environmental impacts are changes predicted by the implementation of the No Action and Proposed Action alternatives. The analysis includes the direct, indirect, and cumulative impacts of the alternatives.

Analysis of the impacts recognizes that road lengths, acreages, and wood volumes are estimates and may vary slightly from actual measurements. Therefore, these additional lengths, acres and volumes are incorporated into the analysis of effects.

Other Actions

The Proposed Resource Management Plan has been published and is undergoing a 60-day Governor's consistency review. However, the Record of Decision is not anticipated until late December 2008. This Decision will determine which activities will be implemented and upon which future cumulative analyses can be based. The proposed plan provides insufficient information for meaningful consideration at this time (see *NAEC v. Kempthorne*, 457 F.3d 969, 979-80 (9th Cir. 2006) finding it lawful to consider the cumulative effects in the later broad-scale planning analysis).

It is not the intent of the planning or NEPA processes to recalibrate all analyses of existing plan implementation actions whenever a new planning effort begins consideration of a broad array of management guidelines and alternative allocations at the programmatic scale. Analyzing the outcome of the plan revision process as a "reasonably foreseeable future action" in every implementing project of the current plan would create a circular analysis process, where the effects of revising the plan would be used to determine whether to supplement the current plan's analysis that is already being revisited in the revision effort. Rather, the plan-level EIS itself will factor in the cumulative program effects and reset the stage for analysis of subsequent plan implementation actions.

This also holds true for the Pacific Connector Gas Pipeline Project. A draft EIS is under development analyzing for a Liquid Natural Gas pipeline route from the proposed Jordan Cove Terminal in Coos Bay to Malin, Or. As no decision has been finalized on this proposal and is one of four routes being proposed, it is speculative to assess for impacts.

Forest Ecology

Issue 1: Change in the amount, arrangement and quality of late-successional forest cover in the affected environment

Both the No Action Alternative (Alt. 1) and the Proposed Action (Alt. 2) would lead to a causal chain of effects in the environment, starting with changes in forest ecology[10] of portions of the analysis area (5th and 6th fields). These changes are addressed under Issue 1. Changes in forested habitats in the analysis area would lead to changes in other identified issues; these issues are considered later in this chapter under **Wildlife**. Direct, indirect, and cumulative effects are addressed by Alternative. Within-stand effects (e.g., loss of individual trees or within-stand microclimate changes) are discussed qualitatively. Changes in indicators designed to quantify Issue 1 are discussed at stand- and larger spatial scales.

[10] As described above, forest ecology is defined to include the structure of forested habitats in the analysis area including plant community descriptions, overstory and understory characteristics, shrub and herb layer characteristics, and legacy components.

Alternative 1 (No Action)

Direct (within-stand) Effects
Under Alt. 1, there would be no direct effects on Issue 1 indicators and no direct effects on late-successional characteristics within stands.

Indirect Effects
Indirect effects of Alt. 1 would be associated with: a) succession within the action area (Units 1-4); b) buffering of late-successional functions (interior conditions) in adjacent, contiguous stands; and c) usage of this late-successional habitat by species associated with late-successional structures, conditions, or stands (described later in this chapter under **Wildlife**).

The indirect effects of Alt. 1 on the amount and arrangement of late-successional cover in the larger analysis area would include retention of 193 ac. (Units 1-4) of late-successional, *Maturation*-stage forest[11] in the smaller action area. This habitat, described under the environmental baseline (Chapter 3), currently includes: modest development of secondary canopies (Table 2)[12]; modest number of large trees with comparatively weakly-developed structures (Table 3); a limited density of high-quality snags and downed wood (Table III-3). At the sub-watershed scale, retention of this late-successional habitat would continue to buffer both a large (roughly 1,000 ac.) complex of late-successional habitat in the northern portion of the sub-watershed (Map 6 and 7), and one of the oldest patches of late-successional habitat in the MFC (roughly 113 ac.) in the southern portion of the Sandy sub-watershed.

Late-successional habitat in Units 1-4 would continue to undergo succession under Alt. 1. Portions of these units currently supporting hardwood patches would eventually develop second canopies of tolerant species; external disturbance would create large, competent snags and downed wood (currently occurring); existing dominant trees would develop large limbs and other structures supporting late-successional species. Due to the unique disturbance history in the stands comprising Units 1-3 and Unit 4, which includes extensive salvage and stand-modifying fires, the trajectories of these stands would be distinctive and would be predicted to produce lower densities of suppression-induced snags and downed wood and larger limb-structures in live trees (due to less competition). It would likely require > 100 years for units in the action area to reach the *Vertical Diversification*-structural stage (Franklin *et al.* 2002). At and beyond this developmental stage, these units would be expected to support late-successional structures including large, tall overstory trees with large platforms, deformities, cavities, large snags and large diameter downed wood.

Summary[13] of Alt. 1 cumulative effects
Cumulative effects on forest ecology associated with Alt. 1 within the MFC would be attributable to: no action (succession) in Units 1-4; harvest of 350 ac. of Coquille Tribal lands; and intensive management of USFS and BLM matrix holdings and all private holdings. By 2056, roughly 11% of the watershed would be predicted to be maintained at stand ages < 80 (mostly federal matrix allocations), and 67% of the watershed would be predicted to be maintained at stand ages $\leq$ 40 in private ownership. Alt. 1 would maintain late-successional cover in the action area directly. Barring major disturbance or change in ownership/management, the amount of late-successional forest cover in the MFC under Alt. 1 would be maintained below 20%. Sandy Creek sub-watershed late-successional cover would be maintained below 30%. These levels would represent < 30% and < 50% respectively of the estimated mean historic cover by old forest types (Ripple *et al.* 2000). Although total late-successional cover in future scenarios would be similar to the environmental baseline, the quality and arrangement of this late-successional cover

[11] Effects analysis will use a GIS-estimated 193 ac. for estimated size of the action area, corrected to match GIS watershed and sub-watershed boundary breaks. Final traversed action area size is predicted to be slightly (~ 8ac.) larger.
[12] All of the Tables used in this analysis are included in Appendix A except for Table III-3.
[13] A more detailed discussion is located within the FE Technical Report

would be altered. Mature (80-120 YO) late-successional cover would increase in the watershed, while old (> 120 YO) late-successional cover would decrease, as non-reserved old late-successional forest areas were harvested.

Under Alt. 1, the majority of late-successional cover in the watershed would continue to come from small late-successional patches compared to historic conditions; 50% of the late-successional cover would come from patches < 250 ac. in size. Management regimes (and historic disturbance regimes) would maintain interior late-successional forest cover < 6% in the watershed (Table 7), and produce low connectance at both the watershed and sub-watershed scales. The cumulative effects of Alt. 1 would result in a 5th field best described by Outcome 3 in the NFP regarding maintenance and abundance of ecological diversity, connectivity, and processes (USDA and USDI 1994a:3&4-40). In this outcome, many late-successional patches were predicted to be too small to support the full range of ecological processes and functions associated with late-successional systems, with moderately large distances (>12 miles) between large late-successional patches.

Alternative 2 (Proposed Action)

Direct (within-stand) Effects

Harvest of Units 1-4 associated with Alt. 2 would directly lead to a change in the quality and amount and arrangement of late-successional forest cover in the action area. Harvest of Units 1-4 would change the action area from *Maturation*-stage late-successional stands to *Cohort Establishment*-stage stands with NFP snag and downed wood legacies. Within-stand qualities in the action area would change dramatically. In harvested areas, changes would occur to stand structure, overstory and tree complexity/ composition, legacy pools, and microclimate/microenvironment. Changes in stand structure would include:

- Current two-story stands with well-developed > 120 ft. tall canopies and developing understories would be converted to a single layer of dense, short, young Douglas-fir seedlings with 6-8 residual overstory trees/acre . Canopy height diversity (CHD) indices would be reduced from > 4 (Table 2) to 1.
- Within-stand horizontal structural variability would be greatly decreased. Overstory gaps and hardwood patches would be replaced by evenly-spaced conifer seedlings: resultant gap cover would be estimated to be < 15%.

Changes in overstory and tree complexity/composition would include:

- Individual tree structures[14] would be reduced within the action area. Currently > 5 TPA support some developed structures (Table 3); retained green trees would reflect the harvested stand, thus < 1 TPA with structures would be predicted post-harvest.
- Large Douglas-fir (> 37 in. DBH), characteristic of late-successional and old-growth forests, would be similarly reduced. Total densities of green trees retained following harvest would be 6/ac. Large retained green trees could in time develop some open-grown characteristics but would provide limited microclimatic buffering and limited horizontal/ vertical concealment cover. Following site preparation, some of the green trees retained would be predicted to die and enter snag pools.
- Tree richness would be modified following harvest and planting of a new stand. Hardwoods and Port Orford cedar would not be planted in regeneration layers; Douglas-fir, western red cedar and western hemlock would be retained.

Changes in legacy pools would include:

[14] Structures were defined as limbs > 6 in. diameter above 30 ft. on tree boles > 25 in. DBH, with or without moss cover.

- The action area currently has few large, competent snags compared to most unmanaged mature forests (Table III-3). Existing downed wood and snags would be lost or reduced in quality in Units 1-4 through site prep, removal and (in the case of tall snags) downing for safety.
- Following harvest disturbance and site preparation (burning), two new large, competent snags and roughly 120 linear feet/ac. of downed wood would be created using residual trees left in addition to the 6 green trees/ac. from the previous stand. Newly-created legacies would be retained in a simplified and exposed physical setting (see above).

Changes in microclimate/ microenvironment and shrub/ herb layers would include:

- Following harvest, Units 1-4 would retain no interior late-successional conditions. This would represent loss of 0-94 acres of interior forest, assuming edge effects of 400 m to 100 m[15]. Aggregated green tree retention areas within the action area would retain some structure and minimal microclimatic buffering, but virtually no interior conditions. Relative humidity, soil and air temperatures, and wind speeds would be predicted to increase throughout the action area and to approximate conditions in the *Cohort Establishment*-stage stands adjacent to the action area.
- Harvest and site preparation burning would change shrub and herb communities in the action area (described in this chapter under Botany). Tall shrubs, old shrubs, and hardwood species promote biotic diversity in developing *Maturation*-stage stands (Muir *et al.* 2002). These features are present in the action area (Table 4), and Alt.2 harvest would directly remove these features, and replace them with young Douglas-fir seedling biomass. An early-successional shrub community would occupy the site, including re-sprouting shrub remnants and early-successional species.
- Plant species associated with interior conditions would be decreased or eliminated during harvest of Units 1-4 (described in this chapter under **Botany**).

Alt. 2 would replace 193 ac. of *Maturation*-stage, marginally multi-canopied late-successional forest with *Cohort Establishment*-stage forest. Effects of this removal on within-stand quality are described above. Alt. 2 would directly reduce late-successional cover in the MFC by <1% and in the Sandy Creek sub-watershed by roughly 1% (Tables 6 and 10); this loss is described cumulatively below.

Indirect Effects

Indirect effects of Alt. 2 on Issue 1 would be associated with: a) changes in the future conditions in the action area associated with maintaining converted Units 1-4 (the action area) on a 60-80 year rotation; b) changes in the quality, amount and arrangement of late-successional stands at larger spatial scales attributable to harvest of Units 1-4; and c) effects of change in the amount and arrangement of late-successional habitat in and adjacent to the action area on late-successional associated species (described in this chapter under **Wildlife**).

Under Alt. 2, the 193 ac. of matrix land comprising the action area (Units 1-4) would be converted to the *Cohort Establishment*-stage, and maintained under a 60-80 year rotation in perpetuity. Harvested units would undergo succession to the *Biomass accumulation/ competitive exclusion* stage. Units in this stage would be characterized by single overstory canopy layers of Douglas-fir, with minimal horizontal variability, and little tree or stand structure. Prior to the end of this structural stage, the action area would again be harvested. Retained green trees, roughly 6 TPA[16], would provide the only future large snags, downed wood, or late-successional structures (large platforms, deformities, cavities) in the action area. Green tree retention blocks were envisioned to be retained for multiple rotations (USDA and USDI 1994a: C-41) the long-term functioning of these small blocks of few residual trees through time is unknown.

[15] Multiple edge effects are provided to suggest a range in response to edges by different functions. Functions subject to 400 m edge effects (perhaps relative humidity) would have no interior conditions in Units 1-4. Functions subject to 100 m edge effects (perhaps soil moisture) would have 94 ac. with interior conditions in Units 1-4.

[16] An unknown number of retained green trees per acre would be predicted to die and enter snag pools in the years following harvest.

Outside of the action area, the indirect effects of harvest of Units 1-4 on Issue 1 would include: a) reduction in the size of late-successional stand complexes (roughly contiguous patches) which currently include Units 1-3 and Unit 4; and b) effects on the quality of adjacent late-successional areas. Harvest of Units 1-3 would reduce the late-successional stand complex of which these units are a part (Map 7), reducing it from roughly 1,277 ac to 1,185 ac.; harvest of Unit 4 would remove roughly 100 ac. of *Maturation*-stage late-successional habitat from a roughly 250 ac. *Maturation*-stage stand complex. In addition to the direct removal of interior late-successional forest by harvest in Units 1-4, Alt. 2 would indirectly lead to reduced interior conditions in late-successional areas adjacent to Units 1-4, including adjacent Riparian Reserves, LSR and non-operational late-successional areas. Relative humidity, soil and air temperatures, and wind speeds would be predicted to increase in newly created edge areas following harvest of Units 1-4. Assuming an edge effect of 100 m, roughly 71 ac. of late-successional interior area occurs outside and directly adjacent to Units 1-4 (principally west of Unit 4); Alt. 2 would create edge conditions in roughly 14 ac. of this area.

Summary[17] of Alt. 2 cumulative effects
Alt. 2 would cumulatively result in substantive changes from the environmental baseline in the amount, quality, and arrangement of late-successional forest in the analysis area. Differences in effects on late-successional characteristics between Alt. 1 and Alt. 2 are most apparent at the stand and sub-watershed scale; at larger spatial scales, the direct effects of the action are dwarfed by succession in reserved areas and harvest in all other areas. In contrast to Alt. 1, Alt. 2 would directly remove 193 ac. of late-successional habitat from the analysis area, reducing current late-successional forest cover in the MFC from roughly 17.2% to 17.1%; late-successional forest cover in BLM holdings would change from 41.8% to 41.5% at the watershed level.

The NFP suggests that if late-successional forest area in Federal ownership falls below 15% of a watershed, no additional removal of late-successional stands can occur; federal lands within the MFC currently support > 40% late-successional cover of total for federal lands. Alt. 2 would maintain federal cover by late-successional forest > 40% over the next 100 years; however, forest structural quality would be degraded, as older *Maturation*-stage and some *Vertical diversification*-stage forest was harvested and younger *Maturation*-stage forest developed through succession.

Total cover of federal lands by late-successional forest in the MFC is currently low (< 14%). The cumulative effects of Alt. 2 would include harvest of roughly 15,600 ac. late-successional forest of federal matrix, tribal and private lands, as well as succession in reserved federal forests. Alt. 2 would return total late-successional forest cover in the MFC to 17.2% by 2056, 0.1% less than Alt. 1 (Table 6). This level would represent approximately 28% of 1930s covers, 27% of estimated mean historic cover by old forest types (Ripple *et al.* 2000), and would be far outside the 25% quantile estimated for historic late-successional cover at the LSR-scale (Wimberly *et al.* 2000)[18]. The environmental baseline and predicted long-term late-successional cover levels are both below thresholds (30% of historic levels) suggested as a turning point in de-stabilization and risks to old forest associates (Andren 1994, Franklin and Forman 1987). Compared to Alt. 1, the cumulative effects of Alt. 2 would be predicted to maintain the analysis area at old forest retention levels considered at higher risk of losing late-successional biodiversity and late-successional ecosystem function. In the long-term (within 50 years) Alternative 2, in conjunction with all other federal, private and tribal actions (including reserves) in the analysis area, would result in a landscape roughly similar to current conditions in terms of late-successional cover, but with slightly fewer, larger patches of slightly younger, less structurally developed, more clumped late-successional

[17] A more detailed discussion is located within the FE Technical Report
[18] Being outside the 25% quantile suggests that less than 25% of the modeled observations of historical (pre-European) late-successional cover would be predicted to be as low as the predicted future late-successional cover in the watershed.

forest. This pattern would be consistent with the blocked forest patterns assessed at large spatial scales in the RMP (pg. 4-42).

Wildlife Resources

Issue 2: Threatened and Endangered Species

Alternative 1 (No Action)

Direct, Indirect and Cumulative Effects
The No Action Alternative would have no adverse direct, indirect or cumulative effects on listed wildlife species. Maintaining this relatively small amount of late-successional forest habitat would not aid the spotted owl or marbled murrelet population recovery. Habitat for listed species would remain unchanged in the short term. As time progresses, the proposed units would slowly grow and develop more complex forest structure such as snags, down wood, deformed trees, multiple canopy layers, diversity in spacing, and large limbs. Habitat values for listed and other late-successional dependent wildlife species would correspondingly increase at the site scale.

Proposed Units 1, 2 and 3 would continue to provide northern spotted owl roosting, foraging and dispersal habitat. The units are not high quality spotted owl habitat as the stands are rather small and isolated. These three units do not currently contain nesting habitat for murrelets and suitability requirements would not be met for approximately 20 years.

Within 50 years, total potential habitat for both the spotted owl and marbled murrelet would decrease by approximately 17% in the sub-watershed (Sandy Creek) and decrease by approximately 20.6% at the 5th-field watershed (MFC) (Table IV-1). Within 100 years, habitat would increase by a marginal 0.05% within the sub-watershed and by 42% at the larger 5th field watershed.

Alternative 2 (Proposed Action)

Endangered Species Act Compliance
Compliance with the Endangered Species Act has been met through Section 7 Consultation with the U.S. Fish and Wildlife Service (Biological Opinion #s 1-7-96-F-411, 1-7-98-F-079 and 1-7-98-F-320). The Service determined that harvesting forest stands associated with the Sandy-Remote Timber Sale (including the Remote Control Units analyzed here) is not likely to jeopardize the continued existence of the northern spotted owl or the marbled murrelet or adversely modify their Critical Habitat. All pertinent mandatory Terms and Conditions from the Biological Opinion have been incorporated.

Marbled Murrelets

Direct and Indirect Effects
There will be no direct effect to murrelets or their habitats as none of the proposed units contain suitable murrelet habitat. There will be no disturbance effects associated with the proposed action.

There will be no indirect effects as a result of the creation of forest edges in adjacent habitat to Unit 4. There have been a total of five years of protocol survey data for the habitat adjacent to Unit 4 (Table III-1) with no murrelet presence or occupancy. Edges can have negative and positive consequences. Positively, research has shown that marbled murrelets prefer nest trees adjacent to canopy gaps including forest edges (Huff *et al.* 2006). The trade-off to easy access along an edge is increased vulnerability of the nest to predation (Marzluff *et al.* 2000). Nest sites on forest edges have higher levels of nest predation than nests in the interior of the stand (Manley and Nelson 1999). As there is no current occupancy of the

adjacent stand, potential edge effects (positive or negative) are not expected during implementation of the project.

Deferring harvest of these 193 acres would have no long-term effect on marbled murrelet recovery at the site- or watershed scale. Under the NFP, forests in matrix lands are not expected to provide habitat for murrelet recovery. These lands have not been designated as Critical Habitat.

Cumulative Effects
Although forest stands at 80 years old begin to develop habitat components, they may not yet be suitable habitat for murrelets. This is the case in the proposed harvest units. However, for this cumulative analysis, all late-successional forest is assumed to be potential suitable habitat. Tables 7 and 12 in Appendix A were used for this analysis.

At the sub-watershed scale, across all ownerships, there are currently about 3,757 acres of late-successional forest. Implementation of the proposed action would decrease the percentage of this habitat by 1.5% across all ownerships. Over the next 50 years, there is an anticipated 6% decrease in potential murrelet habitat in the sub-watershed across all ownerships, and these habitats would be limited primarily to federal reserve allocations. In 100 years, the amount of late-successional habitat in the sub-watershed would be approximately the same as the current condition across all ownerships.

At the watershed scale, on all ownerships there are approximately 33,833 acres of potential murrelet habitat of which 26,965 acres are federally managed. Late-successional habitat availability trends in the watershed are expected to be stable at 50 years then increasing at 100 years across all ownerships. In 50 years implementation of the proposed action would reduce total late-successional forest cover (potential habitat) by <0.01% within the Middle Fork Coquille watershed. In 100 years, this would be expected to increase by15.7% to 39,148 total acres across all ownerships. Potential murrelet habitat would be located primarily in federal reserve allocations. This reflects the projected in-growth of the Riparian Reserve and Late-Successional Reserve land-use allocations.

The NFP anticipated the cumulative increase in available habitat over time to contribute to population recovery. The US Fish and Wildlife Service has reviewed the application of land-use allocations in the NFP and determined that the plan would not likely jeopardize the continued existence, or destroy or adversely modify the critical habitat of any listed species including murrelets (USDA and USDI 1994b) Additionally, the USFWS Service determined through site-specific consultation that implementing this action would likely jeopardize the continued existence of the marbled murrelet.

Northern Spotted Owls

Nest Sites
The amount of suitable habitat within the home ranges of known NSO sites near the proposed units varies from 24% to 14%. Harvest of Unit 4 would decrease by 2% the available amount of suitable spotted owl habitat (Table IV-1) within the 1.5 mile home range of these two spotted owl nest sites (Remote and Slide-Remote Alternate). The indirect impact of this reduction is not clear as the Slide-Remote site is being used at a threshold below the expected target for viable nesting habitat (Ch. 3), and is the only nest site of the two that is currently active. This habitat it not located within the critical 100-acre core areas around the nest sites and is located further on the edges of the home ranges.

Table IV-1 Suitable Habitat within the Home Ranges of Known NSO Nest site centers near the Proposed Units

NSO Nest Site	Land Use Allocation	Total Acreage – Suitable habitat		% of suitable NSO nesting habitat		Total amount of federal lands.	
		Pre-harvest	Post-harvest	Pre-harvest	Post-harvest	Acres	Percentage
Remote	GFMA	1080	974	24	22	1996	44%
Slide-Remote Alternate	GFMA	630	522	14	12	1177	26%

[1] Acreage figures are estimates obtained from GIS analysis.

