United States Department of the Interior

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In Reply Refer To:
1792 (ORC040)
DOI-BLM-OR-C040-2011-0008-EA
Wagon Road Pilot Environmental Assessment

January 12, 2012

Dear Citizen,

As a result of comments received on the Wagon Road Pilot Environmental Assessment (EA) and unsigned FONSI (Finding of No Significant Impact), available for review from November 10 – December 12, 2011, we have made changes to the EA to provide additional clarification to project design and additional supporting information to the effects analysis in some sections.

The *Final* Wagon Road Pilot EA and signed FONSI have been posted to the District's Internet site, http://www.blm.gov/or/districts/coosbay/plans/index.php. This project has been designed to implement management objectives and direction of the 1995 Coos Bay District Resource Management Plan while demonstrating the ecological restoration principles designed by Drs. Norman Johnson and Jerry Franklin. The Environmental Assessment contains analysis of conducting a variable retention harvest in the Matrix land use allocation, density management thinning in portions of the Riparian Reserves, and commercial thinning and alder conversion in a buffer area of unsurveyed suitable marbled murrelet habitat.

These treatments would be accomplished through a timber sale(s) to be offered in 2012.

Upon reviewing the external and internal comments, the BLM made some notable changes to the EA to provide additional information, refine the proposed action and further clarify project design features. These do not constitute substantive changes or result in different outputs or alternatives; therefore, additional effects analysis is not needed. The following is a summary of these changes:

Purpose and Need – There were questions about the need for a pilot project, what gridlock means and the intention of the Secretary of the Interior in demonstrating the principles of Drs. Johnson and Franklin.
Response – We have included additional information about the intent of the pilot project and more background for the need of the project.

Log Exports – There were comments about log exports being an issue considered but eliminated from detailed analysis.
Response – We have included additional information on pages10-11 and have reached the same conclusion that this issue does not warrant detailed analysis for this project.

Riparian Reserves – There were comments about the treatments in Riparian Reserves not meeting RMP direction or ACS objectives because of the beargrass component.
Response – We have included more information about the current stand condition and need for treatment within the Riparian Reserves. Professors Franklin and Johnson did not propose restoration treatments within the Reserves.

Additional information has been added to the analysis of consistency with the Aquatic Conservation Strategy objectives and the conclusion is the same – the project maintains each objective.

Hardwood Conversion – There were concerns about removing all of the hardwoods in the MAMU buffer area.
Response – The BLM has clarified that this is actually Alder Conversion – only alder would be removed. A design feature has been added on page 20 that all non-alder hardwoods ≥12" DBH would be retained within the harvest unit.

Individual Tree Retention/Port-Orford-cedar – There were comments from Dr. Franklin to reserve larger hardwoods and comments from the public about retaining Port-Orford-cedar (POC).
Response – Where feasible, all hardwoods other than alder would be retained within the harvest unit and approximately 17 additional larger, healthy POC have been retained.

Reforestation – There were additional comments about the reforestation levels.
Response – These have been clarified on page 30. Appendix F contains additional information about natural regeneration and the problems associated with natural regeneration within the Oregon Coast Range.

Monitoring – There were questions on the proposed project monitoring.
Response – The EA has been clarified to provide more information on the reforestation and breeding bird monitoring on page 19 and in Appendix E. Additional monitoring in the form of photo points has also been included.

Tailhold/Guyline Trees – The public requested more information about the use of tailholds or guylines in adjacent marble murrelet habitats.
Response – Additional design features have been added on page 22 to describe the use of tailhold/guyline trees.

Alder conversion – Internal review noted a discrepancy about the description of the alder conversion area as well as some errors in the effects analysis. These have been rectified and changes have been made in the Forest Resources section on pages 27-30.

NSO No Action – Comments disagreed with the No Action alternative effects analysis for Northern Spotted Owls.
Response – We have included more information about the No Action alternative to address some of these comments.

T&E Species – There were comments about the effects analysis concerning NSO and marbled murrelets.
Response – Additional clarifying information about the effects of implementing the proposed action have been included on NSO (pages 31-36) and for marbled murrelets (pages 36-38).

We have also received the Biological Opinion from the U.S. Fish and Wildlife Service. This information has been updated on page 8.

Annual Yield – There was confusion over the difference between Annual Yield and Peak Flows.
Response – We have included the analysis from the hydrologist report on annual yield and included the issue in the water resources section on pages 47-48. However, the conclusion is still the same – that there would be no detectible change in annual yields from implementation of the Wagon Road Pilot.

Climate Change – It was noted the analysis did not include the fertilizer associated with reseeding bare areas.
Response – This has been added in the calculations. During this update, it was discovered that a few other factors were incorrect. The result is that we had over-estimated the amount of carbon flux associated with the project and the correct analysis results in half of what was originally estimated.

Peak Flows – There were concerns the analysis of peak flows and harvest was inadequate because the issue was not analyzed in detail.
Response – The analysis in the hydrologist's report has been reviewed and more information supporting the conclusion that peak flows would not be affected by the project has been included. Peak Flows from harvest activities would not occur and therefore we have summarized the analysis and incorporated by reference the hydrologist's report.

Finally, we have also added two photographs – one of the area following the fire in 1950 and one photo after the area was salvage logged.

None of these changes in the EA invalidated the analysis supporting the FONSI, which I have now signed. A Decision Document will be prepared when the decision is made to go forward with the timber sale and a notice advertised in the local paper.

Please direct requests for copies, questions, or comments to Coos Bay District BLM, 1300 Airport Lane, North Bend OR. 97459-2000, ATTN: Aimee Hoefs; call (541) 756-0100; FAX (541) 751-4303, or email to OR_CoosBay_Mail@blm.gov, ATTN: Aimee Hoefs.

Sincerely,

/s/ Kathy Hoffine
Kathy Hoffine
Myrtlewood Field Manager

United States Department of the Interior

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In Reply Refer To:
1792 (ORC040)
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Wagon Road Pilot Environmental Assessment

FINDING OF NO SIGNIFICANT IMPACT
for the
Wagon Road Pilot Environmental Assessment
DOI-BLM-OR-C040-2011-0008-EA

I. Introduction

An Interdisciplinary Team has prepared an Environmental Assessment (EA), which contains analysis of the effects of implementing a variable retention harvest on 151 acres of lands designated as the Matrix land use allocation, five acres of density management thinning within the Riparian Reserve, and nine acres of density management and alder conversion within a marbled murrelet habitat buffer area (Matrix). The variable retention harvest prescription was based on the principles of Drs. Norman Johnson and Jerry Franklin (*Applying Restoration Principles on the BLM O&C Forests in Southwest Oregon (2010)*) as directed by the Secretary of the Interior.

This document contains two alternatives: a no action alternative and a proposed action alternative. The no action alternative provides a useful baseline for comparison of environmental effects and demonstrates the consequences of not meeting the Need for the action. The proposed action alternative describes the effects of meeting the Purpose and Need of the EA which includes conducting the harvest activities, maintaining a complex early-successional forest stage for 20 to 30 years, improving the health of the Riparian Reserve, enhancing a beargrass (*Xerophyllum tenax*) population, and improving habitat for the recovery of the marbled murrelet (EA pp.4 and 6). This alternative also includes 1.1 miles of new road construction, 4.1 miles of road renovation or improvement, and 1.2 miles of road decommissioning. The BLM would offer this timber sale(s) in 2012. The location of the project is T. 28 S., R. 10 W., Section 17 Willamette Meridian.

II. Background

This EA was developed under the management direction of the 1995 Coos Bay District Record of Decision and Resource Management Plan (1995 ROD/RMP). The analysis supporting this decision tiers to the *Final Coos Bay District Proposed Resource Management Plan/Environmental Impact Statement* (UDSI 1994). The 1995 Record of Decision is also supported by, and in conformance with, the *Final Supplemental Environmental Impact Statement (EIS) on Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan)* (USDA and USDI 1994) and it's *Record of Decision* (USDA and USDI 1994a) as supplemented and amended.

The Coos Bay District initiated planning and design for this project to conform and be consistent with the Coos Bay District's 1995 RMP. Following the March 31, 2011 decision by the United States District Court for the District of Columbia in *Douglas Timber Operators et al., v. Salazar*, which vacated and remanded the administrative withdrawal of the Coos Bay District's 2008 ROD and RMP, we evaluated this project for consistency with both the 1995 RMP and the 2008 ROD and RMP.

Based upon this review, we have determined that the proposed action is consistent with the Coos Bay District's 1995 RMP and the 2008 ROD and RMP. Although the proposed action contains some design features not mentioned specifically in the 2008 ROD and RMP, these design features are consistent with the 2008 ROD and RMP.

As stated in the Record of Decision for the Northwest Forest Plan, the Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands within the range of Pacific Ocean anadromy. Consistency of the proposed alternative with the ACS objectives is included in Chapters 3&4 of the EA (pp. 54-61).

III. Finding of No Significant Impact

The EA effects analysis indicates that there would not be a significant impact on the quality of the human environment from the implementation of either alternative. This finding and conclusion is based on my consideration of the Council of Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to context and intensity of the impacts described in the EA.

Context

The proposed action would occur within the Matrix land use allocation, particularly the General Forest Management Area (GFMA), and the Riparian Reserve as designated by the 1995 Coos Bay District ROD/RMP. The RMP anticipated the need to conduct silvicultural treatments within: (1) Matrix to supply a sustainable supply of timber and to provide early-successional habitat and (2) Riparian Reserves to restore or maintain the objectives of the Aquatic Conservation Strategy. The RMP also has management objectives to manage habitat for federally listed species to achieve species recovery in compliance with the Endangered Species Act (p.32).

Intensity

Impacts that may be both beneficial and adverse (40 CFR 1508.27 (b)(1))

Any impacts, both beneficial and adverse, are not significant as they are consistent with the range and scope of those effects of timber management analyzed in the 1994 Final Coos Bay District Proposed Resource Management Plan/Environmental Impact Statement to which the EA is tiered.

Public Health and Safety (40 CFR 1508.27(b)(2))

No aspect of the proposed action would have an effect on public health and safety. Smoke management from pile burning would adhere to the Oregon Smoke Management Plan (EA p.61). There would be no impact to the water quality of the North Fork Coquille River, which is a drinking water source for the City of Myrtle Point (EA p.67). There would be no impact to the water quality of the Coquille River, which is a drinking water source for the City of Coquille (EA p.67).

Unique characteristics of the geographic area (40 CFR 1508.27(b)(3))

There are no known prime or unique farmlands, wetlands, floodplains, Wild and Scenic Rivers Areas of Critical Environmental Concern or wilderness values within the project area (EA p.69).

Degree to which effects are likely to be highly controversial (40 CFR 1508.27(b)(4))

In December of 2011, the Secretary of the Interior directed the BLM to apply the principles of ecological restoration as developed by Drs. Norman Johnson and Jerry Franklin. Besides demonstrating Drs. Johnson and Franklin's principles, the pilot projects would be used to identify challenges and barriers to current implementation of the Northwest Forest Plan and inform future land use planning.

The environmental effects of the Wagon Road Pilot are within the scope of the Coos Bay District Resource Management Plan and FEIS to which the EA is tiered. As stated in the EA "the RMP projected that in the second decade, (FY05 to FY14), the Coos Bay District would harvest 7,600 acres and 310 MMbf of timber using regeneration harvest techniques. As of May 2011, the District has harvested 273 acres (3.5%) and 6.0 MMbf of timber (1.9%) of this projection" (EA p.3). Harvesting 121 acres and 6.1 MMbf of timber would constitute another 1.6% and 2.0% respectively of this projection.

Degree to which effects are highly uncertain or involve unique or unknown risks (40 CFR 1508.27(b)(5))
The possible effects of the proposed activities on the quality of the human environment are not highly uncertain and do not involve unique or unknown risk. Timber harvest is a common practice on lands managed by the BLM in western Oregon. None of the public comments received indicated unique or unknown risks to the human environment.

Consideration of whether the action may establish a precedent for future actions with significant impacts (40 CFR 1508.27(b)(6))
The proposed project does not establish a precedent for future actions or represent a decision in principle about future actions with potentially significant effects. The timber management program on BLM-managed lands in western Oregon is well-established and this project would not establish a new precedent.

This project is to demonstrate the principles of Drs. Johnson and Franklin and would be used to inform decisions about future planning efforts in western Oregon. Future large-scale planning efforts would include analysis at that time for significant impacts.

Consideration of whether the action is related to other actions with cumulatively significant impacts (40 CFR 1508.27(b)(7))
There are no cumulatively significant impacts identified by the environmental assessment. These include impacts to forest structure (pp.26-31), wildlife (pp.31-42), botany (pp.42-44), fisheries (pp.44-47), water resources (pp.47-52), soil resources (pp.52-54), fuel loadings (p.54), and climate change and carbon storage (pp. 54-58).

Scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8))
The proposed activities would not affect districts, sites, highways, structures or objects listed in or potentially eligible for listing in the National Register of Historic Places. Nor would the activities cause a loss or destruction of significant scientific, cultural or historical resources.

Threatened or endangered species and their critical habitat (40 CFR 1508.27(b)(9))

- The Myrtlewood Field Office initiated consultation with the U.S. Fish and Wildlife Service (Service) for evaluation of effects to the Northern Spotted Owl and the Marbled Murrelet. We have received a Biological Opinion (TAILS# 13420-2011-F-0225) in which the Service concurred with the District's effects determination and states that the Proposed Action "would not jeopardize the continued existence of the spotted owl or the marbled murrelet".
- The Myrtlewood Field Office has determined that the proposed activities would have "no effect" to federally threatened Oregon Coast coho salmon and its associated Critical Habitat; thus consultation with the National Marine Fisheries Service is not required.
- The proposed action would also not result in adverse effects to Essential Fish Habitat as designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1855 as amended).
- There are no Threatened or Endangered botany species within the project area.

Any effects that threaten a violation of Federal, State, or local laws or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10))
The proposed action would not violate Federal, State or local laws imposed for the protection of the environment. These include the Endangered Species Act and the Clean Water Act.

This project complies with the Coastal Zone Management Act, as there would be no adverse effects to Coastal Zone resources from implementing this project because water quality would not be impacted (EA pp.47-52).

Analysis has also concluded that implementation of the proposed actions will not change the likelihood of and need for listing of any Special Status Species under the ESA as identified in BLM Manual 6840 and BLM OR/WA 6840 policy.

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in *Conservation Northwest, et al. v. Sherman et al.*, No. 08-1067-JCC (W.D. Wash.), granting plaintiffs' motion for partial summary judgment and finding NEPA violations in the *Final Supplemental to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (USDA and USDI, June 2007). In response, parties entered into settlement negotiations in April 2010, and the Court filed approval of the resulting Settlement Agreement on July 6, 2011. Projects that are within the range of the northern spotted owl are subject to the survey and management standards and guidelines in the 2001 ROD, as modified by the 2011 Settlement Agreement.

The Wagon Road Pilot project is consistent with the Coos Bay District Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD) as modified by the 2011 Settlement Agreement.

Pursuant to Executive Order 13212, the BLM must consider the effects of this decision on the President's National Energy Policy. As there would be no impact to the exploration, development or transportation of undeveloped energy sources from the proposed action, a Statement of Adverse Energy Impacts is not required.

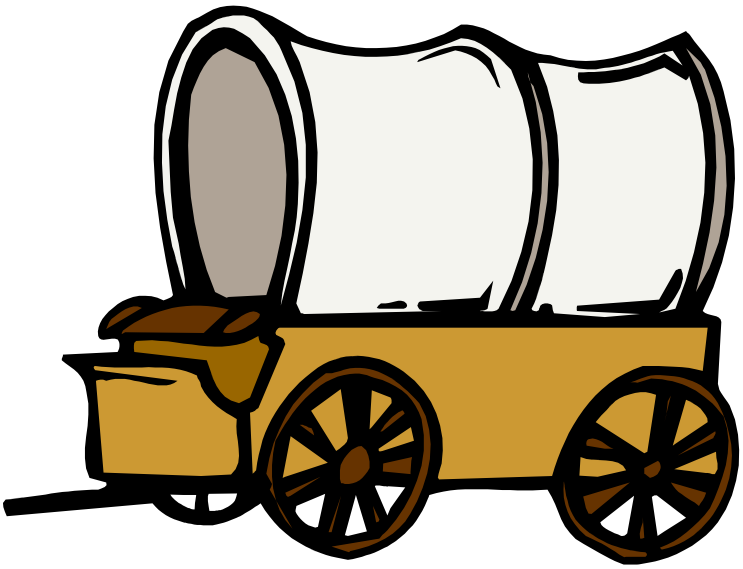
Conclusion
Based on the information contained in the EA (DOI-BLM-OR-C040-2011-0008-EA), and all other information available to me I have determined that the proposed action would not have a significant impact on the human environment within the meaning of section 102(2) (c) of the National Environmental Policy Act of 1969, and that an Environmental Impact Statement is not required. I have determined that the effects of the proposed activities would be in conformance with the 1995 *Record of Decision/Resource Management Plan* for the Coos Bay District.

/s/ Kathy Hoffine ***January 12, 2012***

Kathy Hoffine
Myrtlewood Field Manager

Date

Wagon Road Pilot
Environmental Assessment



DOI-BLM-OR-C040-2011-0008-EA

Bureau of Land Management
Coos Bay District

Coquille Indian Tribe

Final 1/12/2012

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CHAPTER 1 PURPOSE AND NEED

Background

The Final – Coos Bay District Resource Management Plan and Environmental Impact Statement (RMP) (USDI 1994) and its Record of Decision (ROD) (USDI 1995) responds to multiple needs, the two primary ones are the need for forest habitat and the need for forest products. The RMP addressed these needs through an ecosystem management strategy under which BLM lands "will be managed to maintain healthy, functioning ecosystems from which a sustainable production of natural resources can be provided."

Introduction - Secretarial Pilot Demonstration Projects

The Secretary of Interior designated Pilot Demonstration Projects in three BLM Districts in southwest Oregon to demonstrate the application of principles of restoration developed by Drs. K. Norman Johnson and Jerry F. Franklin (Applying Restoration Principles on the BLM O&C Forests in Southwest Oregon 2010). Part of the intent of his designation of these projects is to help inform long-term planning of BLM O&C lands.

The RMP projected that in the second decade of the life of the plan (FY05 to FY14), the Coos Bay District would harvest 7,600 acres and 310 MMbf of timber using regeneration harvest techniques. As of May 2011, for this decade, the District has regeneration harvested 273 acres (3.5%) totaling 6.0 MMbf of timber (1.9%) of this projection (2010 Annual Program Summary; USDI 2011). The shortfall in regeneration harvest is a direct result of the numerous protests, appeals and litigation efforts brought forth by certain individuals and organizations against decisions to conduct regeneration harvest.

The Secretary of Interior and the Oregon Congressional Delegation have expressed a need to break existing administrative and legal gridlock concerning regeneration harvest in the RMP in order to move forward with ecosystem restoration **and** with economic recovery in southwest Oregon. As such, the Secretarial Pilot Demonstration Projects would serve to illustrate the various principles and the project design features presented by Franklin and Johnson and thereby gauge whether or not the BLM can achieve broader social support for active management.

Johnson and Franklin state, "Restoration of moist forests ...is intended to accelerate the development of older complex forest and provide a modest amount of early successional communities and timber harvest" (2009).

The Coquille Indian Tribe (CIT) engaged the Secretary to conduct a Pilot project within the Coos Bay Wagon Road lands (CBWR) which represent a portion of their aboriginal homeland. The CIT has a longstanding interest in the management of federal lands in Coos County and is interested in assisting with the economic stability of the local community. As such, the CIT proposed a joint effort in conducting a pilot with the Coos Bay BLM in order to thoroughly understand and incorporate the Franklin and Johnson approach and gain operational knowledge on CBWR lands. In April 2011, the Department of Interior endorsed the tribe working with the BLM to develop a demonstration timber sale "pilot" in coordination with Franklin and Johnson.

Purpose (Objectives)

A reasonable action alternative must meet the objectives provided in the ROD/RMP for implementation of projects within the planning area. The ROD/RMP and applicable statutes specify accomplishing the following objectives in managing the lands in the project area:

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).
- Providing timber sale volume towards the Coos Bay District Allowable Sale Quantity as required by 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 federal government from the Oregon and California Railroad grant (O&C lands) for permanent forest production in accordance with the sustained yield principle.

Protect, manage and conserve federally listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and the Bureau Special Status Program (p.32) by:

- Providing 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).

Provide early-successional habitat by:

- Maintaining a well-distributed pattern of early and mid-seral forest across the Matrix (p.53);
- Applying silvicultural systems that are planned to produce, over time, forests with desired species composition, structural characteristics and distribution of seral or age characteristics (p. 53).

Contribute to local, state, national and international economies through sustainable use of BLM-managed lands and resources and use of innovative contracting and other implementation strategies (p.45) by:

- Planning and designing forest management activities to produce a sustained yield of products to support local and regional economic activity.

Continue to fulfill government-to-government and trust responsibilities to appropriate American Indian tribes regarding heritage and religious concerns (p.40) by:

- Developing partnerships with local American Indian tribes and other interested parties to accomplish resource objectives (p.40).

Need for the Wagon Road Project

In 2010, the Secretary of the Interior called for the establishment of pilot forestry projects in Southern Oregon to apply the principles suggested by Johnson and Franklin in designing a variable retention harvest project prolonging a diverse early seral stage in moist forests of the Oregon Coast Range. The Wagon Road Pilot addresses the need to demonstrate Johnson and Franklin's principles.

Of particular concern is the lack of quality early-successional habitat across all ownerships. While adjacent industrial timberlands have regenerating forests, they are densely reforested to truncate the length of early-succession and often involve the use of herbicides to limit competition of brush with desired tree species (Swanson *et al.* 2010). Spies *et al.* (2007) modeled 100 years into the future to determine what the Oregon coast landscape would look like under all current forest management policies. Industrial forest management is expected to "intensify over time, decreasing the period required for plantations to reach canopy closure, increasing the uniformity of plantations and decreasing the occurrence of remnant trees in the open, early-successional stage." This would result in the decline of overall ecological diversity associated with early-successional forest types.

Early-successional ecosystems are highly diverse, trophic- and function-rich ecosystems that exist on forest sites between a stand-replacement disturbance and reestablishment of a closed forest canopy

(Swanson *et al.* 2010). Pacific Northwest moist forests ecosystems are far below historical levels of these diverse early-successional ecosystems and future levels are expected to continue to decline (Johnson *et al.* 2007, Spies *et al.* 2007, Wimberly 2002).

Extensive studies have been conducted on Mount St. Helens, comparing wildlife species responses (Dale *et al.* 2005). Many studies included comparisons of naturally occurring complex early-seral sites and industrial clear-cutting with intensive reforestation and brush control. Species richness and abundance of small mammals were found to be more diverse in the unmanaged areas that retained legacy structures when compared to the young industrial plantation (Ch. 14). Beetle assemblages were much more diverse in the disturbed areas when compared to the reference timber plantations (Ch. 9). Birds showed the same results: "field inventories of the avifauna revealed much higher species abundance and more numerous foraging guilds in the naturally regenerating blast area than in dense, young plantation forests that had been salvage logged" (Ch. 20). From 25 years of analysis comparing the natural regeneration of areas impacted by Mount St. Helens, and comparing them to reference sites of young, intensively managed forest stands, the authors made eleven conclusions, of which this is one:

> Large disturbed areas experiencing slow succession may become integral components of regional biodiversity, especially in areas where fire suppression and intensive culture of forests aim to maximize the dominance of conifer forest canopy. Early-seral patches provide complex habitat and diversity of herb and shrub species that are hosts to very diverse communities and food webs involving birds, invertebrates, and other taxa (p.299).

Finally, the Wagon Road Pilot is a cooperative effort between the Coquille Indian Tribe and the Coos Bay District of the BLM. As stated above, the intent of this pilot project is to apply the principles suggested by Franklin and Johnson in designing a variable retention harvest project prolonging a diverse early seral stage in moist forests of the Oregon Coast Range.

Pilot Demonstration

Johnson and Franklin (2009) have suggested the need to increase diverse early-successional ecosystems in Moist Forests through regeneration harvest with modified site preparation and regeneration. The goal is to move the current conditions towards desired forest conditions that include:

- Retaining individual older trees found within younger stands proposed for management;
- Implementing regeneration harvests in younger forests located within the Matrix or other appropriate land allocations. Regeneration harvests on Moist Forest sites would utilize variable retention harvest prescriptions. Significant structural and compositional elements (e.g., individual trees, snags, and logs and intact forest patches) would be retained to sustain biota and enrich the post-harvest stand; and
- Extending the development period of early-successional forest ecosystems immediately following harvest by using less aggressive approaches to site preparation and tree regeneration. Early-successional ecosystems are unique ecosystems that occupy forested sites between a stand-replacement disturbance and re-establishment of a closed forest canopy. These ecosystems are typically rich in biodiversity, including many species that are habitat specialists, and have specialized functional roles.