Habitat

Harvesting the proposed units would reduce potential "nesting, roosting and foraging" habitat by 2.8% leaving 3,231 acres available in the Sandy Creek sub-watershed. Total "roosting and foraging" habitat would be reduced from 3,757 acres to 3,564 acres (-5.1%) in the sub-watershed. At the watershed scale, there would be a reduction of 0.4% of "nesting, roosting, and foraging (NRF)" habitat and a reduction of 0.57% of "roosting and foraging (RF)" habitat. This information is derived from Tables 6 and 12 in Appendix A, and is shown in Appendix D, Table 13.

The only discernable difference in habitat levels at any scale or time would be in 100 years concerning "nesting, roosting, or foraging" habitat. The difference in acreage between outcomes is that currently there are 3,324 acres of NRF and in 100 years there would be 2,980 acres of NRF. However, at the 5thfield scale in 100 years total "nesting, roosting, and foraging" habitat increases by 41% to 32,236 acres.

Cumulative Effects

Removal of a small percentage of nesting habitat or roosting and foraging habitat before it can develop into nesting habitat would make little difference to northern spotted owl populations at the watershed scale. In Appendix B, Tables 6 and 12 summarize at the watershed (MFC) and sub-watershed (Sandy creek) scales, expected cumulative effects of the project to the amount of available late-successional forest habitat. At both watershed scales there would be a reduction in late-successional forest cover in 50 years but this cover would become similar to the no Action Alternative in 100 years. The analysis also shows a decrease in habitat labeled "roosting and foraging" but an increase in "nesting roosting, and foraging" habitat, which is of overall better quality for spotted owls. This trend for forests set-aside as reserves to continue to age and develop late-successional characteristics at the various analysis scales is the basis for anticipated northern spotted owl recovery.

The loss of this suitable habitat has been analyzed in the NFP and in the Coos Bay District Proposed Resource Management Plan Environmental Impact Statement. These lands are in the matrix land-use allocation and are not expected to provide habitat for spotted owl recovery. These lands are not identified in the Final Recovery Plan to contribute to the conservation of the species and these lands are not designated as Critical Habitat. The NFP also established 100 acre core areas of the highest quality contiguous nesting habitat around known owl sites (excluding alternate sites), and the expectation was that these would continue to function and support the northern spotted owl population base. Within the watershed there are ten known northern spotted owl nest sites (including three alternate sites) within five miles of the proposed units that can be used by nesting spotted owls.

Barred Owls
Sightings were intermittent during the approximately 15 site visits, so nesting is doubtful. The barred owl is more likely using the habitat at this time for foraging purposes. The effects from a decrease in available habitat because of the interaction of barred and spotted owls present in the Slide-Remote Site would be unknown.

The Final Recovery Plan considered the effects of barred owl expansion and the USFWS is initiating actions to effectively address the threat. This includes "research of the competition between spotted and barred owls, experimental control of barred owls, and, if recommended by research, management of barred owls" (USDI 2008). These actions are at the regional landscape scale and beyond the scale of the proposed action.

Issue 3: Stand Structure

Alternative 1 (No Action)

Direct and Indirect Effects
Snag and down wood dependent species would remain low within these stands because of the lack of these structures. There would continue to be a short-term deficit of these resources. Stands would continue upon their current growth trajectories, under which sang and down wood recruitment would occur over time through outside factors such as disease outbreaks, wildland fire, and weather events.

Creation of supplemental snag and down wood components would not occur, particularly the additional snag creation within the Riparian Reserves adjacent to Units 1 and 2. These habitat components are critical for meeting food, shelter and breeding requirements for a wide variety of species. As a result, snag and down wood dependent species in the analysis area would find little available habitat in the proposed units. Stands would persist in a less than fully functioning ecological state (Bunnell *et al.* 2002a). Although these stands only total 201 acres, there would continue to be modest contributions to ecological functions from organisms associated with snags and down wood (Pyle and Brown 2002).

Cumulative Effects
The retention of these stands would have no effect to species associated with these legacy structures as they are lacking in much of the stands.

Alternative 2 (Proposed Action)

Direct and Indirect Effects
Implementation of the proposed action would likely result in the incidental loss of some existing snags and down wood during harvest operations. However, design features are included to retain all existing snags and down wood to the extent possible during harvest and site preparation activities. These also include clumping green tree retention areas around existing snags and down logs where feasible to protect them from breakage during harvest activities.

Additional Design Features have been included to make up for current deficits of desired snag and downed wood levels. These include retaining two trees per acre to be felled as the down wood component, another two trees per acre would be topped and converted into snags, and six green confers per acre would be left as legacy trees. On some units hardwoods would also be retained after harvest for diversity. Additional snags would be provided on units where necessary to meet 40% population needs throughout these matrix lands. Snag creation is targeted at replacing hard snags between 15 in. and 18.8 in. DBH. Prescriptions for Units 3 and 4 (creating two snags/acre) would meet the 40% requirement across matrix lands within the 40-acre window, except for snags >25 in. DBH. Snags over 25 in. DBH are not available in the units or are not at sufficient levels in the area.

Within the Riparian Reserves near Units 1 and 2, and additional 14 snags would be created to enhance the structural qualities of these remaining stands. This is an addition to and above RMP requirements.

Cumulative Effects
Snag and down wood dependent species would continue to use retained snags and down wood for shelter, foraging and nesting. The numbers and types of wildlife using these resources would continue to be low due to the limited amount of this resource in the area. Snags and down logs created from felling and topping green trees would not be immediately useful for the intended species because green structures are too hard for immediate use. Newly created snags would be utilized by all primary excavators for nesting when they reach decay classes 2 and 3. Green structures are expected to begin to provide usable habitat for species dependent on these resources within a decade (Brown 1985). This time frame would be shorter than the natural recruitment under the no Action Alternative.

Project design features would ensure compliance with snag and down wood requirements that are expected to retain viable populations of species associated with these structures. The effects of this action, particularly with the inclusion of these additional design features, are within the effects anticipated under the Coos Bay District Resource Management Plan. Retention and creation of snags and down wood on federal lands is expected to provide for 40% population levels of snag dependent birds and is also expected to meet the needs of other associated wildlife in the Analysis Area.

Issue 4: Open Road Density

In their fall hunting management guide, the Oregon Department of Fish and Wildlife has stated it is close to meeting its management objectives for elk populations within the Tioga Management Area (ODFW 2008). Under either alternative, Reciprocal Right-of-Way agreements between BLM and private land owners make it difficult to impossible for BLM to reach this stated objective for road densities. The following table shows the comparison of the two alternatives:

Table IV-2 Open Road[1] Density Comparisons

BLM managed lands	Alt. I (mi/mi^2)	Alt. II (mi/mi^2)
Sandy Cr., 6th field	2.95	2.98
Middle Fork Coquille Watershed, 5th field	4.33	4.34

[1] Open roads = roads accessible to motorized vehicles.

Alternative 1 (No Action)

The current road density would remain at the current level of 2.95 mi/mi^2, which is in the range of management goals. However, at the watershed scale the 4.33 mi/mi^2 would remain above this goal.

Alternative 2 (Proposed Action)

As shown in Table IV-2, there would be an increase of 0.03 mi/mi^2 in open road density on BLM lands in the sub-watershed and an even smaller 0.01 mi/mi^2 increase in open road density in the Middle Fork Coquille Watershed. This very small increase on BLM lands will not likely impact the current population levels of breeding elk within the watershed, particularly when compared to other factors (such as hunter success rates).

Issue 5: Special Status Species/Other Wildlife of Concern

This analysis describes potential effects based on the current knowledge of the target species, knowledge of similar species, and on habitat correlates.

Foothill yellow-legged frogs and western pond turtles would have no impacts from the implementation of either alternative as water quality would remain unaffected. Additionally, as there are no cliff or cave habitats within the units, there would be no effect to American peregrine falcons, Townsend's big-eared bats, or Fringed myotis.

Alternative 1 (No Action)

Direct and Indirect Effects
Species that associate favorably with early-seral habitat conditions would likely remain absent from the area. The opportunity to artificially create down wood and snags would not be accomplished and species that respond favorably to these conditions would not realize this benefit, such as Purple Martins.

Bald eagles are not currently nesting in this watershed but could use the habitat in Unit 4 as the species continues its recovery.

Species possibly present or who utilize habitats within these units would remain within the area, such as red tree voles and the Fringed myotis. Until more structure, such as large snags and large down wood, are developed, fisher would likely not utilize the area except as a migratory corridor.

Alternative 2 (Proposed Action)

Direct, Indirect and Cumulative Effects
Bald Eagles – As there are no identified nests within the action area (or Watershed) there would be no direct impacts to bald eagles. Only Unit 4 meets bald eagle habitat criteria so harvest would indirectly result in the loss of potential nest trees. Bald eagle population numbers would not decline as a result of the removal of this potential habitat. There are many more lands under the LSR and Riparian Reserve Land Use Allocations along the Middle Fork Coquille River to provide suitable nesting habitat for birds that may move into the area for nesting purposes.

Purple Martin – The transition of these stands back to an early-successional condition with the number of snags to be retained and created would likely benefit these birds. Post-harvest conditions would be their preferred habitats for nesting.

Pacific fishers – There is a low likelihood that Pacific fishers persist in the analysis area due to the fragmented landscape and low amounts of dead wood. This species needs cover for movement throughout their large home range and dead wood for resting and den sites. The proposed units could provide cover and foraging opportunities for fisher passing through the area. If fishers are using the watershed they would be expected to avoid the units after harvest as there would be no cover.

Red tree voles – Red tree voles are likely present in the proposed units and would be directly impacted from implementation of the proposed project. However, retained green trees may offer some refugia for a few of these voles if trees with nests are retained and in close enough proximity to other trees for sufficient food availability and alternate nest locations. Riparian Reserves are also located immediately adjacent to the Units. The project area is located within the Mesic Biological Zone (FSEIS: USDA and USDI 2007), which contains a stable, well-distributed population of red tree voles. This FSEIS found that because of their large size and connectivity across the landscape, federal reserved lands "have a high likelihood of providing sufficient habitat (including known sites) to provide for stable populations of tree voles" on these lands within this zone. Potential effects at the site-scale would not cause an impact to species viability at the larger watershed or regional scale.

Issue 6: Migratory and Resident Birds

This analysis will address potential effects to migratory and resident birds from each alternative. There is no specific data on bird populations in the analysis area so the discussion will be based on data for the region and on assumptions tied to habitat. Listed species have already been addressed in Issue 2.

There would be no effect to the mourning dove or band-tailed pigeon from implementation of either alternative. This is because of their general habitat requirements and ability to adapt to landscape changes.

Alternative 1 (No Action)

Direct/Indirect/Cumulative Effects

There would be no direct or indirect effects to any of the birds described in Chapter 3. Birds that prefer more early-seral habitats like the olive-sided flycatcher and the black-throated gray warbler would not likely remain within the project area for long periods of time. Birds not currently known within the project area but may use these late-successional habitats for foraging include the northern goshawk. The rufous hummingbird would likely be common in Units 1, 2, and 3 because of their more brushy nature.

Alternative 2 (Proposed Action)

Direct/Indirect/Cumulative Effects

Birds who would likely respond to the creation of early-seral habitat include the olive-sided flycatcher and the black-throated gray warbler. Creation of edges could benefit the rufous hummingbird but the loss of brushy habitats from Units 1, 2, and 3 would likely negate this. Northern goshawks would lose foraging opportunities with the loss of these mature stands. None of these effects would have discernable impacts for any one of these species populations at the landscape level.

Botany Resources

Issue 7: Special Status Species Plants

Alternative 1 (No Action)

Direct/Indirect/Cumulative Effects

Under this alternative, these stands would continue to act as propagule sources for adjacent timber lands, many of which are younger and would benefit from having a nearby late-successional propagule source for lichen, bryophyte, and fungal plant species.

Alternative 2 (Proposed Action)

Direct/Indirect Effects

Site surveys for special status lichen, bryophyte and vascular plant species found a single special status lichen site, *Bryoria subcana*, growing on the lower boles of five Douglas-fir trees in the northwest corner of Unit 1 adjacent to the main road. All five host trees are growing close together. Additional Project Design Features have been included in project development to protect the host trees. A no-harvest buffer would be left that completely encircles them, which includes trees both below the road and on the ridgeline across the road and would be approximately one acre in size. The buffered site is directly adjacent to a Riparian Reserve area, increasing the size of the uncut reserve in this area of the unit. To protect the buffered site from post-harvest slash burning, the portion of the unit below the buffer would be hand-piled and burned rather than broadcast burned, reducing the possibility of scorching the boles of the host trees. With these protections in place, this site would continue to act as a propagule source for this

species with the expectation that this species would persist on site. No other special status species were found during these surveys.

There are a total of 24 species of Fungi are not considered practical to survey for which are suspected of occurring within the project area. The recommended process was used to determine the likelihood of presence within the project area in order to assess potential impacts; 15 of the 24 have a "reasonable likelihood of occurrence." These species are all considered rare and generally have been found on late-successional forest land in all, or a portion of, the range of the northern spotted owl. The process used included habitat evaluations and examinations, evaluation of species-habitat associations and presence of suitable or potential habitat, and review of existing survey inventories. A summary for each of the 15 fungal species is located in Appendix B, Table 12.

In the Middle Fork Coquille 5th field watershed, which encompasses the project area, eight of the 15 special status fungi species have been located in forest stands ranging in age from 40 years to over 200 years of age. Within the smaller Sandy Creek 6th field sub-watershed, two of the 15 have been found in habitat similar to that of the project area. However, because habitat requirements are general for all these fungi species and all of these species are considered rare, there is no guarantee any one of these species will occur at a given location in the appropriate habitat.

Using the "Conservation Assessment for Fungi Included in Forest Service Regions 5 and 6 Sensitive and BLM California, Oregon and Washington Special Status Species Programs", it is possible that activities of the proposed project could result in direct and indirect effects to fungi species, if present. Regeneration harvest could pose threats to fungal individuals and mycelial mats by removing the majority of the trees in the project area. Logging disturbance and the subsequent post harvest broadcast slash burn could also pose threats to the underground fungal mycelial mats depending on the timing and intensity of the yarding and slash burning activity. However, given the rarity of fungi species, the small size of the project, and retention of Riparian Reserves directly adjacent to the units, it is unlikely that implementation of this project would cause an impact to the species viability at the sub-watershed or watershed scale for the 17 species potentialy found within these stands.

Cumulative Effects

In the Record of Decision (USDI 2007d) of the Final Supplemental Environmental Impact Statement (FSEIS: USDA and USDI 2007) to remove the Survey and Manage guidelines, it was concluded that current levels of protection combined with existing management policies "will continue to conserve rare and little known late-successional forest associated species" (p.27) of which these 15 species of fungi are included. Elements of the Northwest Forest Plan are in place to reduce risks to these species, of which Reserves remain the primary conservation element. In the Northwest Forest Plan, 81 % of all federally managed lands are in reserves and 87% of all late-successional forests are in reserves. These lands are designated as matrix, but are adjacent to Riparian Reserves. Also, as analyzed in the Forest Ecology section, late-successional forest cover within the watershed is projected to stay about the same in 50 years and be about 2.7% greater than it currently is in 100 years.

Finally, the retention of legacy components, such as snags, large green trees, and down logs will reduce risks to these species. This project incorporated design features to protect the existing structures as well as create additional snags.

Therefore, the anticipated possible effects of the proposed action are the same as what was analyzed in the 2007 FSEIS.

Aquatic Resources

Issue 8: Changes to Stream Flow Associated with Peak Flow, Annual Yield & Low Flow

Alternative 1 (No Action)

Spatial and Temporal Scales
The Aquatic Conservation strategy strives to restore health at the *watershed* and *landscape* scales (USDA and USDI 1994b). The *landscape* scale, in this analysis, also refers to the Middle Fork Coquille River watershed (MFC) which is a topographically discrete 5th field watershed and joins other tributary watersheds of the Coquille sub-basin before flowing directly into the Pacific Ocean at Bandon, Oregon. Due to the size of the MFC the analysis incorporates a more defined investigation at the *sub-watershed* scale or 6th field to be able to discuss levels of scale appropriate for examining cumulative effects data related to stream flow. The Sandy Creek 6th field sub-watershed describes the proposed project *analysis area* for Water Resources. In this analysis, *site* scale includes the site of the disturbance or the stream reach where the disturbance takes place.

The immediate effects of the action alternative, considered short term impacts, were investigated using a period of 0- 5 years from the proposed project initiation. This temporal scale considers the short-term impacts immediately following the removal of trees in the project units and the effects to streamflow. Long term impacts are relative to the age at which forest stands begin to exhibit evapotranspiration rates common for mature vegetation; in this location, this age for conifers is approximately 20 years and older. The long term refers to the period from which forest stands recover their intake of water from evapotranspiration and interception within the overall water budget.

Direct and Indirect Effects
Under this alternative, there would be no direct effects at any spatial or temporal scale, from the management activities described, to stream flows. The timing and magnitude of flows would remain unaffected by the no action alternative since timber management in the proposed analysis area would not occur, as well as, any of the proposed new road construction, renovation or decommissioning projects associated with harvest activities.

Cumulative Effects
Within the analysis area streams will continue to develop within mature stands, adjusting channel form and maintaining their respective sediment and streamflow regimes. Streams within proposed harvest units are 1st and 2nd order intermittent, as well as, very low flow (less than 10 cfs for 2YR/24 Hour design flow) perennial streams, that are lacking of late-successional stores of LWD within the active channels. This condition makes these channels more susceptible to changes in morphology due to large scale disturbance, natural or human induced. The cumulative effects of Alternative 1 is relative to the total retention of existing vegetation, which can regulate the current stream flow regime by moderating storm discharge, sediment storage, and channel morphologies. Thus, the cumulative effects of leaving mature vegetation at site and downstream reaches are that no additional water becomes available for fall/spring discharges and the total potential large wood component remains for delivery to streams.

The existing stream channels within the analysis area can display discontinuous reaches of channel incision, simplified channel form, and a reduction in sediment storage capability.

Currently, the MFC retains about 29 percent of its total land area in simplified forest structure of stands younger than 20 years of age. The analysis area of Sandy Creek sub-watershed currently consists of 23 percent of its area resembling similar conditions. Thresholds for observed increases in annual yield are

usually detectable when at least 20% of forest cover has been removed (Bosch and Hewlett 1982). The cumulative effects of these forest conditions on stream flows suggest, in part, increased peak flow discharges owing to young or open stand conditions, and the increases in annual yield are prevalent in the analysis area and larger 5th field watershed. The effects of increased peakfows on unprotected low order or valley bottom streams can cause stream bank erosion and the headward migration of unbuffered channels that increase sedimentation to downstream reaches. These conditions are more apparent in low gradient agricultural reaches and on private timber lands where recent harvest operations under less stringent regulations have increased.

Cumulatively, under this alternative, there would be a minute short-term and long-term positive effect within the analysis area and larger 5th field watershed on stream flow by retaining the existing mature vegetation, averting potential changes to local stream hydrographs, channel geometries, and the potential for sedimentation as a result. The effects, related to streamflow, are site specific and rapidly diminish in influence at larger scales. Sandy Creek is managed by federal, and mostly private timber and agricultural ownerships. The analysis area and the larger watershed likely persist at slightly increased levels of annual yield and spring and fall streamflows caused by the open characteristics of lowland agriculture, harvest openings, and early seral vegetation structure.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Peak Flow - The direct effect of the proposed action is a likely increase to stream discharge in the adjacent first and second order tributaries during the typical early fall storm events. However, peak flow discharges during early fall storms to intermittent channels and small perennial seeps are minor and do not produce the stream power or energy to initiate large scale active channel erosion generated by estimated increases. These initial events, relative to maximum yearly storms are, comparatively, many times smaller and are expected to be inconsequential to the channel morphology of downstream Sandy Creek.

The outcome of several paired-watershed studies in various climate regimes have found that the first precipitation events and consequent peak flows in the fall are usually minute and thus geomorphically inconsequential to channel morphology (Lewis 1998, Ziemer 1981). After measuring 526 peak flows and 59 storms between the 1985 and 1996, Zeimer (1998) found a 35% mean peak flow increase in an entirely clearcut drainage as well as a 16% mean increase in a partially clearcut drainage for flows occurring less than twice a year.

Studies have observed the effect of logging on peak flow was best predicted by the percent of area logged divided by the sequential storm number, beginning with the first fall storms (Ziemer 1998). By the time winter storms are producing large discharges the effects (percent increase to peak flows) have been successively reduced. Combining the proposed harvest area (2% of sub-watershed) with the current open canopy conditions of the sub-watershed using the IVMP data (26%), infers the analysis area would maintain greater than 70% of its area in forest canopy during peak flow events. Less than 30% is far below the treatment area in similar studies which report slight effects from harvesting a greater or total percentage of the treated watershed (1998). If, mean increases to totally clearcut watersheds can produce 35% increases in peak flow discharge to rain dominated areas, then, by comparison the effects of the proposed action should be substantially less and inconsequential to hydrological processes.

The literature shows that patch-cuts, especially those with buffers, have less affect on stream flow in comparison to clearcutting (Reiter and Beschta 1995). This suggests that the hydrologic response of a landscape to regeneration harvest where RR's and leave trees are maintained is less pronounced compared to catchments harvested from ridge-top to stream edge, or patch-cuts with comparatively narrow buffers

and no leave trees. In a well known report, Reiter and Beschta (1995) state that where individual trees or small groups of trees are harvested the remaining trees will generally use any increased soil moisture that becomes available following harvest. A return to the range of pre-harvest levels is expected as stands reach stages of canopy recovery (5-15 years), when interception and soil storage conditions become most favorable. All planned project units will maintain intact riparian reserves which consist of mature forest stands greater than 115 years old. Evapotranspiration demands from re-established vegetation should negate any additional effects attributed to past or recent harvest. There are no estimated increases to peak flows in the long term at the site scale.

The indirect effects, if any, would produce little inflation to the downstream discharge of Sandy Creek and would be likely outside the accuracy of measurement. Rothacher (1973), Harr (1976), Jackson and Haveren (1984), and others found that major high flows were not significantly increased as a result of timber harvest in the low elevation Coast Range of Oregon. Similarly, the effects of clearcut harvest on peak flows from the proposed action in the larger Sandy Creek sub-watershed would also be negligible to current channel conditions.

Annual Yield & Low Flow - The removal of timber temporarily increases ground water availability and annual water yields caused by the routing of excess storage to streams (Keppeler 1998). One report, which synthesized results from six paired watershed studies, illustrates relative increases in summer flows were initially high after harvest but were eliminated within a few years due to re-growth of vegetation (Harr 1983). Another study shows base flows (non-storm flow) can actually decrease below pre-harvest levels if more consumptive riparian species occupy near-stream areas, such as, Alder (Hicks *et al.* 1991). Presently, this condition may be occurring throughout the larger sub-watershed due to the large number of alder and generally immature vegetation conditions within many of the previously harvested stands on private lands. Thus, indirectly, there would be some additional water available to downstream resources, but with negligible effects to water quality, or quantity.

Reported increases for Pacific Northwest studies in annual water yield following harvest can reach up to 25 inches (Harr *et al.* 1979). Although, at the site scale, for small intermittent and low order perennial streams, the direct effects of short term increases are less pronounced in magnitude, and include increases spread across the full range of both, large increases to low flows and smaller increases to winter storm flows, which are expected to be inconsequential to channel form.

Studies show that patch-cutting produces considerably less increase in annual yield compared to clearcutting from ridge to stream (Harr 1976, Harr *et al.* 1979, Harr and Krygier 1972, Hicks *et al.* 1991, Keppeler 1998, Reiter and Beschta 1995, Ziemer 1998). In western Oregon, patch-cutting 25% of the 250 acre drainage (H.J. Andrews Experimental Forest) and 30% of a 169 acre drainage (Coyote Creek Experimental Watersheds in northern California) produced annual yield increases one-half to one-third the size of those produced by clearcutting 237 acre and 123 acre drainages (Harr 1976, Harr *et al.* 1979). In the Alsea Watershed Study in the Oregon coast range, three patch-cuts with 50 to 100 foot buffers (patches totaling 25% of the 750 acre drainage) produced an average annual yield increase one-seventh the size of that produced by a severely burned, extensively clearcut 175 acre catchment without riparian buffers (Harr 1976) .

Research on clearcut harvest at the H. J. Andrews Experimental Forest and the Oregon Coast Range has shown that spring, mid-summer and fall base flows (Rothacher 1973) and overall water yield (Harr 1976) may increase for several years post-harvest. While these studies reported flow increases of 150-300 percent, these increases were over very small base flows and the actual flow increases were very small. The reported August water yield increase of 159 percent from a 237 ac. clearcut at the H. J. Andrews Forest corresponded to an increased discharge of only 2.3 l/s/km^2, or 0.076 cfs/ km^2 (Hicks *et al.* 1991). Within three years of logging the regrowth of deciduous vegetation, primarily in the riparian zones,

eliminated the increases in summer yield. Patch cuts (25 percent of watershed) in a nearby watershed did not result in any change to base flow. The proposed action includes regeneration harvest of 4 units totaling 193 ac. in Sandy Creek, a sub-watershed that presently has 26 percent of land with open canopy.

Since the proposed timber harvest involves less than 2% of the Sandy Creek sub-watershed, about 193 of 12,730 acres, negligible increases to annual water yield are expected, and results would be inconsequential to water resources of the project area. In addition, any potential effects on water yield from the proposed timber harvest would be reduced gradually over time (5-15 years) as the remaining trees in untreated stands increase their growth rates and uptake of nutrients and water.

Water Quantity and Roads

New Construction - Approximately 1.2 miles of new road would be constructed to access the proposed units. At the site scale, the removal of vegetation due to the road prism will increase the availability of water to be routed to nearby streams and facilitate the potential extension of the drainage network by additional concentrations of stormflows. After project road decommissioning there would be a net increase of 0.3 miles to the open road density

It has been well documented that roads have the potential to increase peak flows (Beschta 1978, Wemple *et al.* 1996). Roads with cut-banks have been known to intercept subsurface flows and divert water directly into the drainage network. As a result, roads can serve to extend the drainage network and can potentially increase peak flows by delivering water from their ditch lines to stream channels at a faster rate than a non-roaded landscape. Peak flows have also been shown to increase when 12% or more of a watershed is occupied by roads or other compacted surfaces (Harr 1976). Existing roads in the 5th field watershed, however, contain close to 3% of total land area in the road prism, and for the sub-watershed it is 2 % of the total land area, which is far below reported thresholds for detectable increase.

The compacted area created by the proposed roads would have a negligible effect on peak flows, due to the design and location of new construction. Ridge top roads have a low potential for diverting flows. The construction design features would encourage any drainage from the road surface to infiltrate into the soil profile and not connect or add to drainage from the existing road system. Project BMPs may include, but are not limited to: construction during the dry season, avoiding fragile or unstable areas, minimizing excavation and height of cuts, end-haul of waste material where appropriate, and provision for adequate road drainage. These measures would reduce the likelihood of a potential change in the magnitude or timing of stream flow from new construction.

Renovation/Improvement - There is renovation to existing road grades which cross a perennial stream in unit 3, which will increase the size of the culvert to current NFP design standards, as well as, increase the potential for short-term, slight, debris or sediment pulses. In general, however, the added maintenance, improvements, and renovation would benefit the routing of water to stable vegetative slopes, reduce the potential for future failure, and reduce the potential for existing roads to alter the magnitude and timing of flows in the drainage network.

Road Closure – Decommissioning and full decommissioning would take place on more than 1.1 miles of road (Table II-1) as a result of the proposed action in Units 2, 3, and 4 including the removal of legacy cat trails in Unit 4. Decommissioning of roads is described under Transportation Management in Chapter 2. Decommissioning of these road sections would eliminate the potential to alter flow magnitude and timing, and the potential to deliver sediment to the drainage network. Approximately 0.55 miles of the newly constructed roads would not be decommissioned but have restricted access behind a locked gate, and would be returned to a stable hydrologic condition to allow future access when necessary to perform stand maintenance activities.

Watershed Scale – There are no direct or indirect effects to stream flows expected at this scale as a result of the proposed action which can be determined using the best available scientific information.

Cumulative Effects
The 6th field sub-watershed and 5th field watershed were analyzed to determine stand age and openness using a combination of the latest available satellite imagery and aerial photo interpretation to approximate conditions for all ownerships (Appendix B, Tables 6 and 10). The combined percentage of young conifer stands less than 20 years old is approximately 24% in the sub-watershed, and less than 29% across the entire MFC. Private stands with birthdates after 1985 were estimated at 1,565 acres (12%) in the 6th, and 46,116 acres (23%) across the entire 5th field watershed. Young stands (<20 years) contributing to effects on stream flows from public land in the Sandy Creek analysis area number 1,427 acres (11%), and 10,197 acres (5%) within the larger watershed. The proposed project would increase these numbers to 1,620 acres (GIS), less than 2% in the Sandy Creek analysis area and increase the area of the MFC by 0.1% or 10,390 acres (GIS).

The analysis area, according to IVMP data, has less than 26% of its total area in an open canopy condition across private, and public lands. Private industry accounts for 11% (2,532 acres) of the unrecovered stands or lands with <30% vegetative cover; public lands contain 8% (1,802 acres). Vegetative cover of less than 30% is often considered an open canopy condition and thus used during Landsat imagery interpretation as a surrogate for unrecovered stand (conifer) conditions (Jiang *et al.* 2004, Yang *et al.* et al. 2005). This project would decrease the canopy across the 5th field watershed by about 1%. The increases to water yields or peak flows in these drainages should continue to be negligible to the hydrologic function of the watershed.

Although, short-term negligible increases to stream flows are expected from the removal of trees, such increases at the site level are inconsequential to adjacent project unit streams, or are minor undetectable impacts when combined with downstream channel reaches of the sub-watershed. Due to the scale and magnitude of the proposed action there are no estimated cumulative effects to peak flow at site scale. Estimated increases to peak flow, at this scale, are topographically discrete and unrelated to the management actions in other drainages. Due to the scale and magnitude of the proposed action there are no estimated cumulative effects to annual yield and low flow at site scale.

Currently, over half the analysis area, as well as the larger watershed, is managed by private forest or agricultural landowners regulated by the state of Oregon. According to the Caspar Creek Study on the effects of clearcut logging, harvesting 50 percent of a watershed produced no significant statistical change, while completely clearcut tributary drainages to the same area produced a 35 percent increase to peak flows that occurred less than twice a year (Lewis 1997, Lewis 1998). The proposed alternative should have a much less cumulative effect considering less than 26 percent of the analysis area has stands less than 20 years of age, and this action effects less than 2 percent of Sandy Creek sub-watershed.

While the water yield increases from recently harvested catchments can be relatively large, depending on precipitation, their influence on the yield of the larger parent watershed can be overshadowed by uncut or reforested areas. Reiter and Beschta (1995), state that where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following harvest. This implies that the hydrologic response of the watershed to regeneration harvest, where vegetated riparian areas are maintained, is less pronounced compared to catchments harvested from ridge-top to stream edge, or patch-cuts with comparatively narrow buffers and no leave trees. All regeneration harvest units will leave riparian buffers of at least 110 feet on intermittent and 220 feet for perennial streams. Given the re-growth of forests in the analysis area, stream flow (annual yield) is predicted to be similar to undisturbed mature stands that would experience natural disturbance to fire, wind, and insect disease.

The augmentation in available flows within local streams is expected to be short term, and negligible to channel morphology. Low flows may initially increase following regeneration harvest in the proposed project area, but the effect is expected to be short lived (5-10 years) and would likely be immeasurable beyond between-year variance. Any increase in low flows would be considered indirectly beneficial to downstream fish habitat during the summer when temperatures are high and consumption from irrigation is highest.

The effects of harvest activities in the MFC and the sub-watershed are expected to persist. However, the harvest units do not change or remove the levels of vegetation of the watershed known to change yields that is beyond the downstream capabilities to attenuate any differences. Scientific literature indicates detectable increases occur when more than 25% of the drainage area is harvested, and these effects are short term 10-20 years (Hicks *et al.* 1991, Stednick and Kern 1992) . Moreover, the age class compositions of the adjacent vegetation within the respective drainages of Sandy Creek have reached stages of hydrologic recovery to compensate and utilize available groundwater. Any increase in peak flows during rainstorm events should be undetectable, unlikely to occur and should not impact channel erosion.

Issue 9: Aquatic Species and Habitats

Alternative 1 (No Action)

Existing sources of sediment entering streams from roads would continue under Alternative 1. Sediment input to streams from roads can occur when roads cross streams, are located adjacent to streams, and/or have roadside ditches and cross drains which are connected to streams. Existing roads which are adding sediment to streams or lacking the appropriate drainage features would not receive maintenance, renovation, improvements, or be decommissioned under Alternative 1. These roads would continue to influence drainage patterns and potentially cause sediment to enter streams.

The levels of sediment currently in stream channels within the analysis area could increase in the short and long term. Roads contributing sediment to streams could have short and long term negative effects to Coho Critical Habitat (CCH), Special Status Species (SSS), and Essential Fish Habitat (EFH). Sediment entering streams could result in a reduction of spawning production, juvenile rearing survival, and insect production (Meehan 1991).

The habitat conditions of Riparian Reserves, CCH, EFH, and SSS located within the analysis area would continue on their current trends under Alternative 1.

Alternative 2 (Proposed Action)

Sediment

Harvest Activities

Sediment delivery to streams is not expected to occur as a result of the proposed harvest activities. Some short-term soil displacement may occur as a result of localized soil disturbance from felling, yarding, and the transportation of timber or equipment on road surfaces during the winter hauling season. However, Riparian Reserve buffers, as described above, are intended to function as stream protection buffers. The no-harvest riparian buffers of a minimum of 110 feet in width would protect streams from sediment delivery resulting from harvest activities (FEMAT 1993). The riparian areas provide a buffer to sediment transportation because of vegetative filtering and the very high infiltration capacities of forest soils in the Pacific Northwest (Dietrich *et al.* 1982). Best management practices and Design Features applied to the proposed actions would aid in the prevention of sediment delivery to streams from harvest activities.

Lewis (1998) found no significant increase to suspended sediment and total sediment yield above background levels during logging and road construction in the North Fork Caspar Creek paired watershed study between 1990 and 1995. Lewis determined the lack of sediment entering streams to be a result of current forest practices and differences in road alignment, yarding methods, and stream protection zones.

Road Activities

The BMPs and Design Features were designed to prevent sediment delivery to streams from road activities. Design Features include improvements in: road alignment, drainage systems, construction designs, protection of vegetative buffer strips to filter sediment, and restrictions on the type and timing of traffic.

The 1.2 miles of proposed new roads would be located on or near ridge tops and incorporate Design Features such as, avoiding fragile or unstable areas, minimizing excavation and height of cuts, end haul of waste material where appropriate, and construction during the dry season. The roads would be designed to route surface flow across the road prism, and any potential sediment-laden surface water would infiltrate into forest soils. All new construction, dirt roads and landings would be made erosion resistant, and seasonally maintained prior to winter rains if they are to be used the following year. Seasonal maintenance may include but is not limited to providing adequate water bars, and mulching, using wood chips or straw and seeding.

A culvert replacement is proposed on Spur 3. The culvert is approximately 0.66 miles from CCH, SSS, and EFH. The culvert replacement would not affect suspended sediment where coho, CCH, SSS, or EFH are located downstream because 1) the distant proximity of the culvert to coho, CCH, SSS, and EFH and 2) BMPs and Design Features would be used to guide replacement activities.

The main haul route would utilize the paved Sandy Creek Road. Sediment delivery to CCH, EFH, and SSS from gravel surface roads would be eliminated through the use of silt fencing and/or straw bale barriers, removal and relocation of trapped sediment to stable upland areas, gravel lifts to stream crossings, and deferring hauling to dry season use when appropriate.

Riparian Reserves, Pool Habitat, and Large Woody Debris

All perennial streams would retain Riparian Reserves widths of 220 feet on each side of the stream channel. Fetter Creek, a cutthroat stream, would have a Riparian Reserve width of 440 feet. Seven intermittent streams would have a Riparian Reserve width of 110 feet on each side of the stream channel.

Because the Riparian Reserve boundary was adjusted to 110 feet on seven intermittent streams the area outside of the 110 feet would no longer be designated as Riparian Reserve. The adjusted Riparian Reserve boundary on the seven intermittent channels was made in accordance with the *Riparian Reserve Evaluation Techniques and Synthesis* module, detailed within the *Supplement to Section II of Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (REO 1997). Stream and riparian area processes would be protected and maintained because components such as riparian vegetation, inner gorge, and debris input were considered when delineating the Riparian Reserve buffers. The Riparian Reserve Assessment located in Section I of the Remote Control analysis file includes the evaluation of Riparian Reserve adjustments on debris input, debris flows, and fluvial transport as well as other riparian area functions. Functions of streams and riparian areas would be maintained within the adjusted Riparian Reserve buffers.

The Riparian Reserves and Design Features would retain existing and future recruitment of LWD. The long term condition of Riparian Reserves would not change as a result of the proposed actions. Pool

habitats form mostly as a result of interactions between streams and LWD accumulations (Beechie and Sibley 1997). Current and future recruitment of LWD would not be adversely affected by the proposed actions because Riparian Reserve buffers would be retained.

Harvest and road related activities including winter haul would not cause changes in sediment delivery to the extent as to cause changes to pool frequency, pool quality, and pool depth. Pools would be maintained because no new road construction would occur within Riparian Reserves and when yarding across streams, logs would be fully suspended where feasible so that the logs would clear stream banks and stream channels.

CCH, EFH, and SSS located within the analysis area would remain unchanged because Riparian Reserve and stream processes would not be affected by the proposed actions.

Endangered Species Act

The proposed actions in the Remote Control EA have been determined to have "*no effect*" on Oregon Coast coho and CCH.

Direct or indirect effects would not occur to coho or CCH in the analysis area from the proposed timber harvest, timber yarding, and fuels treatments during or following harvest. Riparian Reserve widths and Design Features (i.e. dry season restrictions and erosion protection measures) would prevent any direct or indirect effects to coho or CCH from the harvest and yarding related activities. There would be no transport of sediment to reaches where coho or CCH are present. The harvest activities would not affect the timing, magnitude, duration, and spatial distribution of peak flows. Physical habitat components such as pool character and quality, large woody debris, and width/depth ratios would remain unchanged.

Sediment would not be transported to CCH as a result of the road activities because of the distant proximity of the road activities from CCH, the Design Features, and the BMPs. There would be no new road construction in Riparian Reserves. The road related activities would not affect the timing, magnitude, duration, and spatial distribution of peak flows.

The proposed timber hauling activities would have no effect on coho or CCH. The proposed haul would not deliver sediment to CCH because of the distant proximity of the majority of the haul and the Design Features which were designed to eliminate sediment delivery mechanisms to streams. Because of the Design Features and the surfacing type on the roads which cross CCH, sediment would not enter stream channels at these crossings.

Magnuson-Stevens Act

There would be no activities within the proposed actions which would affect EFH. The harvest and road related activities would not affect the timing, magnitude, duration, and spatial distribution of peak flows. The Riparian Reserve buffer widths would maintain current and future LWD recruitment, protect stream bank stability and filter sediment derived from harvest activities. Road related activities would not result in sediment affecting EFH and would reduce chronic sediment input to stream channels.

The proposed actions in Alternative 2 would not adversely affect EFH. This assessment fulfills the requirements as described in the Magnuson-Stevens Fishery Conservation Management Act (16 U.S.C 1855((b)).

The BLM may incorporate an EFH assessment into NEPA documents and public notices pursuant to 40 CFR section 1500. EFH assessments should contain sufficient information to satisfy the requirements in 50 CFR 600.920(g) for EFH assessments and must clearly be identified as an EFH assessment.

1) Description of the proposed actions: A description of the proposed actions can be found within Chapters 1 and 2 of the Remote Control EA.

2) Analysis of individual and cumulative adverse effects on EFH: The Design Features would eliminate sediment input to EFH. The Riparian Reserve no harvest buffers would maintain current and future LWD recruitment, protect stream bank stability, and filter sediment derived from harvest activities. Because of the Riparian Reserve buffers there would not be an increase in stream temperatures. The proposed road related activities would not cause adverse affects to EFH.

3) Determination of effects on EFH: The proposed actions in Alternative 2 Would Not Adversely Affect EFH. The current quantity and quality of EFH within the analysis area would remain.

4) Proposed mitigation: Best Management Practices found within the Coos Bay District RMP and Design Features located in Chapter 2 of the Remote Control EA would mitigate adverse impacts to EFH.

Special Status Species

The proposed actions would not contribute to the need to list the Bureau Sensitive species found in the analysis area under the Endangered Species Act. Habitat for Bureau Sensitive species would be maintained. There would be no increase in stream temperatures. The BMPs and the Design Features would eliminate sediment transport mechanisms to SSS habitat. The proposed actions would therefore not contribute to the need to list any SSS found within the analysis area under the Endangered Species Act.

Noxious Weeds

Issue 10: Noxious Weed Spread

Alternative 1 (No Action)

Direct/Indirect Effects

The No Action alternative would not have a noticeable change in the overall noxious weed population in the proposed sale area or the Sandy Creek sub-watershed Analysis Area; there would be no new road construction, road renovation, or landing construction that would be associated with this alternative. Existing roads within the immediate area would continue to receive similar levels of vehicle traffic associated with recreation and commercial activity which can be one form of transport for noxious weed spread. The BLM would continue to monitor and treat known weed sites and new noxious weed populations that are found in scattered settings on BLM managed lands and BLM controlled roads. Weed treatment and removal would consist of manual methods and chemical applications.

Cumulative Effects

Roadsides are more liable to be host to new weed populations if continued monitoring and treatment fail to occur. Without ground disturbance, any new introduction of weeds from current levels of vehicular traffic is unlikely on both BLM and private lands in the Analysis Area. BLM will survey the roads in the area in the coming years as part of the annual monitoring and treatment program on BLM controlled roads located on federal and private lands. Weeds not adjacent to roads on private lands may go undetected and untreated, although some landowners are taking a more active role in treatment of noxious weeds. Recently the State of Oregon has developed a strategic plan to address noxious weed spread on non-federal lands. The effect of this No Action would be minimal when combined with the present and foreseeable future effects from actions by private landowners.

Alternative 2 (Proposed Action)

Direct Effects
The proposed harvest area would have some areas of exposed soil after road construction and some yarding activities which may serve as a host to pioneer species of noxious weeds. Noxious weeds have the ability to overtake and eliminate native vegetation by competing for water, sunlight, nutrients, and physical space. The broom species and gorse have the ability to fix nitrogen and are able to establish on nutrient-poor sites. This adaptation gives these species an ecological advantage over most native species.

Indirect Effects
Indirectly, these species can impact wildlife by creating less desirable forage and reducing habitat quality. It appears that only a few generalist wildlife species utilize noxious weeds. Some broom species have seeds that are able to remain dormant up to 80 years under proper conditions (Turner 1933). Thus weed inoculation on disturbed soil from the Proposed Action could result in re-growth with increased density at a later time following natural or human caused disturbance. If rotations of activity are short enough, weed species will re-invade areas with increased density following natural or human caused disturbance events. Noxious weeds will continue to spread along roads but at a lesser rate than in disturbed sites. Previously treated BLM noxious weed sites would be slower in returning due to past treatments.

Cumulative Effects
The BLM is required to develop a noxious Weed Risk Assessment when it is determined that an action may introduce or spread noxious weeds or when known habitat exists (USDI 2007c). This assessment has been completed for the Remote Control project and is included in Appendix C. Prevention measures identified as a result of this assessment not already applied on District lands as part of routine activities (USDI 1997), have been incorporated into the Project Design Feature to minimize the potential for introducing weeds to the project area or spreading existing weed infestations.