The proposed harvest unit lies within the General Forest Management Area (GFMA) of the Matrix land use allocation, where intensive management of timber would occur (USDI 1995). The management direction for the GFMA is to schedule regeneration harvest on stands at or above the culmination of mean annual increment (i.e. the age range that produces the maximum average annual growth over the lifetime of the stand). Stand exam information on portions of the proposed harvest unit conclude that the stand is above the age of culmination of mean annual increment. Therefore, these stands meet the management direction for regeneration harvest in the GFMA (p.53).

Riparian Reserves and Enhancement of Beargrass
While conducting surveys for red tree voles and legacy structures, the CIT documented a beargrass population area within the upland south-facing portion of a Riparian Reserve. Beargrass (*Xerophyllum tenax*) is of significant cultural importance to the CIT. Used in the making of art and baskets, beargrass has utilitarian, economic and trade values to the members of the CIT. There has been a decline in abundance and quality of traditional beargrass gathering sites, likely due to forest encroachment resulting from the absence of fire (Shebitz *et al.* 2009). This one area within the upland portion of the Riparian Reserve contains multiple suppressed plants. This relatively dry site just happens to be within an interim Riparian Reserve land use allocation. Beargrass requires an open forest overstory with filtered light (Fluharty *et al.* 2010) and responds to thinning and fire treatments. By treating this site, the beargrass would flourish and might expand up the ridge.

The ID Team considered the overstocked condition of this portion of the Riparian Reserve, which has uniform structure and low stand vigor. The 1995 RMP has management direction to apply "silvicultural practices for Riparian Reserves to control stocking, re-establish and manage stands and acquire desired vegetation characteristics" (p.13). Thinning this area to achieve the objectives of the RMP for riparian areas would also encourage growth in this specific beargrass population. While this portion of the project does not illustrate the principles of Johnson and Franklin, it demonstrates the cooperation and coordination between the Coos Bay District and the Coquille Indian Tribe and does not deter from the pilot demonstration.

Marbled Murrelet Recovery Actions
Finally, this area in the buffer adjacent to suitable marbled murrelet habitat is in a condition that could be enhanced to meet recovery actions identified in the recovery plan (USDI 1997) for the marbled murrelet. This area has a large alder component, the conifer portions are overstocked and this stand could be treated to "provide replacement habitat" (USDI 1997, p.140). Malt and Lank have shown that edge effects are reduced with reserves of regenerating conifer forest around the edges of stands of murrelet habitat (2009). The ID Team considered that harvest equipment would be within the immediate area and analyzed conducting recovery plan activities at the same time through providing a conifer buffer to the existing stand. This action is not part of Johnson and Franklin's principles but does not deter from the pilot demonstration because the acres are in a buffer that would not be available for variable retention harvesting.

Location
The Wagon Road Pilot project is located in the central portion of the East Fork Coquille 5th field Watershed **(Map 1)**. This area is located about 20 miles southeast of Coos Bay, Oregon and is north of State highway 42. The proposed harvest activities are located in T. 28 S., R. 10 W., Section 17 Willamette Meridian.

The lands are part of the Coos Bay Wagon Road (CBWR) lands in Coos County, which the Secretary selected as the landscape to consider for a pilot demonstration project. The CBWR lands contain approximately 26% of timber management lands within the Coos Bay District.

Franklin and Johnson's selection criteria for the demonstration areas included that the stands were previously treated and were between 60-80 years old. The stands were not to be selected from current or planned timber sales from the Coos Bay District. The location also could not conflict with the ancestral tribal lands of the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians.

Decision Factors
In choosing an alternative that best meets the Purpose and Need, the Myrtlewood Field Manager will consider the extent each alternative would:

1. Fulfill the Secretarial direction to actively demonstrate the application of the principles developed by Johnson and Franklin in a variable retention harvest project;
2. Achieve cultural resource and management objectives of the CIT;
3. Provide a commercially-viable timber sale that provides jobs in the local communities from forest management, logging and wood processing that is replicable across the Oregon Coast Range; and
4. 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 Existing Land Use Plans

This project was initiated under and tiered to the *Coos Bay District Proposed Resource Management Plan/Final Environmental Impact Statement* (USDI 1994) and its *Record of Decision* (ROD/RMP, as supplemented and amended. The Coos Bay District ROD/RMP is supported by and consistent with the *Final Supplemental Environmental Impact (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) (USDA and USDI 1994a) and its *Record of Decision* (USDA and USDI 1994b).

The Coos Bay District initiated planning and design for this project to conform and be consistent with the Coos Bay District's 1995 RMP. Following the March 31, 2011 decision by the United States District Court for the District of Columbia in *Douglas Timber Operators et al. v. Salazar*, which vacated and remanded the administrative withdrawal of the Coos Bay District's 2008 ROD and RMP, we evaluated this project for consistency with both the 1995 RMP and the 2008 ROD and RMP. Based upon this review, we have determined that the proposed action is consistent with the Coos Bay District's 1995 RMP and the 2008 ROD/RMP. Although the proposed action contains some design features not mentioned specifically in the 2008 ROD and RMP, these design features are consistent with the 2008 ROD and RMP.

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in *Conservation Northwest et al. v. Sherman, et al.*, No. 08-1067-JCC (W.D. Wash.), granting Plaintiffs' motion for partial summary judgment and finding NEPA violations in the *Final Supplemental to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (USDA and USDI 2007a). In response, parties entered into settlement negotiations in April 2010, and the Court filed approval of the resulting Settlement Agreement on July 6, 2011. Projects that are within the range of the northern spotted owl are subject to the survey and management standards and guidelines in the 2001 ROD, as modified by the 2011 Settlement Agreement.

The Wagon Road Pilot project is consistent with the Coos Bay District Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA and USDI 2001) as modified by the 2011 Settlement Agreement.

Documents Incorporated by Reference

The ID Team used the following documents to assist in the analysis and design of the Wagon Road Pilot project and reference them throughout this document:

Restoration of Federal Forests in the Pacific Northwest: Strategies and Management Implications (Johnson and Franklin 2009)

A Guide to Creating Diverse early Successional Ecosystems through Variable Retention Regeneration Harvest on the Coos Bay District of the BLM (Franklin and Johnson 2011)

Recovery Plan for the Marbled Murrelet (Washington, Oregon, and California populations) (USDI 1997)

Revised Recovery Plan for the Northern Spotted Owl (USDI 2011c)
East Fork Coquille Watershed Analysis (USDI 2005 *Update*)
Western Oregon District's Transportation Management Plan (USDI 2010 *Update*)
Analysis files containing referenced staff reports and Instruction Memorandum

Endangered Species Act

Consultation with the U.S. Fish and Wildlife Service (USFWS) as provided in Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1536 (a)(2) and (a)(4) as amended) has been completed. A Biological Opinion (USDI 2011a) has been received in which the USFWS concludes this project would not "jeopardize the continued existence of the spotted owl or the murrelet." The BLM would(Agee 1981) incorporate all of the applicable Terms and Conditions.

The BLM will not request consultation with the National Marine Fisheries Service as the ID Team has determined the proposed project will have "no effect" to threatened Oregon Coast coho salmon. Additionally, project activities would not adversely affect essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855 (b)).

Decisions to be Made

The Field Manager of the Myrtlewood Field Office, Coos Bay BLM, must decide whether to conduct these vegetation treatments within the Wagon Road Pilot project area. Chapter 2 contains a detailed description of this project.

The Field Manager must also determine if implementation of the selected alternative would or would not constitute a major federal action significantly affecting the quality of the human environment. If the Manager decides it would not significantly affect the quality of the human environment, then the Manager can prepare and sign a FONSI (Finding of No Significant Impact).

If the Manager determines that the selected alternative would significantly alter the quality of the human environment, then the project must be dropped, modified, or have an EIS (Environmental Impact Statement) and a ROD (Record of Decision) prepared and signed before the Wagon Road Pilot could proceed.

Public Involvement

The primary purpose of scoping is to identify agency and public concerns relating to a proposed project and helps define the environmental impacts of concern the EA will examine in detail. The BLM sent scoping notices to adjacent landowners, agencies that have requested these documents, and other interested parties from the District mailing list. The original scoping period for the proposed project ran from May 18 to June 17, 2011. In response to public comment, the BLM extended the official scoping period to July 5, 2011. The BLM received five comments. In addition, the BLM and CIT held a public meeting on May 31, 2011 and conducted field tours on June 1, 2011 and September 14, 2011. Following the second field tour, the BLM received two additional comments. The EA and unsigned FONSI also had a comment period from November 10 to December 12, 2011 and five comments were received.

Issues Considered but Eliminated from Detailed Analysis

There were many questions and issues raised during the public meeting and in the formal scoping period. In most cases, these comments were generic in nature and did not identify circumstances requiring development of additional action alternatives. Other comments were concerned with the background and history of the pilot project and are not relevant to the NEPA process and development of this EA. The following summarizes and addresses these comments by topic:

Restoration means more than just logging.

The BLM should consider other "restoration" factors in the EA.

Rationale for Elimination: Johnson and Franklin have "focus[ed] on forest restoration activities that achieve ecological goals while simultaneously providing economic and social benefits" (2009). They have further defined a Moist Forest Restoration Strategy, which includes "implementing regeneration harvests in Matrix forests using principles of ecological forestry to help provide a regular flow of structurally complex, early-successional habitat (as well as other stages of forest development). These actions could help provide ecologically important habitats that have become increasingly rare while also supplementing timber harvests (2009). To implement these principles but comply with the Coos Bay District RMP, the Purpose and Need includes creating early-successional habitat. Other types of traditional restoration activities are not included in this pilot project because of the direction to illustrate the principles of Johnson and Franklin.

Consider a range of alternative ways of restoring early seral forest, creating jobs, tribal cultural restoration, producing wood, testing new silvicultural concepts, etc.

Rationale for Elimination: These types of activities would not meet the Purpose and Need of demonstrating the principles of Johnson and Franklin through a variable retention harvest timber sale as requested by the Secretary of the Interior.

The BLM must consider a proper no action alternative.
The no action alternative must contain consideration of not logging, how much habitat currently exists for NSO, forest connectivity, deferring regeneration harvest, etc.
The no action should consider what actions the BLM is not doing, because they are doing this one.

Rationale for Elimination: This is not an issue. The BLM prepares the "no action" alternative as per CEQ and Departmental guidance.

Avoid all new road construction.
Include an alternative that builds fewer road miles.
Use needed road construction to offer economically viable timber sales.

Rationale for Elimination: This is not an issue because this EA contains lengthy analysis concerning the effects of roads. The Interdisciplinary Team (ID Team) carefully assessed each new road for implementing the Purpose and Need of the project. The ID Team used the updated Western Oregon Districts Transportation Management Plan (2010) to manage the transportation system in a manner consistent with the RMP and other current regulations.

Using water quality as an example, the ID Team analyzes each road to ensure that it is properly designed, drained, maintained (and in some cases decommissioned) so that the road does not pose erosional problems that could affect water quality. The BLM bases road locations on factors such as topography, slope stability and preferably shortest route for accessing desired stands. In developing this project, other management considerations affected final road location design, such as the 28-10-17.3 road. The ID Team originally designed this spur to be approximately 890 feet of new construction; however, the discovery of an active RTV nest resulted in a buffer that eliminated use of the shorter spur. The resulting road to access the timber in the northwest corner of the unit avoids this buffer and is approximately 1700 feet long. To avoid other aggregate retention blocks and facilitate harvest, the ID Team relocated or added other spur roads (such as the 28-10-17.4 road). These examples demonstrate that each proposed road segment is integral for implementing the Proposed Action and neither adding nor deleting roads would meet the Purpose and Need.

Roads represent a project cost that reduces timber sale value and receipts to the BLM and O&C County governments. Consequently, it is not in the BLM's interest to construct any more road than necessary for stand access of these Matrix lands, which are primarily for the purpose of timber production.

New information (e.g. barred owls) requires modification of Matrix objectives.

Rationale for Elimination: Changing the management direction for the Matrix land use allocation would require a RMP amendment or revision, which is beyond the scope of this project. Additionally, formal consultation with the U.S. Fish & Wildlife Service was conducted and the biological assessment and biological opinion both included consideration of effects of barred owl presence.

The BLM received numerous suggestions for different approaches for managing these Matrix stands. For example, "increase the amount of harvest" and "these stands must be conserved." There were suggestions to specific retention features versus no retention features.

Rationale for Elimination: Developing additional alternatives based on these suggested variables would be outside the parameters of Johnson and Franklin's principles and thus would be beyond the Purpose and Need of this proposal.

Do not conduct treatments in Riparian Reserves.
Develop an alternative that includes commercial harvest in the Riparian Reserves.

Rationale for Elimination: Johnson and Franklin's prescriptions do not apply to the Riparian Reserve and thus treatments in this land use allocation would not demonstrate their principles and would be beyond the scope of this project. The only portion of the Riparian Reserve included in this analysis is where Riparian Reserve treatments would also enhance a beargrass population, a culturally significant plant to the members of the CIT. This portion of the project does not include the principles of Johnson and Franklin and meets the Purpose and Need for collaboration with the CIT (see p.5 above). There are approximately 75 acres of overstocked Riparian Reserve stands not treated in this proposal.

Do an alternative comparing the 2008 RMP (a WOPR alternative).

Rationale for Elimination: The questions to be answered with this demonstration project focus on Johnson and Franklin's principles rather than the differences between the 1995 and the 2008 RMP's. The 2008 FEIS did this comparison at the landscape scale, as the No Action alternative was the continued implementation of the 1995 RMP. This project is to demonstrate the principles of Johnson and Franklin and would be designed the same way under either RMP the only difference would be the buffer widths of the Riparian Reserves. The 2008 RMP would have 25 acres available of which 8 acres (30%) would be retained in aggregates, a net gain of only 17 acres.

The economic impacts of this project and the timber export market need to be considered in the EA analysis.

Rationale for Elimination: It is unnecessary and outside of the scope of this EA to provide a detailed economic analysis of this project, especially a comparison of regeneration harvest versus commercial thinning harvest jobs creation. The timber that this project yields in delivering forestry related jobs is in support of the Coos Bay District RMP objective for Matrix lands: "Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability." Additionally, there is no need to analyze the disposition of BLM logs versus logs that might be exported to Asia from private lands. In the first place, these markets are highly unpredictable. Secondarily, it was never the intention of this project to make up for the loss of private logs that are exported and substitute

the BLM logs to local timber mills. This is already illegal under all BLM timber sale contracts that state, "All timber sold to the Purchaser of this contract is restricted from the export from the United States in the form of unprocessed timber, and is prohibited from being used as a substitute for exported private timber."

Could this sale be sold as a scaled sale, not a lump-sum sale?
Scaled sales reduce economic risk to purchasers.

Rationale for Elimination: While the BLM/CIT might have liked to pursue this opportunity as part of the demonstration, the extremely short timeframe from the Secretary of the Interior just did not leave enough time to prepare for the implementation of a scaled sale.

There were many comments about the principles of Drs. Franklin and Johnson and the validity of their assumptions, current forested conditions, climate change, management implications and perceived "unsupported claims."

Rationale for Elimination: The Secretary of the Interior directed that three pilots demonstrate the principles set forth by Johnson and Franklin consistent with the RMPs after their presentation of these principles to the Oregon delegation and the public. The purpose of this current NEPA process is to analyze the impacts of implementing their principles as presented and not to debate what these authors have outlined in their report *Restoration of Federal Forests in the Pacific Northwest: Strategies and Management Implications* (2009).

The Tribe expects an outcome from this project; management of 60,000 acres of the Coos Bay Wagon Road BLM lands in Coos County.
The pilot cannot transfer federal public lands to the tribe.

Rationale for Elimination: The CIT has presented to Secretary Salazar a proposal to manage the Coos Bay Wagon Road Lands. However, this pilot project is to meet the Purpose and Need of designing a timber sale to the principles of Johnson and Franklin. The CIT did request to participate in a pilot project on Coos Bay District lands, to which the Department of Interior agreed. There is nothing in the Purpose and Need, other than collaboration between the CIT and the BLM on this pilot demonstration project, to transfer lands to the CIT. That type of proposal must be presented to Congress and is beyond the scale and scope of this NEPA analysis.

The EA needs to address how the application of Drs. Franklin and Johnson's ecological principles will provide jobs, promote economic growth, and generate revenues on a sustained basis.

Rationale for Elimination: The scale of this project is too small to determine how the application of Johnson and Franklin's principles in Section 17 will sustain jobs and economies. However, the pilot projects combined are intended to help inform deliberations around sustaining a regional forest workforce and wood products manufacturing capability and the potential of these efforts to provide revenues for county governments.

Issues Carried Forward

The public identified the following issues through formal scoping, public meetings and field tours: **reforestation**, **monitoring**, **T&E species** and **S&M species**. They are relevant to the Wagon Road Pilot project development and/or analysis. The Interdisciplinary Team members identified other issues and addressed them in Chapter 3&4 of this EA.

CHAPTER 2 ALTERNATIVES

This Chapter is a description of each alternative and summarizes the environmental consequences of each alternative.

This EA contains the analysis of a no action alternative and a proposed action alternative. For the BLM to consider an action alternative, it must meet the purpose and need while not violating minimum environmental standards. The action alternatives developed must be consistent with the RMP and satisfy the purpose and need of implementing the RMP.

For the harvest unit location, refer to **Map 1**. Appendix D of the RMP describes the Best Management and Conservation Practices for harvest related activities while Appendix E describes the silvicultural objectives of regeneration harvest. The principles of Franklin and Johnson also guide harvest prescriptions (2009).

The ID Team based all quantifications (i.e. acreages, mileages, etc.) on estimates obtained from geographic information systems (GIS). Because there are inherent differences between a geographic projection and what is finalized on the ground, the BLM assumes there is variability in all estimated calculations based on GIS. The Decision Document would disclose the final acreages and mileages.

Harvest volumes for the regeneration harvest and density management treatments are estimates derived primarily from stand exam information. These volume estimates are variable and actual volume harvested may differ.

No Action Alternative

The No Action Alternative provides 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. This alternative does not preclude future harvesting in the stand that the BLM could analyze under a subsequent EA. This alternative would not meet the Purpose and Need.

The BLM would not conduct the treatments described in this document in the near 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 other projects covered by earlier decision records.

Proposed Action Alternative

Initial Area

The BLM/CIT began the scoping process looking at all of T. 28 S., R. 10 W., Section 17 which is approximately 654 acres. Using comments from the public, Recovery Plans for T&E species, recommendations from Johnson and Franklin, RMP direction and other policies/guidance, the ID Team had 151 acres available for a demonstration pilot project. Table II-1 lists the breakdown of acres within Section 17 that are not considered or available for a variable retention harvest (see also **Map 2**).

Table II-2 Acreage Classifications within Section 17

Acreage Classification	Acres
Riparian Reserve	170
Marbled Murrelet Occupied Habitat	102
Marbled Murrelet Unsurveyed Suitable Habitat	73
Marbled Murrelet Buffer	86
Deferred for Later Harvest	50
Not Practible	9
Younger Stand	6
Older Stand w/Residuals	6
TPCC Fragile	1
Sub-Total	503
Acres Available for Demonstration	**151**
Total	654

Project Summary

The Wagon Road Pilot proposed action includes conducting a variable retention harvest as described by Johnson and Franklin and associated road management activities on approximately 151 acres of BLM administered lands in the Matrix LUA. This treatment includes 30 acres within the project area retained as aggregates. Riparian Reserves that are distributed within the project area, account for 15 acres of the aggregate total, which is 45 acres.

In addition to the demonstration of a variable retention harvest, the proposed action includes five acres density management thinning in the Riparian Reserve, and nine acres of density management/alder conversion treatments to enhance recruitment habitat (Table II-2; **Map 2**) in the Marbled Murrelet buffer. The density management thinning and density management/alder conversion are not part of the variable retention harvest demonstration, but are harvest activities that may occur at the same time.

The BLM may offer all these activities in one timber sale in 2012 and contribute approximately 6.1 MMbf to local mills and the local economy. Road management activities would consist of construction of new roads, renovation/improvement of existing roads, and decommissioning of roads not needed on a long-term basis (>5 years).

Table II-2 Proposed Action Summary

Activity		Total	
Variable Retention Harvest (Pilot Demonstration)	Regeneration Harvest (GFMA)	121 acres	
	Aggregate – Red Tree Vole	25 acres	30% retention of 151 acres
	Aggregate – Riparian Reserves*	15 acres*	
	Aggregate – Scattered	5 acres	
Riparian Reserves/Beargrass Enhancement	Density Management	5 acres	
Marbled Murrelet Recovery Action	Density Management/Alder Conversion (Marbled Murrelet Buffer)	9 acres	
Timber Yarding	Cable yarding	85%	
	Ground based yarding	15%	
Timber Hauling	All Season/Gravel Roads	5.2 miles	
	All Season/ Paved Roads	0.3 miles	
Fuel Treatments	Broadcast Burn	5 acres	
	Hand Pile and Burn	130 acres	
Road Activities	New Construction	1.1 miles	
	Renovation	2.9 miles	
	Improvement	1.2 miles	
	Decommissioning (Total)	1.2 miles	

*Riparian Reserves are not available as part of the VRH base acres (151), but do contribute to the final aggregate total

Forest Management

The ID Team developed the Wagon Road Pilot treatment prescriptions using the Coos Bay 1995 RMP and the management strategies for moist forests developed by Johnson and Franklin (2009; 2011). The RMP provides the objectives and management direction for conducting timber harvest in the Matrix and Riparian Reserve land use allocations. Johnson and Franklin recognize that these land use allocations (LUAs) are a fixture of the current plan and propose alternative ways to achieve the goals of the land allocations (2009, p.11).

Variable Retention Harvesting

Variable retention harvest (VRH) as proposed by Johnson and Franklin involves the retention of structures, organisms, and conditions from a pre-harvest forest stand for incorporation into the post-harvest forest ecosystem and ultimately, forest stand. These can include individual structures, such as old trees and snags, small (e.g. ½ to 3 acres) intact areas of the pre-harvest stand, or patches of ecologically important conditions found in the pre-harvest stand (e.g., seeps and rock outcrops) (Johnson and Franklin 2011). As an alternative to regeneration harvest described in the RMP, Franklin and Johnson used a three-phase approach for providing ecologically sound and socially acceptable Moist Forest regeneration harvest:

1) Provide significant structural retention for structurally complex and diverse early successional communities,
2) Consider stands outside of reserves and other controversial areas below the age threshold (approximately 120), and
3) Fit the approach within the agencies other laws and mandates (2009, p.54).

Regeneration harvest conducted in the Matrix LUA using the scenario proposed by Johnson and Franklin would be consistent with the Coos Bay District RMP as described in the Purpose and Need (p.4).

The general goals of VRH as proposed by Johnson and Franklin (2011, p.2) include:

- Providing for continuity of forest structure function, and biotic composition between forest generations;
- Regenerating a new cohort of trees;
- Sustaining plant and animal species by providing critical habitat, food sources, and micro-environmental conditions;
- Structurally enriching the post-harvest ecosystems, including the early successional (pre-forest closure);
- Providing conditions for expression of early successional (pre-forest) ecosystem; and
- Altering visual conditions from within and outside of the harvest unit.

Aggregates – Background

The VRH prescription for the Wagon Road Pilot is to leave roughly 30% of the harvest area in aggregated retention. Johnson and Franklin modeled a minimum of 20% retention (2009, p.40) but for the Wagon Road Pilot proposed a range of 20-30% retention (2011, p.3). Starting with 151 acres available for regeneration harvest, aggregated retention would leave 30% of the proposed regeneration harvest area intact, or approximately 45 acres for this Pilot project. The candidate areas for location of aggregate retention (2011, p.3) include:

- Representative patches of the pre-harvest forest stand
- Locations of old-growth trees
- Concentrations of large woody debris
- Locations of snags selected for retention
- Special habitats such as seeps
- Facilitation of spotted owl foraging

Distribution of aggregates would be constrained by logging feasibility but there would be no harvest area opening larger than approximately 10 acres in size. The size of aggregates would also range from approximately ½ to 3+ acres in size (2011, p.3). Additional retention in the form of single trees dispersed throughout the harvest area would also occur.

Aggregates – Riparian Reserves

Because of the large amount (about 30 acres) of Riparian Reserves well distributed within the harvest area, Johnson and Franklin agreed that for the Wagon Road Pilot, Riparian Reserves could account for 10% of the 30% retention. Of the approximately 30 acres of Riparian Reserves immediately within the harvest area, 15 acres would count toward the target aggregate total (45 acres). These Reserves include a small finger running southward from the northern border of the section into the unit as well as two fingers coming in from the east. The riparian thinning acres (five) and the Riparian Reserve along the west edge of the unit are not included. These acres are not included in the VRH base acreage calculations.

For the East Fork Coquille 5th field watershed the Riparian Reserve buffer distance has been calculated to be 220 feet slope distance from the stream bank. No harvest would take place within the Riparian Reserve except roughly five acres of density management. Those five acres would not count towards aggregate retention.