BLM will survey the roads in the area in the coming years as part of its annual monitoring and treatment program. Surveying will occur on BLM controlled roads located on both federal and private lands within the Myrtlewood Resource Area. Weeds not adjacent to roads on private lands may go undetected and untreated, although some land owners are taking a more active role in treatment of noxious weeds. Recently the State of Oregon has developed a strategic plan to address noxious weed spread on non-federal lands. The effect of this action would be minimal when combined with the present and foreseeable future effects from actions by private landowners.

Port-Orford-cedar

Issue 11: Port-Orford-cedar (POC)

(For complete technical report on POC and PL see Analysis File)

Alternative 1 (No Action)

Direct and Indirect Effects
The spread of *Phytophthora lateralis* (PL) would continue in High Risk Sites such as along streams and open roads used by public and private for hunting, mushroom gathering, and timber harvest activities. Spread of PL would continue to be caused by animals such as elk and deer at current natural rates. PL infection centers along roads would continue to spread in High Risk Sites due to the presence of live POC trees along roadsides on BLM lands. These High Risk Sites could introduce infections into Low Risk Sites, areas greater than 50' from road edge and streams margins, but the rate of spread would be low, if at all.

Cumulative Effects – Spatial Scales
The cumulative effects of PL on POC for the mid to long term and mid to large spatial scales is described in the Final Supplemental EIS – Management of POC in Southwest Oregon (POC FSEIS)[19]. The local scale is considered to be the Sandy Creek 6th field sub-watershed, the mid spatial scale is the North Coast Region, and the large spatial scale is the natural range of POC in Oregon and California.

Cumulative Effects – Sandy Creek Sub-watershed
The Sandy Creek sub-watershed has 5,948 acres of BLM lands and 6,773 acres of private lands for a total of 12,721 acres.

There are 4,724 acres (79%) of Low Risk sites for PL infection on BLM managed lands. The entire sub-watershed for all ownerships has 78% of the acreage (9,974 acres) in Low Risk sites. Even though there could be a slight increase of infection to POC in the Low Risk sites on all ownerships, it is unlikely that this would affect the viability of POC throughout the Analysis Area.

Future management actions that will likely occur on private lands would be clearcut timber harvests. Silvicultural activities are also likely to occur. POC populations would initially decrease on treated acres, but would slowly increase over time as new POC trees are seeded in from adjacent stands and green trees retained in some units.

Cumulative Effects - North Coast Region
The mid spatial scale for POC is considered to be the North Coast Region which includes the Oregon Dunes National Recreation Area, Coos Bay BLM District, and Powers Ranger District of the Siskiyou National Forest, which amounts to 126,248 acres of federal lands (p.3&4-14). There is an estimated 50,000 acres of private land in the North Coast region with POC stocking (p3&4-25).

PL infects POC on about 15% of the acres or 75% of the high risk sites (p.3&4 -44) of the total area occupied by POC on Federal lands in the North Coast Risk Region (NCRR). The spread of PL is predicted to reach 17% of the NCRR on 82% of the high risk sites in 100 years (p.3&4-53).

Low risk sites in the North Coast region amount to about 80% and these areas are expected to maintain healthy populations of POC because they are at little risk of becoming infected.

Private timber harvest within the range of POC in the North Coast Region is estimated to be 232 million board feet per year harvested on approximately 8,500 acres yearly. The majority of this harvest is clearcut harvesting with an average rotation age of 45 years (p.3&4 9-10). This would result in less POC stocking on these harvested lands. Douglas-fir is the preferred planting species in most private clearcuts.

PL infections would tend to increase on high risk sites on private lands and on BLM roadsides where the conditions of the reciprocal rights-of-way agreement apply. Also, new private roads (non-discretionary) would be constructed across BLM lands under the terms and conditions of the appropriate reciprocal rights-of-way agreement (p.3&4 15,16).

Cumulative Effects - Natural Range of POC
The large spatial scale for POC is considered to be the natural range in Oregon and California which includes 271,963 acres of POC in Oregon plus 34,818 acres in California for a total of 306,781 acres (p.3&4 14,22). There is an estimated 54,550 acres of POC on private lands in Oregon (p.3&4-42), based on Current Vegetation Survey (CVS) data. Private and Tribal lands account for an estimated 2,000 to

[19] All references within this section are from this document.

5,000 acres of POC in California, (p.3&4-8). Total POC acreage ranges from 363,281 to 366,281 acres. For purposes of analysis total POC acreage is approximately 366,000 acres.

The total area predicted to be infested in 100 years is 21% for lands in Oregon. California lands are expected to have a low rate of infection because all National Forests have POC management plans to reduce the spread of the disease (p.A31-A39). Private timber harvest within the range of POC in Oregon is 286 million board feet per year and within California is expected to be 189 million board feet per year. Infections on private lands and especially along haul roads would likely increase at a higher rate than federal lands since no consideration is given to protecting POC and 87% of the timber harvest occurs on private lands. Approximately 11,000 acres are harvested yearly in Oregon and 12,700 acres yearly in California. The majority of this private harvest is clearcutting with some thinnings (p.3&4 8-10).

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Through application of the Risk Key (p.2-18) to the Sandy Creek sub-watershed, no impacts to POC populations were identified, no additional site-specific management measures for POC are required for the Remote Control Timber sale to limit the spread of the root pathogen, PL. The Risk Key analysis demonstrated that there is no additional risk to Port-Orford-cedar as a result of implementing the Remote Control Timber Sale. Although the Risk Key identified no additional site specific management measures being needed, it would be beneficial to sanitize the -15.2 road from the junction of the -15.3 road to the junction of the -21.2A road. There are portions of heavy POC stocking along this road with some scattered pockets of PL. Sanitizing this road segment would reduce the likelihood of disease spread into uninfected areas away from the road and deter illegal bough cutting. This road would require future winter access for tree planting and other silvicultural activities.

This alternative includes approximately 193 acres of regeneration harvest. Units 1, 3, and 4 were found to have POC presence totaling 182 acres. Units 1 and 4 were found to have PL infections present. There would be 1,071 merchantable POC trees harvested, and 153 POC trees retained as wildlife trees, 76% of which are found in Green Tree Retention (GTR) areas. The 153 POC trees left as wildlife trees represent what the percentage of POC trees would be in the overall species mix. Trees found in GTR's are likely to survive site preparation activities and will provide future seed sources. POC is also found in adjacent standing timber outside of the unit boundaries which also will provide seed sources.

The planting mix would approximate the species mix prior to harvest. Resistant POC seedlings would only be planted in Low Risk sites.

The risk of infecting green Port-Orford cedar in skyline yarded units with one end suspension is expected to be negligible because of mitigation measures. These mitigation measures include: equipment washing, winter haul on surfaced roads, sanitation of the 15.2 road along areas of heavy POC stocking, and dry season operations on dirt roads and some units.

There would be 2500 feet of new construction that would remain open and rocked to Unit 4, in order to provide tree planting access and other silvicultural activities. The -21.2 road would be gated at the property line between Sections 20 and 21. The -29.2 road would be blocked at the junction of the Spur 4A road. All other new roads would be decommissioned. New road construction and decommissioning will take place during the dry season and reduce the risk of disease spread.

Cumulative Effects- Sandy Creek Sub-watershed
The BLM is proposing forest management treatments within the Sandy Creek sub-watershed on 182 acres with POC presence, which is 3% of the 5,948 BLM acres in the sub-watershed (High Risk and Low Risk).

Because the Remote Control timber sale was determined to have no impacts to POC, it will have no incremental, cumulative effect to POC in the Sandy Creek sub-watershed described in the EA. Added to the other activities taking place in the Sandy Creek sub-watershed, there are no significant cumulative impacts to POC as a result of implementing the Remote Control timber sale.

The proposed action in the Remote Control EA does not produce any off-site cumulative impact at the mid and long-term temporal scale that was not identified in the POC FSEIS. The Remote Control timber sale presents no direct effect or measurable additional risk to spread of PL; it contributes no incremental, cumulative effects to be disclosed or analyzed.

This analysis of POC resources in the Sandy Creek sub-watershed also tiers to the effects analysis of the 2004 POC FSEIS including the cumulative effects analysis. Any cumulative effects concerning POC within the range of POC, including the Coos Bay District, the area of the Remote Control timber sale, the NCRR, and the range of POC have already been considered in the FSEIS. The FSEIS discloses the cumulative effects to federal lands as a result of current POC management practices and timber harvest on non-federal lands, (p.3&4 8,11), and also discloses the past harvest and mortality of POC on all lands, non-federal and federal (p.3&4-12).

With regard to specific cumulative effects discussion in the 2004 POC FSEIS relevant to the cumulative effects of *PL*-related mortality, including the Remote Control timber sale project and other reasonably foreseeable timber harvest projects in the Sandy Creek sub-watershed, the FSEIS discusses *PL*-related mortality and timber harvest in high-risk riparian areas, the concerns for the snag and down log requirements of wildlife, as well as concern over effects of timber harvest and POC-mortality on genetic resources. POC is a minor to non-existent component of riparian areas in Sandy Creek sub-watershed. Douglas-fir will provide adequate snags and down log requirements for wildlife.

The discussion of cumulative effects of *PL*-caused mortality and timber harvest relevant to wildlife, states that no wildlife species were identified that were exclusively linked to POC, and that cumulative effects to wildlife are better linked to loss of specific habitat components, such as snags and down wood requirements (p.3&4 -105).

Based on all of the above reasons, when the Remote Control timber sale is viewed in light of other reasonably foreseeable future federal and non-federal timber harvest projects and past, present and foreseeable *PL*-related mortality to POC on federal and non-federal lands, the sale will have no significant cumulative effects on the genetic resources of POC. Additionally, Table 3&4-21 of the 2004 POC FSEIS shows the breeding zones, 115 and 130, that cover the Sandy Creek sub-watershed are already stocked with available resistant POC seed. Planting mix in regeneration harvest units would approximate the species mix prior to harvest, and resistant POC would only be planted in Low Risk Sites.

Cumulative Effects - North Coast Region
According to the District's GIS database, there are 82,410 acres of forest land with POC on the Coos Bay BLM District with 319 acres of non-roadside PL infestations and 2,391 acres of roadside considered infested, not including infestations on the intermingled private lands (p.3&4 -23). Additionally, the Powers Ranger District has a total of 61,014 acres of POC of which 8,138 acres are infested with PL lands (p.3&4 -24). On private lands in the NCRR there are approximately 50,000 acres of POC with 8,500 acres of PL (p.3&4 23,24). On Federal lands in the NCRR there are 143,424 acres of POC with

10,848 acres of PL infections. This amounts to a total for the NCRR of approximately 193,424 acres of POC with 19,348 acres of PL infections.

PL infects POC on about 15% of the acres or 75% of the high risk sites (p.3&4 -44) of the total area occupied by POC on Federal lands in the NCRR. The spread of PL is predicted to reach 17% of the NCRR in 100 years (p3&4-53).

Low risk sites in the North Coast region amount to about 80%, and these areas are expected to maintain healthy populations of POC.

The intermingled nature of private and Federal lands in this area and the relative lack of mitigations and seasonal restraints on private operations increases the potential for infestation on Federal lands along shared haul routes (p.3&4 -149).

Cumulative Effects - Natural Range of POC
The cumulative effects of the Biscuit Fire relative to POC in risk regions within Oregon and California was estimated that 55,400 acres of uninfected POC were killed within the perimeter of the fire (p.3&4 30-31). The cumulative effects of timber harvest activities generally, such as harvesting and transporting annual volume from federal forests, on the spread of *PL* (p.3&4 30-149), estimates that the current management practice of cleaning equipment before permitting a purchaser to work on Federal lands reduces the likelihood of such spread. The risk is higher on private lands where equipment washing may not be a common practice.

Federal timber harvest levels assume full implementation of the NW Forest Plan harvest volume and other objectives such as density management thinnings in Late-Successional Reserves and Riparian Reserves (p.3&4 -148).

The total area predicted to be infested in 100 years is 21% for lands in Oregon (p.3&4 -53). California lands are expected to have a low rate of infection because all National Forests have POC management plans to reduce the spread of the disease (p.A31–A39).

Some equipment washing is occurring by large private industrial timber land owners. Small landowners typically do not wash equipment. All roads on private lands are assumed to be infected. PL infections would tend to increase on high risk sites on private lands and on BLM roadsides where the conditions of the reciprocal rights-of-way agreement apply. Also, new roads (non-discretionary) would be constructed across BLM lands under the terms and conditions of the appropriate reciprocal rights-of-way agreement. Low Risk sites may become infected on private lands, if tractor yarding systems are used during winter operations.

Forest Fuels and Air Quality

Issue 12: Forest Fuels and Air Quality

Alternative 1 (No Action)

Direct Effects
Under the no action alternative, no direct consequences to the fuels, fuel loadings, and air quality of the proposed project areas would occur.

Indirect Effects
An indirect consequence to no action would allow natural processes to continue to build up available fuels both on the ground and aerial. These processes would contribute fuels to the forest floor through self-pruning of limbs, the dying and subsequent falling down of suppressed trees in the understory, and through larger-scale stand mortality due to overcrowding, loss of vigor, and/or wind throw. The ladder fuel component of these stands would continue to develop, and would create a potential for higher mortality due to increased stand density that could encourage crown fire activity during a fire event. This slow build up of dead, dying and live fuels would gradually increase the potential for extreme adverse results such as stand replacement fires. The effectiveness of fire management resources during suppression activities would be hindered by rapid rates of fire spread and increased fire intensities, thereby losing a defensible space to stop fire from spreading onto private forest land or Wildland Urban Interface (WUI) areas.

Air Quality – the No Action Alternative allows hazardous fuels to accumulate in increasing amounts over time. This accumulation of fuels would cause degradation of air quality during large and extreme fire activities.

Cumulative Effects
In addition to the indirect effects of a slow build up of dead, dying and live fuels in the proposed units, cumulative effects of Alt. 1 would include burning and smoke emissions for site preparation and fuel load reduction done on private forests which has intensive management on a 40-year rotation.

Coquille Tribal actions in the foreseeable future in the MFC include 3 regeneration harvest timber sales totaling roughly 350 acres, of which 170 acres are being harvested immediately. Harvest of Coquille Tribal Forest lands are managed similarly to federal matrix allocations. The USFS manages roughly 1500 ac. in the MFC, in the southern portion of the watershed. No USFS-proposed actions are considered foreseeable; it is assumed that USFS matrix holdings would be managed intensively and that reserved areas would undergo succession. The State does not directly manage any forestland in the analysis area.

The Oregon Smoke Management Plan (OAR 629-043-0043), manages the cumulative effects on air quality from fire activities for private and public lands. Site preparation and prescribed burning consumes approximately 205,000 tons of fuel per year in Coos County (CFPA 2005).

Alternative 2 (Proposed Action)

Direct Effects
Under the proposed action alternatives, there would be a short term increase in surface fuel loadings causing a short term risk of damage from wildfire occurrences. Although slight, some threat is present during the logging operation that could increase the possibility of human caused wildfires. In regeneration harvest, however, the immediate post logging fuels will have high fuel moistures which would reduce the potential for a fire start or in case of a fire, rapid fire spread. Within a year from harvest, the logged regeneration units will receive some form of treatment to significantly reduce or eliminate the available fuels that could have damaging effects during a fire event. Fuel loads are expected to range from 7 to 70 tons per acre with an average of 27 tons per acre.

Air Quality - All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan, (OAR 629-043-0043), as addressed in the RMP. To reduce the amount of material consumed, hand pile burning would be scheduled during periods of high rainfall (November to April) when burning will be confined to piles only. In addition, seasonal restrictions reduce the likelihood of ignition of a large-scale wildfire and subsequent smoke emissions. Smoke from prescribed fire activities would have little contribution to particulate emissions into the surrounding air shed.

Table IV-3 Remote Control Site Preparation Prescriptions

Unit #		Harvest Type	Unit Acres	Recommended Treatment	WUI Unit
1		Regen	48	Broadcast burn	Yes
2		Regen	20	Handpile, cover and burn	Yes
3		Regen	26	Handpile, cover and burn	Yes
4		Regen	108	Broadcast burn	Yes

Indirect Effects
Harvest/conversion activities would create openings in the project areas which may mimic openings caused by natural fire occurrence. These harvest activities would create favorable opportunity to re-establish stand diversity, structure and edge habitat which closely resembles the results of natural fires on a landscape.

Snags and coarse woody debris – An inadvertent result of broadcast burning would be the creation of snags in green tree retention areas and along adverse sections of the unit boundary, and the reduction of coarse woody debris. Units on north and east aspects would receive less damage to these components than on south and west slopes where dryer conditions exist. Mitigation measures would be taken by burning under spring like conditions and using ignition patterns which are timed and placed in a manner to lessen or pull heat away from green trees, snags and coarse woody debris. In units receiving a hand pile, cover and burn treatment (2 units), green tree retention and coarse woody debris would be left undamaged.

The Southwest Oregon Fire Management Plan (USDA *et al.* 2004) addresses Wildland Urban Interface (WUI) criteria. Proposed harvest units are within the Wildland Urban Interface area, and have been evaluated to determine appropriate mitigating measures to protect adjacent public and private property and provide for public health and safety. Hazardous fuels reduction and site preparation treatments will not deviate from the management direction provided in the RMP (p. 74-76). Specific examples of protection treatments to private land boundaries could include pullback or removal of ladder and surface fuels, pruning, waterhole restoration, shaded fuel break, and roadside hazardous fuel reduction.

Plantations – The proposed treatment post-logging and the subsequent fuels treatment would be to plant conifer on 9' X 9' spacing. How a plantation reacts to a potential fire is dependent on the geographical location, weather (temperature, relative humidity, wind speed and direction), fuel and soil moisture, aspect, percent slope, fuel type, age of plantation, canopy cover, adjacent forest structure, and existing activity fuels. However, fuels on all 4 units will be significantly reduced or eliminated through prescribed fire treatment. During the early stage of a plantation (1 to 5 years) an increase in fire potential (probability of ignition) and fire activity (rate of spread) would exist. This increase is caused mostly by the openness and the grass and brush component that develops at this stage of growth. Though this fine fuel offers available fuel for a fire it also gives a greater opportunity for extinguishment during a suppression activity. As the plantation progresses beyond 5 years the canopy develops creating shade which reduces or eliminates the grass and brush component. In this stage of development, ground fuels are reduced, and the moisture content of existing dead fuels and soil increases over time. Also, in this closed canopy environment, higher relative humidity and lower temperatures exist that would be a deterrent to a fire start or subsequent fire spread. Geographically, fires in second growth forest structures located on the west side of the coastal mountain range historically stay at a smaller size and are frequently suppressed within the first burning period (see *fire history* in Affected Environment). The factors affecting wildfire potential is analyzed in the RMP (p. 140-141). The potential for wildfire is present in all vegetation structures including these mosaic stands and landscapes with varying forest ages, structures, densities, and range of fuel levels. The existing forest road network would allow safe access for fire

suppression resources and provide strategic locations for efficient and effective fire suppression. Furthermore, within some stands, silvicultural treatments (prescribed fire and other non-fire treatments) are used to reduce or eliminate fuels that could increase wildfire hazards. In conclusion, the Remote Control plantations have no more inherent risks of wildfire than any of the other forest structures that are present. Based on historical fire information, coastal climate influences, effective forest management practices, and highly proficient suppression forces, the plantations resulting from the Remote Control project would have minimal to no causal effects toward landscape size fires.

Cumulative Effects
The RMP (p. ROD-8) anticipated average annual site preparation prescribed burning of 760 acres for the first decade, consuming 21,000 tons of fuel.

No cumulative effects from smoke would occur during prescribe burning because of the spacing, timing and tonnage requirements when complying with the Oregon Smoke Management Plan.

Project Consistency with Aquatic Conservation Objectives

Components of the Aquatic Conservation Strategy
There are four main components to the ACS: Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. A "fifth" component is a subset of these four, and is the Standards and Guidelines for management activities. These **Standards and Guidelines** were incorporated into the Draft Coos Bay District Management Plan preferred alternative which was under development (USDA and USDI 1994b:A-2). With the signing of the Record of Decision for this Resource Management Plan in May of 1995, these **Standards and Guidelines** were superseded by the RMP **Management Actions/Direction**.

Riparian Reserves:
Riparian Reserve widths of 440 feet would be retained on the unnamed fish-bearing stream, located along the northern portions of T29S R10W sections 15 and 16. All perennial non fish-bearing streams would retain Riparian Reserve widths of 220 feet on each side of the stream channels. Seven intermittent stream channels would have Riparian Reserve widths of 110 feet. Vegetation treatments would not occur within Riparian Reserves.

The **Standards and Guidelines** (p. B-13) states, "The prescribed widths of Riparian Reserves apply to all watersheds until watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for finale Riparian Reserve boundaries is presented through the appropriate NEPA decision making process". The Sandy-Remote Watershed Analysis included a Riparian Reserve evaluation performed at multiple scales and using multiple variables to determine Riparian Reserve widths necessary to meet ACS objectives. The Riparian Reserve evaluation identified potential adjustment for specific intermittent streams associated with the current Remote Control EA analysis area. Site-scale investigations were conducted both during the original Sandy-Remote EA planning effort and during the current Remote Control EA planning effort using new available information. The adjustments to the Riparian Reserve boundaries in the Remote Control EA were made because as a part of the Sandy-Remote Watershed Analysis, an interdisciplinary team determined that modifications to the interim Riparian Reserve widths would be possible in this area This recommendation led to a site specific Riparian Reserve Assessment for the Remote Control EA. The analysis suggests that retaining a one-half site potential tree height, or 110', would be adequate to protect the health of the aquatic system and its dependant species, while also providing benefits to upland species.

The Proposed Action includes narrowing the Riparian Reserve buffer width on seven intermittent 1st order streams to one-half of the site potential tree height. While the literature indicates that up to 10% of woody debris may originate from over 100' from a stream, protection needs for intermittent streams vary with slope and geology (FEMAT 1993:V-38). Similar geographic and topographic features control drainage network and hillslope stability patterns. These features may exert a strong influence on the design of the Riparian Reserve. For example, in the highly dissected Oregon Coast Range, the primary mass movement process is debris flows which originate in channel heads (p. V-39). Also, because much of the Coast Range is highly dissected, Riparian Reserve boundaries are also determined by the ability of the adjacent trees to be able to contribute to the potential large wood recruitment. Occasionally, due to the dissected nature of the topography, buffer widths may extend over a ridge, and trees that may fall would not be able to reach the stream channel. The area where Riparian Reserve boundary adjustments occur have slopes of <50%.