Aggregates – Red Tree Vole Habitat Areas

Red Tree Voles (RTVs) are a Survey & Manage species and surveys are required when conducting non-exempt "habitat-disturbing" activities on BLM lands (USDA and USDI 2011). Surveys were conducted and seven nests were confirmed "active" and six nests confirmed "inactive" using Version 3.0 of the "Survey Protocol for the Red Tree Vole" (USDA and USDI 2007b). The "Management Recommendations for the Red Tree Vole *Arborimus longicaudus* Version 2.0" (USDA and USDI 2000) include delineating RTV Habitat Areas ≥10 acres in size with a one-site potential tree height between nest trees and the Habitat Area boundary. Using these recommendations, the ID Team delineated three separate RTV Habitat Areas within the harvest units totaling roughly 25 acres. These RTV Habitat Areas would constitute the largest part of aggregated retention.

No harvest activity would occur within these aggregates. While the existing 28-10-17.0 road runs through a portion of one of the habitat areas and the BLM has proposed rocking this road for this project, the road would not be widened to the extent it removes habitat where it passes through the RTV Habitat Area.

While these RTV aggregates are larger than the recommendation by Johnson and Franklin, this project must comply with the Coos Bay District RMP and the management directions for the Survey & Manage program. Johnson and Franklin have approved the final design for this project that includes having the larger aggregates. **Map 3** shows the initial planned aggregates solely based on direction from Johnson and Franklin compared to the final proposal incorporating red tree vole Habitat Areas as aggregates.

Aggregates – Scattered

Following the guidelines for aggregates, the RTV aggregate areas are "representative patches of the pre-harvest forest stand" (2011, p.3) and facilitate northern spotted owl foraging. Therefore, the ID Team used the following priorities to delineate the remaining 10 aggregates (approximately five acres) based on Johnson and Franklin principles:

- Larger trees with complexity. This includes trees with broken or spiked tops, epicormic branches, large horizontal branches >6 inches, cavities, large platforms, defect, broken limbs and visible burn scars.
- Existing snags and large down wood.

- Large Port-Orford-cedar
- Open areas no larger than approximately 10 acres.

In summary, aggregate retention outside of Riparian Reserves would total 30 acres, or 20% of the harvest area. In addition, roughly 54 individual trees meeting some of the criteria listed above would be retained in the harvest unit (Table II-2). No harvest or other type of treatment would occur within the aggregate areas.

Table II-2. Aggregates and other tree retention areas based on 151 acres available for variable retention harvest.

Type of Aggregate	Acres	Retention Percentage of VRH Area (151 acres)
RTV Habitat Areas	25	16
Riparian Reserve	15	10
Scattered Aggregates	5	4
TOTAL	**45**	**30**
Individual Tree Retention (Outside Aggregates)	54 Trees	

Down Wood

The RMP requires 120 linear feet per acre of down wood in decay class 1 and 2 in regeneration harvest units are retained post-harvest (USDI 1995). Down wood retained in the aggregates would contribute to this requirement. As needed, additional trees would be left in the harvest unit to be felled after site preparation.

Snags

The RMP requires retention of snags "within a timber harvest unit at all levels sufficient to support species of cavity-nesting birds at 40 percent of potential population levels" (p.53). For the Coos Bay District, this has been equated to 1.5 snags per acre of harvest unit (USDI 2002). A 100% survey of the aggregates shows they contain enough snags to meet this on an average of 2.5 snags per acre. There are over 250 hard snags (decay class 1-3) >11 inches DBH and over 40 soft snags (decay class 4-5) >11 inches DBH snags in aggregates which meets approximately 60% population levels for cavity nesters (above RMP direction) Any existing snags within the harvest unit would be retained as operationally feasible.

Riparian Reserve Management

Density Management Thinning

The density management (DM) treatments proposed in the Riparian Reserve are designed to:

- promote development of large conifers
- improve diversity of species composition and stand density
- promote forest health
- promote beargrass
- develop within-stand complexity

Density management thinning would occur in roughly five acres of the Riparian Reserve adjacent to and contiguous with the VRH unit where thinning would be beneficial to the development of riparian conditions and jointly enhance a beargrass population. This stand is over-stocked, roughly averaging 300 TPA (trees per acre) and the trees have an average DBH of 12 inches. The canopy closure is approximately 78% and competition mortality is ongoing. With an RD of 79, the stand is considered fully stocked and has reduced growth rates.

Treatments in Riparian Reserves of this age are the beginning of a process designed to accelerate development of late-successional forest characteristics and improve habitat conditions for riparian dependent/associated species. In particular, beargrass responds positively to thinning treatments.

The Riparian Reserve would be thinned from below, removing primarily conifer trees in the suppressed and intermediate canopy classes with some co-dominate trees removed as necessary to obtain the desired density of RD 33 or 75 TPA with a residual basal area of 140. Spacing would vary throughout the thinning area based primarily on the distribution of trees in different diameter classes. Hardwoods would be removed in preference to suppressed conifers. Logging slash ≥4 inches in diameter would be removed so that the remaining scattered smaller fuels would ensure a low intensity broadcast burn. Existing down wood would remain on-site and protected as possible.

The intermittent stream would have a 35-foot no-treatment zone and the width of the reserve is 220 feet slope distance (one site-potential tree height). In addition, two snags and three down logs per acre would be created following burning treatments in the Riparian Reserve.

The only difference from normal density management thinning treatments in the Riparian Reserve is the light broadcast burn treatment that would occur to stimulate growth of beargrass. To accomplish this, some existing shrubs may be slashed to control the intensity of the burn.

Marbled Murrelet Recovery Action

Density Management/Alder Conversion (DM/AC)

The density management and alder conversion treatments are designed to implement Recovery Action 3.1.1.3. "Maintain and enhance buffer habitat surrounding occupied habitat" (USDI 1997). To do this, the prescription would include removing alders that would not contribute to future habitat and thinning overstocked conifer stands to develop structural complexity. The alder has begun to decline immediately adjacent to unsurveyed suitable marbled murrelet habitat. Without action, it may take over 100 years before the site becomes dominated by conifer (Deal 2006, MacCracken 2001). However, because of the extensive salmonberry understory, it is possible that conifer re-establishment may not occur at all (Carlton 1988, Hobbs *et al.* 1992, Newton *et al.* 1968, Tappeiner *et al.* 1991). Therefore, without action, a long-term edge effect would occur along the northern edge of the unsurveyed suitable marbled murrelet habitat until the next disturbance.

These treatments would occur within nine acres of Matrix adjacent to the marbled murrelet stand along the east edge of Section 17. Conifer patches would be thinned to 80 to 120 trees per acre. Healthy, vigorous, undamaged dominant or co-dominant conifer would be favored in spacing. Western redcedar and Port-Orford-cedar would be retained over other minor conifer species. All alder would be removed. All other hardwoods ≥12 inches DBH would be retained. Existing snags and down wood would be retained and protected to the extent practicable. All slash would be piled and burned. Planting would consist of Douglas-fir at approximately 400 trees per acre to ensure conifer regeneration on this specific site.

Port-Orford-cedar

As there are infected Port-Orford-cedar (POC) trees within the project area, the BLM would implement Management Practices from the *2004 Final Supplemental Final Environmental Impact Statement (FSEIS) for Management of Port-Orford-cedar in Southwest Oregon* (USDA and USDI 2004) and it's *Record of Decision* (USDI 2004c). These include Management Practice 9) Road Management Measures, 10) Resistant POC Planting, 12) Logging Systems and 17) Site-Specific POC Management. Management Practice 16) Roadside Sanitation would not occur.

Road Management

Road management consists of developing and maintaining a transportation system that serves the project needs in an environmentally sound manner as directed by the Coos Bay District RMP/ROD and the Western Oregon District's Transportation Management Plan (USDI 2010 *update*). This would involve construction of new roads, renovation and improvement of existing roads, and decommissioning of roads (Table II-3; **Map 4**).

Table II-3 Road Work and Closure Estimates

Road Number	Road Work	Surface Type	Haul Season	Closure Type	Miles
28-10-17.6	Improvement	Rock	All	Decommission	0.12
28-10-17.7	New Const.	Rock	All	Decommission	0.30
28-10-17.8	New Const.	Rock	All	Decommission	0.06
28-10-17.5	New Const.	Rock	All	Decommission	0.07
28-10-17.3	New Const.	Rock	All	Decommission	0.24
28-10-17.4	New Const.	Rock	All	Decommission	0.08
28-10-17.2	New Const.	Rock	All	Decommission	0.09
28-10-17.1	New Const.	Rock	All	Decommission	0.06
28-10-8.3	New Const.	Rock	All	Decommission	0.18
28-10-8.1	Renovation	Rock	All	None	0.18
28-10-9.0	Renovation	Rock	All	None	2.74
22-10-17.0	Improvement	Rock	All	None	1.1

New Road Construction

New road construction would consist of approximately 1.1 miles of gravel surface roads. The type of road to be constructed and the location of the road would be governed by the Best Management Practices (BMPs) listed in the Project Design Features later in this Chapter. There would be no new construction of roads or landings within the Riparian Reserve.

All proposed new construction spur roads would be rocked with a layer of gravel adequate to allow all season harvest operations. Additional roadside landings would be constructed along existing roads and construction would consist of creating wide spots to facilitate safe yarding and loading of logs and are typically about ¼ acre in size, which includes the existing roadbed.

As development of the timber sale progresses and becomes more refined, some short unplanned spur roads or landings may be required to facilitate easier harvest operations. These unplanned spurs would be subject to the same BMPs and design criteria as the planned roads.

Road Renovation/Improvement

Road renovation involves bringing an existing road back up to the standard it was originally built to. Activities may include clearing brush and/or trees within the road prism, cleaning or replacing ditch relief/stream crossing culverts, replacing depleted surface rock, restoring proper road surface drainage, grading, or other maintenance. Renovation totaling roughly 3 miles would occur on roads 28-10-8.1 and 28-10-9.0.

Road improvement consists of increasing the design standard of a road by adding capital improvements such as additional ditch relief culverts, surfacing existing dirt roads, or adding rock to existing rocked roads. For this project, road improvement totaling 1.2 miles involves adding a gravel surface and additional culverts to road 28-10-17.0 and adding a gravel surface to road number 28-10-17.6. This is for providing all season harvest operations, access for site preparation, planting, and subsequent silvicultural activities.

Road Decommissioning

All newly constructed spur roads (1.1 miles) and an improved road (0.1 mile) would be decommissioned, totaling 1.2 miles. Roads to be "Decommissioned" would be closed to vehicles on a long-term basis (> 5

years) but may be opened and maintained for future use. This closure would include the construction of earthen or rock barriers. They would be left in an erosion-resistant condition by installing waterbars, stabilizing or removing fills on unstable areas and treating exposed soil areas.

Monitoring

Reforestation

The BLM would monitor the VRH area after planting to assess the extent of natural regeneration and reforestation. Usually, the first season of monitoring (year 1) occurs the September after planting (Feb/March) and **at a minimum** the site would be monitored again in years 3, 5, 8 and 12. In year 12, the objective is usually to see if the trees are established and free-to-grow and if pre-commercial thinning needs to be scheduled. The goal is to maintain a Relative Density of less than 0.15 or approximately 200 trees per acre to extend the early-successional conditions for 20-30 years. There is more discussion on pages 28 of Chapter 3&4 for the expected stand condition to be maintained.

Breeding Bird Species

There have been many studies done on the effects of regeneration harvest on breeding bird populations in the United States including studies in Oregon (Chambers *et al.* 1999, Morrison and Meslow 1983). Studies in the Oregon Coast Range have shown that some species benefit from clearcutting, others do not, and some seem to show little change (Chambers *et al*. 1999). Instead of replicating existing studies comparing pre-harvest bird populations to post-harvest bird populations, BLM would conduct surveys to compare breeding bird populations within the Pilot project area post-harvest and on recently harvested private forestland. The intent of this monitoring is to compare species richness in early seral habitat created by a traditional regeneration harvest where few or no retention areas or wildlife trees are left within the unit versus the proposed variable retention harvest in the Pilot project area where aggregates and wildlife trees would be left scattered throughout the unit. Because the proposed Pilot project would leave more aggregates and wildlife trees, we would expect there to be greater species richness on BLM lands and would expect this greater species richness to persist for several years. Plots would be set up so that birds nesting outside the timber sale boundaries would not be counted as breeding species. Surveys would be done by an experienced bird surveyor using standard protocols and would occur on a yearly basis for a minimum of five years. Appendix E contains the study design and survey protocol.

Photo Point Monitoring

The objective of establishing permanent photo points is to document the current forest stands through the early to mid-seral stages over time. Sites would be visited (at a minimum) pre-harvest, post-harvest, 1 year after planting, 5th year, 10th year and 15th year. Sites would also be visited after any other occurrence of silvicultural activities, such as pre-commercial thinning. Appendix E contains more information on design.

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 proposed action. Design features are site-specific measures, restrictions, requirements, or mitigations included in the design of the project in order to reduce adverse environmental impacts.

Harvest Operations – All Areas

- Mechanical harvesters or chainsaws would be used to accomplish tree felling.
- Trees would be felled away from all unit boundaries, reserves, aggregates and property lines.
- Existing snags would be reserved from cutting except those that must be felled to meet safety standards. Snags felled or accidentally knocked over would be retained on site.

- Existing down logs in decay classes 3, 4 and 5 would be reserved. Existing down logs in decay classes 1 and 2 greater than 20-inches on the large end would be reserved from cutting/removal during logging operations.
- All non-alder hardwoods ≥12" DBH would be retained.
- The CVS (Current Vegetation Survey) inventory tree tags would be protected from being removed during cutting to the extent possible. This CVS Plot is located along the north property line east of the Riparian Reserve.
- Cable yarding, with one-end or full log suspension would be required.

Ground-Based Areas

- The BLM restricts ground-based equipment to the dry season when soil moistures are below the 25% threshold. The BLM defines this as when the soil moisture content measurements, taken 2 to 4 inches below the organic layer, are below 25%. This is typically May through October. Soil moisture contents above 25% may require the discontinuation or limitation of ground-based operations in order to prevent excessive compaction. Operators may use forwarders, log loaders, tractors, or rubber-tired skidders capable of achieving one-end suspension to yard logs. The BLM restricts this equipment to areas with slopes less than 35%.
- Skid trails would be designated with the objective of having less than 12% of a harvest area affected by compaction. Existing skid roads/trails would be used to the extent practical.
- Ground-based logging operations would utilize slash layers created by the harvesting process to limit bare soil exposure.
- Drainage and erosion control measures, including water barring of skid trails, would be applied to bare soil areas following use and prior to winter rains (ROD, D-5 #8f).
- Access points for skid trails would be blocked with logging debris to prevent vehicle access after harvest operations are completed.
- The BLM would permit a skyline cable system capable of achieving one-end suspension to operate during the wet season in ground-based areas; however, road surface condition may restrict timber haul.

Riparian Reserves

- The BLM would retain a minimum 35-foot no-treatment zone adjacent to the intermittent stream.
- The stream no-treatment zone would be measured starting from the stream bank, an identifiable topographic break near the bank (generally, the top of a steep inner gorge), or from the stream-side edge of vegetation, whichever is greater.
- Trees ≥24" DBH would be reserved from harvest.
- The location, number and width of corridors would be specified prior to yarding, and use natural openings as much as possible (ROD, D-5 #2) as approved by the contract administrator.
- Skyline corridors would be a maximum of 12 feet wide. Distance between skyline corridors would be a minimum of 150 feet apart at the widest point where feasible.
- If operationally feasible, yarding corridors would be placed to avoid cutting trees ≥24" DBH. Operators would leave on-site all trees ≥24" DBH felled for yarding corridors.
- Approximately 10 yarding corridors would be needed through the Riparian Reserve to facilitate density management. Trees within the no-treatment zones that might be cut for skyline cable clearance would be directionally felled into the stream channel and remain as down woody material.
- Skyline corridors would be perpendicular to the stream as much as possible to minimize the total length of openings created by the yarding corridors along the stream channel.
- Two snags and three down logs per acre would be created following burning operations.

Fuels Treatments

- The BLM would conduct fuel reduction measures along those roads not identified for closure or decommissioning after harvest operations. These measures would include pulling back all slash greater than two feet in length and up to six inches in diameter to within 20 feet on each side of these roads.
- Heavy concentrations of slash resulting from cable yarding operations would be piled on roads and landings. Constructed piles would be as few as feasible and free of soil and rock materials. Placement of piles within 15 feet of reserved trees, aggregates, snags or suitable coarse woody debris would be avoided.
- All logging slash (outside of the Riparian Reserve treatment area) greater than 2 feet long and ≤6 inches in diameter would be hand piled. Material exceeding the specified diameter limit would be left as long as all limbs/tops within the diameter limits are cut and piled.
- On slopes less than 35%, and when environmental conditions allow, slash could be machine-piled (except pieces that would contribute to the down wood requirements).
- Machine piling would be restricted to the dry season when soil moisture is below 25%. Low ground pressure vehicles, such as wide-tracked excavators, would be required. To the extent feasible, machine-piling vehicles would remain on slash layers to limit compaction of bare soil areas.
- All piles would be covered with black plastic and burned in the late fall or early winter months.
- Coarse woody debris and live trees would be protected by using lighting techniques and patterns that would reduce extreme heat near these key features. In some areas, logging debris would be pulled away from these features and a fire trail would be constructed.
- All applicable Oregon State Fire Laws would be followed. Burning of slash piles would comply with the Oregon Smoke Management Plan (2007 OAR 629-43-043).

<u>Broadcast Burning</u>

- A light intensity broadcast burn would only occur within the Riparian Reserve treatment area.
- Burning would not occur within 60 feet of the intermittent stream channel.
- All debris greater than ¼ inch in diameter would be pulled back to a distance of 5 feet from the bole of leave trees and would be scattered into the unit.
- Fire trails would be constructed along the perimeter of the broadcast burn area and along the segmented areas that divide the treatment areas from top to bottom.
- Fire trails would not be constructed within 45 feet of the intermittent stream channel.
- Fire trails would be constructed to mineral soil and be three feet wide.
- Fire trails would be waterbarred on any slope to direct water into forest debris.

Reforestation (VRH area only)

- Planting would occur at an average of 200 trees per harvested acre with non-uniform spacing. The initial seedling mix for planting would consist of Douglas-fir, western redcedar and Port-Orford-cedar.
- Seedlings would be protected from animal damage with Vexar tubing as needed.
- Areas located near natural seed sources like the retention aggregates, would not be planted.
- If abundant natural regeneration augments planting, the BLM would conduct treatments to maintain 200 trees per acre or a relative density of less than 0.15.
- This condition would be maintained for 20-30 years following harvest activities.

Noxious Weeds

- To prevent the introduction and spread of noxious weeds during the contract period, equipment would be washed prior to entering the project area.

- Vehicles and equipment would be required to stay on road and landing surfaces, except equipment specifically designated to operate off roads and landings (e.g. mechanical harvesters).
- To the extent practical, travel would be avoided or minimized through weed-infested areas.
- BLM-controlled haul routes and potential landing areas would be inventoried for noxious weeds and treated, either mechanically or chemically, prior to hauling from the harvest units.
- Roads and landings would be monitored on an annual basis to identify new invaders and treat them using an integrated pest management approach.

Tailhold/Guyline Trees

- Aggregate trees would not be used for tailholds or guylines.
- The harvest unit would be designed to avoid using a tailhold or guyline tree within the occupied and unsurveyed suitable marbled murrelet habitat.

Port-Orford-cedar

- Road Management Measures. These would include the use of surfaced roads. All roads within the project area would be rocked.
- Logging Systems. Cable logging systems would be used during the wet times of the year.
- Resistant POC Planting. Reforestation would include the planting of resistant Port-Orford-cedar seedlings in areas likely to escape infection. These would include ridge tops, uphill from stream channels and well-drained sites away from roads. To reduce disease spread, spacing would create discontinuous populations and lessen the possibility of root grafting.
- Site-Specific POC Management. Within the harvest unit, all POC ≥ 36" DBH would be reserved. Additional healthy POC would also be retained.

Special Status Species

- All timber sale contracts contain a standard provision that includes management guidelines for species found after the contract is awarded. These species include Threatened & Endangered species, occupied marbled murrelet sites, active raptor nests, federal proposed and candidate species, Bureau Sensitive or State listed species protected under BLM Manual 6840.
- Daily Timing Restrictions limiting harvest activities from two hours after sunrise to 2 hours before sunset would be implemented in the murrelet DM/AC area. These would be applied throughout the nesting season, from April 1 to Sept 15.

Roads

<u>New Construction</u>

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 and landings would be designed and constructed to BLM standards, but be the narrowest and smallest sizes that would meet safety standards, objectives of anticipated uses, and resource protection. For this project, rocked and natural surface roads would typically have a running surface of 14 – 16 feet.
- New road construction would be located on stable locations, such as ridge tops, stable benches or flats, and gentle-to-moderate side-slopes.
- Stable end-haul (waste) sites would be located prior to end-hauling. Maintenance would keep these sites properly shaped, drained and vegetated.

- The BLM would design road drainage 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.
- When possible, activities would direct road drainage onto convex slopes (ridges) and not onto concave slopes (troughs) to prevent adding more water to typically wet, slide-prone areas.
- Road surface shape (e.g. crowning, insloping, and outsloping) that meets planned use and resource protection needs would be used.

- New road construction would be located outside of Riparian Reserves.
- Bare soil areas created from landing and road construction would be mulched with appropriate weed-free straw, or equivalent, and seeded with a native or BLM-approved mix.
- Right-of-way clearing limits including the roadbed would be approximately 35 feet in width (Figure II-1).

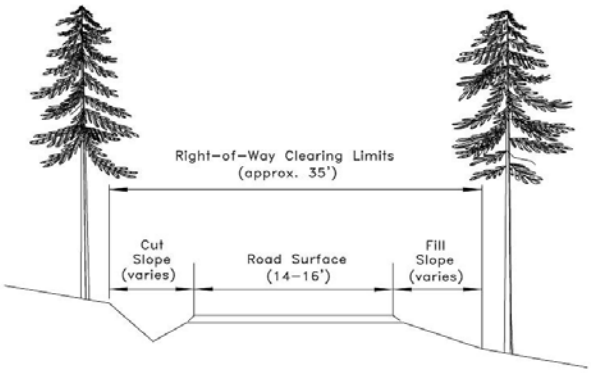

Figure II-1 Illustration of road widths and clearing limits for visibility.

Road Renovation and Improvement

- Drainage and erosion control practices would be applied to renovated roads in the same manner as newly constructed roads (ROD, D-4 #17). These may include, but are not limited to, dry season grading and ditch-relief culvert replacements, appropriate end-haul and disposal areas and proper dispersal of water from ditch-relief culverts.
- The BLM would plan road renovation activities to minimize soil erosion and subsequent stream sedimentation (ROD, D-4 #18). These would include, but are not limited to, grading to remove ruts, removal of bank slough and adding gravel lifts where needed in the road surface. Activities would not disturb existing drainage ditches that are functioning and have a protective layer of non-woody vegetation.
- Depending on road conditions after renovation, additional sediment filters may be required to prevent sediment from entering stream channels from road ditchlines. Sediment filters would allow free passage of water without detention or plugging. The filters would receive frequent maintenance; this would consist of the removal of retained sediment and disposal of this sediment. Contractors would dispose of the sediment away from delivery to stream channels.
- Other stream culverts or cross-drains may be installed in areas with deficient drainage during road renovation. Table II-4 would be used as the guide for road drainage spacing if needed. In addition, a road drainage feature may be installed upslope of each stream crossing in order to route most of the ditch flow away from the stream and onto forest soils where it can infiltrate. Depending on slope and other site conditions, this distance would generally be about 100 feet from the drainage feature outlet to the channel.

Table II-4: Guide for Drainage Spacing by Soil Erosion Classes and Road Grade.

Gradients (%)	Road Surface	
	Natural	Rock or Paved
3-5	200	400
6-10	150	300
11-15	100	200
16-20	75	150
21-35	50	100
36+	50	50
Spacing is in feet and is the maximum allowed for the grade. Drainage features may include cross drains, waterbars, ditch-outs, or water dips.		

Haul

- The BLM Contract Administrator would monitor road conditions during winter use to prevent rutting of the rock surface and delivery of fine sediment to stream networks.
- Depending on road conditions during winter haul, additional sediment filters may be required to prevent sediment from entering stream channels from road ditchlines.
- An additional lift of rock may be applied to the area of a road that can influence the stream if erosion and sediment delivery is evident from the road tread near live stream crossings. The BLM Contract Administrator would make this determination.
- On gravels roads, if the ground is already saturated from winter rains and more than 1 inch of precipitation is predicted in the project area over the next 24 hours, then winter haul would be suspended. Operations would resume after the 24-hour suspension, except when another storm (exceeding 1 inch) is forecasted. Currently, the BLM bases precipitation predictions on the Quantitative Precipitation Forecast (QPF) maps from The Hydrometeorological Predication Center internet site: http://www.hpc.ncep.noaa.gov/html/fcst2.html. The BLM would use a similar predictive model internet site if this site should be unavailable in the future.

Decommissioning

- Soil-stabilization techniques would be used such as seeding, mulching and fertilizing exposed soils. Other activities may include installation of water bars/dips to route surface runoff to vegetated areas depending on site-specific conditions.
- Closure of decommissioned roads would include the installation of a barrier to prevent vehicular traffic. Barriers could include, but are not limited to, tank traps and boulder barriers.

Cultural Resources

- If cultural resources are encountered during project implementation, all work within the vicinity would be stopped and the District Archaeologist would be notified.

CHAPTER 3 & 4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Analysis Background

This chapter contains the affected-environment and effects-analysis discussion and is arranged by specific resource values that may be impacted. It identifies the direct, indirect and cumulative environmental effects that may result from implementation of either of the two alternatives described in Chapter 2. It also addresses the interaction between the effects of the proposed variable retention harvest, density management thinning and alder conversion with the current environmental baseline. This chapter includes analysis of impacts that might be expected, how these impacts would occur and the incremental effects that could result. The description of the current conditions inherently includes and represents the cumulative effects of past and current land management activities undertaken by the BLM, other federal, and tribal and private entities.

Reasonably Foreseeable Actions

Annual recurring activities are likely to occur within the analysis area (here defined as the East Fork Coquille 5th field watershed). These include, but are not limited to, fire suppression activities, routine road maintenance, treatment of noxious weeds and silvicultural activities in young stands. Table III/IV-1 displays the timber sale acres for sales that are active or will be active in the analysis area over the next five years.

Table III/IV-1. Federal Timber Sale Activity in the Analysis Area (AA).

EA Name/Number	Timber Sale Name	Contract Number	Type of Treatment	Acres in AA
Brummit Creek Density Management and Restoration OR128-03-24	Brummed Out	OR120-TS08-30	DMT	331
	Cherry Wall	OR120-TS08-31	DMT	97
	Skattered Skeeter	OR120-TS09-30	DMT	262
	Broken China	OR120-TS12-30	DMT	79
Weaver-Sitkum DOI-BLM-OR-C040-2010-0001-EA	East Yankee	OR120-TS11-31	CT	174
	Green Chain	OR120-TS-11-32	CT	103
Cherry-Vaughn DOI-BLM-OR-C040-2010-0010-EA	Multiple sales	-	DMT	Approximately 1400 acres

The BLM assumes private forests would be intensively managed on a 40-to-50 year harvest rotation under the direction of the State of Oregon Forests Practices Act (OAR 527).

On December 17, 2009, the Federal Energy Regulatory Commission issued a certificate of public convenience and necessity to Pacific Connector Gas Pipeline, LP for construction of a natural gas pipeline from Coos Bay to Malin, Oregon (FERC 2009). This project is still pending a decision by the BLM to issue a right-of-way grant for this project before it can proceed. As a portion of the proposed route goes through the analysis area, it is analyzed as part of the baseline (the no action alternative) from which the Wagon Road Pilot effects would be added.

Table III/IV-2 BLM-managed lands that the construction of the pipeline would clear and the permanent acreage that would remain in the permanently maintained ROW by age class.

	Age Class Grouping (in Acres)			
	≤35 yrs	35-80 years	80+ years	Operation Totals
Initial 'clearing' operations for construction[1]	6.53	0	11.67	18.2
Permanent conditions – low herbaceous cover maintained (30' ROW)	5.21	0	10.02	15.23

Cumulative Effects Considerations

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 only required to the extent that this review informs agency decision making regarding the proposed action." This is because a description of the current state of the environment inherently includes 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 historic details of individual past actions."

The information on individual past actions is merely subjective, and would not be an acceptable scientific method to illuminate or predict the direct or indirect effects of the action alternative. The basis for predicting the direct and indirect effects of the action alternative should be based on generally accepted scientific methods such as empirical research. The cumulative effects of this project upon the environment did not identify any need to exhaustively list individual past actions or analyze, compare, 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.

Resources

Forest Structure

Early-Successional Habitat

The Coos Bay District currently has approximately 18,800 acres of early-successional habitat (approximately 0-20 yrs. of age). This constitutes approximately 6% of the total BLM-managed forested land base on District; the East Fork Coquille watershed has approximately 1,790 (3.9%) acres of BLM-administered lands in an early-successional stage. However, most of these early successional habitats lack the habitat complexity and legacy components typical of stand establishment forests following natural disturbance (USDI 2008b). Wimberly (2002) modeled that "early successional forests occupied between 12 and 29% of the landscape with a median of 17%" within the Oregon Coast Range prior to European settlement.

Project Area Current Conditions

The western hemlock series (Aztet *et al.* 1996, McCain and Diaz 2002), most commonly the sword fern and the salmonberry associations, describe plant associations for the project area (which includes the three areas proposed for treatment). This includes an overstory of Douglas-fir, with western hemlock and occasional western redcedar and POC. Hardwood tree species include red alder (often associated with soil disturbance), Oregon myrtle, and big leaf maple; chinquapin occurs occasionally on southern aspects and ridges.

[1] Clearing operations include a 95' ROW, storage areas and temporary workspaces.

The project area stand is described as in the Biomass Accumulation/Competitive Exclusion (BACE) stage of development (Figure III/IV-1), based on field-collected data and application of characterization in Franklin *et al.* (2002). Also, from field review and the current stand age (<80 years old), the project area would not meet definitions of late-successional forest (FEMAT 1993, Spies and Franklin 1991, USDA 1993). This area lacks substantial late-successional characteristics or has very low densities and arrangements of late-successional structures, meeting few of the criteria for old-growth conditions (Garman *et al.* 2003, USDA 1993).

Figure III/IV-1 Structural Stage comparison. Reprinted from USDI 2008.

Typical stand age[b] (years)	Oliver (1981) stand development stages	Franklin et al. (2002) structural stage	1994 RMP/EIS Seral stage	Structural stages (This RMP/EIS)
0	Disturbance and legacy creation			
20	Stand Initiation	Cohort establishment	Early seral	Stand Establishment
30	Stem Exclusion	Canopy Closure	Mid seral	Young
50		Biomass accumulation/ competitive exclusion	Late seral	
80	Understory Reinitiation	Maturation		Mature
150	Old Growth	Vertical diversification	Mature seral	Structurally Complex
300		Horizontal diversification	Old-growth	
800-1200		Pioneer cohort loss		

[a]A more extensive comparison of classification schemes can be found in Franklin et al. 2002.
[b]Stand ages are provided as references. However, stands can achieve structural classes at different stand ages, depending on disturbance and site conditions.

Stand exam information indicates that the treatment areas are less than 80 years old with average diameters less than 14 inches and relative density greater than 60. In the densest areas, there are over 300 trees per acre, which equates to a basal area per acre of more than 260 square feet.

Alder is a minor component throughout the harvest area except in a strip along the northern edge of the unsurveyed suitable marbled murrelet habitat in the east portion of Section 17. According to stand exams conducted in 2002, red alder comprises 97% of the stems in this area. The alder is over 80 years of age years old, averages 12 inches in diameter and 90 feet tall. These alder are deteriorating rapidly. The conifers (primarily western hemlock) either tend to be scattered individuals or tightly spaced in small groups.

<u>Older Cohort</u>
Within the project area, there are several unconnected islands of 100-year-old trees left over from the original salvage harvest. When taken as individual islands of a different cohort rather than part of the proposed stand for harvest, this older cohort could be considered late-successional forest based strictly on age. However, with the largest of these islands at only 2.5 acres, they currently do not influence the surrounding young stand enough to exhibit the characteristics of a stand in the mature stage of structural development. These characteristics include vertical diversity, presence of large shade tolerant trees, deciduous shrub layer, large snags, and large down woody material. The dominant trees in these areas (approximately five acres) typically are Douglas-fir over 40 inches in diameter with heights approaching 200 feet tall. All of these islands have been retained within aggregates. Pages 32 and 36 include a discussion of the habitat quality of this cohort for spotted owls and marbled murrelets.

Other individual trees
Additional scattered trees that exhibit complex structure characteristics have been retained. Many of these trees have deeply fissured bark, deep crowns, and large limbs associated with trees that have spent a substantial part of their lives in an open grown environment. These trees were selected based on these characteristics and not by a particular size or age. Approximately 35 of these individual trees have been identified within the regeneration harvest portion of the unit. Additionally, 19 healthy Port-Orford-cedar have also been retained and most of them are ≥36 inches DBH. All of these trees would be protected to the extent practible during harvest and site preparation activities.

Snags and Down Wood
Completed inventories of the aggregates shave documented there are over 250 hard snags (decay class 1-3) >11 inches DBH and over 40 soft snags (decay class 4-5) >11 inches DBH.

Within the variable retention harvest area, down wood varies in quantity and quality based on surveys and general observations. In locations near the original salvage landings are numerous large Douglas-fir logs (>30 inches in diameter) that are mostly decay class 4 and 5. Smaller, less appreciable down wood resulting from suppression mortality occurs more uniformly throughout the harvest unit. These pieces show advanced decay and may not persist longer than 10 years.

No Action
Stand development and succession in the proposed harvest area would continue to occur depending on current stand structural stage and ensuing natural density-dependent and density-independent (e.g., wind, fire) disturbances. In the absence of stand-replacing disturbances, the harvest unit as a whole would probably enter horizontal diversification (old-growth) stages within 100 years. Although within-stand succession would lead to more advanced stand structural stages in the proposed harvest unit, between-stand characteristics including late-successional habitat contiguity, road densities, distances to nearest late-successional habitat, and late-successional stand size would remain similar to current conditions due to land use allocation constraints. However, as these lands are designated as Matrix, primarily for the purpose of timber production, any of these stands could be proposed for harvest.

Complex early-successional habitat would remain missing from the landscape in this area, continuing the current decline in this type of habitat across the Oregon Coast Range (Spies *et al.* 2007, Swanson *et al.* 2010, Wimberly 2002). Species associated with this type of habitat are discussed in the wildlife section on p.39.

All of the alder in the harvest area is nearing 80 yrs. of age and is declining in vigor. Research has shown that alder rarely lives past 100 years of age (Grotta and Zobrist 2009). Where alder is scattered throughout predominantly conifer areas, the alder would decay and create small gaps where understory re-initiation may occur.

In areas of dense alder with an extensive salmonberry understory, such as the marbled murrelet buffer stand, it is more likely that conifers would not become established at all (Carlton 1988, MacCracken 2001, Tappeiner *et al.* 1991) resulting in a permanent edge to the adjacent stand. The resulting salmonberry thicket may persist until the next disturbance (Grotta and Zobrist 2009).

The MAMU buffer stand proposed for treatment contains two discernible stand characteristics based on topography. In the south portion where the slope is primarily gentle and flat, red alder and salmonberry mainly occupy the site with pockets and scattered single western hemlock trees. This is a direct result of soil disturbance, where skid trails are visible in 1959 photos (**Map 8**) from the past salvage harvest across the treatment area. Most of the established hemlocks are growing directly on or adjacent to nurse logs left

over from the harvest. On the upper slope, approximately two acres in the east portion of the buffer, the red alder component is reduced and a denser mixture of hemlock and Douglas-fir dominate the stand.

Within the Riparian Reserves, retaining the current stocking levels would retard attainment of two functions that are contingent on the presence of large diameter trees: large wood delivery to riparian areas and wildlife habitats (FEMAT 1993). Stand projection simulations on the Coos Bay District suggest that unthinned stands may not regularly produce large diameter forest structure associated with late-seral forests until the stands are about 200 years old (USDI 2002). Tappeiner *et al*. (1997) found that many Coast Range old-growth stands developed under low stocking densities and developed large diameter trees capable of providing large structure by the time those trees were 50-years-old.

Proposed Action

The variable retention harvest would modify or reduce vertical and horizontal habitat complexity, associated vegetative diversity, and the pool for future recruitment of legacy structures. The aggregates, individual tree retention and Riparian Reserves would provide recruitment of some of these structures. For 20-30 years following the action, the harvest area would be in an establishment or initiation phase of stand development.

The harvest area stand would change from a tall, predominantly single-story canopy with occasional gaps and understory trees to a stand providing early-successional habitat with small patches of older forest in the form of aggregate retention, occasional legacy trees and large down wood, and dense cover by shrub and tree species. Aggregate retention patches within portions of the harvest area would ameliorate loss of structural diversity and structural legacies because the aggregates are designed and located to protect existing high-quality structures. The aggregates would also limit soil/litter disturbance and solar buffering in unharvested areas. The largest aggregate (15 acres) would retain roughly 2.5 acres of interior forest coinciding with the 100-year-old cohort. Microclimate and soil ecologies in the harvest areas and retention aggregates would be modified and/or simplified. The individual tree retention (54 trees) would add structural diversity in the regenerating stand.

Rhododendron, salmonberry, western hemlock, Douglas-fir, Port-Orford-cedar, and other minor trees, shrubs, and grasses would regenerate naturally depending on seedbed conditions, environmental conditions, and seed sources while Douglas-fir, western redcedar, and disease resistant Port-Orford-cedar would also occur as seedlings planted at variable densities.

The VRH would increase the amount of BLM-managed acres in the 0-20 age class in the East Fork Coquille Watershed by 6.6% and the Coos Bay District by 0.6%. As the existing stands <20 years old are the result of intensive reforestation following clearcut harvesting and most lack the habitat complexity and legacy components typical of stand establishment forests following natural disturbance (USDI 2008), this particular stand would provide some missing complexity. The resulting stand would be more complex because of a change in reforestation levels, encouragement of shrub and broad-leaf species, and the aggregate retention areas dispersed throughout the regenerating stand.

Density management thinning in the Riparian Reserve would accelerate growth rates, impart diversity in tree spacing, and include creation of snags and down wood. Post-thinning canopy closure would be roughly 65% with a basal area of 140. The increased growth rates, creation of spacing diversity, and snag and down log creation would improve development of late-successional forest characteristics such as multi-layered canopies, large diameter trees, and diverse structure (Tappeiner *et al.* 1997). The reduced canopy cover would allow more light to penetrate to the forest floor allowing some understory vegetation development, which would include beargrass. The prescribed fire treatments are expected to stimulate growth of existing beargrass plants and provide bare soil for increased seed germination (Shebitz *et al.* 2009).

Snags within the aggregate areas would be protected and would meet the RMP direction for providing for 40% of cavity-nesting birds. For the Coos Bay District, this is calculated as 1.5 snags/acre; the proposed action would average 2.5 snags/acre. At this level of retention, approximately 60% of cavity nesters would be provided for. Existing down wood would also be retained in these aggregates and standing trees reserved from harvest would be felled to meet the RMP requirement of 120 linear ft./acre after harvest.

Within the MAMU buffer treatment area, there are a few scattered legacy trees. However, most of the conifers are within the 10-20 inch DBH range and these would be the target for thinning. All non-alder hardwoods and single tree/well-spaced conifers would be retained to provide additional canopy cover in areas of alder removal. The density management treatment would thin some of the denser conifer pockets down to 80 to 120 TPA while leaving the dominant and co-dominant trees with good form and deep, healthy crowns. Most of the western hemlock in the south portion of the buffer is currently infected with dwarf mistletoe; considerations would be made to retain trees with well-developed brooms for MAMU recruitment habitat and to thin out the heavier infested suppressed trees.

Reforestation

Reforestation would be a combination of planting and natural regeneration. Planting trees of a variety of species would occur within one year at an average of 200 trees per acre (TPA) and ensure minimal reforestation[2] as per management direction in the RMP (See Appendix F for more information). Initial planting would be Douglas-fir, western redcedar and root disease resistant POC. As most of the current existing stand is Douglas-fir, it would be the most prevalent species replanted. If follow up planting is needed (based on monitoring) in subsequent years due to mortality, western hemlock would be planted because it is shade tolerant and would be better suited to survive after the rapid occupation of the site with competing vegetation. It is expected that the planting would be successful with a three-year survival of 75% or higher.

Portions of the planting area near natural seed sources (including aggregates) would not be planted. The natural regeneration that might occur would likely be red alder and western hemlock because they are species that would have more consistent seed crops. Port-Orford-cedar is also a consistent producer of some seed, but there are few POC and any reproduced seed would not likely be disease resistant.

What is uncertain is the type and amount of natural regeneration that would occur. The present stand was created following a forest fire from sometime in the 1940's (**Map 7**). The fire would have created a favorable seed bed for germination. It is unknown if the stand naturally regenerated or was artificially seeded.

The proposed action would use a combination of machine and hand piling as site preparation. Burning would depend on the size and extent of the piles. This method of site-preparation would not create an ideal mineral soil seed bed for natural regeneration (Hobbs *et al.* 1992). Woody and herbaceous vegetation would rapidly reoccupy the site, especially with the increase in growing space and sunlight, further making conditions unsuitable for natural regeneration.

Large seed crops of the commercial species found within the project occur at infrequent intervals (Table III/IV-3). If a large seed crop follows harvest, there could be considerable natural regeneration. If there are small or no seed crops, or heavy predation of the seed crop for several years following harvest, there could be little natural regeneration due primarily to the rapid propagation of competing vegetation (Hobbs *et al.* 1992, Stein 1995).

[2] Customary planting practices for the region are 300-450 TPA (Rose and Haase 2000).

Table III/IV-3 Frequency of large seed crops[3].

Tree Species	Length of Time Between Large Seed Crops
Douglas-fir	2-11 years
Port-Orford-cedar	3-5 years
Red Alder	3-5 years
Western Hemlock	5-8 years

If abundant natural regeneration augments the planting, then precommercial thinning would be done to maintain early seral conditions. Stocking on the stand would not exceed a 0.15 Relative Density or approximately 200 TPA. Precommercial thinning may be done multiple times if warranted. Tree to tree competition would not occur at a Relative Density of less than 0.15. There would be no crown closure in the stand. Individual tree growth would be maximized since the trees are not competing with each other. The stand would be considered understocked, since the growing space is not being fully utilized by trees, allowing early seral conditions to persist. This would be maintained for 20-30 years.

Wildlife

For the discussion of wildlife species, the action area is defined as the East Fork Coquille watershed, the project area includes Section 17 and all lands within 1.5 miles. This encompasses all occupied or unsurveyed suitable spotted owl or marbled murrelet habitat within the disturbance and/or disruption distances, and any suitable dispersal or NRF habitat within a historic spotted owl site or alternate site with a high likelihood of being impacted by the project. The harvest unit is the proposed treatment area.

Threatened and Endangered Species

The action area is within the range of two species that are federally listed as threatened under the Endangered Species Act: the northern spotted owl (*Strix occidentalis caurina*; NSO), and the marbled murrelet (*Brachyramphus marmoratus*; murrelet).

Recent surveys of the project area have documented some limited usage by NSO and there are two historic owl sites within the project area (1 Active, 1 Alternate). The harvest unit contains marginal nesting habitat for NSO but provides dispersal, roosting and some foraging habitat.

No murrelet habitat occurs within the harvest unit. In 1999 and 2000, the BLM completed murrelet surveys for several stands surrounding the harvest unit. One confirmed occupied site has been delineated in the southern portion of Section 17. The older stand in the east of Section 17 is considered unsurveyed suitable murrelet habitat.

Northern Spotted Owl

Habitat

The project area is not currently designated as Critical Habitat (57 CFR 1796). The USFWS expects to issue a revised Critical Habitat rule by January 2012, and what lands will be designated as Critical Habitat is unknown.

There are standard classifications to describe NSO habitat based upon use – dispersal and suitable habitat. NSO dispersal habitat consists of those stands capable of providing for the safe movement of spotted owls across the landscape. Dispersing owls use habitats classified as suitable and dispersal-only habitat. Dispersal-only habitat provides some forage and roosting habitat, and some protection from predators, but lacks the structure of suitable nesting habitat. For this area, dispersal habitat is described as stands greater than 40 years of age with 40% canopy cover and trees averaging at least 11 inches DBH.

[3] The Woody Plant Seed Manual. (Bonner and Karrfalt 2008)

Suitable NSO habitat consists of stands used by owls for nesting, roosting and foraging. Owl nesting, roosting or foraging habitat (referred to as NRF) is identified as forest approximately 80 years of age and older with complex forest structure, multiple canopies, canopy closure of 60% or greater and having conifers at least 24 inches DBH (USDI 2011c).

Table III/IV-4 Summary of BLM NSO Habitat within the Watershed and the Proposed Action.

	East Fork Coquille Watershed			Proposed Action		
	Total Current Acres[(2)]	**Acres in Reserves**	**Acres Not in Reserves**	**NSO Presence**	**Harvest Acres Included by Treatment**	**Post-Harvest Acres**
Total BLM Administered Acres[(1)]	45,525	36,844	8,681		DM = 4.8 DM/AC = 9.4 VRH = 120.6	No Change
Acres in Suitable (NRF) Habitat	17,439	16,484	1077		None	Downgrade 7.37 ac. [(4)]
Acres in Critical Habitat	21,130	20,439	691		None	N/A
Acres in Dispersal Habitat[(2)]	34,204	28,898	5,306		DM = 4.8 DM/AC = 9.4 VRH = 120.6	130.0 ac. removed 4.8 ac. maintained
Sites or Activity Centers (number of)	Active = 15 Alternate = 8			Active = 1 Alternate = 1[(3)]	N/A	N/A

DM=Density Management in Riparian Reserves, DM/AC=Density Management and Alder Conversion in the Mamu buffer area, VRH= Variable Retention Harvest area

(1) Total Acres in East Fork Coquille Watershed = 85,923 acres (BLM = 45,525 ac., BIA = 1,354 ac., Pvt/Other = 39,044 ac.)

(2) NSO Dispersal Habitat (BLM lands) = Forests at least 40 years of age (as of year 2011).

(3) NSO Sites or Activity Centers = Includes those known owl sites within 1.5 miles of the harvest area.

(4) 1.44 acres in owl site 2182O, 2.52 acres in owl site 2317A, and 3.41 acres not associated with any owl site.

The stand proposed for variable retention harvest (151 acres) is less than 80 years of age. However, a small cohort (approximately seven acres) contains a 100-year-old age class of trees (five acres) and a few scattered clumps of larger trees (two acres). Recent surveys, discussions with USFWS staff, and discussions amongst the South Coast Interagency Level One Team, have led to the conclusion that this small cohort (**Map 5**) of older and larger trees has enough structure and biological legacy that it could be utilized by NSO for nesting, roosting and foraging. Therefore, this cohort is classified as suitable or NRF habitat.

Owl Sites

There is one historic (2182O) and one alternate site (2317A) within 1.5 miles of the harvest unit. The BLM manages 2,028 of the 4,524 acres within the home range of NSO site 2182O, and 2,701 acres of the 4,524 acres within the home range of NSO site 2317A. Alternate sites are not the primary nesting site and are only used if other conditions prohibit nesting at the main site (Forsman and Giese 1997, Sovern *et al.* 2011). There may be many alternate sites within the territory of one breeding pair. Therefore, for purposes of analysis there is only one active pair within the project area that could be affected by the proposed action.

The effects of habitat modification to owl sites in the Coast Range Province are assessed by evaluating habitat availability in generalized nest patches, core areas and home ranges with a radii of 300 meters, 0.5 miles and 1.5 miles respectively (USDA and USDI 2008).

Surveys

The project area was surveyed between May and August of 2011 using the survey methods identified in the Protocol for Surveying Proposed Management Activities (USDI 2011b). Thirty-two stations were

surveyed within 1.5 miles of the harvest unit. Surveyors documented nine total NSO detections (n = 3 female, n = 6 males, n = 1 undetermined), and 16 barred owl responses. Three of the nine NSO responses were within 0.25 miles of the proposed harvest unit. Both male and female NSOs were recorded within 0.5 miles of each other; however, detections occurred exactly one month apart. With the exception of one male NSO detected within the harvest unit on August 25, 2011, the other two detections within 0.25 miles of the harvest unit occurred within the suitable habitat to the south and east. Survey results suggest some usage of the area by NSO and barred owls; however, occupancy and/or pair status could not be established.

Since one male NSO was detected within the harvest unit, one can assume that the area is being used by NSO for some roosting and/or forging; however, the likelihood of nesting in this stand is low due to the limited amount of NRF habitat available, the lack of sufficient nesting structure, the stand is located between two high-quality potential nesting stands and the fact that no female NSOs were documented using the stand. Based on modeling outputs, field surveys, and personal field experience, there is a higher likelihood that the owls detected are using the more suitable habitat within the existing owl sites or the adjacent suitable habitat within the 1.5-mile home ranges for nesting. It is important to note that documented usage at one point in time cannot adequately describe cause-and-effect relationships. The relationship between owl habitat and owl occupancy has not been quantitatively established because of the many other factors influencing wildlife populations, although it has been documented to be a major contributing factor to owl trends (Dugger *et al.* 2005, Olson *et al.* 2004).