The adjustments to the interim Riparian Reserve widths on 7 intermittent stream segments are adjacent to (or included within) proposed harvest units 2, 3, & 4. Riparian Reserves on these intermittent streams were analyzed and adjusted to 110' on each side of the stream channel. This adjustment is a reduction of the interim width used in the RMP of one site-potential tree height for each side of the stream channel. For the Sandy Creek sub-watershed, the site-potential tree height is calculated at 220 feet (Sandy-Remote Watershed Analysis p.130). These Riparian Reserves were adjusted in accordance with the *Riparian Reserve Evaluation Techniques and Synthesis* module, detailed within the *Supplement to Section II of Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (REO 1997). The purpose of the module was to help managers implement direction in the Northwest Forest Plan, that requires watershed analysis prior to the final delineation and management of the Riparian Reserve network in a watershed (REO 1997). The module addresses the physical and biological elements that are necessary to both meet the Aquatic Conservation Strategy (ACS) objectives (USDA and USDI 1994b:B9-33) and provide habitat benefits to terrestrial species within an integrated Riparian Reserves system (REO 1997).

Key Watersheds:
The Remote Control analysis area is not located within a Key Watershed. The Remote Control analysis area is located in the Sandy Creek 6th field sub-watershed within the Middle Fork Coquille River 5th field watershed, neither of which is designated as a Key Watershed.

Watershed Analysis:
The Sandy-Remote Watershed Analysis was completed by the BLM in September, 1996. The proposed activities in the Action Alternative are consistent with the Sandy-Remote Watershed Analysis.

The Watershed Analysis found some lacking components of fish habitat such as inadequate amounts of large wood, deep overwintering pools, and shading. The proposed activities in the Remote Control EA would not exacerbate these issues. The management of Riparian Reserves in the Remote Control EA would contribute to the improvement of instream habitat in the analysis area. The Watershed Analysis also found high levels of fine sediment in the watershed. Project design criteria and BMPs would reduce the amount of sediment delivered to stream channels from road related activities. The adjustments to the Riparian Reserve interim boundary widths would not adversely affect instream habitat components such as large woody debris, shade and pools. The adjusted widths were found to be wide enough to meet all the ACS objectives. The adjusted Riparian Reserve boundaries would effectively filter sediment from harvest activities from entering stream channels. Some activities within the Proposed Action such as road renovation, improvement, maintenance and decommissioning would reduce sediment input.

Figure III.1-4 in the Watershed Analysis shows the Timber Production Capability Classification in the Sandy-Remote watershed. The proposed units and new road construction are located on non-fragile lands.

Figure IV-1 in the Watershed Analysis shows the potential thinning and regeneration harvest areas. The units proposed for regeneration harvest in the Remote Control EA are located in priority 1 regeneration harvest areas in Figure IV-1 of the Watershed Analysis.

The adjustment of the interim Riparian Reserve widths in the Remote Control EA is consistent with the discussion found in the Sandy-Remote Watershed Analysis for modifying the interim Riparian Reserves.

The proposed activities in the Remote Control EA are consistent with the management objectives for the core topics listed in the Sandy-Remote Watershed Analysis because the Remote Control EA would follow the management directions in the Northwest Forest Plan and the RMP including the Aquatic Conservation Strategy, Best Management Practices, and Riparian Reserve management.

Watershed Restoration:
Watershed restoration is intended to aid in the recovery of fish habitat, riparian habitat, and water quality. Restoration activities proposed within the Remote Control EA include the creation of snags within Riparian Reserves and road related activities intended to reduce the amount of off-site sediment transport. The Coos Bay RMP (p. 8) noted one of the programs most important components is the control and prevention of road-related runoff and sediment production.

This project includes 1.8 miles of road renovation, 0.2 miles of road improvement, and 6.3 miles of road maintenance. A total of 2.6 miles of road would be closed.

For the purpose of this analysis renovation of existing roads may include reconditioning the road bed, cleaning and reshaping ditches, trimming roadside vegetation, cleaning, repairing, replacing drainage structures, and generally restoring the original condition of the road. Road improvement would include all renovation items mentioned above but would also consist of work that raises the original standard of the road. Improvement work may include adding culverts, replacing existing culverts with larger ones, and adding rock surfacing to a depth that is greater than the original road.

The Proposed Action contains 3 types of road closures: temporary, decommissioned, and fully decommissioned. These roads are closed with a gate or barrier and drainage structures are left in place. Decommissioned roads would be closed to vehicles on a long term basis (>5 years) but may be used again in the future. These roads would be left in an erosion resistant condition by blocking, establishing cross drains, eliminating diversion potential at stream channels, and stabilizing or removing fills on unstable areas. Roads proposed to be fully decommissioned may involve sub-soiling, water barring, and planting to reestablish vegetation. Cross drains, fills in stream channels, and unstable areas may be removed if necessary to restore natural hydrological flow.

Road maintenance would occur along 6.3 miles of existing roads used for hauling logs not already covered under new construction, renovation or improvement. This would include roadside brushing, replacement of drainage features that are in poor or unsatisfactory condition, maintenance of drainage structures, and surface grading to maintain drainage.

There is one stream crossing culvert proposed for replacement as part of the Proposed Action. The culvert replacement would improve the drainage and replace the currently undersized culvert. The other culverts to be replaced include approximately 12 ditch relief culverts.

The Proposed Action also includes the creation of 14 snags in Riparian Reserves in Units 1 and 2. Creating snags would improve wildlife habitat in Riparian Reserves and eventually become coarse woody debris.

Management Actions/Direction
The following Management Actions/Directions related to the Proposed Action are found in the Coos Bay District RMP:

Forest Management

a) "Provide a sustainable supply of timber and other forest products" (p.52).
b) "Provide early-successional habitat" (p.22)
c) Maintain "… ecologically valuable structural components such as down logs, snags, and large trees" (p.22).
d) "Provide connectivity … between Late-Successional Reserves" (p.22).
e) "Provide habitat for a variety of organisms associated with both late-successional and younger forests" (p.22).

Transportation Management

a) "Develop and maintain a transportation system that serves the needs of users in an environmentally sound manner" (p.69).
b) "Correct problems associated with high road density by emphasizing the reduction of minor collector and local road densities where those problems exist" (p.69).
c) "Manage roads to meet the needs identified under other resource programs (p.69).

The Coos Bay District RMP's Best Management Practices (BMPs) and the Northwest Forest Plan ROD's Standards and Guidelines (S&Gs) were also incorporated into the Proposed Action. These measures were designed to maintain water quality and soil productivity. Standards and Guides are ". . . the rules and limits governing actions, and the principles specifying the environmental conditions or levels to be achieved and maintained" (USDA and USDI 1994b)

Site specific design features were developed in addition to the Management Actions/Directions, BMPs, and S&Gs to avoid, minimize or rectify impacts on resources and are included as part of the action alternative (see Chapter 2 of this EA).

Existing Watershed Condition
The existing conditions of the Middle Fork Coquille River 5th field watershed are:

- The BLM administers 63,065 out of 197,607 acres within this watershed or 32% of the land within the 5th field watershed.
- Approximately 27,373 acres or 43.4% of BLM land are in the interim Riparian Reserves.
- 36% of the trees within Riparian Reserves are between 0-40 years old.
- The BLM controls approximately 385 miles of road or 31% of all road miles within the watershed.
- There are 278 miles of fish bearing streams within the watershed. Several long standing barriers limit anadromous salmonids to 79.7 miles of this total or 27% of available fish bearing stream miles.

The existing conditions of the Sandy Creek 6th field sub-watershed are:

- The sub-watershed is approximately 12,740 acres or 19 square miles.

- The BLM manages 47% of the Sandy Creek sub-watershed. The remaining 53% is privately owned.
- Within the entire 6th field sub-watershed, there are 3.26 miles of road per square mile.
- Land use in the sub-watershed is predominately timber production, followed by grazing and agriculture.
- Tributary drainages consist of narrow canyons with much steeper channel gradients, and drain rugged mountainous landforms.
- About 283 miles of streams are found in the Sandy Creek sub-watershed. First and second order streams comprise 79% of the total drainage density.
- Riparian Reserves adjacent to the proposed units are mature forests, approximately 125 years old.

The net effects of the Proposed Action on existing aquatic conditions are:

- Road maintenance, renovation, improvement, and subsequent decommissioning would correct drainage problems and reduce or eliminate road related erosion and sediment delivery to stream channels.

Aquatic Conservation Strategy Objectives

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

The landscape-scale features necessary to ensure the protection of the aquatic systems applicable to the Slater Rocks EA include the riparian area associated forest stands.

Riparian area associated forest stands provide many functions which include "the maintenance of surface and ground water quality in aquatic systems; … maintenance of streambank and streambed stability; maintenance and protection of habitat structure for fish, wildlife, and vegetation; and maintenance of favorable microclimates for riparian-dependant species." (Everest and Reeves 2006)

Riparian area functions that will be analyzed include microclimate, water quality, streambank stability, sediment regimes, and habitat provided for riparian associated species. Microclimate will be addressed under ACS Objective 1. Water quality issues are in Objectives 3 and 5; streambank stability and sediment regimes are in Objectives 4, 6, and 7; and providing habitat for riparian associated species is found in Objectives 2, 8, and 9.

Site Scale

Short and Long Term

Microclimates found in riparian areas are an important component of watershed and landscape-scale features needed to ensure the protection of the aquatic systems. Buffer widths, determined by either the change in riparian to upland vegetation or by the topographic slope breaks, were found to be sufficient in maintaining microclimate post upslope harvest (Anderson *et al.* 2007). The Riparian Reserve buffers in the Proposed Action would maintain the microclimates found in the analysis area because the buffer widths would include the slope break and the retention of riparian vegetation.

Because of the Riparian Reserve buffers widths, changes to microclimates within the analysis area would remain unchanged from the natural range of variability at the site scale in the short and long terms.

5th Field Analysis

Short and Long Term

Because the BLM proposed management actions would not affect the watershed and landscape-scale features in the short or long term at the site scale, these features would remain at their current levels and trends at the 5th field scale.

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

Site Scale Analysis

Short and Long Term

Upslope areas would have disturbance from the proposed harvest activities. Green trees, snags, and coarse woody debris would be retained in the uplands as directed in the RMP and as prescribed in Chapter 2 of this EA. This upslope structure would maintain connectivity within and between watersheds at the site scale in the short and long terms.

Maintaining riparian associated networks would ensure the effectiveness of the spatial and temporal connectivity within and between watersheds at the site scale in the short and long terms. Because of the Riparian Reserve buffers these network connections would remain intact for aquatic and riparian-dependant species.

No new physical obstructions would be created in streams because no new roads would be constructed across stream channels. Water quality would be maintained so migration routes would not be chemically obstructed.

5th Field Analysis

Short and Long Term

The spatial and temporal connectivity within and between watersheds at the 5th field scale in the short and long terms would remain unchanged as a result of the Proposed Actions. The small amount of BLM land at the 5th field scale and the relatively small amount of treatment would prevent measurable improvements in connectivity. Culvert barriers within the 5th field watershed would remain until actions by other entities are taken.

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

Site Scale

Short and Long Term

The physical integrity of the aquatic system including shorelines, banks, and bottom configurations would be maintained at the site scale in the short term. The Proposed Action would not adversely modify any stream channels or aquatic habitat, nor remove any wood from any channel. All new road construction is located on ridgetops. New construction would not take place within any Riparian Reserves. None of the proposed new road construction would have stream crossings or are located in valley bottoms. Riparian Reserve buffers would assist in maintaining bank stability, shorelines and bottom configurations. The proposed action includes replacing an existing stream crossing culvert. Replacing this currently undersized culvert would improve downstream bank stability. Project design criteria, such as seasonal restrictions and no-harvest buffers, would further ensure stream bank stability. As a result of the above

stated determinations the aquatic system, including shorelines, banks, and bottom configurations would be maintained at the site scale in the short term and long term.

5th Field Analysis

Short and Long Term

Because there would be no noticeable impact to the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations at the site scale, there would be no change at the 5th field watershed scale in the short or long term.

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.

Site Scale

Short and Long Term

Water quality necessary to support healthy riparian, aquatic and wetland ecosystems would be maintained at the site scale in the short and long terms. Water quality would remain within the range that would maintain the biological, physical, and chemical integrity of streams.

There would be no expected increase in stream temperatures at the site scale in the short or long terms with the implementation of the Proposed Action. Delineation of Riparian Reserves within the project is as follows: 440 feet along fish-bearing stream channels, 220 feet along non fish-bearing perennial stream channels, and 110 feet along seven intermittent stream channels. No vegetation treatments would occur within the Riparian Reserves. The retention of these buffers and their current condition maintains shade along stream channels, preventing heating from solar radiation.

As stated in the Remote Control EA in the "Other issues identified but not used to develop action alternative" section, the Proposed Action 1) would not add any detectable amount of organic solids to adjacent streams, 2) would not be expected to increase directly or indirectly water temperature of any streams, and 3) would not be expected to have any direct or indirect suspended sediment effects above the current State ODEQ standard for water quality. These determinations were based on the riparian reserve buffer widths, adequate riparian tree shade, and project design criteria including sediment barriers at stream crossings along haul routes.

Slight increase in turbidity could occur in the short term in some localized areas as a result of road and harvest related activities, but would not measurably alter water quality. Design features were designed to minimize the amount and duration of sediment entering stream channels. Such increases in turbidity would not measurably alter the biological, physical, or chemical integrity of streams. Aquatic and riparian-dependent species' survival, growth, reproduction, and migration would be maintained. The proposed road renovation, improvement, maintenance, and road closures would result in a net reduction in turbidity in stream channels in the long term.

The Proposed Action is not expected to result in any chemical inputs to stream channels. Herbicides use is not included in the Proposed Action.

5th Field Analysis

Short and Long Term

As there would be no noticeable impact to water quality at the site scale, there would be no change in water quality at the 5th field watershed scale in the short or long term as a result of the Proposed Action.

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

Site Scale (Harvest)
Short and Long Term
Sediment delivery to streams is not expected to increase from background levels as a result of the harvest activities. Riparian Reserves are established to function as buffers and as sediment filters in regards to harvest activities, such as felling and yarding. FEMAT (1993) found that the proposed intermittent stream buffer widths of 110 feet would be sufficient to protect stream banks from sediment delivery resulting from harvest activities (p.V-26). Riparian Reserves provide a buffer to resist transporting sediment due to vegetative filtering and the very high infiltration capacities of forest soils in the Pacific Northwest (Dietrich *et al.* 1982).

Following the proposed harvest activities the sediment regime would be maintained at the site scale in the short and long terms because of the no-harvest Riparian Reserve buffers, project design criteria, implementation of Best Management Practices, and adherence to the applicable Standards and Guidelines.

5th Field Scale (Harvest)
Short and Long Term
As there would be no noticeable impact to the sediment regime at the site scale from harvest activities, there would be no change at the 5th field watershed scale in the short or long terms.

Site Scale (Roads)
Short Term
The sediment regime under which aquatic ecosystems evolved would be maintained at the site scale in the short term. Some activities within the Proposed Action such as road renovation, improvement, maintenance and decommissioning would reduce sediment input in the short term. Streams within the analysis area evolved with sediment input. Sediment input can result from natural disturbances such as landslides, slumps, wildfires, bank erosion and channel scour.

A minimal amount of sediment would enter stream channels from road related activities in the short term at the site scale. Project design criteria and BMPs are included in the Proposed Action and would reduce the amount of sediment delivered to stream channels from road related activities. The amount of sediment delivered would not exceed a 10% increase over background levels as established by ODEQ.

New road construction would be located on or near ridgetops and not within Riparian Reserves. Following the proposed road activities there would be a net increase of 0.3 miles in roads. The proposed new roads would incorporate project design criteria such as, avoiding fragile or unstable areas, minimizing excavation and height of cuts, end haul of waste material where appropriate, and construction during the dry season. The roads would be designed to quickly route surface flow across the road prism and any potential sediment-laden surface water should quickly infiltrate into forest soils.

All new construction, dirt roads and landings would be made erosion resistant, and seasonally maintained prior to winter rains if they are to be used the following year. Seasonal maintenance may include but is not limited to providing adequate water bars, and mulching, using wood chips or straw and seeding with a district approved erosion control seed mix.

Some existing roads within the analysis area are currently contributing sediment to stream channels from surface erosion, inadequate drainage, inadequate stream crossings or unstable cutbanks and fill slopes. The Proposed Action would improve these roads by restoring adequate drainage and thus reducing

sediment delivery to streams. The Proposed Action also includes decommissioning roads which would include properly routing water and installing water bars.

The main haul route would utilize the paved portions of the Sandy Creek Mainline Road. Most haul routes are paved, or will be improved and renovated to standards which would reduce or eliminate the potential for sediment delivery to streams. Sediment delivery to streams from gravel surface roads would be minimized or eliminated through the use of silt fencing and/or straw bale barriers, removal and relocation of trapped sediment to stable upland areas, gravel lifts to stream crossings and deferring hauling to the dry season.

Site Scale (Roads)
Long Term
The proposed road renovation, improvement, maintenance and road closures would result in a net reduction in sediment delivery to stream channels in the long term. The Proposed Action includes 1.8 miles of road renovation, 0.2 miles of road improvement, and 6.3 miles of road maintenance. A total of 2.6 miles of road would be closed.

Replacing failing culverts with those sized to meet 100-year flood events would reduce the risk of culverts plugging and washing out. Culvert failures can result in the fill within the road prism entering stream channels, increasing sediment loads in streams.

The proposed road decommissioning would result in long term benefits to streams. Stabilizing the drainage on these roads would reduce the potential of the roads failing and sediment entering stream channels.

5th Field Scale (Roads)
Short and Long Term
Sediment delivery from other forested lands within the 5th field watershed would be dependent on the Oregon Forest Practices Act. The expected sediment to be delivered at the site scale in the short term would not be measurable at the 5th field scale in the short or long terms. At the 5th field scale, taking into consideration the small amount of BLM land compared to privately owned lands and the relatively small size of the project, the Propose Action would provide a negligible benefit of reduced sediment delivery to stream channels.

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

Site Scale
Short Term
In-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitat would be maintained at the site scale in the short and long terms. Patterns of sediment, nutrient, and wood routing in addition to the timing, magnitude, duration, and spatial distribution of peak, high, and low flows would be maintained at the site scale in the short and long terms.

Although, short term negligible increases to stream flows are expected from the removal of trees, such increases at the site scale are inconsequential to stream channels and are undetectable. Due to the scale and magnitude of the Proposed Action there are no estimated cumulative effects to peak flow at the site scale. Estimated increases to peak flow, at the site scale, are topographically discrete and unrelated to the management actions in other drainages. See the Water Resource section in this EA for a detailed analysis on peak flows, annual yield, and low flow.

Long Term

There are no estimated increases to peak flows in the long term at the site scale. A return to the range of pre-harvest levels is expected as stands reach stages of canopy recovery (5-15 years), when interception and soil storage conditions become most favorable. All planned project units would maintain intact riparian reserves which consist of mature forest stands greater than 115 years old. The literature shows that patch-cuts, especially those with buffers, have less affect on stream flow in comparison to clearcutting (Reiter and Beschta 1995). This suggests that the hydrologic response of a landscape to regeneration harvest where Riparian Reserves and leave trees are maintained is less pronounced compared to catchments harvested from ridge-top to stream edge, or patch-cuts with comparatively narrow buffers and no leave trees. In a well known report, Reiter and Beschta (1995) state that where individual trees or small groups of trees are harvested the remaining trees will generally use any increased soil moisture that becomes available following harvest.

5th Field Scale

Short and Long Term

There are no expected short or long term effects to stream flows at the 5th field scale. This project would decrease the canopy across the 5th field watershed by about 1%. Existing roads in the 5th field watershed make up approximately 3% of the total land area, which is far below reported thresholds for detectable increases in peak flows. The negligible increases in water yields or peak flows at the site scale would not be measurable at the 5th field scale in the short or long terms.

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

Site Scale

Short and Long Term

The timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands would not be affected by the Proposed Action. The interaction of water with wetlands and meadows would be unaffected at the site scale both in the short and long terms. There are no meadows within the proposed units. Wetlands discovered on field inspections were buffered out of the units accordingly.

5th Field Watershed

Short and Long Term

Because there would be no noticeable impact to the timing, variability, and duration of floodplain inundation and water table elevation in meadows or wetlands at the site scale there would be no change at the 5th field watershed scale in the short or long terms.

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.

Site Scale

Short and Long Term

Species composition and structural diversity of plant communities in riparian areas and wetlands would be maintained at the site scale in the short and long term because there would be no vegetation treatments within Riparian Reserves in the Proposed Action.

Because the Riparian Reserve boundary was adjusted to 110 feet on seven intermittent streams, the area outside of the 110 feet would no longer be designated as Riparian Reserve. The adjusted Riparian Reserve boundary on the seven intermittent channels were made in accordance with the *Riparian Reserve Evaluation Techniques and Synthesis* module, detailed within the *Supplement to Section II of Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (REO 1997). The Riparian Reserve evaluation includes several components considered necessary to protect riparian area and stream functions. Because components such as riparian vegetation, inner gorge, debris input were considered when delineating the Riparian Reserve buffers, stream and riparian area processes would be protected and maintained. The Riparian Reserve Assessment located in Section I of the Remote Control Analysis Files includes the evaluation of Riparian Reserve adjustments on debris input, debris flows, and fluvial transport as well as other riparian area functions. As such the plant communities in riparian areas would be fully encompassed and maintained within the adjusted Riparian Reserve buffers.

5th Field Watershed

Short and Long Term

Because there would be no noticeable impact to species composition and structural diversity of plant communities in riparian and wetland areas at the site scale there would be no change in at the 5th field watershed scale in the short or long term.