Modeling

The ID Team chose to use the species distribution model MaxEnt (Phillips *et al.* 2006, Phillips and Dudik 2008) to model spotted owl relative habitat suitability for the Wagon Road Pilot project area based on recovery plan recommendations (USDI 2011). Species distribution models are used to evaluate species-habitat relationships, evaluate an area's suitability for the species, and to predict a species' presence (Elith and Leathwick 2009). Telemetry data from seven owl pairs was used with Gradient Nearest Neighbor habitat data (LEMMA 2008) (for three of the fourteen covariates used in the 2011 NSO Recovery Plan published model) and local data derived from LiDAR (for two additional covariates not available to the USFWS) to predict and map the spatial distribution of habitat suitability in the Wagon Road Pilot project area (**Map 6**). This model was developed to explore relationships between observed NSO occupancy and the environmental variables that are expected to influence NSO behavior. The process is still experimental and is intended for informational purposes only.

Despite variations between the 2011 NSO Recovery Plan Modeling variables, and the Pilot modeling variables, the Pilot model performed similarly to the full USFWS service model (AUC *Pilot 0.854* vs *FWS 0.864* and Gain *Pilot 0.79* vs. *FWS 0.81*).

Modeling outputs showed higher probabilities of occupancy in draws, and areas with higher levels of canopy closure and more structural complexity (Table III/IV-5). The proposed harvest unit had a very low suitability index ($\mu = 0.09$) compared to nearby older habitat suggesting that NSO are less likely to inhabit the treatment area. The modeling covariates indicate that the treatment area's lower suitability value is due to its high ridge top location, on the crest between two large 5th field watersheds, and its uniform forest structure. Older stands with known nesting behavior located to the south and east of the proposed harvest unit were identified as having a higher suitability for NSO. As a comparison, the adjacent core area (100 acre) mean values are 0.29 and 0.48 (max 0.84) and the home range (1.5 mile circle) mean values are 0.21 and 0.22 (max 0.85) respectively. The closer values are to 1.0 the higher the probability of occupancy.

Table III/IV-5 Results from MaxEnt modeling using Recovery Plan and LiDAR information

Areas in T28S-R10W-Sec17	COUNT	MIN	MAX	STD	MEAN
Younger Stand	248	0.0157	0.1045	0.0185	**0.06**
Scattered Aggregates	216	0.0153	0.2059	0.0423	**0.06**
Marbled Murrelet Buffer	2931	0.0066	0.3190	0.0560	**0.08**
Regeneration Harvest Area	4863	0.0041	0.3465	0.0589	**0.09**
Older Stand / Residuals	226	0.0172	0.2249	0.0327	**0.09**
Red Tree Vole Aggregates	1153	0.0165	0.2945	0.0554	**0.10**
Riparian Reserve	6651	0.0027	0.4396	0.0657	**0.10**
Beargrass Density Management Area	191	0.0340	0.2788	0.0566	**0.11**
Marbled Murrelet Occupied Habitat	4110	0.0071	0.4717	0.0933	**0.15**
Marbled Murrelet Unsurveyed Suitable	2962	0.0108	0.6666	0.1449	**0.22**
NSO IDNO (100 ac. owl core)	**COUNT**	**MIN**	**MAX**	**STD**	**MEAN**
2317A ELK LOOP	3822	0.0091	0.7486	0.1601	**0.29**
2182O BREWSTER VALLEY	4373	0.0641	0.8411	0.1303	**0.48**
Owl Home Range Buffer (1.5 mi)	**COUNT**	**MIN**	**MAX**	**STD**	**MEAN**
2317A ELK LOOP	81608	0.0019	0.8461	0.1796	**0.21**
2182O BREWSTER VALLEY	75478	0.0021	0.8541	0.1797	**0.22**

No Action

Survey results indicate that NSO presence in the treatment area is infrequent and transient (USDI and CIT 2011). Barred owls were also observed in and near the harvest unit. Under the no action alternative, this level of use is not expected to change in the near term. Through time, as the stand develops more complexity through tree mortality and small-scale disturbance, it may gradually become more suitable for NSO nesting, roosting and foraging. The MaxEnt model indicates that the topographic position of the stand may make it less desirable in general than other locations of equal stand complexity. The stand's slope position along with the known presence of barred owls may limit the potential of this stand for NSO use. Stand replacing events such as severe fire or wind storm and the degree which climate change may affect the probability or frequency of disturbance, are unpredictable.

Proposed Action

Suitable Habitat (NRF)

The proposed action would not remove any suitable habitat within the project area. However, the removal of 121 acres of dispersal habitat adjacent to seven acres of NRF within the stand would modify the use of this suitable habitat by NSO. The proposed action would "downgrade" these seven acres of NRF. Downgrade is a term used in consultations with the USFWS to describe altering the function of NRF habitat to the extent that it no longer supports nesting, roosting or foraging behavior, but would retain enough cover to support spotted owl dispersal.

For owl site 2182O, 1.44 acres of NRF would be downgraded (Table III/IV-6). These acres would continue to function for dispersal activities. This would be a 0.07% net decrease in NRF acres for this owl site. However, as the acres are located on the outer edge of the home range (approximately the last 200 feet), the small size of these acres, any owls in this site would be expected to maintain current life history function including breeding success.

For owl site 2317A, 2.52 acres would be downgraded (Table III/IV-6). These acres would continue to function for dispersal activities. This would be a 0.08% net decrease in NRF acres for this owl site. However, as the acres are located on the outer edge of the home range (approximately the last 250 feet), the small size of these acres, it is not the primary site for nesting within the territory, any owls in this alternate site would be expected to maintain current life history function including breeding success.

Outside of these owl circles, another 3.41 acres would be downgraded. Because these acres are scattered amongst a younger stand, are clumps of a few trees, are maintained within aggregates, and are not included in a known home range, owls would continue to use these areas for dispersal activities.

Table III/IV-6 Summary of BLM Suitable (NRF) habitat within the owl sites and effects of the proposed action.

Site IDNO/ Name	Buffer Distance	Total Acres	Total BLM Acres	Percent BLM of Total	NRF Pre-Harvest	NRF % of BLM Pre-Harvest	NRF Acres In Harvest Area	NRF % of BLM Post-Harvest
2182O Brewster Valley	Nest Patch	69.87	69.87	100.00%	51.62	73.88%	No Change	No Change
	Core	502.65	400.42	79.66%	313.65	78.33%	No Change	No Change
	Home Range	4523.82	2028.22	44.83%	1258.40	62.04%	1.44 downgraded	61.97% (-0.07%)
2317A Elk Loop	Nest Patch	69.87	69.87	100.00%	56.53	80.91%	No Change	No Change
	Core	502.65	338.35	67.31%	160.29	47.37%	No Change	No Change
	Home Range	4523.82	2701.44	59.72%	1369.68	50.70%	2.52 downgraded	50.62% (-0.08%)

Dispersal Habitat

The proposed action would remove approximately 130 acres, and treat and maintain approximately 5 acres of the 34,204 acres of dispersal habitat in the watershed. This is less than 0.4% of the total dispersal acreage in the watershed (Table III/IV-4). While this 0.4% of dispersal habitat would not develop into suitable habitat, there are potentially 5,227 acres of BLM-managed stands within the East Fork Coquille watershed that could develop into suitable habitat by the year 2032[4]. These developing acres represent a potential increase in suitable habitat across the East Fork Coquille watershed by 30%.

The proposed action would reduce the amount of dispersal habitat within the home range of NSO site 2182O by approximately 2% (1,751 acres to 1,702 acres), and would reduce the amount of dispersal habitat within the home range of NSO site 2317A by approximately 2% (2,145 acres to 2,092 acres) (Table III/IV-7). However, this activity would not reduce dispersal habitat below 50 percent within the action area (from 75.1% to 74.8%), which would not preclude owls from dispersing across the landscape (USDI and USDA 2008).

Table III/IV-7 Summary of BLM dispersal habitat within the owl sites and effects of the proposed action.

Site IDNO/ Name	Buffer Distance	Total Acres	Total BLM Acres	Percent BLM of Total	Dispersal Acres Pre-Harvest	Dispersal % of BLM Pre-Harvest	Dispersal Acres In Harvest Area	Dispersal % of BLM Post-Harvest
2182O Brewster Valley	Nest Patch	69.87	69.87	100.00%	69.87	100.00%	No Change	No Change
	Core	502.65	400.42	79.66%	396.77	99.09%	No Change	No Change
	Home Range	4523.82	2028.22	44.83%	1750.60	86.31%	48.90	83.9% (-2.41%)
2317A Elk Loop	Nest Patch	69.87	69.87	100.00%	69.87	100.00%	No Change	No Change
	Core	502.65	338.35	67.31%	298.49	88.22%	No Change	No Change
	Home Range	4523.82	2701.44	59.72%	2145.53	79.42%	53.20	77.45% (-1.97%)

With the exception of the density management treatments in the Riparian Reserve, post-harvest stands would not function as dispersal habitat for a minimum of 40-60 years, due to the extension of the early-successional stage in regeneration. However, the aggregates and individual tree retention would minimize edge effects and reduce the distance between refugia across the much smaller openings created

[4] Time by which BLM-managed stands would reach a late-successional age threshold, which is approximately 60-80 years.

by the harvest. Dispersal would be easier when compared to a traditional clear-cut opening on the landscape. As these lands are designated as Matrix and are intended for intensive timber harvest, these effects are within the range anticipated and analyzed in the FEIS supporting the Coos Bay District RMP (USDI 1994).

Recovery Action 10
The proposed action would be designed to avoid the removal of NRF habitat, as well as avoid disturbance or disruption of spotted owl nesting within the nest patch or core area of any historic owl sites.

Recovery Action 32
The ID Team worked with the USFWS to identify approximately seven acres that contain biological legacies capable of supporting spotted owl roosting, foraging and possibly nesting activities. The proposed action would be designed to protect these areas within larger retention areas so they would remain on the landscape.

Disturbance
Since the project would occur during the critical nesting season and has the potential to generate sounds in excess of ambient levels, there would be possible disruption impacts to owls in eight acres of suitable habitat within 65 yards and disturbance impacts in 116 acres of suitable habitat within 440 yards of the harvest unit. Disruption effects could include altered foraging behavior and decreases in nest attendance dependent on the proximity of the owl. Because of the location of the project on the outer edges of both home ranges and not the core or nest patch, project implementation is not expected to affect nesting success. Also, only one pair of owls would be disturbed because the alternate site is not likely being used. However, alterations in roosting and foraging activities would likely occur.

Disturbance effects cause owls to be distracted from normal activities, but would not impact nesting success within the occupied owl site.

Marbled Murrelet
The project area is not designated as Critical Habitat. While the proposed project area occurs within 50 miles of the coast and is comprised primarily of Douglas-fir and western hemlock, the harvest area does not contain suitable habitat for nesting murrelets. On average, the stand is less than 80 years of age with an average DBH of <13 inches. Most of the trees lack multiple large limbs >4 inches or platforms such as mistletoe brooms with enough moss or duff to provide a nest cup.

There are seven acres of multilayered structure (the older cohort described on p. 27)which include residual trees with mistletoe brooms, and/or marginal platforms; however, there are fewer than six trees per five acre area so these do not meet the South Coast Interagency Level 1 Team's criteria (USDI 2004b) for remnant habitat that could support nesting murrelets. In addition, these residuals have marginal platforms/brooms and lack sufficient canopy cover to prevent predation and/or reduce microclimate effects, and have no interior habitat. Therefore, the likelihood of a murrelet currently using these areas for nesting is not expected.

Portions of the action area were previously surveyed between 1999 and 2000. During the 1999 season, BLM conducted surveys at 14 survey sites with two sites having presence detections. During the 2000 season, BLM conducted 67 surveys at 46 survey sites and had 63 detections within the Elk Creek sub-watershed. Site 99-T, which is located in the south of section 17, had 22 detections. This site, (Elk Cr. Upper Hook) totaling 115 acres, was designated occupied unmapped LSR MSNO C3072. This is the only known occupied murrelet stand within the disturbance distance of the proposed action. The 450-year-old stand to the east of the project was surveyed, but occupation was not confirmed. This stand is considered unsurveyed suitable murrelet habitat.

The stand north of the unsurveyed suitable habitat is predominantly alder. Ripple *et al.* (2000) found that frequency of hardwoods around nest sites was low, likely because hardwoods are not typically used for nesting.

The likelihood of murrelets using this unsurveyed suitable habitat is possible, as activity has been documented; however, the likelihood of nesting success is very low. Currently, there are two large hard edges along the stand in the east resulting from the two adjacent regenerating stands on private property. This decreases the amount of interior habitat available for nesting success. Also, considering a density of one nesting pair per 355 acres of habitat (McShane *et al.* 2004, Raphael *et al.* 2006, USDI and Research 2008), only one pair would be expected within the stand. However, the stand in Section 17 comprises only 45.7 acres and even adding the 31.5 acres of habitat in the adjacent section, the size of the whole stand is only 77.2 acres. Studies have shown that murrelets appear to select forest stands greater than 123.6 acres (50 ha) (Burger 2002). Further, there are only 23.2 acres of interior habitat providing the right microclimate and protection from predators. Interior habitat is defined as all areas 60 m (197 ft.) from edges with adjacent stands, a distance that ameliorates soil temperature and soil moisture edge effects (Chen *et al.* 1999) and lies outside edge areas for murrelet nest placement (McShane *et al.* 2004). Therefore, based on all the aforementioned factors, the likelihood of occupancy of the adjacent stand is approximately 4% (USDI and CIT 2011).

No Action

In the variable retention harvest area, forest stand conditions would continue to develop along the general current trends until the next harvest or disturbance.

The Riparian Reserve stand would continue to undergo slow growth and suppression mortality. These stands would require some type of stand-modifying disturbance to facilitate development of multiple tree canopies, tolerant understories, and large overstory dominants associated with old-growth forest (Poage and Tappeiner 2002).

In the hardwood stands in the buffer adjacent to unsurveyed suitable habitat, the alder would continue declining and it may take a century for conifer to replace the alder (Deal 2006, MacCracken 2001). Where salmonberry is present, conifer establishment may not occur at all (Carlton 1988, MacCracken 2001). As stated in the forest resources section (p.28), there is an extensive salmonberry understory and regeneration of a conifer stand would not likely occur until another disturbance. This would ensure a permanent hard edge effect allowing possible predation to nesting murrelets over the long-term. This would not contribute to the recovery of the marbled murrelet.

Proposed Action

<u>Habitat</u>

The proposed action would not remove any occupied or unsurveyed suitable habitat. All of the occupied and unsurveyed suitable murrelet habitat would have a 300-foot no-touch buffer except for the ten acres where the proposed action would include density management and alder conversion treatments to meet Recovery Action 3.1.1.3 (USDI 1997).

<u>Edge Effect</u>

The variable retention harvest area would maintain a 300-foot buffer to all adjacent occupied and unsurveyed suitable habitats; therefore, there would be no edge effect from implementing this portion of the proposed action. The activity that would occur within the buffer that could result in edge effects to the adjacent unsurveyed suitable habitat is the nine acres of density management/alder conversion.

Alder Conversion of stands that are ≤ ½ Site-Potential Tree Height

In general, alder conversion in a stands ≤ ½ site-potential tree height (these are 90 feet) is unlikely to affect windthrow or microclimate in adjacent unsurveyed suitable marbled murrelet habitat for the following reasons:

- Alder conversion activities would not affect microclimate for potential nest sites because the treatment stand contains trees ≤ ½ site-potential tree height, which are not contributing to microclimate of potential murrelet nest sites. Research has reported that all murrelet nests have been found in the upper half of the trees (Hamer and Nelson 1995).
- Murrelet nests are nearly always in the top half of a tree; thus, adjacent stands ≤ ½ site potential tree height are unlikely to offer any protection from wind or sun to the murrelet nest; nor do these shorter stands offer any concealment for murrelet nests in the upper canopy of the adjacent suitable/recruitment habitat stand.

The northeastern separate stand (1.3 acres) designated as marbled murrelet habitat with a clearcut along one edge likely does not contain any nesting marbled murrelets. There is no interior habitat at this site.

For the larger habitat area, on the northwestern portion of the stand, there is a red tree vole buffer between the stand and the DM/AC area, eliminating an edge effect from those acres. There is also a TPCC fragile area providing a buffer. Because of these protections, there is only 480 feet of the unsurveyed habitat (3.2% of the total perimeter of the habitat) that could have increased predation from implementation of the DM/AC portion of proposed action.

This activity would directly increase the amount of edge adjacent to unsurveyed suitable habitat and has the potential to modify the short-term usage of that habitat. However, this is not likely to cause a discernible impact to murrelets because: 1) the likelihood of murrelets using this stand is low (~4%), 2) there is very little existing interior habitat available in the stand currently providing protection from predators, 3) there is already an existing hard edge effect along the eastern edge of the murrelet habitat, and 4) The small size of the project compared to the total perimeter of the stand (3.2%). Therefore, alder conversion would have an indiscernible effect to nesting marbled murrelets within the short-term (up to 20-40 years) (Malt and Lank 2009).

Increased stocking in this area following treatment would decrease the time it takes for the stand to begin competitively excluding underbrush, and would shorten the length of time the area is in an early-seral condition. Once the stand has competitively excluded early-seral species, which are desirable to corvids and other murrelet predators, the magnitude of the edge effect would decrease. Malt and Lank (2009) found that within ~20-40 years, regenerating forest provided relative safety from avian predators, both at patch and landscape scales. Compared to the No Action alternative, in which a conifer stand is unlikely to develop along this 480-foot edge without disturbance, growing conifers to ameliorate the edge effect within 20-40 years (compared to ~100 years) contributes to the long-term recovery of the marbled murrelet. With the retention of the residual conifers, reinitiation of an understory cohort would accelerate the development of complex late-successional characteristics and improve long-term habitat potential.

In the short-term, while alder conversion would increase the possibility of predation, the long-term beneficial effect would speed up the development of future recruitment habitat and provide continuity between the existing habitat and future habitat (USDI 2004a). This would also provide connectivity with the 450-year-old stand to the north (1.3 acres). This treatment is consistent with RMP objectives and the murrelet Recovery Plan recommendations to maintain or enhance areas adjacent to occupied or unsurveyed suitable murrelet stands.

Disturbance

The proposed project has the potential to cause disturbance impacts as it would occur during the critical nesting season for murrelets, and has the potential to generate sounds in excess of ambient levels. The proposed action has the potential to cause disruption impacts to murrelets (if present) using 16 acres of suitable murrelet habitat within 100 yards. This would largely be associated with the DM/AC activities. Considering a density of one nesting pair per 355 acres of habitat (McShane *et al.* 2004, Raphael *et al.* 2006, USDI and Research 2008), the probability for occupancy is less than 4%. As stated above, the stand conditions and size make it unsuitable for successful nesting. However, within this area, the BLM would implement daily timing restrictions to lessen the disturbance impact during the main feeding hours when parents deliver food to the chick. This reduces the likelihood of nest abandonment or alteration of breeding success. Finally, to harvest these 10 acres within this disruption distance would take an estimated two to three weeks, lessening the duration of the disruption. Therefore, based on all the factors listed above, the BLM does not anticipate any discernible behavior changes to a nesting murrelet pair from this activity.

Special Status Species

These species are included because they could be present within the project area and could be affected by the project. Other species that could be in the analysis area but would not be affected by the project include bald eagle, fringed myotis, Pacific fisher, Townsend's big-eared bat and yellow-legged frog. There are no known nests, perch trees, or roosts for bald eagles within or adjacent to the harvest unit. There are no known locations for maternity, day or winter roosts for fringed myotis or Townsend's big-eared bat and the project would maintain all larger snags (potential habitat) within aggregates. The nearest habitat for yellow-legged frogs occurs over 1.5 miles from the harvest area and project design features would prevent sediment delivery to stream channels eliminating potential impacts.

Spotted Tail Dropper

Habitat requirements of the spotted tail dropper consist of leaf litter within conifer forests with a deciduous component. A cool/moist microclimate near the forest floor is important for maintaining populations of spotted tail-droppers.

Mortality because of desiccation is a danger to terrestrial mollusks from habitat modifications that tend to promote open dryer conditions. Examples of habitat changes that can result in a deterioration of suitable habitat include disturbance of soil (i.e., compaction or exposure), rock, leaf litter, removal of course woody debris, and reduction of vegetative cover.

There are two known sites for this species in the Big Creek sub-watershed and another site is in the Lower South Fork Coquille watershed. Strategic surveys throughout other areas of the District have located no additional specimens. Currently, there is little information on the spotted tail-dropper. The extent to which surveys were conducted and the rarity of detections during mollusk surveys and strategic surveys, suggests a low probability of populations of this slug occurring in the project area.

Proposed Action

While the probability of occupancy is low, the variable retention harvest and alder conversion would reduce canopy cover and create large openings resulting in a drier microclimate that would reduce the potential for dispersal and future use. As this is a less mobile species, if any were within the harvest area they would likely be disturbed if not fatally injured. However, loss of any specimens within this stand of 130 acres would not increase the likelihood of listing under the ESA, as there are 36,844 acres of BLM-managed lands within the watershed currently designated as Reserves. Reserves are intended to provide habitat for a variety of species associated with late-successional and riparian areas.

American Peregrine Falcon
Within the East Fork Coquille 5th field, there are two active peregrine eyries. Both eyries produced young in 2011. These include the East Fork Coquille site that fledged three young this year and the Elk Mountain site that fledged two young this year (Jim Heaney, Personal Communication).

Proposed Action
Impacts to peregrine falcons are negligible in that the unit proposed for treatment is at least 0.5 miles from known sites and is not adjacent to known, unsurveyed cliffs. Indirect effects to the peregrine may come from an increased prey availability (i.e. band-tailed pigeons) that may be attracted to early-seral habitat or food resources created in the short-term through prolonging early-successional conditions.

Survey & Manage
The 2011 Settlement Agreement states:
"for projects with signed Records of Decision, Decision Notices, or Decision Memoranda from December 17, 2009, through September 30, 2012, the Agencies will use either of the following Survey and Manage species lists:

a) The list of Survey and Manage species in the 2001 ROD (Table 1-1, Standards and Guidelines, pages 41-51.
b) The list of Survey and Manage species and associated species mitigation, Attachment 1 to the Settlement Agreement."

The Wagon Road Pilot project applies the Survey and Manage species list in the 2011 Settlement Agreement (Table, Settlement Agreement Attachment 1) and thus meets the provisions of the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, as modified by the 2011 Settlement Agreement. Appendix A contains the checklist of wildlife Survey & Manage species and the compliance tracking form.

Red Tree Vole (RTV)
Seven active and six inactive RTV nests were located during surveys. The ID Team delineated three Habitat Areas using the best habitat surrounding the sites (*Management Recommendations for the Oregon Red Tree Vole Arborimus longicaudus, Version 2.0*, September 27, 2000). The largest Habitat Area is 14 acres and contains four active nests and one inactive nest. The Habitat Area in the west contains one active nest and two inactive nests and the buffer incorporates an older stand of trees and the Riparian Reserve. The east Habitat Area contains two active nests and three inactive nests and the buffer incorporates the 450-year-old unsurveyed suitable murrelet habitat. In all Habitat Areas, the edge of the buffer is at least one site-potential tree from any active or inactive nest.

Migratory Birds
In the recently signed Memorandum of Understanding to Promote the Conservation of Migratory Birds between the Bureau of Land Management and the U.S. Fish and Wildlife Service, the BLM would evaluate the effects of planned actions on migratory bird populations. The 2008 Birds of Conservation Concern for the Northern Pacific Forest (http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf) includes the following species that could be affected by the project: northern goshawk, olive-sided flycatcher and rufous hummingbird. Purple martin is also included in this discussion.

The BLM would conduct monitoring for Neotropical birds following harvest and reforestation. Appendix E details the protocols used, but expected species include the olive-sided flycatcher, rufous hummingbird and purple martins.

No Action (for all species)
Northern goshawks and rufous hummingbirds and would be expected to behave and utilize the habitat within the project area in the same fashion as they do now. These stands are not currently habitat for Olive-sided flycatchers or purple martins nor would they be until a disturbance (like harvest), creates early-successional conditions. Larger trees would continue to develop over time and possibly provide future snag habitat; however, lack of management on the site would prolong the development and availability of future foraging habitat for these species by promoting dense canopies instead of more open habitat areas.

Northern Goshawk
Northern goshawks have been observed in the East Fork Coquille watershed infrequently; the proposed action area has been extensively surveyed for other species and no incidental observations of goshawks or potential nests were observed.

Proposed Action
Given that nesting goshawks has not been documented in this area, conducting the proposed action would have no discernible direct effect to northern goshawks. An indirect effect may come from an increase in prey availability that would be attracted to complex early-successional habitat and the created food sources.

Olive-Sided Flycatcher
Olive-sided flycatchers are associated with early-seral broadleaf habitat, especially where burns have left scattered large snags, live trees and relatively open canopies. The decline of this species and many others is associated with the decline in diverse early-seral broadleaf habitats (Betts *et al.* 2010).

Spies *et al.* (2007) have projected that on BLM and Forest Service lands within the Coast range, habitat for the olive-sided flycatcher would decline 23% in 100 years under the current management direction under the Northwest Forest Plan.