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

Site Scale

Short and Long Term

Habitat needed to support riparian-dependent species including plants, invertebrates and vertebrate species would be maintained at the site scale in the short and long term. No-harvest buffers would provide areas of undisturbed litter layers, structures, vegetation, and protected microclimates that would provide refugia areas for riparian-dependant plants and animals. Microclimates were discussed under ACS Objective 1.

Full interim buffers (440 feet) would be retained on the fish-bearing stream channel, Fetter Creek. All perennial non fish-bearing streams would retain Riparian Reserve widths of 220 feet on each side of the stream channels. Seven intermittent stream channels would have buffers of 110 feet. No vegetation treatments would occur within these Riparian Reserve buffers. The Riparian Reserve Assessment located in Section I of the Remote Control Analysis Files, which drew upon suggestions in the Sandy-Remote Riparian Reserve Evaluation, found that the adjusted Riparian reserve buffer widths would adequately protect riparian values. Riparian values include habitat necessary to support riparian-dependent species.

The Proposed Action also includes the creation of 14 snags in the Riparian Reserves in units 1 and 2. Creating snags would improve wildlife habitat in Riparian Reserves and contribute to coarse woody debris at the site scale in the short and long terms.

5th Field Watershed

Short and Long Term

Because there would be no noticeable impact to habitat for riparian dependant species at the site scale, there would be no change at the 5th field watershed scale in the short or long term.

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CHAPTER VI Acronyms and Abbreviations

ACS Aquatic Conservation Strategy
ASQ Allowable Sale Quantity
BLM Bureau of Land Management
BMP(s) Best Management Practice(s)
BO Biological Opinion
CEQ Council on Environmental Quality
CFPA Coos Forest Protective Association
CONN Connectivity
CR Coast Range
CVS Current Vegetation Survey
CWA Coquille Watershed Association
CT Commercial Thinning
DBH Diameter at Breast Height.
DC Decay Class
DO Dissolved Oxygen
EA Environmental Assessment
ECM Ectomycorrhizal
ESA Endangered Species Act
FE Forest Ecology
FEIS Final Environmental Impact Statement
FEMAT Forest Ecosystem Management Assessment Team
FLPMA Federal Land Policy and Management Act
FOI Forest Operational Inventory
FSEIS Final Supplemental Environmental Impact Statement
GIS Geographic Information System
GFMA General Forest Management Area
GTR Green Tree Retention
HUC Hydrologic Unit Code
IDT Interdisciplinary Team
IVMP Interagency Vegetation Mapping Program
LSF Late Successional Forest
LSR(s) Late Successional Reserve(s)
LUA Land Use Allocation
LWD Large Woody Debris
MBF Thousand Board Feet
MMBF Million Board Feet
NCRR North Coast Risk Region
NEPA National Environmental Policy Act
NMFS National Marine Fisheries Service
NTU Nephelometric Turbidity Unit
NFP Northwest Forest Plan
OAR Oregon Administrative Rules
O & C Oregon and California Railroad Lands
ODA Oregon Department of Agriculture
ODEQ Oregon Department of Environmental Quality
ODF Oregon Department of Forestry
PCT Precommercial Thinning
PDC(s) Project Design Criteria
PL Phytophthora lateralis
POC Port-Orford cedar
PRMP Proposed Resource Management Plan
QPF Quantitative Precipitation Forecast
REO Regional Ecosystem Office
RIA(s) Rural Interface Area(s)
RMP Resource Management Plan
ROD Record of Decision
RR(s) Riparian Reserve(s)
SEIS Supplemental Environmental Impact Statement
S & G(s) Standards and Guidelines
S&M Survey and Manage
SOD Sediment Oxygen Demand
SRWA Sandy-Remote Watershed Analysis
SSS Special Status Species
TMO Transportation Management Objectives
T&E Threatened and Endangered (species)
TPA Trees per Acre
TPCC Timber Production Capability Classification
TSS Total Suspended Sediment
TSZ Transient Snow Zone
USFS U.S. Forest Service
USFWS U.S. Fish and Wildlife Service
USDA United States Department of Agriculture
USDI United States Department of the Interior
WA Watershed Analysis
WSA Wilderness Study Area
WUI Wildland Urban Interface
YO Years Old

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Appendix A Forest Ecology Tables

Forest Structural Stages

Table-1 Comparison of Franklin et al. (2002) structural stage, RMP (1994) structural stage classifications, and simplified system used in this document. "YO" is years old.

Typical stand age[A]	Franklin et al. (2002) structural stage	RMP structural stage	Simplified Structural stages (This document) [B]
0	Disturbance and legacy creation		
20	Cohort establishment	Early seral (0 - 15 YO)	
30	Canopy Closure	Mid seral (15-40 YO)	
50	Biomass accumulation/ competitive exclusion	Late seral (40-100 YO or -CMAI)	
80	Maturation		Mature (80-120 YO)
150	Vertical diversification	Mature seral (CMAI- or 100-200 YO)	
300	Horizontal diversification	Old-growth (> 200 YO)	Old (> 120 YO)
800-1200	Pioneer cohort loss		

[A] Stand ages are provided as references. However, stands can achieve structural classes at different times-since-replacement-disturbances (ages), depending on disturbance and site conditions.
[B] Simplified structural stages used in this document for referring to groups of late-successional stands.

Environmental baseline/ Unit-level analyses

Table-2 Existing canopy structural conditions within the action area. Measures derived from plot-level data. n=sample size; CHD=canopy height diversity index (Spies and Cohen 1992); richness is number of species; SD=standard deviation; Unk=Unknown or appropriate references not found. Total canopy cover is resolved for overlap by lower canopy layers; Cover by lower canopies includes summed understory and sapling layers.

		CHD		Overstory richness			
Unit	n	Mean	Range	Mean	Range	Total canopy cover (%)	Cover by lower canopies (%)
1	10	5.3	1.6 - 7.5	1.1	1 - 2	86.3	25.4
2	4	5.3	3 - 7.2	1.5	1 - 2	89	83.3
3	4	4.5	3.4 - 6	1.3	1 - 2	85.8	51.25
4	10	4.1	1 - 9	2.3	1 - 4	91.6	93.1
Reference values							
Young		4*		5.6**	4.7-6.6	Unk	Unk
Mature		7.5		5.1	4.3-5.9	Unk	Unk
Old		13		5.5	4.9-6.0	Unk	Unk

* Reference values from (Spies and Cohen 1992)
** Richness references for Westside OR/WA (Spies and Franklin 1991), including mean and confidence limits; only roughly comparable to collected data.

Table-3 Existing stand structural conditions in the action area. Measures derived from transect data. n=sample size; large trees here defined as trees > 25" DBH; "structure" is here defined as having observed branches> 6" in diameter above 30 feet on the tree bole (with or without moss cover), as well as obvious tree deformities (brooms, etc.); Unk= appropriate references not found.

UNIT	n*	Open overstory gaps	Overstory gaps filled by hardwoods (%)	Large trees TPA	Large trees with structures TPA
1	8	23.3	6.6	21.8	8.1
2	4	11.2	23.3	20	5.1
3	3	17.8	16.7	27.6	12.3
4	9	3.9	26.4	17.3	7.3
Reference values					
Young		7.5**	Unk	Residuals only***	Residuals only
Mature		18.2	Unk	Few	Few
Old		13.1	Unk	Many	Many

* n for large tree survey was 5 and 10 for Unit 1 and Unit 4, respectively.
** Ref values for canopy gaps (Spies *et al.* 1990) have different definitions and may include hardwood-filled gaps.
*** Qualitative prediction based on late-successional studies.

Table-4 Existing tree and shrub conditions in the action area. Measures derived from plot aggregation. n=sample size; QMD=quadratic mean diameter; CV=coefficient of variation (standard deviation as a percentage of the mean); TPA=trees per acre; TOL=shade-tolerant.

Unit	n	QMD	Total TPA (CV)	TPA of DF> 37 in. DBH	TOL tree TPA	Large TOL tree TPA	Most common sapling*	Tolerant saplings TPA	Shrub cover (%)
1	10	25	96.1 (79.1)	8	0	0	CACH	19.9	176
2	4	15.2	239.5 (127.6)	8.4	30.3	0	PSME	124.5	116
3	4	30.1	68.8 (37.9)	10.8	11.2	11.2	PSME	149.4	200
4	10	18.7	154 (190.9)	1.6	70.6	31	LIDE3	368.4	45
Ref values									
Young		8.3	378**	0.2	684**	17**	Unk	563**	
Mature		13.4	183	1.0	326	24	Unk	208	
Old		12.2	181	7.7	667	28	Unk	828	55**

* CACH is golden chinquapin; PSME is Douglas-fir; LIDE3 is tanoak.
** Reference values from (Spies and Franklin 1991) for western OR and WA and were collected differently than data describing the action area. Values would be predicted to be only roughly similar and are presented for general reference only.

Watershed (Middle Fork Coquille)-scale analyses

Table-5 Cover by different structural classes by different land managers in the Middle Fork Coquille (MFC) Watershed. Stand initiation includes BLM stand ages 0-19 and FS, Coquille Tribal, and private stands with similar conditions (< 10 in. DBH); Young includes BLM stand ages 20-80 and FS, Coquille Tribal, and private stands with similar conditions (10-19 in. DBH); Late-successional includes BLM stand ages > 80 and FS, Coquille Tribal, and private stands with similar conditions (> 20 in. DBH); Brush areas may include some stand initiation areas. Coquille Tribal lands were modeled as Fed IMF/ Fed reserves.

	Land manager			
Structural class	Federal intensively-managed	Federal Reserve	Private	Totals
Stand Initiation	2.62	2.54	23.41	28.57
Young	5.95	7.14	16.72	29.81
Late-successional	4.46	9.23	3.48	17.17
Ag, Water	0.07	0.09	9.54	9.7
Brush, Hardwood	0.28	0.33	14.14	14.75

Table-6 Predicted cover by mature and old late-successional forest types in the MFC assuming historic conditions, the environmental baseline (current conditions), and 3 different future management scenarios, for two future time periods. Direct effects scenarios include regeneration (modification from late-successional to stand initiation) of solely the four units described (Units 1-4). Alt. 2 Cumulative 2056 and 2106 scenarios predict succession on federal reserves, regeneration harvest on private IMFs on a 40-year rotation, and regeneration harvest on a 60 year rotation on Federal IMFs (modified for CON holdings); Coquille Tribal included in Fed IMF and Fed reserves. Alt. 1 cumulative effect scenarios have the same assumption but allow succession in Units 1-4. Succession 2056 predicts results of solely succession on all lands (including private) for roughly 50 years.

				Direct Effects	Cumulative effects-2056			Cumulative effects-2106	
Metric	Units	Historic reference*	Env. Baseline	Alt. 2-Post-harvest**	Alt 1-2056	Alt 2-2056	Succession-2056	Alt. 1-2106	Alt. 2-2106
Mature Late-Successional cover (81-120)	ac.	41,783	11,022	10,921	15,138	15,138	58,739	6,912	6,912
	% of MFC	21.2	5.59	5.54	7.68	7.68	29.81	3.51	3.51
Old Late-Successional cover (> 120)	ac.	80,913	22,811	22,719	18,920	18,726	33,833	32,430	32,236
	% of MFC	41	11.58	11.53	9.60	9.50	17.17	16.46	16.36
Total late-successional cover	ac.	122,696	33,833	33,640	34,058	33,864	92,572	39,342	39,148
	% of MFC	62.20	17.17	17.07	17.29	17.19	46.99	19.97	19.87

*****Historic reference is from 1930s cover type maps (Harrington 2003). This cover type map had greatly different data standards than modern mapping efforts, and would be predicted to underestimate fragmentation and patch densities, and overestimate patch size, interior area.

** Acres of harvest in Units 1-4 based on GIS are roughly 193. This is roughly 8 ac. fewer than traversed unit acres. GIS acres have been used to allow comparison to watershed breaks.

Table-7 Predicted fragmentation metrics describing current conditions and possible future conditions for late-successional forest patches in the MFC assuming historic conditions, the environmental baseline (current conditions), and 3 different future management scenarios. Metrics are for late-successional patches only. LS is late-successional; CV is coefficient of variation; ha is hectares; MFC is Middle Fork Coquille watershed.

		Scenario							
				Direct	Cumulative				
Frag metric	Units / Range	Historic reference[1]	Env. Baseline	Alt. 2-Post-harvest**	Alt 1-2056	Alt 2-2056	Succession–2056	Alt. 1-2106	Alt. 2-2106
Late-successional Cover[2]	% of MFC	62.2	15.9	15.8	17.1	17	46.6	19.9	19.8
Late-successional Patch #	#	15	868	871	449	455	708	397	402
Mean LS Patch Size	ac. (CV)	8,179.1 (354.2)	36.1 (392.5)	35.8 (385.4)	74.9 (359)	73.5 (359.8)	129.5 (1,238.6)	98.5 (378.2)	96.8 (379.9)
Cover by interior Area[3]	% of MFC	52.9	1.9	1.8	3.8	3.8	14.44	5.3	5.3
Disjunct interior patches	#	8	132	132	91	89	281	83	81
Mean Interior Patch Size	ac. (CV)	6,953 (360.7)	4.2 (816.7)	4.1 (830.5)	16.5 (645.8)	16.3 (650)	40.2 (1483.5)	26.2 (691.8)	25.9 (696.3)
Connectance Index[4]	%:0-100	0.952	0.105	0.104	0.19	0.187	0.2142	0.281	0.278
Clumpiness metric[4]	range: 0-1	0.983	0.896	0.896	0.912	0.912	0.902	0.915	0.915

[1] Historic reference is from 1930s cover type maps (Harrington 2003). This cover type map had greatly different data standards than modern mapping efforts, and would be predicted to underestimate fragmentation and patch densities, and overestimate patch size, interior area.
[2] Late-successional cover estimated with FRAGSTATS is slightly different than acres-based estimates due to GRID smoothing.
[3] Interior areas defined as areas outside of edge (200 m depth-of-edge influence from non-late-successional to late-successional)
[4] Clumpiness, connectance and cohesion are FRAGSTATS metrics, measuring how connected late-successional patches are in the landscape.

Table-8 Late-successional patch size distribution in the MFC. "LS" is late-successional. Data in this table was generated using polygons created from (WODIP) grid data; polygon "patches" created in this manner would not be predicted to produce the same patch configuration as that used to develop BLM's Forest Operational Inventory data.

LS patch size (ac.)*	Number of patches of this size	Amount of cover in patches of this size in MFC (ac.)	Percent of all MFC LS in this patch size (%)	Cumulative %
<10	448	1,118	3.4	3
10	190	1,608	4.9	8
20	52	1,035	3.2	12
30	36	1,072	3.3	15
40	28	1,100	3.4	18
50	20	1,003	3.1	21
60	10	604	1.9	23
70	10	719	2.2	25
80	9	698	2.1	28
90	3	260	0.8	28
100	1	105	0.3	29
110	2	222	0.7	29
120	5	596	1.8	31
130	2	258	0.8	32
140	1	136	0.4	32
100-150	16	2,112	6.5	39
150-250	18	3,552	10.9	50
250-490	18	6,225	19.1	69
500-2,670	9	10,138	31.1	100

Sub-watershed-scale analyses (Sandy Creek)

Table-9 Cover by different structural classes by different land managers in the Sandy Creek Sub-watershed.

	Land manager			
Structural stage	Federal intensively-managed	Federal Reserve	Private	Totals
Stand Initiation	5.07	6.13	12.29	23.49
Young	3.26	4.19	28.71	36.16
Late-successional (81-120)	0.97	1.15	1.29	3.4
Late-successional (>120)	7.54	18.1	0.47	26.11
Brush, HW, Ag	0	0.18	10.66	10.84

Note: Coquille Tribal included in Fed IMF and Fed reserves

Table-10 Predicted cover by mature and old late-successional forest types in the Sandy Creek sub-watershed assuming historic conditions, the environmental baseline (current conditions), and 3 different future management scenarios. % 6th is percent of the Sandy Creek sub-watershed.

			Scenario					
			Direct Effects	Cumulative effects				
Metric	Units	Env. Baseline	Alt. 2-Post-harvest**	Alt 1-2056	Alt 2-2056	Succession-2056	Alt. 1-2106	Alt. 2-2106
Mature Late-Successional cover (81-120)	ac.	433	332	534	534	4,604	781	781
	% 6th	3.40	2.61	4.19	4.19	36.16	6.13	6.13
Old Late-Successional cover (> 120)	ac.	3,324	3,231	2,640	2,446	3,757	3,173	2,980
	% 6th	26.11	25.38	20.73	19.21	29.51	24.93	23.40
Total late-successional cover	ac.	3,757	3,564	3,173	2,980	8,361	3,954	3,760
	% 6th	29.51	27.99	24.93	23.40	65.67	31.06	29.54

*Coquille Tribal included in Fed IMF and Fed reserves

**Acres of harvest in Units 1-4 based on GIS are roughly 193. This is roughly 8 ac. fewer than traversed unit acres. GIS acres have been used to allow comparison to watershed breaks.

Table-11 Predicted fragmentation metrics describing current conditions and possible future conditions for late-successional forest patches in the Sandy Sub-watershed. Metrics are for late-successional patches only.

		Scenario							
				Direct	Cumulative				
Frag metric	Units / Range	Historic reference*	Env. Baseline	Alt. 2-Post-harvest	Alt 1-2056	Alt 2-2056	Succession–2056	Alt. 1-2106	Alt. 2-2106
Late-successional Cover**	% of sub-WS	58.6	28.3	26.8	24.2	22.7	67	31.1	29.3
Late-successional Patch #	#	6	45	49	37	42	26	25	27
Mean LS Patch Size	ac. (CV)	1,241.6 (207.4)	79.8 (296.4)	69.4 (311)	83.3 (252.3)	68.8 (285.2)	325 (433.3)	158 (190.9)	138.1 (220)
Cover by Interior Area	% of sub-ws	43.96	7.2	6.7	6.4	6.3	24.8	10.4	10.3
Disjunct interior patches	#	3	10	8	8	6	25	6	5
Mean Interior Patch Size	ac. (CV)	931.2 (220.4)	20.4 (354.8)	17.3 (392.1)	22.1 (423.6)	19.1 (463.4)	121 (450.9)	53 (346.6)	48.7 (364.5)
Connectance Index	%:0-100	6.667	1.313	1.276	3.003	2.671	7.4	5.667	5.413
Clumpiness metric	range: 0-1	0.976	0.928	0.925	0.912	0.912	0.894	0.918	0.917

*****Historic reference is from 1930s cover type maps (Harrington 2003). Grain of this map is probably too large to interpret at a 6th-field scale; however, it is presented here as an extremely rough reference. This cover type map had greatly different data standards than modern mapping efforts, and would be predicted to underestimate fragmentation and patch densities, and overestimate patch size, interior area.
****Note:** late-successional cover is slightly different than acres-based estimates due to GRID smoothing.
LS=late-successional.

References:

Harrington, C. A. (2003). The 1930s Survey of Forest Resources in Washington and Oregon. Portland, OR, USDA, Forest Service: 10.

Spies, T. A. and W. B. Cohen (1992). "An index of canopy height diversity." COPE Report 5: 5.

Spies, T. A. and J. F. Franklin (1991). The structure of natural young, mature and old-growth Douglas-fir forests in Oregon and Washington. Wildlife and Vegetation of Unmanaged Douglas-fir Forests. Corvallis, OR, U.S. Dept. of Agriculture - Pacific Northwest Research Station.

Spies, T. A., J. F. Franklin, et al. (1990). "Canopy gaps in Douglas-fir forests of the Cascade mountains." Canadian Journal of Forest Research 20: 649-658.

Appendix B SSS Fungi Species

Table-12 Fungi reasonably certain to occur within the analysis area

SPECIES	#of Known Sites-Includes 2007 data		Documented Sites on Coos Bay BLM Lands		HABITAT REQUIREMENTS (as of 1/29/2008)	RANGE OF SPECIES (ORNHIC 2004)
	WA/OR/ CA.	Coos Bay District	MFC 5th Field	Sandy Creek 6th Field		
Arcangeliella camphorata	15	11	0	0	Associated with pines, especially Douglas-fir and western hemlock, 200 to 950 m, March through November; CR & KM Ecoregions and Washington.	Endemic to the Pacific Northwest (PNW) OR to British Columbia
Cudonia monticola	32	3	0	0	Grows on spruce needles and coniferous debris; fruits in late summer and autumn	Western North America.
Gomphus kauffmanii	72	1	0	0	Closely gregarious to caespitose, partially hidden in deep humus under Pinus and Abies sp.	Western North America.
Leucogaster citrinus	57	7	0	0	Sub-surface soil. Roots of white fir, sub-alpine fir, shore pine, western white pine, Douglas-fir, and western hemlock.	PNW from WA south to CA.
Phaeocollybia californica	66	9	3	0	40 year old plantations to >400 year old-growth forests, associated with the roots of Pacific silver fir, Douglas-fir, and western hemlock; fruits October-December	PNW from WA south to CA.
Phaecollybia dissiliens	27	11	4	0	Occurs on soil, litter and humus in association with roots of Pacific fir, Sitka Spruce, Douglas-fir and western hemlock principally in Western Hemlock series (67%). Elev 313-2431 ft. OR Coast Range, Western Cascades, Klamath	PNW from British Columbia south to CA.
Phaeocollybia olivacea	51	23	12	0	40 year old plantations to >400 year old-growth forests, associated with the roots of Pacific silver fir, Douglas-fir, and western hemlock; fruits October-December	PNW from WA south to CA
Phaecollybia oregonsis	42	5	0	0	On soil in association with roots of Douglas-fir, western hemlock and Pacific silver fir, primarily Western hemlock series (75%) at elev. 826-3817 ft. OR Coast Range, Western Cascades, Klamath	PNW from WA south to CA
Phaeocollybia pseudofestiva	46	11	3	0	40 year old plantations to >400 year old-growth forests, associated with the roots of Pacific silver fir, Douglas-fir, and western hemlock; fruits October-December	PNW from WA south to CA
Phaeocollybia scatesiae	19	5	2	0	Occurs in litter, associated with roots of Pacific Silver fir, Douglas-fir, western hemlock. In OR/WA primarily in Western Hemlock (67%) and Pacific Silver Fir (17%) series. WA Olympic peninsula, OR Coast Range, Western Cascades, Klamath	PNW from WA south to CA
Phaeocollybia sipei	66	38	21	1	40 year old plantations to >400 year old-growth forests, associated with the roots of Pacific silver fir, Douglas-fir, and western hemlock; fruits October-December	PNW from WA south to CA
Phaeocollybia spadicea	88	33	7	1	40 year old plantations to >200 year old old-growth Douglas-fir forests and in mature Sitka spruce stands in coastal lowlands regions;	PNW from WA south to CA
Ramaria gelatiniaurantia	28	4	0	0	Occurs on litter and soil, associated with Pinaceae spp. Western Hemlock series (88%) elev. 1632-3618 ft. OR all provinces except Willamette Valley, WA Cascades	PNW from WA south to CA
Ramaria largentii	17	1	1	0	Occurs on litter, humus and soil, associated with Pinaceae spp. Western Hemlock series (48%) White Fir (19%) Douglas-fir (14%) elev. 1332-5108 ft. OR all provinces except Willamette Valley, WA Cascades	PNW from WA south to CA
Sowerbyella rhenana	73	1	0	0	Groups in duff of moist, undisturbed mature conifer forests, one collection from a tan oak stand in Curry County on Coos Bay BLM; CR & WC Ecoregions.	The cool North Temperate zone in Europe and Asia as well as N.A.

Appendix C Noxious Weed Assessment

The BLM is required to develop a noxious weed risk assessment when it is determined that an action may introduce or spread noxious weeds or when known habitat exists. The following document is intended to satisfy this requirement and identify prevention measures that will minimize the potential for introducing weeds to the planning area and/or spreading weed infestations that already exist within the planning area.

Noxious Weed Risk Assessment

1) Does suitable habitat for noxious weeds exist in the planning area? **Yes.** If so, what are these areas? **Primarily road sides, landings, and areas of disturbed soil.**

2) May the actions proposed in the Remote Control EA introduce or spread noxious weeds within the planning area? **Yes.** What is the level of risk for spreading weeds via project activities? **Low to medium. The specific prevention measures listed below will reduce the risk of spreading or introducing weeds within the planning area.**

3) What are the primary actions / conditions / vectors that may pose a risk of spreading weeds within the planning area? **Vehicle travel along forest roads and soil disturbance associated with project activities.**

4) What are the primary weeds of concern that may be found within or introduced to the planning area? **Scotch broom, French broom, gorse, Himalayan blackberry.**

5) Can actions be taken to avoid or minimize weed spread associated with project activities? **Yes.**

6) What actions can be taken to prevent or minimize the spread of weeds within the planning are? **See the specific prevention measures listed below.**

7) Have any high-risk sites been identified for treatment prior to project implementation? **Yes. Weed inventories and treatments are conducted by field office personnel on an annual basis. Sites that are identified, have been and will be treated using integrated pest management techniques as deemed necessary to prevent the spread of weeds within the planning area prior to project implementation.**

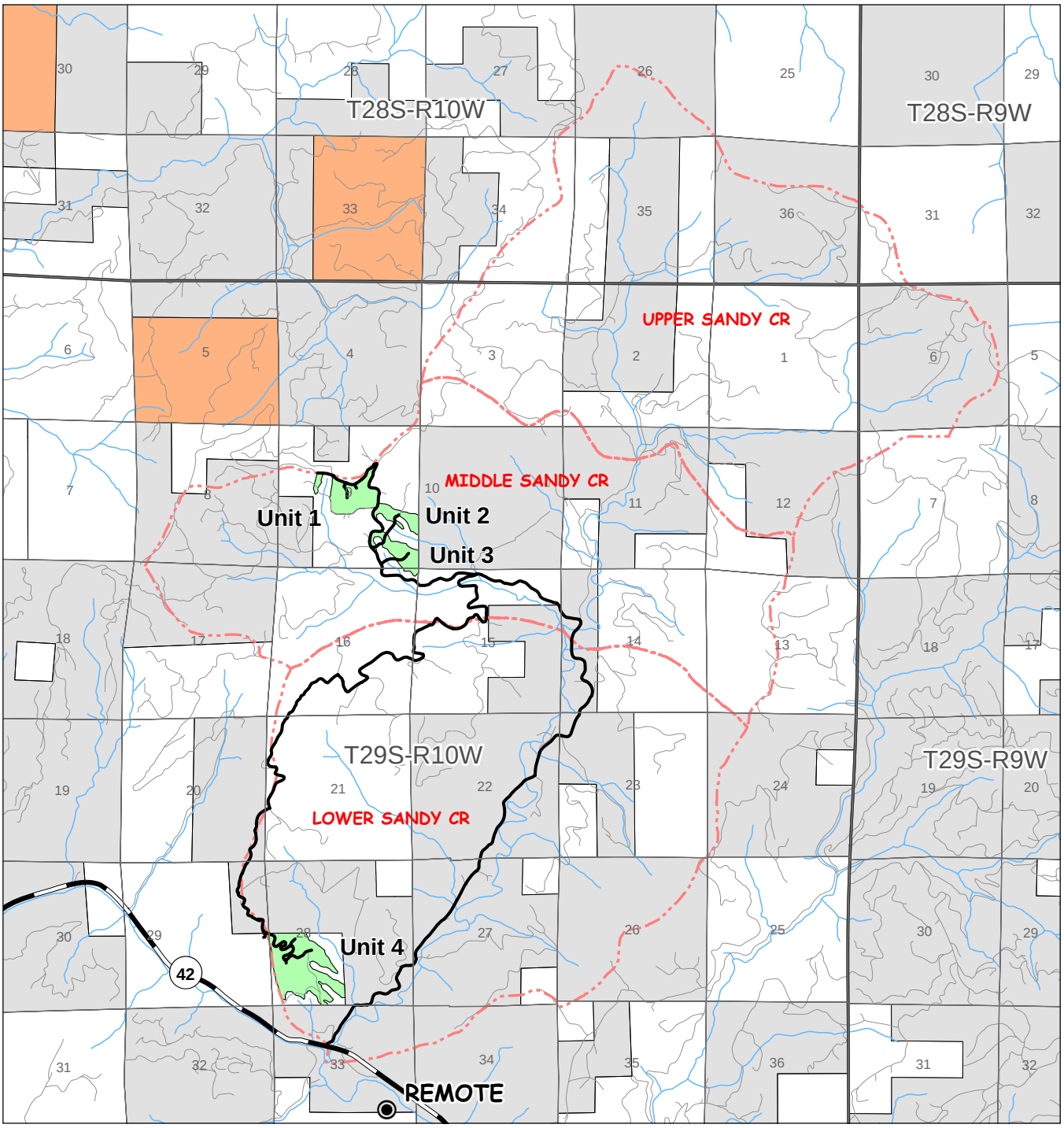
8) Are there any additional conditions or circumstances that need to be considered in relation to weed management within the planning area? **None have been identified.**

Appendix D Wildlife Table

Table-13 Comparison of Owl habitat conditions under both Alternatives expressed as percentage change from current condition.

		After Harvest	50 years			100 Years		
			No Action	Remote Control	Difference	No Action	Remote Control	Difference
5th Field MFC	NRF	-0.4 %	-17.05 %	-17.9 %	0.85%	+ 42 %	+41 %	1 %
	RF	-0.6 %	0 %	0 %	0	+ 16.3 %	+15.7 %	0.6%
6th Field Sandy Creek	NRF	-2.8 %	-20.6 %	-26.4 %	5.8 %	+ 0.05 %	-10.3 %	10 %
	RF	-5.1 %	-15.5 %	-20.7%	5.2 %	+ 0.52 %	0	0.52 %

Appendix E Maps



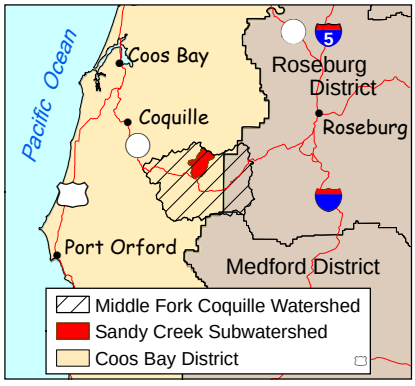
Legend

- Remote Control Haul Road
- Other Roads
- Fishbearing or Perennial Stream
- Sandy Creek Subwatershed
- Sandy Creek Drainage
- BLM Administered Land
- Coquille Forest
- Private/Other Ownership
- Proposed Remote Control Unit

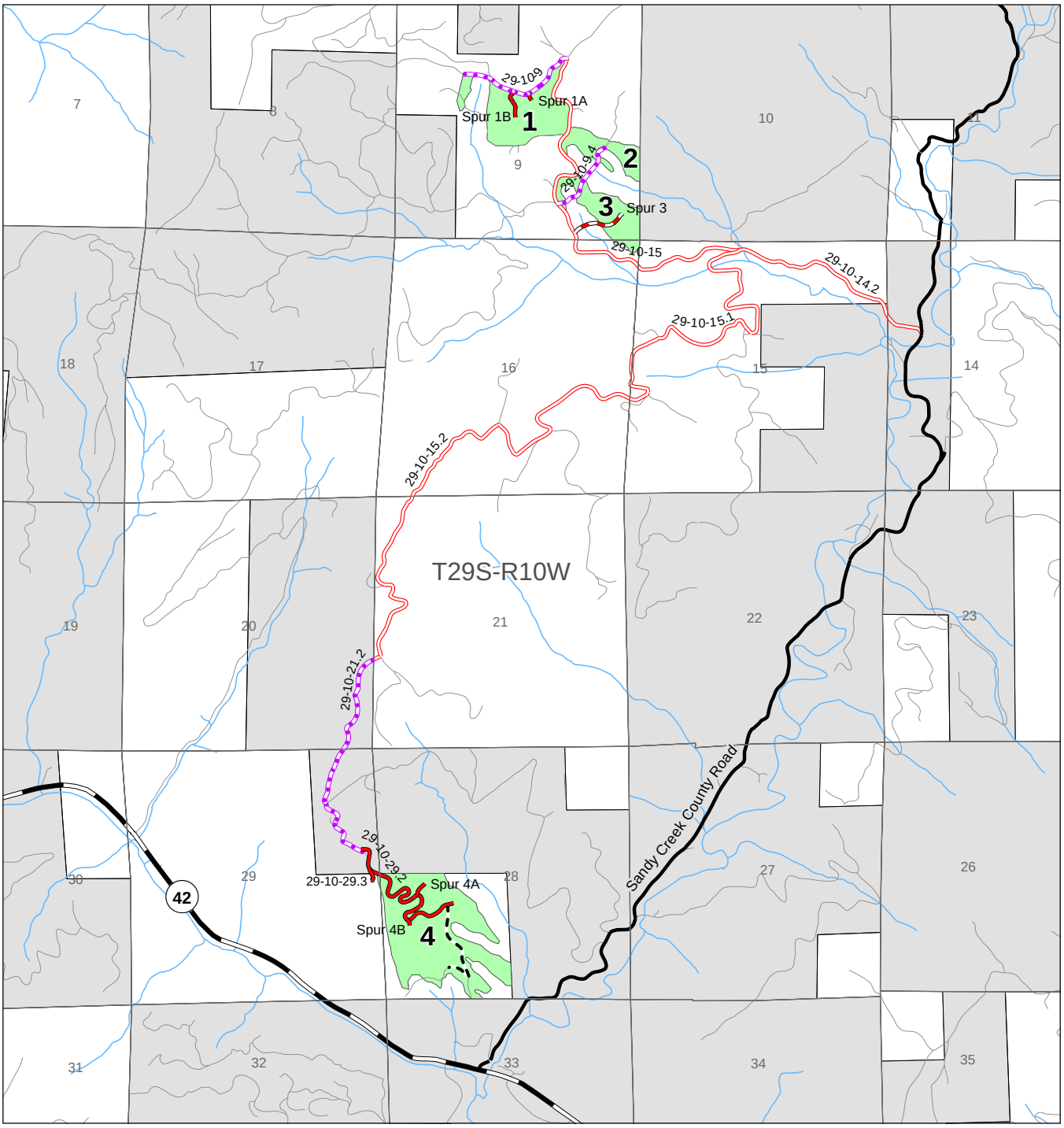
N

0 0.5 1 1.5 2
Miles

US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Coos Bay District Office
Myrtlewood Resource Area



Map 1. Remote Control Vicinity - Sandy Creek Subwatershed

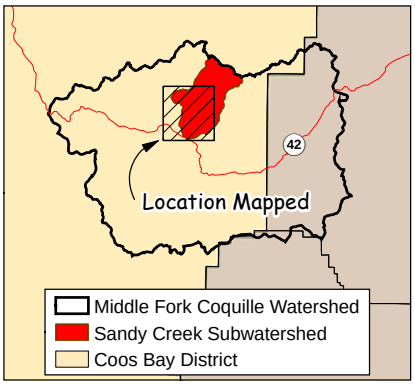


Road Improvement
Road Maintenance
New Construction
Road Renovation
Equipment Swing Road
Other Roads
Fishbearing or Perennial Stream
BLM Administered Land
Private/Other Ownership
Proposed Remote Control Unit

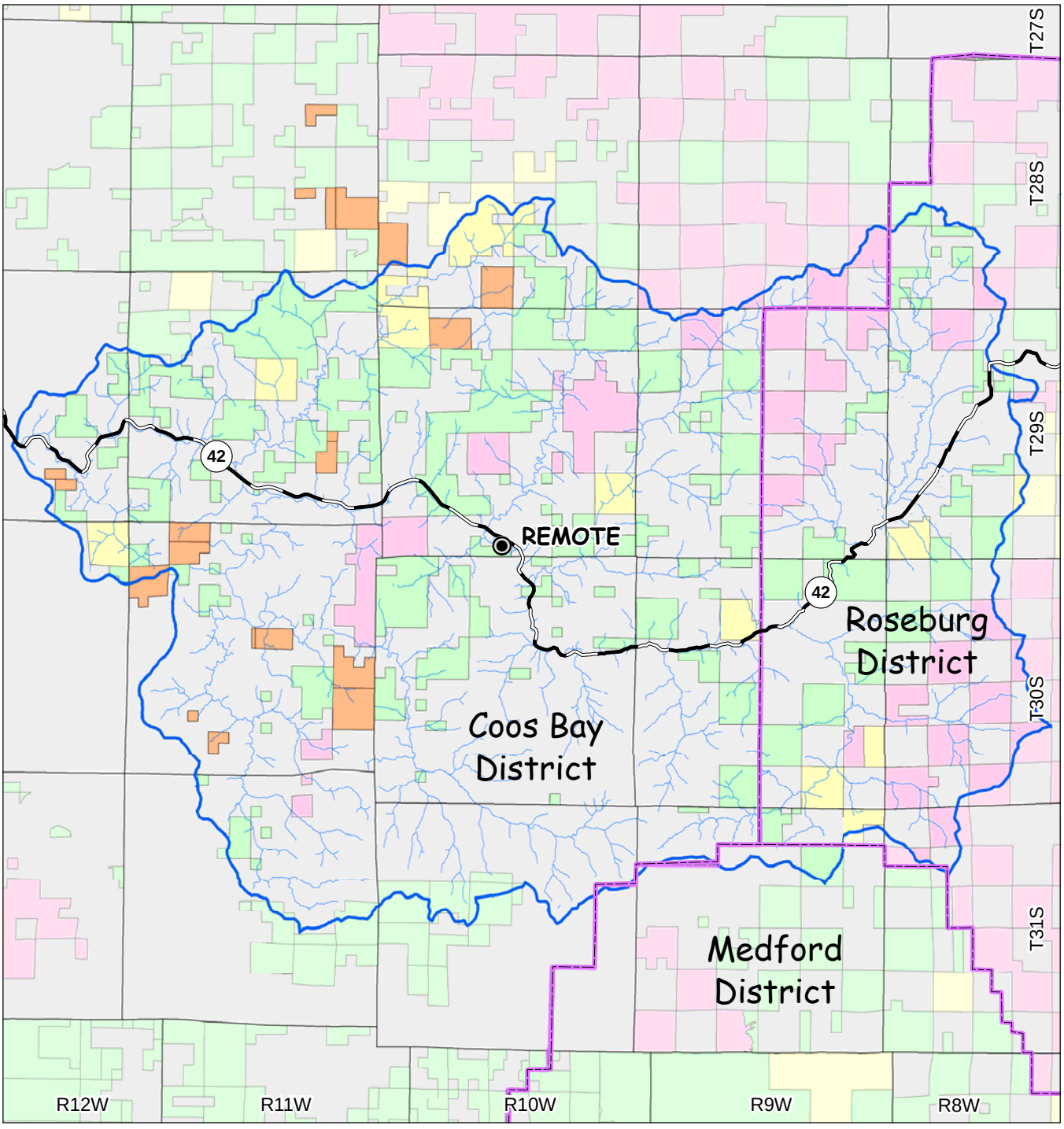
N

0 0.25 0.5 0.75 1
Miles

US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Coos Bay District Office
Myrtlewood Resource Area



Map 2. Proposed Regen Harvest Units and Transportation Management



Highway 42
Fishbearing or Perennial Stream
BLM District Boundaries
Middle Fork Coquille Watershed
Sandy Creek Subwatershed

BLM Land Use Allocations

Connectivity/Diversity Block
General Forest Mgmt Area
Late Successional Reserve
Private/Other Ownership

0 1 2 3 4 5 6
Miles

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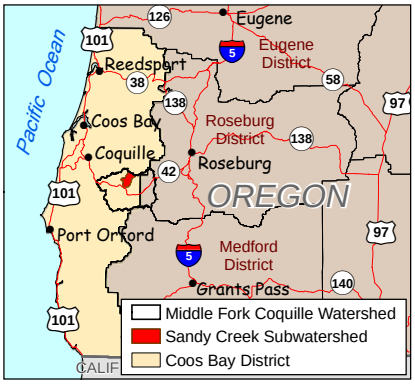
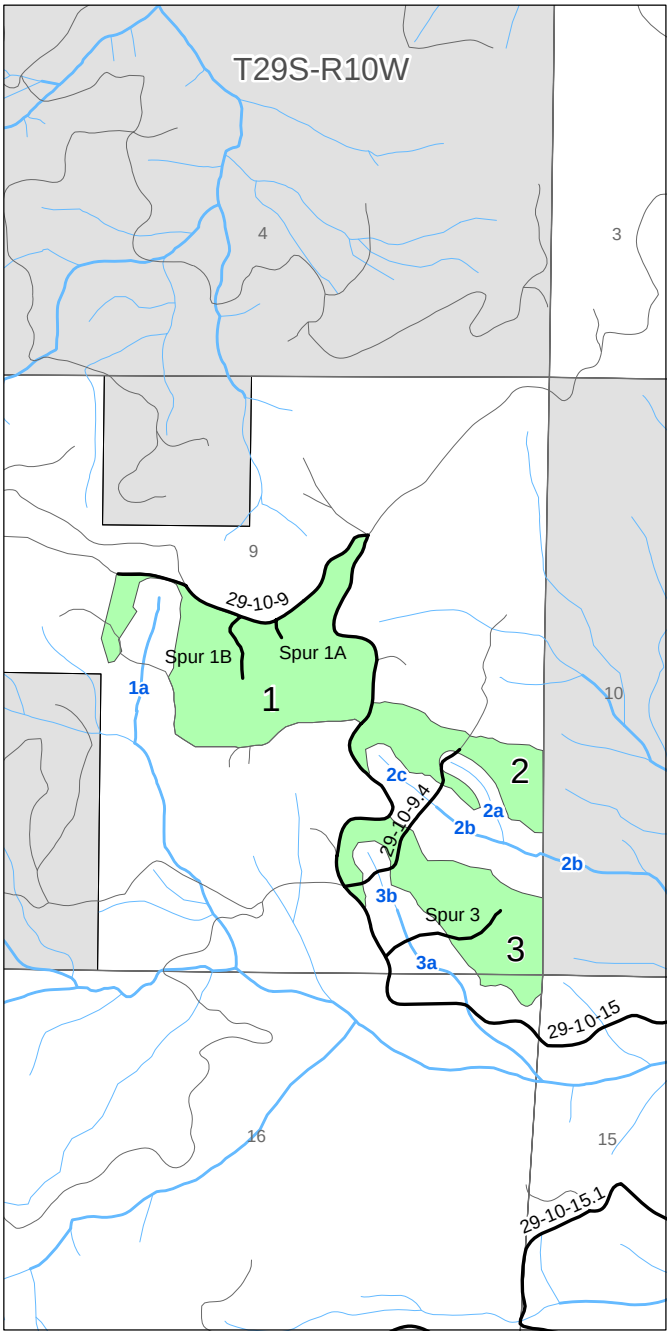
Coos Bay District Office
Myrtlewood Resource Area