Proposed Action
The creation of complex early-successional habitat with retention of structures for perching would benefit the local population for approximately 30 years until canopy cover closes. Betts *et al.* (2010) found that "the positive response of olive-sided flycatcher, often considered a late-seral associate, to the amount of early-seral habitat at a fine spatial scale (150 m) likely reflects this species' use of high-contrast edges (i.e., between late- and early-seral stages for foraging (Rosenberg and Raphael 1986)."

At the watershed scale, this high quality habitat would make up 6.76% of all 0-20-year-old stands on BLM-managed lands within the East Fork Coquille watershed. However, the size of the treatment area is too small to cause a reversal in the decline of the overall population even at the watershed scale. The breeding bird monitoring (Appendix E) would indicate if there is increased usage of the created complex early-successional habitat by olive-sided flycatchers.

Rufous Hummingbird
Rufous hummingbirds seem to prefer a high canopy and well-developed understory for breeding. Within the action area, rufous hummingbirds would be found at edges and open areas within coniferous stands. The decline of this species is not well understood but may include habitat loss, use of pesticides and invasive plant species. Biologists have documented these birds within the analysis area.

Proposed Action
The creation of complex early-successional habitat would benefit this species at a local scale. Flowering shrubs would be a feature maintained in the regenerating stand, from which nectar is a large portion of their diet. They also feed on small insects, which are also associated with early-seral habitats. The aggregates adjacent to the regenerating area would provide nesting habitat. The size of the treatment area is too small to cause a reversal in the decline of the overall population even at the watershed scale.

Purple Martin
In Oregon, purple martins primarily inhabit the Coast Range. They nest in colonies, primarily in fabricated cavities such as nest boxes along rivers and estuaries and crevices beneath bridges, and occasionally in snags or hollow trees in forest clear-cuts and burns. Purple martins forage diurnally for flying insects over open areas such as rivers, lakes, marshes, fields, and high above the forest canopy.

Proposed Action
Purple martin would have an increase in nesting habitat because mid-seral forest in the VRH area around snags would be removed. With the retention of larger snags and the resulting early-seral conditions, purple martins would be expected to utilize the area for nesting and foraging. This would last for approximately 20-30 years as the early-successional stage is extended over time.

As an example, there is one documented purple martin site (Wimer Creek) within the East Fork Coquille Watershed. The Wimer Creek site is the result of a 1997 clear-cut and it was determined that five to ten pairs were nesting in snags left in the area after harvest.

Other Species
Betts *et al.* (2010) found a direct negative relationship to the amount of early-seral broadleaf forest and 42-year population trends; species most associated with this habitat type declined at the greatest rates. Currently declining species that had positive associations with complex early-seral habitats include rufous hummingbird, American goldfinch, olive-sided flycatcher, orange-crowned warbler, pacific-slope flycatcher, black-throated gray warbler and purple finch. Overall, of the 25 species included in their study, 16 were significantly associated with early-seral cover type.

Other studies researching early-seral species associations have found that songbirds species richness and diversity increases with creating open stand conditions (Klaus *et al.* 2010); and broadleaf plants (Ellis and Betts 2011). One study showed a peak in shrub-associated birds in year 10 following the regeneration harvest (Schlossberg and King 2009). Ground-dwelling beetles communities (Heyborne *et al.* 2003) and many butterflies and moths (Miller and Hammond 2007) are also positively associated with early-seral habitats.

Botany
There are no T&E botany species known or suspected to occur in the project area.

Survey & Manage/Special Status Species
The Wagon Road Pilot project applies the Survey and Manage species list in the 2011 Settlement Agreement (Table, Settlement Agreement Attachment 1) and thus meets the provisions of the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, as modified by the 2011 Settlement Agreement. The list of Survey & Manage (S&M) species is located in Appendix B.

There are 44 Bureau sensitive species suspected of possibly occurring in the Wagon Road Pilot project area. Of these 44 special status species, 18 are fungi which surveys are considered impractical to perform

(Cushman and Huff 2007). Therefore, there are 26 special status species that botanists suspect of possibly occurring on the project area for which surveys are recommended.

There are 62 S&M species suspected of occurring in the Wagon Road Pilot project area. Of these 62 S&M species, 57 are fungi for which surveys are considered impractical to perform (Cushman and Huff 2007). Of the six remaining S&M species suspected of occurring on the project area, four are also considered Bureau Sensitive special status species. Therefore, there are only two S&M species that are not already included within the 26 special status species for which surveys are recommended.

In conclusion, for the Wagon Road Pilot project, surveys are practical to conduct for 28 species that are Bureau Sensitive, S&M, or listed as both. Appendix C contains the list of all Bureau Sensitive species that could occur within the project area and Appendix D contains a list of all the fungi that could occur within the project area, but for which surveys are not conducted.

The BLM conducts field surveys for Bureau sensitive and S&M vascular, lichen, and bryophyte species using the intuitive controlled method where high likelihood habitats are surveyed more intensively than other areas within the project (USDA and USDI 1997, 2003). Survey routes, dates of survey, and any special status sites encountered are flagged in the field, and are recorded on data sheets and topographic maps.

Vascular plant, lichen, and bryophyte special status surveys have been completed on the proposed project area and no special status or S&M plant species were located.

No Action

The analysis area has several timber sale activities that are on-going or planned for the next five years. Where appropriate, surveys for Special Status and S&M plant species have been completed on the following EAs: Brummit Creek Density Management, Weaver-Sitkum and Cherry Vaughn. All special status sites found have been buffered such that the species would persist on the site. Thus, there would be no known cumulative impacts to any special status or Survey and Manage vascular, lichen or bryophyte plant species.

Proposed Action

No special status or S&M plant species were found during botanical surveys in the proposed project area so there would be no direct effects to any special status or S&M vascular plant species, lichens, or bryophytes.

Fungi are not considered practical to survey for (Cushman and Huff 2007) so no surveys were conducted for any special status or S&M fungal species. The proposed timber harvest stand averages 63-73 years of age with some scattered legacy trees greater than 80 years of age. The minimum age for late-successional forests is typically in the 80 to 130 year range (USDA and USDI 2001). There are a few legacy trees greater than 80 years of age in the harvest area but these would all be included in aggregate retention areas. Trees with late-successional characteristics, such as thick bark, large diameter limbs and large diameters, would be included in these aggregates. These aggregate retention areas would reduce potential impacts to the substrate and any fungal organisms present (Cushman and Huff 2007). Appendix D has a list of the 57 special status and S&M fungal species that could possibly occur on the project area in the few areas where legacy trees greater than 80 years of age are concentrated.

Over half of the BLM-manages lands in the East Fork Coquille 5th field watershed have been designated as reserves. The area proposed for variable regeneration harvest are all within the General Forest Management Area land classification, and would not decrease the size of reserve allocations in the East

Fork Coquille 5th field watershed. In total, the Northwest Forest Plan sets aside 81% of all federally managed lands in reserves, with 87% of all late-successional forests in these reserves. These late-successional reserves, including those within the East Fork Coquille 5th field watershed, would provide long-term habitat for late-successional associated fungal species, which would help minimize the likelihood of and need for listing of any of the special status or S&M fungal species that could possibly occur on the proposed project area.

Beargrass

Many suppressed beargrass plants are located within the upland dry portion of the Riparian Reserve. Beargrass (*Xerophyllum tenax*) is a member of the lily family and requires an open forest over-story with filtered light (Fluharty *et al.* 2010). Due to forest encroachment from the absence of fire, beargrass is believed to have declined in traditional gathering sites (Shebitz *et al.* 2009). Beargrass is fire-resistant and needs periodic burning to stimulate new growth. Native tribes including the Coquille Indian Tribe have long used beargrass to make baskets, hats, and other items. In the Coquille region, "only the flexible, newly emerging center leaves were traditionally harvested by pulling them out of their sheaths. Then they'd be bleached in sunlight, sorted by length, and bundled for later use or dying" (Fluharty *et al.* 2010). Daniela Shebitz (2005) succinctly describes the importance of basket making to native tribes:

> "While the beauty of traditional baskets is physically apparent, their importance is deeper than aesthetics. Each traditional basket represents not only the artist's perspective, but also incorporates elements of the artist's culture and family. Basketmakers' traditional knowledge is passed on to younger generations via oral traditions and through physical representation in baskets themselves."

While the beargrass population here is not large, the availability of healthier plants would have a good cultural benefit to the members of the CIT.

No Action

The suppressed beargrass plants would likely not reproduce or have any discernible growth until another disturbance opens the canopy cover to allow light or a fire occurs. These plants would not be of use for traditional basket weaving activities.

Proposed Action

As stated under Forest Resources, the reduced canopy cover would allow more light to penetrate to the forest floor allowing some understory vegetation development, particularly for beargrass. The prescribed fire treatments are expected to stimulate growth of existing beargrass plants and provide bare soil for increased seed germination (Shebitz *et al.* 2009).

Fisheries

For this discussion, the analysis area includes the Brewster Canyon and Elk Creek 6th field sub-watersheds located within the East Fork Coquille 5th field watershed. The analysis area is located within the federally listed threatened Oregon Coast coho, *Onchorhynchus kisutch*, evolutionarily significant unit (ESU). The East Fork Coquille River and Elk Creek are used by coho and chinook (StreamNet GIS data 2003 and BLM GIS data) and are designated as coho critical habitat (CCH) under the Endangered Species Act (73 FR 7816) and essential fish habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (67 FR 2343).

Aquatic Sensitive species on the Bureau SSS list found in the analysis area include Oregon Coast coho (federal threatened), Oregon Coast steelhead (Sensitive), Pacific Coast chum salmon (Sensitive), and the foothill yellow–legged frog (Sensitive). The wildlife report (p.17) covers yellow-legged frogs. Chum distribution in the analysis area is not known, however a safe assumption would be that any streams used by chinook and/or coho could also be used by chum. Steelhead are found in East Fork

Coquille River, Elk Creek, and an unnamed tributary to the East Fork Coquille in T28S R10W section 8 (StreamNet GIS data 2003 and BLM GIS data).

Natural barriers or steep stream gradients within the analysis area limit anadromous fish distribution. A portion of the analysis area is located upstream of Brewster Gorge, a natural barrier in the East Fork Coquille River located in T28S R10W section 9. The gorge is a passage barrier to coho and chinook. Steelhead can move upstream through the gorge during certain flow conditions (USDI 2005 *Update*).

Natural surface and rocked roads within the analysis area with surface erosion, inadequate drainage, inadequate stream crossings or unstable cut banks and fill slopes contribute sediment to stream channels and potentially fish habitat where there is a connection between the road and a stream channel. Adjacent streams have been subject to episodic and/or chronic fine sediment input due to poor road design and lack of maintenance. Specifically, the 28-10-9.0 road has nine stream crossings located approximately 0.36 to 0.5 miles to fish habitat in the East Fork Coquille River. There is potential for sediment to enter streams at these crossings because of the way the water is currently draining off the road. Properly designed, surfaced, and maintained roads in the analysis area do not contribute sediment to stream channels. Roads with proper drainage features such as cross drains direct sediment laden water onto forest soils and not directly into streams and fish habitat.

Riparian Reserve Condition

Riparian Reserve (RR) stands within and adjacent to the proposed unit range 80 years or younger. Past management practices and other disturbance events have, in some cases, resulted in stands that are lacking the desirable species components that will lead to the development of late-successional characteristics (USDA and USDI 1998). Late-successional characteristics include multi-level canopies, future recruitment of large coarse wood, and diverse species composition. Riparian Reserve stands within and adjacent to the proposed unit range from conifer dominated to alder dominated. The conifer dominated stands have uniform structure, low species diversity, slow growth rates, low stand vigor, small diameters and are in an over-stocked condition. The current average diameter in the RR adjacent to the unit is approximately 12 inches DBH with 300 trees per acre (TPA).

The RR stand proposed for thinning is adjacent to an intermittent stream. The intermittent stream flows into a large basin/depression area created by the Sitkum Landslide. See the water resources report (page 3) for a detailed description of the landslide. The flow ends in the basin and does not connect to the East Fork Coquille River where fish habitat occurs. Therefore, it is not possible for this stream to deliver large woody debris, nutrients or sediment to fish-bearing stream channels. Refer to the forest structure, wildlife or Aquatic Conservation Strategy sections for analysis of effects to Riparian Reserve conditions. The discussion for fisheries will focus on the potential effects of road management activities to fish-bearing stream channels.

No Action

Road renovation, improvement, and decommissioning would not occur under the No Action alternative. Sediment delivery to streams and potentially fish habitat from the 28-10-9.0 road would continue without the proposed road renovation. Renovating the 28-10-9.0 road would reduce the amount of sediment entering streams in the long-term. The renovation would include measures designed to reduce if not eliminate sediment input to stream channels. Such measures include but are not limited to rocking stream crossings that have the potential to deliver sediment to streams and reshaping the road to direct water off the running surface before it reaches stream channels. Chronic sediment input to streams reduces spawning production, juvenile rearing survival, and insect production (Everest *et al.* 1987, Hicks *et al.* 1991, Meyer *et al.* 2005, Waters 1995).

Proposed Action

The term fish habitat as used below includes CCH, habitat for Sensitive fish species, and EFH.

Road Construction

The proposed new road construction would not occur within RRs. The proposed new roads would be located outside RRs on stable, non-slide prone areas on or near ridge tops. Sediment would not reach stream channels or fish habitat from the proposed road construction because the forested area between the roads and stream channels would filter sediment and there would be no stream crossings. New road construction includes drainage features designed to direct sediment-laden surface water onto forest soils. Bare soil would be seeded and mulched prior to the rainy season. The proposed action is to decommission all newly constructed roads and leave them in an erosion resistant condition. The water resources report (p. 10) concluded the new road construction would have no effect on sediment delivery to stream channels.

Road Renovation, Improvement and Decommissioning

The closest road activity to fish habitat would be the renovation of the 28-10-9.0 road. The nine stream crossings on this road are located approximately 0.36 to 0.5 miles to fish habitat in the East Fork Coquille River. The proposed renovation would result in bare soil, which could cause sediment to enter streams during the first winter. While sediment would enter stream channels, it would not cause changes to fish habitat. Sediment entering streams would be short-term and indistinguishable from background levels. Following the first winter after road activities, sediment entering streams would become negligible. Best Management Practices and PDFs for road related activities would reduce and in some cases eliminate sediment from entering stream channels. The sediment derived from roadwork would primarily end up on the forest floor as it moves through ditch lines and out of ditch relief culverts. Well-vegetated ditch lines would reduce the amount of sediment entering stream channels where roads are connected to streams. A PDF stating, "existing drainage ditches that are functioning and have a protective layer of non-woody vegetation would not be disturbed" would reduce the total length of ditchline disturbance and reduce sediment input to streams. The proposed renovation would reduce the amount of sediment entering streams in the long-term. The renovation will include measures designed to reduce if not eliminate sediment input to stream channels. Such measures include but are not limited to rocking stream crossings that have the potential to deliver sediment to streams and reshaping the road to direct water off the running surface. The proposed decommissioning and improvement would not result in sediment entering stream channels or fish habitat because there are no stream crossings on these roads.

Haul

Haul could occur during the wet season on all roads proposed for haul. Haul on the 0.3 mile paved portion of the 28-10-9.0 road would not result in sediment delivery to stream channels. The 28-10-9.0 bridge crossing over the East Fork Coquille River is paved. The remainder of the 28-10-9.0 road is gravel with nine stream crossings. The other roads proposed for haul do not have any stream crossings and have no mechanism to transport sediment to streams or fish habitat.

Renovation activities on the 28-10-9.0 road would include measures to reduce if not eliminate sediment input at the nine stream crossings during wet season haul. See the road section in the proposed action of the EA for a specific description of the renovation activities for the 28-10-9.0 road. The amount of sediment entering streams would be negligible during haul on the 28-9-10.0 road because of the haul related PDFs, BMPs, the adequately surfaced roads, and vegetated ditchlines. The negligible amount of sediment would not affect fish habitat downstream in the East Fork Coquille River because the amount would be negligible and the distance between the stream crossings and the coho, CCH, and EFH would allow the sediment to filter out. Road renovation completed prior to and after haul would further reduce if not eliminate the amount of off-site sediment movement during and after haul. Ditch relief culverts would direct the majority of sediment derived from winter hauling to the forest floor via ditch lines.

Sediment directed to hillsides by ditch-relief culverts would filter into the soil before reaching stream channels. Brake *et al*. (1997) found that on established logging roads within the Oregon Coast Range, the maximum observed distance sediment traveled below a ditch relief culvert with vegetation filtering or a stream crossing culvert with stream material present (LWD, boulders, debris, etc.) was typically not more than 6.21 meters.

Conclusion

Sediment generated from road renovation and haul would not have direct or indirect short-term effects to fish habitat because of the implementation of PDFs and BMPs and the proximity of fish habitat in relation to the proposed road activities. The amount of sediment reaching headwater channels would not cause a reduction in macroinvertebrate production, which is a food source for fish. The proposed road related activities would not cause a change in embeddedness, interstitial spaces, or pool depth. Road renovation would result in a long-term reduction in sediment entering streams because this road activity would improve road drainage and therefore reduce surface erosion.

Water Resources

The proposed harvest unit is located within the 134 square mile, East Fork Coquille River Watershed. Watershed is defined as the 5th field hydrologic unit level. Sub-watershed refers to a smaller, 6th field hydrologic unit which varies from about 15 – 27 square miles for the affected sub-watersheds. Table III/IV-8 below shows the location and scale of the project by sub-watershed. These two sub-watersheds comprise the analysis area (**Map 1**). Approximately 98% of the treatment area is located in the Brewster Canyon Sub-watershed. The other small portion of the harvest area, about 2%, extends over the ridge in the south part of the unit into the Elk Creek Sub-watershed.

Table III/IV-8 Location and Area of Harvest by Watershed

Watershed (5th field)	Sub-watershed (6th field)	Area* (mi^2)	Area* (Acres)	Harvest Acres*	Percent of Sub-watershed
East Fork Coquille River	Brewster Canyon	26.6	17,052	132	0.77
	Elk Creek	15.2	9,698	3	0.03
Totals		41.8	26,750	135	0.50

*Approximate values based on GIS data

Intermittent and small perennial streams are located within or adjacent to the proposed treatment unit (see maps).

The three small streams in the east portion of the unit have no surface connection to the rest of the watershed's stream network. Just to the east of the unit is the Sitkum Landslide that has a surface area of about 1.5 square miles and an estimated volume of about 13 billion cubic feet. This slide blocked the East Fork Coquille River at least 3,000 years ago and created the Sitkum Valley (Lane 1987). The small streams along the eastern boundary of the unit merge to form a small perennial stream a few hundred feet from the unit boundary. This perennial stream flows east about a quarter of a mile and then goes subsurface into the unconsolidated slide material about a mile before reaching the East Fork Coquille River.

Annual Yield, Low Flow and Forest Harvest

Annual water yield is the total volume of streamflow derived from a catchment over an entire year. Timber harvest can increase annual water yield and low flows by reducing evapotranspiration (Harr and Coffin 1992). Studies have shown that changes to annual yield are proportional to the amount of vegetation removed (Bosch and Hewlett 1982, Satterlund and Adams 1992). A review of paired watershed studies in rain-dominated regions of the Pacific Northwest by Moore and Wondzell (2005) found that extreme low flows decreased (flows increased) for at least the first few years after harvest. They found that water yield is increased on average about 6 mm (~1/4 inch) for each percent of basal area

removed. From looking at several paired watershed studies, Stednick (1996) found that about 25% of a watershed in the Pacific Coast region needed to be harvested to detect an increase in annual yield. Yield increased about 50mm (2 in.) for each 10% of a watershed harvested in the Oregon Coast Range.

An increase in annual yield is most detectable as an increase in low flows in summer when precipitation is low and evapotranspiration rates are high. An increase in water yield, especially during summer and early fall low flow periods, is perceived as a net benefit in most cases (WDNR 1997). In some cases, vegetation removal has been used as a tool to increase available water. Moisture from fog or low clouds intercepted by the forest canopy may also be a factor in the annual water balance of coastal areas. One study showed that forest harvest in foggy, coastal areas can actually decrease annual yield as there is less leaf area to capture the moisture (Harr *et al.* 1982). However, this effect is difficult to measure (Jones 2000).

In most cases, harvested areas do not permanently change water yield. As trees are replanted and grow, evapotranspiration will increase over time thereby reducing annual yield to previous levels (Jones 2000, Jones and Grant 1996, Thomas and Megahan 1998). Models have been developed to assess the cumulative effects of vegetative disturbance and subsequent hydrologic recovery on evapotranspiration. Equivalent Clearcut Area (ECA, see Reid (1993) for a review) has been used to calculate the change in water yield for a catchment from past and future harvest activity. The ECA model generates the cumulative effect of harvest by comparing the total vegetative disturbance in a catchment to an equivalent clearcut area.

One ECA model (Ager and Clifton 2005) uses a post-harvest recovery rate (increase in evapotranspiration) of 4.3% per year for moist forests with full recovery at 23 years. BLM used these recovery values and regeneration harvest history to calculate existing ECA in the analysis area. Harvest history was based on Oregon Department of Forestry change detection history GIS layer (Lennartz 2005) and more recent aerial photos. These data cover harvest history from 1972 to 2011. Areas harvested 23 years ago (before 1988) were assumed to be fully recovered. Table III/IV-9 below shows the existing condition of the analysis area in terms of ECA and potential increase in annual yield using these values. The Elk Creek subwatershed was not included in the analysis because of the small area proposed for harvest (3 acres) in the subwatershed. However, judging from the data used below, harvest history is similar to that in Brewster Canyon.

Table III/IV-9 ECA and Existing increase in annual yield for the Brewster Canyon subwatershed

Subwatershed (6th field)	[1]Forested Acres	[2]ECA (acres)	Equivalent % Harvested	[3]Increase in Annual Yield (in)	[4]Percent Increase in Annual Yield
Brewster Canyon	16,283	2,261	13.9	2.8	6.2

1. GIS data from Oregon Department of Forestry (ODF) Change detection History 2005
2. Calculation based on ODF data above, aerial photos, and Ager and Clifton (2005)
3. Based on a 2 inch runoff increase for each 10% harvested (Stednick 1996)
4. Based on an average annual yield of 45" (precipitation of 70" – ET of 25")

The existing (2011) ECA for the Brewster Canyon subwatershed is approximately 2,261 acres or 13.9 % of the subwatershed (Table 2). A simple hydrologic model was used predict the potential increase in annual yield from ECA (Table 2). It is based on the principle that annual water yield or runoff (RO) is equal to the amount of annual precipitation (P) minus water lost through evapotranspiration (ET), plus or minus the change in storage (S). Thus, the complete runoff formula is $RO = P – ET + \Delta S$. Because the annual amount of precipitation going into storage tends to balance out year-to-year over time, it is typically ignored in long-term considerations of water yield (Satterlund and Adams 1992, p 5). Therefore, the simplified formula used in this analysis is $RO = P – ET$.

The average annual precipitation in the analysis area is approximately 70 inches. Therefore, RO = 70" – ET. Based on a review of the literature, the Douglas-fir/western hemlock forests of the Pacific Coast generally have an average annual evapotranspiration of approximately 25 inches. So, in the undisturbed state, RO = 70" – 25", or about 45 inches. The calculated increase in annual yield from harvest is based on an increase of 2 inches for every 10 percent of the watershed harvested as per Stednick (2006) cited above. Table III/IV-9 shows a change in annual yield for the subwatershed of about 2.8 inches based on existing (2011) percent harvested area. The percentage increase in annual yield from previous harvest is approximately 6.2%. This change would be most noticeable as an increase in summer and early fall streamflow compared to a fully forested condition. However, a 10% change in annual yield or runoff is often used as the minimum detectable level.

The proposed harvest would have a negligible effect on annual yield and low flows. The project could slightly increase average annual yield in the analysis area due to decreased evapotranspiration because of harvest. However, the direct effect of the proposed harvest would not be measureable and is much less than the annual variation in precipitation and runoff. Table III/IV-10 shows the existing increase in annual yield from past timber harvest in the analysis area would increase additionally about 0.2 inches as a result of the proposed project. The cumulative post-project increase in annual yield would be approximately 2.9 inches or 6.5% compared to an undisturbed condition.

Table III/IV-10 Increase in ECA and annual yield including the proposed harvest unit.

Subwatershed (6th field)	[1]Existing Increase in Annual Yield (in)	Proposed Harvest Acres	[2]Additional Increase in Annual Yield (in)	Cumulative Equivalent % Harvested	[3]Cumulative Percent Increase in Annual Yield
Brewster Canyon	2.8	135	0.2	14.7	6.5

1. From Table III/IV-9
2. Based on a 2 inch runoff increase for each 10% harvested (Stednick 1996)
3. Based on an annual yield of 45 inches

A 10% change in runoff is often used as the minimum detectable level. Therefore, the cumulative increase in annual yield for the Brewster Canyon subwatershed would be below the detectable level. If this change could be detected, it would be most noticeable as an increase in summer and early fall streamflow, when evapotranspiration is high and precipitation is low.