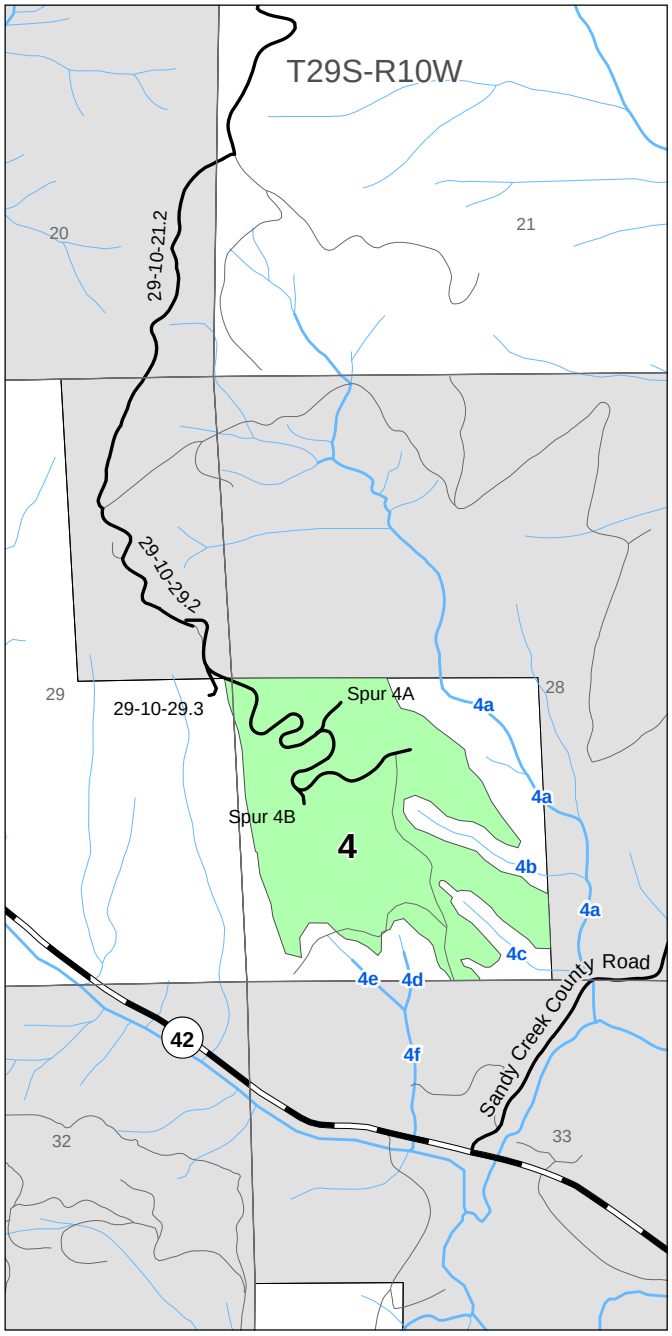


Map 3. Middle Fork Coquille Watershed Land Use Allocations

Northern Units View (Units 1,2,3)



Southern Unit View (Unit 4)



Legend

- Intermittent Stream
- Perennial Stream
- Haul Road
- Other Roads
- BLM Administered Land
- Private/Other Ownership
- Proposed Remote Control Unit

0 0.25 0.5
Miles

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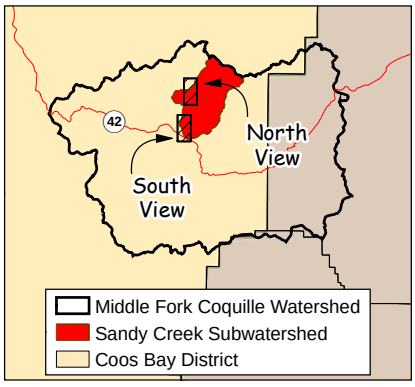
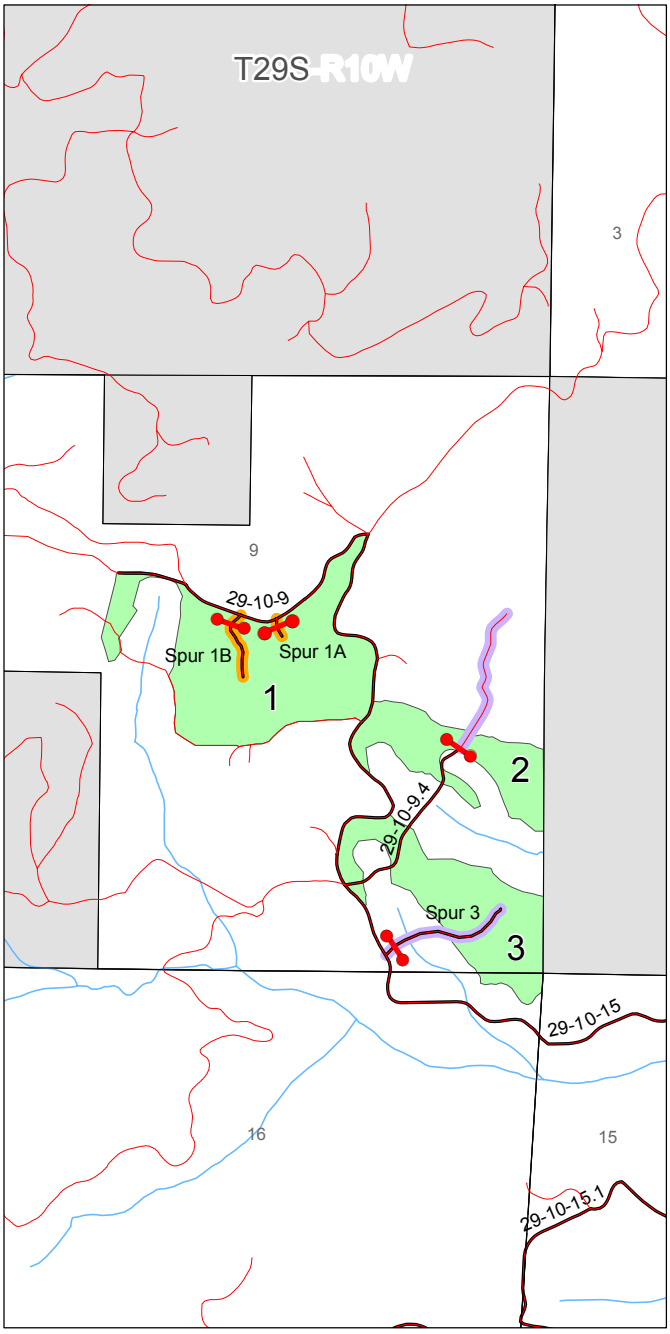
Coos Bay District Office
Myrtlewood Resource Area

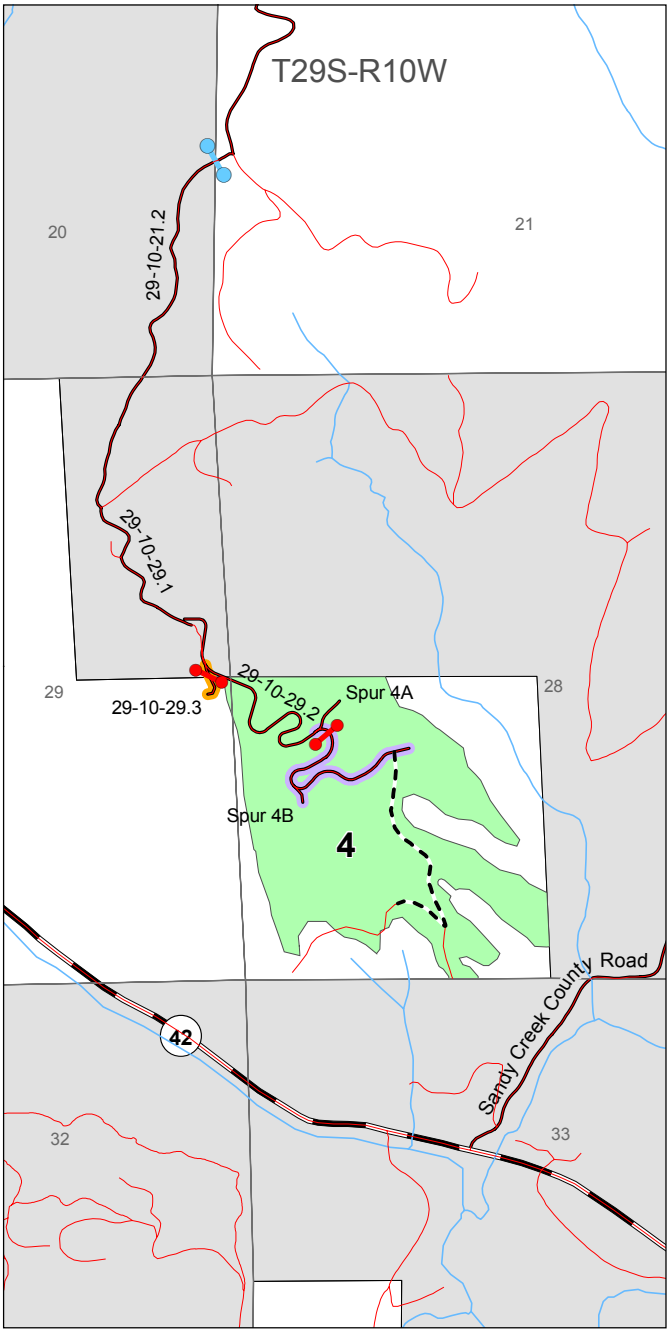


Map 4. Intermittent/Perennial Streams and Segment Labels

Northern Units View (Units 1,2,3)



Southern Unit View (Unit 4)



- Road Closure (Gated)
- Road Closure (Barrier)
- Full Decomm (permanent)
- Block and Waterbar (long term)
- Haul Road
- Equipment Swing Road
- Other Roads
- Fishbearing or Perennial Stream
- BLM Administered Land
- Private/Other Ownership
- Proposed Remote Control Unit

N

0 0.25 0.5

Miles

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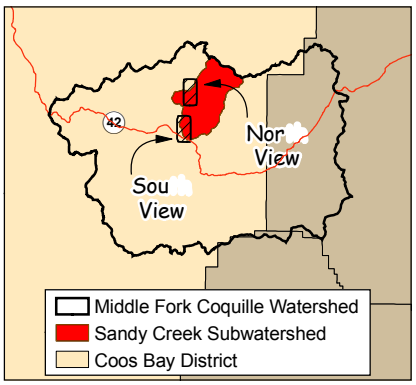
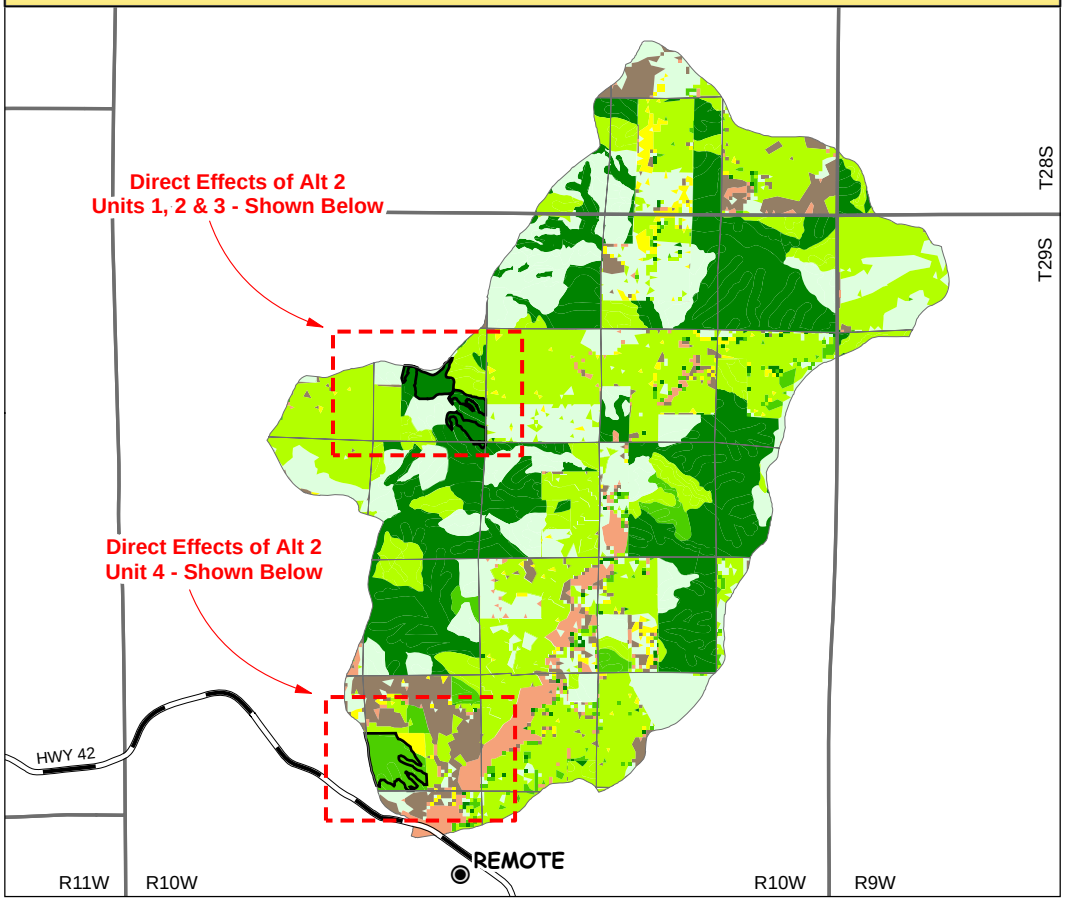
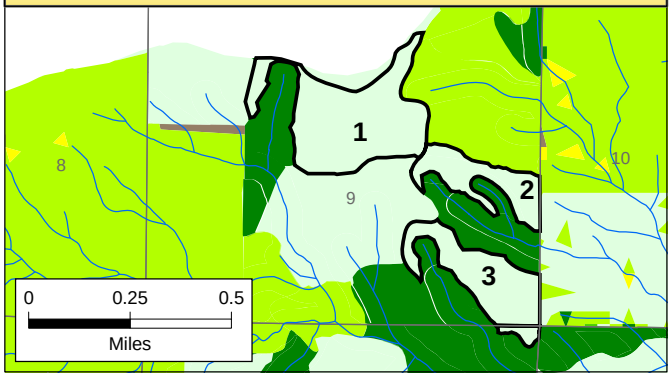


Map 5. Road Decommissioning Closures

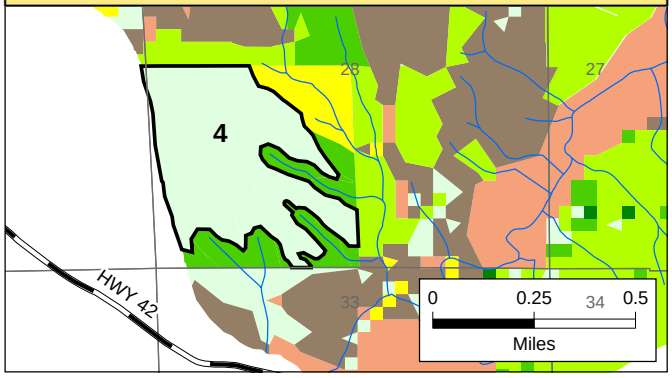
Current Stand Structure (Environmental Baseline)



Direct Effects of Alternative 2 - Unit 1, 2 & 3

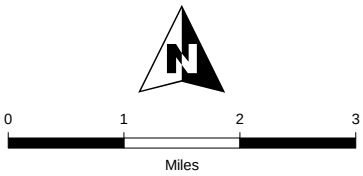


Direct Effects of Alternative 2 - Unit 4



Legend

- Potential Remote Control Unit
- Sandy Creek Subwatershed
- Stand Initiation (0 - 20 yr)
- Young (21 - 80 yr)
- Mature (81 - 120 yr)
- Old (> 120 yr)
- Hardwood
- Brush/Open/Non-Established
- Agriculture/Non-Forest



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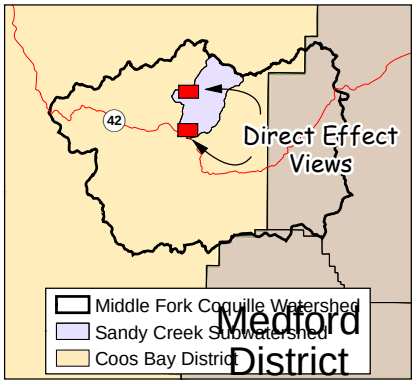
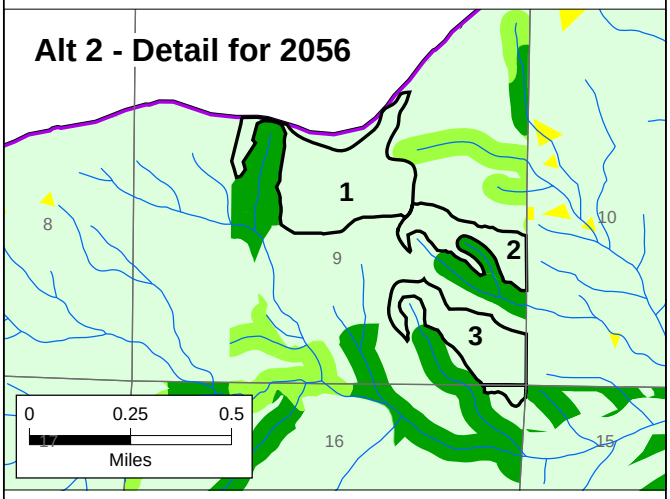
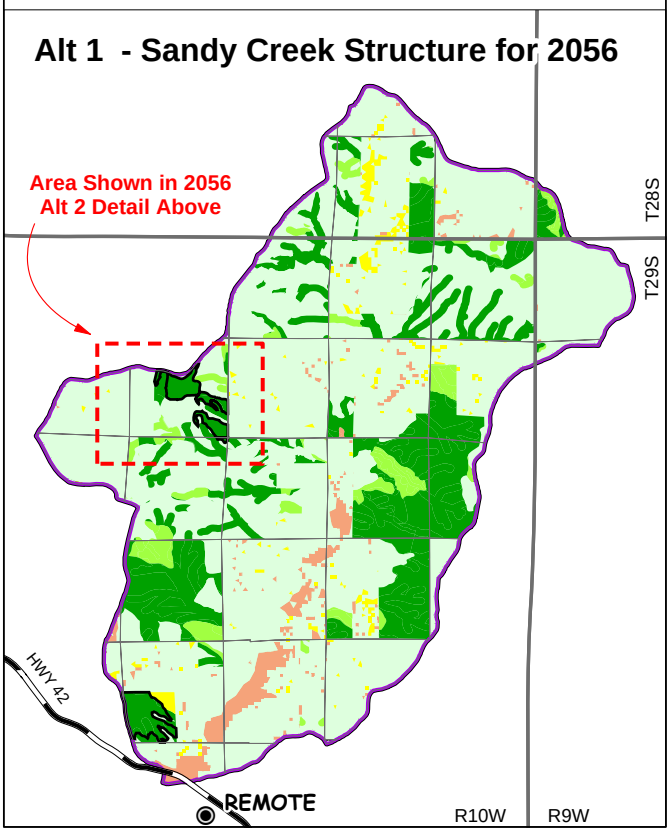


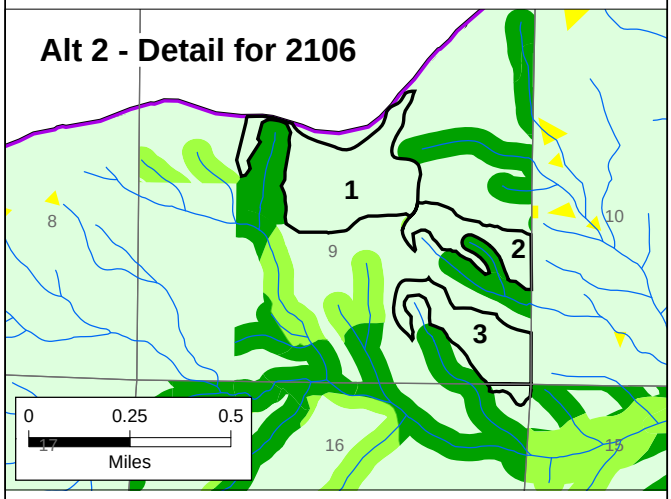
Map 6. Current Stand Structure in Sandy Creek and Direct Effects of Alt 2

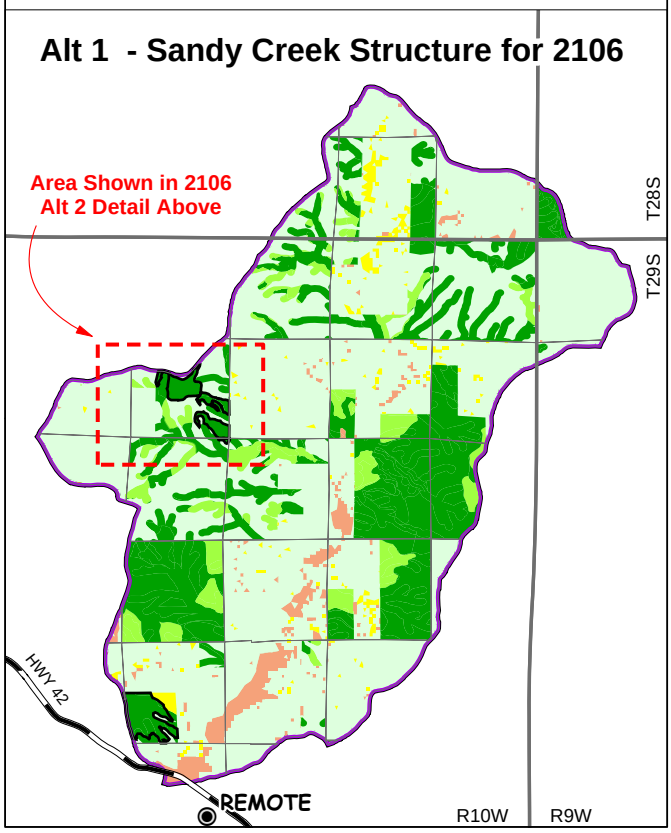
Alt 1 and 2 - Projection for 2056





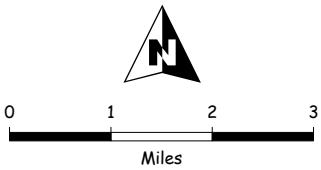
Alt 1 and 2 - Projection for 2106





Legend

- Highway 42
- Stream
- Proposed Remote Control Unit
- Sandy Creek Subwatershed
- Young (1 - 80 yr)
- Mature (81 - 120 yr)
- Old (> 120 yr)
- Hardwood
- Agriculture/Non-Forest



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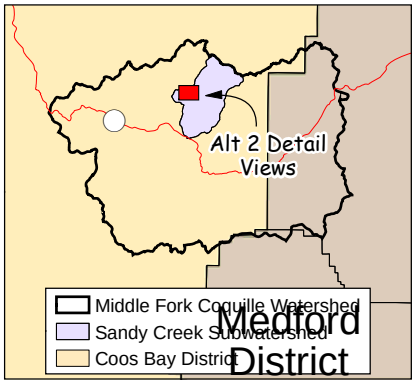

Map 7. Predicted Future Stand Structure in Sandy Creek by Alternative