Peak Flows and Roads

The Governors Watershed Enhancement Board (GWEB) developed a method for assessing the potential risk of the road network to cause an impact on stream flow. The assessment assigns a "threshold of concern" for hydrologic impacts based on the percentage of area covered by roads. The threshold levels are 0-4% low risk, 4-8% moderate risk, and above 8% high risk (WPN 1999).

Based on GIS data, there are about 140 miles of road in the Brewster Canyon Sub-watershed. Using an average road width of 30 feet (0.0057 miles), there are approximately 0.8 sq. miles covered by roads (0.0057 miles width x 140 miles length). This equates to about 3% of the total area covered by roads (0.8 sq. miles road area / 26.6 sq. miles total area). Therefore, according to the GWEB method, the sub-watershed currently has a low risk (<4% road area) of hydrologic impacts due to roads. However, as stated by the authors, the condition of roads and the design of drainage systems may be just as important in determining the impact of roads on stream flow. As noted above, the drainage systems of many roads in the analysis area are directly connected to stream channels. The Elk Creek sub-watershed was not analyzed because of the small area involved (3 acres) and no new road construction in the Sub-watershed for this project.

No Action

Other roads would be constructed in the Brewster Canyon Sub-watershed to access private forest lands. It is unknown whether there would be enough road construction to exceed the GWEB threshold described above to cause impacts to flow regimes. However, the Oregon Department of Forestry has greatly improved requirements for new road design and construction practices (ODF 2007) since the legacy roads were constructed in the 1960s and 1970s. These new roads are less likely to connect to streams or to increase peak flows.

Other planned federal projects in the sub-watershed, including the Green Chain Timber Sale analyzed in the Weaver-Sitkum EA, include road construction and renovation. These proposed projects include design features similar to those in this EA that would reduce road connection with the stream network.

Proposed Action

The approximately 1.1 miles of new road construction would not affect peak flows. Using the GWEB analysis described above, total road area in the sub-watershed would still be below the threshold of concern (<4% road area). The roads do not cross stream channels and would be decommissioned at the completion of project activities. Decommissioning would incorporate design features, including adequate waterbars, which effectively disconnect the roads from the drainage network. Water intercepted by the road surface is routed to the forest floor where it can infiltrate back into groundwater. Finally, by improving road drainage, some roads proposed for renovation and improvement would effectively be disconnected from the stream network.

<u>Sediment</u>

The Oregon Department of Environmental Quality (ODEQ) develops water quality standards that protect beneficial uses of rivers, streams, lakes, and estuaries. Beneficial uses for streams that could be affected by timber harvest include domestic water supply and fish/aquatic life. ODEQ places water bodies that do not meet water quality standards on the States' 303(d) list as Water Quality Limited (ODEQ 2006). There are currently no streams listed for excess stream sedimentation in the analysis area.

Sediment input to stream channels is a result of both natural and management related processes. Primary sediment sources include episodic landslides (e.g. the Sitkum Landslide briefly described above), debris flows usually associated with intense winter storms (Townsend *et al.* 1977), hillslope erosion, stream bank erosion and roads. Forest management-related increases in sedimentation are most often the result of poorly designed and/or poorly maintained forest roads. These roads can be a major contributor of fine sediment to streams (Reid and Dunne 1984).

Approximately 5 miles of the haul route is gravel and 0.3 miles is paved. From a field inspection of the proposed haul route, there is only one area of potential sediment delivery where a section of the 28-10-9 road crosses nine small streams. Four stream crossings on a privately owned portion of this road have some potential for sediment delivery during timber haul in the wet season. Other roads in the analysis area, not part of the haul route, show evidence of surface erosion and inadequate drainage. These roads are also likely to provide excess fine sediment to adjacent streams.

Proposed Action

<u>Road Construction</u>

The 1.1 miles of new road construction would have no effect on sediment delivery to stream channels and would not affect water quality. There would be no new stream crossings. The proposed new roads would be primarily located on or near ridge tops and would incorporate design features that include avoiding fragile or unstable areas, minimizing excavation and height of cuts, endhaul of waste material where appropriate, and construction during the dry season (USDI 1995).

All of the new road surface would be rocked to allow winter harvest. The roads would be seasonally maintained prior to winter rains if they needed to be used the following year. Seasonal maintenance may include but is not limited to providing adequate water bars and seeding/mulching bare soil areas with wood chips or straw. All of the newly constructed roads would be decommissioned when project activities associated with each road are completed.

With the implementation of the road management Project Design Features, these roads would not increase sediment delivery to stream channels due to their locations, intervening forest buffers, and distances to streams. Road drainage features would be designed so that any sediment-laden surface water would quickly infiltrate into forest soils. Therefore, the proposed roads and landings would not affect water quality.

Road Renovation/Improvement

Renovation and improvement of approximately 4.2 miles of the haul route would minimize sediment delivery to streams during project operations. The private portion of the 28-9-10 road (segment C) identified above would be renovated to minimize sediment delivery at the identified stream crossings. Renovation would include construction of ditch-outs and one water dip at specific locations to direct road water onto the forest floor and away from streams. Adding rock to the road near stream crossings would reduce sediment created by haul. The road crown would be graded and shaped to prevent water from flowing down the road to stream crossings. At one stream crossing, installation of a 40-foot silt fence would prevent any road sediment from entering the stream. Because of this renovation, the amount of fine sediment introduced to streams during timber haul would be negligible, compared to natural erosion processes occurring during winter rains, and would have no impacts to downstream resources. At the completion of project activities, the renovation would reduce the potential for stream sedimentation from the road.

A total of 2.9 miles of road, including the 28-9-10 road, would be renovated to meet winter haul standards (Table II-3). Renovation of these roads to standards required for new construction (USDI 1995), would divert road drainage away from stream channels and toward the forest floor where it could infiltrate. Renovation may include surfacing with rock, stabilizing cutbanks and fill slopes, restoring outslope or crown sections and providing adequate drainage.

An additional 1.2 miles of the haul route would be improved by surfacing existing dirt roads with rock and providing adequate drainage to allow all season haul. Road renovation and improvement would occur in the dry season for any activities requiring soil displacement. Bare soil areas would be treated after renovation and before onset of winter rains, if needed, to prevent sediment delivery to streams. Therefore, renovation or improvement would have a negligible potential for short-term (1-2 year) increased sediment delivery to stream channels. In contrast, road renovation and improvement would provide a slight, long-term benefit to flow routing and water quality in the affected areas.

Decommissioning

The 1.1 miles of new road would be decommissioned at the completion of project activities. Decommissioned roads would be closed to vehicles on a long-term basis (>5 years) but may be opened and maintained for periodic future use. The roads would be left in an erosion–resistant condition. Decommissioning would include installation of a suitable barrier to block access. In addition, water bars would be installed where necessary to provide road drainage and bare soil areas would be treated to prevent erosion. Decommissioning of these roads would reduce their potential to deliver sediment to stream channels or alter flow routing in the analysis area.

Haul Activities and Road Maintenance

The amount of fine sediment introduced to streams during timber haul would be negligible, compared to natural erosion processes occurring during winter rains, and would have no impacts to downstream resources. During the dry season, since there is little or no flowing water on road surfaces, there would be a negligible amount of sediment delivery to streams because of haul. During the wet season, there would be no sediment delivery from the paved portion of the haul route because paved roads are not likely to produce sediment (Reid and Dunne 1984).

Wet season haul on gravel roads has the largest potential to deliver sediment to stream channels. However, the 28-9-10 road is the only gravel road that crosses streams and has a potential for increasing sediment delivery during wet season haul. The renovation of this road would divert sediment-laden water on the road surface away from streams and onto the forest floor. Several design features listed in Chapter 2 (Design Features for the Proposed Action) would minimize the potential for increased sediment delivery from haul activities and road maintenance. These design features would be in place before winter haul and may include applying an additional lift of rock to stream crossings if there is a potential for road sediment delivery to a stream; containing any offsite movement of sediment from the road or ditch flow near streams with a suitable sediment filter; monitoring road conditions during winter use to prevent rutting of the rock surface; and suspending haul during very wet conditions. Road maintenance during the life of the project would minimize road drainage problems and reduce the possibility of road failures and increased sediment delivery to streams.

Private timber companies use the majority of gravel-surface haul routes in the analysis area extensively throughout the year. Though some minor sedimentation may result from the additional proposed haul activities, occurrence should only take place during prolonged rainfall events until haul is suspended as noted above. Additional sediment from winter haul would be negligible and not outside levels that presently occur during such rainfall events.

Treatment in Riparian Reserves

This thinning would be similar to typical density management treatments with the addition of a light broadcast burn following harvest. The 35-foot no-harvest area adjacent to this intermittent stream is intended to protect bank stability and prevent sediment delivery to streams from adjacent harvest operations. Rashin and others (2006) found that stream buffers were most effective at preventing sediment delivery when timber falling and yarding activities were kept at least 10 meters from streams and outside of steep inner gorge areas. This buffer would provide an adequate sediment filter strip because non-compacted forest soils in the Pacific Northwest have very high infiltration capacities and are not effective in transporting sediment by rain splash or sheet erosion (Dietrich *et al.* 1982).

Soils

The soils in the proposed harvest area are well suited for timber production. Approximately 90% of the proposed unit is comprised of the Preacher-Blachly soil association and 9% is the Milbury-Bohannon-Umpcoos association. Two other soil associations make up the remaining 1% of the unit. These are all well drained forest soils but have a low resistance to compaction and are easily erodible where steep (NRCS 2010). Impacts to these soils can be mitigated by harvest technique and seasonal restrictions.

A majority of the proposed harvest area is on mild 0–35% slopes. Slopes average 35–75% in the NE corner of the harvest area and in the Riparian Reserve. A few acres in the NW portion of the unit lap over a ridge where slopes average greater than 75%. The northeast portion of the harvest area is near the edge of the Sitkum Landslide, briefly described above under *WATER RESOURCES/Stream Flow*. The harvest unit boundary was pulled back from this edge due to very steep, unstable areas with some vertical rock faces.

The proposed harvest area was logged in the late 1950's. Aerial photos from 1959 show road construction and several skid trails used selectively to log some areas, possibly as fire salvage. Based on an analysis of the 1959 aerial photos, there were approximately 3.4 miles of skid trails in the proposed harvest area. Using an average width of 12 feet, about 5 acres were compacted by these previous skid trails. The existing roads in the harvest area have a length of approximately 1.3 miles. Using an average width of 16 feet, about 2.5 acres is compacted by the existing roads. Therefore, in 1959, about 7.5 acres or 5.6% of the proposed harvest area was compacted to some degree. However, most of the area compacted by skid trails has largely recovered over the last 50 years due to natural processes. Compaction is reduced over time by freezing-thawing, wetting-drying, growth of plant roots, soil organisms and other biological activity (Adams and Froehlich 1984).

No Action

Soil compaction from previous logging in the project area would continue to recover. Since the project area is within the Matrix LUA, timber harvest would occur sometime in the future. The effects to soils from future harvest and road building activities would be analyzed at that time.

Proposed Action

The proposed harvest would result in some additional compaction, but compacted area would remain well below 12% of the harvest area as recommended in the District ROD/RMP (USDI 1995). Using appropriate harvest techniques and other project design features (PDFs) would protect soils. The 1.1 miles of new road construction would result in compaction of approximately 2 acres (16 ft. width x 1.1 miles), or 1.5% of the area harvested.

Harvest operations would use both ground-based equipment and cable yarding. There would be some soil disturbance from cable yarding but additional compaction would be minimal. Cable yarding would require one-end log suspension in cable yarding areas. Designated skyline corridors would be used in the Riparian Reserve and the mamu treatment areas (approximately 13 acres). Corridors would be a maximum of 12 feet wide and a 75-foot lateral yarding capability would be required. The location, number and width of corridors would be specified prior to yarding, and natural openings would be used as much as possible (USDI 1995). Yarding across stream channels would not be required.

Ground-based equipment would be used to harvest approximately 21 acres or 16% of the harvest area. This equipment would create some additional compaction. However, appropriate harvest techniques and other PDFs would protect soil productivity. In order to minimize compaction, ground-based equipment would be restricted to slopes less than 35% and would operate only during the dry season when soil moisture is below 25%. The BLM would designate skidding trails with the objective of having less than 12% or 2.5 acres of the ground-based harvest area affected by compaction. Existing skid trails would be used to the extent practical (USDI 1995). A skyline cable system capable of achieving one-end suspension would be permitted to operate during the wet season in ground-based areas.

Site-preparation for the project would include machine- and hand-piling of slash, which would be burned. Broadcast burning would occur on approximately five acres to enhance beargrass. Large fuels would be removed through the light intensity burn planned in the Riparian Reserve would have a minimal long-term effect on soils. Burning would be restricted to greater than 60 feet from the stream.

Machine and hand-piling would be used to reduce heavy fuel loads on the rest of the unit. Sufficient woody material would remain to assist in soil development. These piles may burn at a high intensity and could adversely affect soils in approximately 3–5% of the harvest area. High soil temperatures can change soil texture and structure and reduce soil nutrients. However, removing excess fuels would reduce the chance of a catastrophic fire that could adversely affect soils over a much wider area. Low ground

pressure equipment, such as wide-tracked excavators, would be required for mechanical piling. Machine piling would be limited to the dry season and when other environmental conditions exist.

At the completion of harvest activities, drainage and erosion control measures, including water barring of skid trails where necessary, would be applied to bare soil areas following use and prior to winter rains (USDI 1995). Access points for skid trails would be blocked with logging debris to prevent vehicle access after harvest operations are completed.

Early successional vegetation that grows because of this project would recharge nutrients that can make the soil more fertile. Many early-seral plants including lupines, alder and some *Ceanothus* species have the ability to fix nitrogen (Swanson *et al.* 2010).

Fuel Loadings

The fuels loading within the stand are currently at a moderate level and are steadily increasing as the younger areas of the stand undergo natural succession. There are patches of older trees that survived the fire in the 1940's, but the younger stand surrounding them has increased the risk for another stand-replacing fire event.

No Action

Natural processes that increase live and dead fuels in the forest structure would continue. This increase in dead fuels would take place through self-pruning, stand mortality and wind throw. Live fuels, mostly ladder fuels, would continue to develop promoting higher mortality due to increased stand density and would be a key component to promote crown fire activity that cause stand replacement fires. Rapid rates of fire spread and increased fire intensities would hinder responding fire suppression resources, therefore loosing opportunity to stop fires from spreading onto adjacent lands.

Proposed Action

There would be a short-term increase in surface fuel loadings, which would escalate the risk of damage of a wildfire occurred. Though the probability is low, during logging operations where the logging has some history of equipment fire starts within the logging operation is where this risk is greatest. Restrictions imposed and enforced by the local fire protection agency (CFPA) would mitigate this risk to a level of little concern. To further this mitigation of hazardous fuels, shortly after the logging activity has concluded, the fuel continuity would be broken up and fuel amounts reduced during the construction of hand or machine piles. This would eliminate heavy concentrations of fuels, but would leave sufficient amounts of woody material to contribute nutrients to the soil. These piles would be burned during the time of year when the reserve is wet and fuel moistures are high. In the Riparian Reserve area where broadcast burning is proposed, larger fuels would be extracted to eliminate subsequent damage to soils when larger fuels burn. The remaining fuel would be smaller and well-distributed providing a fuel base to accomplish a low intensity broadcast burn that can be managed easily. The effects of this type of burn would decrease damage to soil, retained trees and coarse wood debris.

Climate Change

Substantive new information has been produced regarding climate change since publication of the 1994 PRMP FEIS (USDI 1994), to which this EA tiers. Considering information produced since the completion of the 1994 PRMP FEIS, it is unequivocal[5] that global temperatures have increased (approximately 1°C since late 1800's); it is also likely that temperatures in the PNW have increased (CIG 2004, Clark *et al.* 2004, IPCC 2007) by a similar amount (OCCRI 2010). Human influence on this climatic change, through production of greenhouse gasses, disturbance and land cover change, is likely (IPCC 2007). Temperature increases in the west over the next century may range from 2º C at the low

[5] Discussion in this section uses terminology for certainty developed in IPCC (2007, pg. 27).

end of the uncertainty range to 6 ºC at the upper end of the uncertainty range (IPCC 2007, Miles and Lettenmaier 2007, OCCRI 2010). This increase is well (>2 standard deviations) outside of historic conditions. For context, the shift from the last ice age to the current climate was approximately 9 ºC. There have also been increases in winter precipitation since 1930 over much of the western United States (US), although patterns vary in different regions within the west (Clark *et al.* 2004, Salathe *et al.* 2009) . Precipitation changes in the western US over the next century are complex and more uncertain than temperature changes. Western states precipitation may increase by as much as 6% by 2100 (CIG 2009, Hidalgo *et al.* 2009). This increase would be well within 20th century variability in precipitation (<1 SD from historic mean), and would again be expected to differ widely by region within the western US.

Indirect changes in western US ecosystems attributable to changes in temperature and precipitation cycles have also been predicted. Most modeled changes describe potential broad shifts in vegetation types (Lenihan *et al.* 2006, Millar *et al.* 2006), fire behavior (CIG 2004, Mote 2003) or hydrological cycle (Furniss *et al.* 2008, Hidalgo *et al.* 2009). These shifts would have to be considered speculative at the scale of western Oregon and would almost surely be obscured by local conditions at the scale of the analysis area.

There is uncertainty in climate change model predictions due to uncertainty in how the climate actually works as well as uncertainty in future socio-economic and political responses (CIG 2004). Uncertainty in global climate model predictions attributable to physical processes increases at smaller spatial scales, due to the importance of regional climatic patterns (such as ENSO[6]) and local topography (such as the Coast Range) (CIG 2009). Predictive models of temperature and precipitation have been developed (down-scaled) for the Pacific Northwest, but have not been developed specifically for the Coast Range Province or for the local analysis area. Application of larger-scale model results to the analysis area directly would be predicted to induce bias, and to have low accuracy. Extrapolating such models to predict future vegetation or animal response would increase bias even further, and would probably have limited utility in describing the cumulative effects of the Action or in differentiating between Alternatives.

Secretarial Order #3226 (2001, amended 2009) directs all Departments to "consider and analyze potential climate change impacts when undertaking long-range planning exercises." The 1994 PRMP FEIS (Appendix V, pg. 217) considered climate change effects as part of long-term planning efforts at the Plan-scale (western Oregon). Although the 1994 PRMP FEIS recognized the possibilities of increased incidence of wildfire, insect outbreaks, shifting range of species including Douglas-fir, and forest species composition, it found "no scientific consensus about the extent or rate of global warming nor the probable effect on forest ecosystems in western Oregon" (p.217). Although new information has been produced since this FEIS, it is still not possible to reasonably foresee or quantify the specific nature or magnitude of changes in the affected environment. Although it is not speculative that changes in the affected environment will occur due to climate change, it is not possible to reasonably foresee the specific nature or magnitude of the changes ((USDI 2008b) p. 488). Consideration of predicted changes in vegetation, fire, hydrological cycles, or other responses due to climate change would be speculative at the Plan scale; predictions at the scale of the analysis area would be more uncertain. Therefore, potential changes in the analysis area attributable to climate change were not incorporated in the Wagon Road Pilot EA.

The Proposed Action would result in a cumulative 50 year flux of greenhouse gasses (GHGs) to the affected environment on the order of 5 thousand metric tons (megagrams (MG)) of CO_2 by 2061: at the scale of western Oregon, carbon stores are predicted to increase by 169 million MG under the NWFP by 2106 (USDI 2008). Action area carbon flux estimates are quantified and described fully below. However, it is not possible with current science to estimate the effects of these GHG fluxes on the local affected environment. The USGS summarized science regarding the effects of local actions on climate

[6] ENSO is the El Nino southern oscillation.

change and concluded "Difficulties remain in simulating and attributing observed temperature changes at smaller than continental scales…It is currently beyond the scope of existing science to identify a specific source of CO_2 emissions and designate it as the cause of specific climate impacts at an exact location" (USDI 2008a). This memorandum (No. 2008435-DO) is incorporated by reference.

Greenhouse Gasses: Carbon Stores and Carbon Flux

As an aid to decision-making, this analysis estimates carbon flux to the analysis area associated with the Proposed Action. Carbon flux is the rate of exchange of carbon between pools, the net difference between carbon removal and carbon addition to a system. For the atmosphere, this refers to carbon removed by plant growth, mineralization, dissolving in the ocean and other processes, balanced by carbon added through plant respiration, harvest/volatilization, concrete production, fossil fuel burning, volcanic activity and other processes. Forest harvest may lead to flux of greenhouse gasses (GHGs) in addition to CO_2, principally N_2O and CH_4 (Jassal *et al.* 2008, Sonne 2006). N_2O flux from forestry activities may account for ≈15% of GHG emissions (Sonne 2006), this is primarily due to fertilization. Although approximately 320 lbs. *total* of nitrogen fertilizer are being used in the seed and mulch mix for road decommissioning, it is insignificant when compared to the 200 lbs. *per acre* typical in forestry applications. CH_4 may account for an additional 10% of total forest management GHG production (Sonne 2006). Due to lack of scientific information and lack of adequate models on the effects of forest activities in the Pacific Northwest on non-carbon GHGs, and the (presumably) minor contribution of these other gases to GHG flux associated with the Proposed Action in relation to total flux estimation error, they are not here addressed. The indirect effects of carbon flux following timber harvest have been addressed below. Indirect effects of this carbon flux on climate change and the affected environment is addressed in the **Climate** section.

Carbon Flux of the Proposed Action

Estimates of carbon stores in the analysis area as a whole would be fraught with error, could complicate contrast between the Alternatives, and would not facilitate decision-making. Instead, this analysis quantifies the net effect of the Proposed Action on greenhouse gas levels by comparing changes in carbon storage that would occur under the Proposed Action to the carbon storage that would occur under the No Action alternative, as suggested in IM-2010-012 (USDI 2010). Specifically, this analysis estimates the carbon flux associated with implementation of the Proposed Action roughly fifty years from the present, incorporating: **a)** differences in carbon storage in live, dead, and organic soil carbon pools; **b)** the intermediary flux from wood products produced by the Proposed Action through this period; and **c)** "secondary" C fluxes associated with logging and hauling systems.

Analysis of carbon flux associated with changes in live and dead pools attributable to the Proposed Action ("a", above) used relatively simple tree-/stand-scale models available with the Forest Vegetation Simulator (FVS) modeling package[7] (http://www.fs.fed.us/fmsc/fvs/). This method considers changes due to succession and forest management in all major live and dead carbon pools within the action area (treated units). This FVS model does not directly incorporate microclimatic effects, dynamics of herb and shrub understory layers, stable soil pools, or the C flux associated with actual harvest equipment. Herb and shrub carbon pools are relatively small compared to total stores, and are similar between young and mature stands (USDI 2008, p.App-29). Soil carbon represents 9-20% of total site carbon but is the most stable C store and the least likely to respond to disturbance. For example, 60-year old forests and 450-year old forests have similar soil carbon storage (Harmon *et al.* 1990). Flux of carbon from merchantable wood products ("b", in previous paragraph) produced from the Proposed Action during the 50 year analysis window was estimated following synthesis in USDI (2008, p. App-30). GHG emissions from

[7] Climate FVS, which is a similar tool but models growth under different climate change scenarios was not used because it would require an arbitrary selection of a particular climate change scenario (See Climate section). An alternative model, The Forest Sector Carbon model from Oregon State University, is currently only available as a Bets and only for the Western Cascades forest type.

forestry activities necessary to harvest these units ("secondary emissions", "c" in previous paragraph) were estimated following (WRI 2010), and added to FVS estimates (see below).

Proposed Action

The Proposed Action would treat approximately 134 acres of forest, volatilizing some carbon, moving carbon from live tree pools to detritus and wood products pools, and storing some carbon in forest products while leaving some residual trees and growing replacement trees. Making a set of very broad assumptions and using the FVS carbon model and assumptions similar to those developed in the 2008 RMP FEIS (USDI 2008); compared to the No Action Alternative the Proposed Action would result in a C flux of 3,570 metric tons (MG) over the 50 year[8] time period from harvest until approximately 2061. GHG emissions from forestry activities necessary to harvest these units ("secondary emissions"[9]) have been estimated at 0.1429 MG CO_2/ MBF (WRI 2010). Applying this equation to the Proposed Action suggests an additional 1,014 metric tons (MG) CO_2 release attributable to the Proposed Action; this is consistent with Sonne (2006) predicted a relatively small C flux associated with harvest equipment. The sum of forest treatment and harvest system flux is roughly 5 thousand metric tons (4,584 metric tons). The calculations are summarized below.

Table III/IV-11 Stand level stored Carbon (above/below-ground, live/dead pools) in Metric Tons

Present Stored Carbon	Proposed Action[10] in 50yrs (PA)	Wood Products derived from Proposed Action after 50yrs[11]	No Action 2061(NA)	50 yr. Flux (NA-PA+C in wood products)
22,045 (7,682 removable as wood products)	21,062	5393	30,025	3570 (4584 w/ secondary emissions)

The difference in carbon between the action and no action alternatives would continue to decrease through time because the rate of carbon storage decelerates after a stand reaches the age of culmination of mean annual increment. When analyzed over a 20 year timeframe (when modeled stand-level carbon storage appears to be at a minimum but where the percent of carbon stored as forest products is higher), the carbon flux is approximately 7 thousand metric tons.

The total 50-year carbon flux of the Proposed Action compared to the No Action would not produce measurable change in global climates considering current detection and modeling technologies. To place this carbon flux in context, the total 50-year carbon flux associated with the Proposed Action would represent approximately:

- The average annual carbon footprint of 250 Americans, based on information in MIT (2008).
- The carbon flux of an American female with one child and all descendants, based on data in Murtaugh and Schlax (2009).
- <0.01% of carbon stored on BLM-managed lands in western Oregon (USDI 2008)[12]. BLM-managed lands in western Oregon support approximately 1% of the carbon stored in the western U.S., and 0.02% of global carbon stores in vegetation, soil, and detritus (USDI 2008).
- Below the indicative threshold (25,000 metric tons) set by the EPA under a mandatory reporting rule for non-forestry regulated entities (74 FR 56373)[13]

[8] Data were normalized to a 50 year time frame in Sonne (2006)

[9] Secondary emissions are here defined as emissions from equipment consuming fuel employed to harvest, yard, load and haul logs to the mill, similarly to WRI (2010).

[10] Model assumes the replacement stand has, on average, 180 trees per acre at age 10.

[11] From WOPR 2008 Appendix C p.30, uses saw log carbon *emission* of 29.8% at 50 years, or conversely 70.2% *stored*. The initial draft of the EA incorrectly used 29.8% as the stored carbon rate. 7682*.702=5393. Most of the harvested wood volume is expected to be milled into dimension lumber.

[12] Note that the C flux associated with Proposed Action includes not just change in stores but flux due to harvest equipment.

[13] http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-FinalRule.pdf

- From the EPA greenhouse gas equivalencies calculator[14], the yearly CO_2 equivalents of emission from 3595 passenger vehicles, the energy use of 1587 homes, or the emissions of 0.004 coal fired power plants.

It should be emphasized that, as in most non-empirical carbon modeling exercises, estimates of carbon sequestration or flux are useful mostly for broad generalizations or comparisons, appropriate to convey relative sizes, but not very accurate for specific places and situations (Sharrow 2008). This analysis also does not address substitution: i.e., without change in global demand for wood products, the No Action would necessitate harvest in another location (importation/transportation from other countries or regions) or substitution with other building materials (steel, aluminum, concrete etc.) resulting in a comparable (or larger) carbon flux. Although the Proposed Action would be predicted to result in a mid-term flux of carbon to the atmosphere, carbon stores in the reserved portions of the action area under the Proposed Action scenario would be predicted to approach a steady state at or above 250 metric tons acre C, comparable to storage under the No Action Alternative (depending on the frequency of disturbance).

This EA is tiered to the 1994 PRMP FEIS that considered carbon flux and climate change at the Plan scale. The 1994 PRMP FEIS considered speculative and did not consider the indirect effects of carbon flux associated with the Plan on aspects of the affected environment including wildlife, economies, human health, and other resources (Appendix V, p. 217). The 1994 PRMP FEIS concluded that with implementation of any of the alternatives at the Plan level, "the overall impact on the global atmospheric carbon dioxide balance would be much less than 0.01 percent of the total" (p. 4-1). Based on the small estimated permanent flux of carbon that would be associated with the cumulative effects of the Proposed Action following the 1994 PRMP FEIS, the high uncertainty in any such estimate of carbon flux (and other sources of GHGs), and the response of global climate to these GHG's, conclusions in the 1994 PRMP FEIS remain valid and applicable to the cumulative effects of the Proposed Action.

Cumulative effects: At the scale of western Oregon, considering the cumulative effects of both forest succession (a carbon sink) and harvest (a carbon source) under the NWFP in the Plan Area, carbon stores would be predicted to increase by 2106, from 427 to 596 million MG. This sequestration is less than under a "No Harvest" scenario, but does represent a gain in carbon storage. U.S. annual CO^2 emissions (circa 2008) were approximately 6 billion MG. The flux of 5 thousand metric tons of carbon associated with the Proposed Action (over 50 years) would represent far less than 0.00002% of this yearly flux. The difference in carbon storage in 50 years between alternatives would be too small to lead to a detectable change in global carbon storage, and existing climate models do not have sufficient precision to reflect the effects on climate from such a small fractional change in global carbon storage (2008 FEIS, p. 543). Currently, federal thresholds for carbon flux related to individual actions have not been established. Uncertainty associated with all estimates of carbon flux in this analysis would be predicted to be quite high (circa 30%: 2008 RMP FEIS, p. 538). However, estimates of the magnitude and direction in carbon response are probably accurate, and these results may be instructive for comparing the effects of the Alternatives on local (watershed-scale) carbon stores.

Components of the Aquatic Conservation Strategy

There are four components to the Aquatic Conservation Strategy (ACS): RRs, Key Watersheds, Watershed Analysis, and watershed restoration. A "fifth" component is the standards and guidelines for management activities located in the Coos Bay District RMP.

[14] http://www.epa.gov/cleanenergy/energy-resources/calculator.html (accessed 12/16/2011)

1) Riparian Reserves:
The RR width within the analysis area is two site potential tree heights for fish bearing streams and one site potential tree height for perennial and intermittent streams. A site potential tree height in the East Fork Coquille 5th field watershed is 220 feet.

2) Key Watersheds:
The proposed action is not located within a Key Watershed.

3) Watershed Analysis:
The applicable Watershed Analysis is the East Fork Coquille (USDI 2005 *Update*). Incorporated into the proposed action are recommendations from this analysis and include silvicultural treatments within the RRs and road management.

4) Watershed Restoration:
The Coos Bay RMP states the most important components of watershed restoration are control and prevention of road-related run-off and sediment production, restoring the condition of riparian vegetation, and restoring in-stream habitat complexity." Density management thinning in the RRs and road renovation would accomplish watershed restoration.

5) Management Actions/Direction:
The following is a list of management actions/directions within RRs applicable to the proposed action.

Roads Management:
- Preparing road design criteria, elements, and standards that govern construction and reconstruction.
- Preparing operation and maintenance criteria that govern construction and reconstruction.
- Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- Reconstructing roads and associated drainage features that pose a substantial risk.

Timber Management:
- Apply silvicultural practices for RRs to control stocking, re-establish and manage stands, and acquire desired vegetation characteristics needed to maintain ACS objectives.

Existing Watershed Condition
Existing conditions in the East Fork Coquille 5th field watershed include (USDI 2005 *Update*):
- The BLM administers 45,448 acres out of 85,785 acres or 53% of land within this 5th field watershed.
- Approximately 25,047 acres or 55.11% of BLM land in the 5th field watershed is in RRs.
- The watershed contains approximately 44 miles of anadromous and resident fish-bearing streams and an additional 105 miles of resident only fish-bearing streams. Brewster Gorge is located on the mainstem of the East Fork Coquille (T28S R10W section 9) and is a long-standing natural barrier, which limits anadromous use in the watershed.
- 47.8% of stands within RRs are 0-40 years old.

Aquatic Conservation Strategy Objectives
The site scale for this analysis is the stream reaches within or adjacent to a proposed treatment unit or road activity. The watershed scale is the 5th field watershed, which would be the East Fork Coquille 5th field watershed.

The proposed VRH, murrelet habitat enhancement, new landing construction, new road construction, road improvement, and decommissioning would not occur within RRs. These activities have no potential to affect any of the ACS objectives. The following ACS analysis will not include these activities. Refer to effects section in the water resources starting on page 47 for a detailed analysis.

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.

Microclimate, water quality, stream bank stability, sediment regimes and habitat provided for riparian associated species are the watershed and landscape-scale features used for this analysis. Microclimate will be addressed under ACS objective 1; water quality under objectives 3 and 5; stream bank stability and sediment regimes under objectives 4, 6, and 7; and providing habitat for riparian associated species under objectives 2, 8, and 9.

Site Scale: Short and Long-Terms
Microclimates found in riparian areas are important components of watershed and landscape-scale features needed to ensure the protection of the aquatic systems. The five acres of density management thinning proposed in the RR would be adjacent to an intermittent stream. Microclimates adjacent to the intermittent stream would remain unchanged or within the range of natural variability at the site scale because of the 35-foot no-treatment zone. Post thinning canopy cover in the RR would be approximately 50%. Yarding corridors would not cross the intermittent stream channel. Burning would end 60 feet from the stream channels. The fire trails along with controlled lighting techniques conducted during spring-like conditions would prevent fire from entering the 35-foot no-treatment zone. Burning would most likely not result in tree mortality. Slash would be pulled back from the leave trees prior to burning in the RR.

MacCracken (2001) found treatment effects on microclimate variables analyzed were small and extremes in air temperature at conversion sites were similar. The 35-foot no-treatment zone would encompass the slope break and riparian vegetation. Anderson *et al.* (2007) found buffer widths (determined by either the change in riparian to upland vegetation or by the topographic slope breaks) were sufficient in maintaining microclimate post-harvest. These authors also found that microclimate gradients in headwater riparian zones were strongest within 10 meters of the stream center, "a distinct area of stream influence within broader riparian areas." Chan *et al.* (2004) found the greatest change in microclimate occurs between stream center and 15 meters regardless of buffer size or upland treatment.

5th Field Watershed Scale: Short and Long-Terms
There would be no changes to microclimate in riparian areas at the watershed scale because there would be no changes at the site 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-dependent species.*

Site Scale: Short and Long-Terms
Density management thinning would occur on approximately five acres in a RR adjacent to an intermittent stream. The intermittent stream flows into a large basin/depression area created by the Sitkum landslide. The flow ends in the basin and does not connect to the East Fork Coquille River.

The beargrass enhancement would maintain the functions in the RR as a migration corridor for riparian and aquatic dependent species in the short-term at the site scale because of: 1) snag and down wood creation, 2) 35-foot no-treatment zone adjacent to the stream, 3) post thinning canopy cover would be 60%, 4) approximately 75 trees per acre (TPA) would remain post-thinning, 5) trees 24" DBH and greater would be retained, 6) burning would not occur within 60 feet of the stream, 7) existing large down wood would not be consumed by the fire, and 8) no effects to water quality, including temperature and turbidity, would occur. The 35-foot no-treatment zone would remain unthinned thereby retaining the current TPA of 300 in the RR. Yarding corridors would not cross any stream channels. No new road construction would occur within RRs.

The density management thinning would improve the functions in the RR as a migration corridor in the long-term at the site scale by advancing late-successional characteristics. Specifically in the long-term, the RRs would have increased structural and species diversity, an understory shrub layer, large conifers available for instream wood recruitment, upslope down wood and large snags. Suppression mortality would occur in the 35-foot no-treatment zone that would provide snags and down wood.

5th Field Watershed Scale: Short and Long-Terms
The spatial and temporal connectivity within and between watersheds at the 5th field in the short and long-terms would remain unchanged following the proposed action. The proposed harvest treatments consist of five acres in the RR and 130 acres in the Matrix within the 85,785-acre East Fork Coquille 5th field watershed.

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

Site Scale:
Short-Term
The proposed action would not adversely modify stream channels or aquatic habitat, nor remove any wood from stream channels. The density management thinning in the RR would maintain bank stability, shorelines and bottom configurations. No new landings or roads would be constructed in RRs. No yarding corridors would cross stream channels. The 35-foot no-treatment zone would encompass the trees providing bank stability due to root strength. Burning would not occur within 60 feet of the intermittent stream channel. Fire trail construction would end at least 45 feet from the stream. Activities more than half a crown width from the edge of the stream bank are unlikely to reduce the effectiveness of root strength on stream bank stability (USDI 2001).

Long-Term
Development of late-successional characteristics in the RR would increase the potential for LWD recruitment to stream channels at the site scale in the long-term. LWD in stream channels provides channel structure and complexity, which improves bank stability. Increased amounts of large wood, which reduce flow velocity and bank shear stress, would improve stream bank stability in the long-term (USDI 2005 *Update*).

A reduction in bank erosion would occur in the long-term at the site scale following road renovation because improved road drainage would decrease the amount of water directed to stream channels.

5th Field Watershed Scale: Short and Long-Terms
As there would be no 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 scale in the short or long-terms. The beneficial effects to stream banks from LWD recruitment would not be measurable at

the 5th field scale because of the relatively small amount of acres treated. Approximately five acres would be treated in the RR within the 85,785-acre East Fork Coquille 5th field watershed.

The reduction in bank erosion at the site scale from road renovation would be negligible at the 5th field scale in the short and long-terms because of the relatively small amount of road renovation (2.92 miles) compared to the total road miles in the East Fork Coquille 5th field watershed.

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-Terms
Water quality would remain within the range that maintains the biological, physical, and chemical integrity of streams. The proposed action would not result in chemical input to streams.

Incorporated by reference is the water resources report located in the analysis file. The analysis in this report concluded the density management thinning would not increase stream temperature at the site scale in the short or long-terms (p.2). No yarding corridors would cross any stream channels.

The density management thinning, including the fire burning and fire trail construction would not result in an increase in turbidity. A 35-foot no-treatment zone would be maintained on the intermittent stream adjacent to the density management thinning. Burning would not occur within 60 feet of the stream. Fire trail construction would end no closer than 45 feet from the stream and would be appropriately water barred.

Slight increases in turbidity would occur in the short-term in localized areas because of road renovation and haul. The road-related PDFs and best management practices would reduce or eliminate the amount and duration of sediment entering stream channels. The slight increase in turbidity would not change the biological, physical or chemical integrity of streams. The proposed action would maintain the aquatic and riparian-dependent species' survival, growth, reproduction and migration at the site scale in the short and long-terms. Road renovation on the 28-10-9.0 road would improve road drainage and reduce turbidity in the long-term.

5th Field Watershed Scale: Short and Long-Terms
There would be no change to water quality at the 5th field scale in the short or long-terms because there would be no changes at the site scale.

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:
<u>Short-Term</u>
The proposed action would maintain, at the site scale in the short-term, the sediment regime under which aquatic ecosystems evolved. Furthermore, the proposed action would maintain the timing, volume, rate and character of sediment input, storage and transport.

The 35-foot no-treatment zone would protect bank stability and prevent sediment delivery to streams from adjacent harvest operations. The analysis in the water resources report concluded these buffers would provide an adequate sediment filter strip because non-compacted forest soils in the Pacific Northwest

have very high infiltration capacities and are not effective in transporting sediment by rain splash or sheet erosion (p.12). Ground-based equipment could operate within approximately 0.5 acres of the RR. The ground based area is located on the uphill side of a road approximately 185-220 feet from the intermittent stream channel. The equipment would not cross stream channels. No yarding corridors would cross any stream channels and no new landings would be constructed within the RRs. The use of the 28-10-17.0 road for landings would not result in sediment entering stream channels because there are no stream crossings on the road.

Broadcast burning would not cause sediment to enter the intermittent stream channel. Burning would not occur within 60 feet of the stream. Fire trails would not cross any stream channels, would end no closer than 45 feet of the stream, and would be appropriately water barred.

Short-term sediment movement would occur because of the road renovation and haul on the 28-10-9.0 road; however, PDFs and best management practices would minimize if not eliminate sediment from reaching stream channels. The short-term localized sediment input to streams resulting from road renovation and haul would be indiscernible beyond natural erosion processes expected to occur during winter rains. See the sediment analysis in the water resources p.47 and fish sections p.44 in the EA for a detailed discussion.

Long-Term

Road renovation would result in a net reduction in sediment delivery to stream channels at the site scale in the long-term. The 28-10-9.0 road currently has areas with surface erosion that contribute sediment to stream channels. The road renovation would reduce sediment delivery to streams by improving road drainage.

The density management thinning would not result in sediment delivery to stream channels at the site scale in the long-term. The thinning would improve large wood recruitment in the long-term leading to additional sediment storage capacity and routing (USDI 2005 *Update*). Stream channels in the Coast Range are typically gravel-poor, which makes them dependent on large wood for retaining substrate (USDA and USDI 1998).

5th Field Watershed Scale: Short and Long-Terms

As there would be no impact to the sediment regime at the site scale from the density management thinning, there would be no change at the 5th field watershed scale in the short or long-terms.

The expected sediment delivery at the site scale in the short-term from road renovation and haul would not be measurable at the 5th field scale in the short or long-terms. The road renovation would provide a negligible long-term benefit of reduced sediment delivery to stream channels at the 5th field scale because of the relatively small amount of road renovation (2.92 miles) compared to the total road miles in the East Fork Coquille 5th field watershed (645).

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 and Long-Terms

The proposed action would maintain the site scale short and long-term sufficient instream flow to create and sustain riparian, aquatic and wetland habitat. The proposed action would also maintain the patterns of sediment, nutrient and wood routing in addition to the timing, magnitude, duration and spatial distribution of peak, high, and low flows at the site scale in the short and long-terms.

The water resources analysis concluded there would be no effect to peak flows (p.3-5). The water resources analysis concluded "the proposed harvest would have a negligible effect on annual yield and low flows. The project could slightly increase average annual yield due to decreased evapotranspiration because of harvest. However, the direct effect of the proposed harvest would not be measurable and is much less than the annual variation in precipitation runoff (p.7)."

The water resources report included an analysis of the potential risk to stream flow from existing roads and road construction (p. 8). The conclusion was that the analysis area currently has a low risk of hydrologic impacts from existing roads. The road construction would not increase the risk of hydrologic impacts because the roads 1) would not include any new stream crossings, 2) would be decommissioned following use, and 3) would be constructed and designed with proper road drainage on stable slopes. Road renovation would improve road drainage and reduce the amount of water roads direct to stream channels.

An increase in summer stream flows could occur in the long-term due to an increase of in-stream large wood. Aggradation of the channel due to large wood has the potential to increase summer stream flows (USDI 2001a).

5th Field Watershed Scale: Short and Long-Terms
The maintenance of in-stream flows as well as the timing, magnitude, duration and spatial distribution of peak, high, and low flows at the site scale in the short and long-terms would ensure no changes at the 5th field scale.

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-Terms
The proposed action would not affect the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands at the site scale in the short or long-terms. The interaction of water with wetlands and meadows would be unaffected at the site scale both in the short and long-terms. Meadows and wetlands were not found within the unit boundary. The proposed action does not include water diversions or well drilling, activities usually associated with lowering water tables.

A long-term site scale improvement to the groundwater table and floodplain water storage would occur following the density management thinning because of an increase in pool frequency and aggradation of the channel due to an increased amount of in-stream large wood (USDI 2001a).

5th Field Watershed Scale: Short and Long-Terms
Because there would be no impact to the timing, variability, or 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-Terms
The proposed action would maintain the species composition and structural diversity of plant communities in riparian areas and wetlands at the site scale in the short and long-terms. Density

management thinning in the RR would promote forest health, promote development of large conifers, and increase structural diversity at the site scale in the long-term.

The 35-foot no-treatment zone would remain unthinned thereby retaining the current number of TPA (300) available for recruitment into the intermittent stream. The 35-foot no-treatment zone and the number of trees left per acre within the treated portion of the units would maintain the short-term supply of in-stream wood at the site scale. Following the density management thinning in this small portion of the RR, there would be 75 TPA. The density management thinning would lead to an improved source of large wood recruitment at the site scale in the long-term.

The proposed action does not include new landing construction in RRs. Thinning would require the use of roadside landings in the RR along the 28-10-17 road. Using the road for landings would not require cutting additional trees outside of those already selected for the thinning prescription and would not require widening the road prism. Constructing parallel yarding corridors would minimize the number of trees cut to facilitate yarding. Yarding corridors would not cross the stream channel.

The proposed density management thinning would reduce suppression mortality within five acres of a RR. Dead trees resulting from suppression mortality would have been smaller which have a decreased value in terms of their function in streams. Smaller logs decompose faster, are more likely to be moved downstream or repositioned on the stream banks, and do not form as large of pools. Suppression mortality would still occur within eight acres of non-treated RRs associated with the intermittent stream. Suppression mortality would still occur within the 35-foot no treatment zone and the area on the south side of the stream which would have a full site-potential tree height (220 feet) of non-treated RRs. There are 92 acres of RRs in Section 17 associated with the stream segment proposed for thinning; 81 acres are the same age class (approximately 70 years old) as the stand proposed for thinning. Suppression mortality would continue to occur within these non-treated RRs. Tree mortality could occur over time within the thinned portion of the RR due to factors such as wind, insect, or disease.

Broadcast burning would occur within the RR after harvest. Burning would not occur within 60 feet from the stream. Fire trails constructed to control the fire would be no greater than 3 feet in width and would be hand constructed. The fire trails along with lighting techniques and the timing of burning would prevent fire from entering the 35-foot no treatment zone. The controlled burning with fire trails, accomplished during spring-like conditions, would minimize damage to large coarse woody debris and live trees. Slash would be pulled back from the leave trees prior to burning.

The density management thinning would increase light levels received by vegetation and result in greater understory vegetation vigor and growth. "Thinning treatments that lead to greater stand complexity next to a stream will increase the array of niches for insects and other arthropods, and for epiphytes. This in turn leads to a greater variety in types of organic matter that can fall into the stream" (USDI 2005 *Update*). The 35-foot no-treatment zone would also provide a nutrient supply to the intermittent stream. The proposed action includes creating approximately two snags and three down logs per acre. Creating snags and down wood in the RR would improve structural diversity in the short- and long-terms and increase late successional characteristics. Snag and down log creation would not occur within 35 feet of the intermittent stream.

5th Field Watershed Scale: Short and Long-Terms

Because there would be no adverse impacts to species composition or structural diversity of plant communities in riparian and wetland areas at the site scale there would be no change at the 5th field scale in the short or long-term. Benefits would not be measurable at the 5th field scale because of the relatively small amount of acres treated. Density management thinning would occur in approximately 5 acres of the RR within the 85,785 acres East Fork Coquille 5th field watershed.

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

Site Scale: Short and Long-Terms
Habitat needed to support riparian-dependent species (including plants, invertebrates, and vertebrates) would be maintained at the site scale in the short and long-terms. The 35-foot no-treatment zone would maintain areas of undisturbed litter, structure, vegetation, and microclimates. Creating snags and down wood in the RR would improve the structural diversity in the short and long-terms at the site scale and increase late-successional characteristics in the RR. All non-alder hardwoods greater than 12" DBH would be retained in the RRs.

Zobrist and Hinckley (2005) conducted a literature review of thinning and compiled the following discussion of the effects of thinning to understory plant species: "Thinning opens up the stand and allows light to reach the forest floor. This provides for better-developed understories with greater richness, diversity, and cover (Bailey et al. 1998, Curtis et al. 1997, Thomas et al. 1999, Thysell and Carey 2000). Studies have found that thinned stands have greater herbaceous cover (Carey and Wilson 2001, Muir et al. 2002), greater understory trees and shrubs (Bailey and Tappeiner 1998, Muir et al. 2002, Tappeiner and Zasada 1993), and greater density, survival, and growth of conifer seedlings (Bailey and Tappeiner 1998, Brandeis et al. 2001, DeBell et al. 1997, Muir et al. 2002)".

5th Field Watershed Scale: Short and Long-Terms
Because there would be no adverse impacts to habitat for riparian-dependent species at the site scale, there would be no change at the 5th field watershed scale in the short or long-terms. Benefits would not be measurable at the 5th field scale because of the relatively small size of the project. Density management thinning would occur in approximately five acres of the RR within the 85,785 acre East Fork Coquille 5th field watershed.

Resources Not Analyzed in Detail
Due to a lack of concern expressed by Scoping respondents, adequacy of best-management practices and policy and the limited intensity and scope of effects on the affected resource, the items below are excluded from detailed comparative analysis as directed by CEQ regulation § 1500.0(b), 1500.2(b) and other sections. The analysis file contains the analyses pertaining to these conclusions, which are hereby incorporated by reference.

Air Quality and Smoke Management
All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan, (OAR 629-43-043), as addressed in the RMP. To reduce the amount of material consumed hand pile and machine pile burning would be scheduled during the period of high rainfall (November to April) when burning would 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.

Cultural Resources
This analysis area has been the location of both prehistoric and historic cultural activities. A review of project documentation and records does not reveal any known cultural resources in the immediate vicinity of the harvest unit. Field reconnaissance did not reveal the presence of any cultural resources. This project would not affect prehistoric or historic cultural resources. However, if any objects or sites of possible cultural value such as historical or prehistoric ruins, fossils or artifacts are found, all activities near the discovery site would immediately stop and the Authorized Officer immediately notified of the

findings. Operations may resume at the discovery site upon receipt of written instructions and authorization of the authorized officer.

Drinking Water Protection Areas

Under the requirements and guidelines of the Federal Safe Drinking Water Act, ODEQ prepares Source Water Assessments for public water supplies in Oregon. The proposed project is located within the headwaters of the North Fork Coquille River and is, therefore, part of the Drinking Water Protection Area (DWPA) for the Cities of Myrtle Point and Coquille.

Managed forest lands in the DWPAs are listed as one of the potential contaminant sources in the Source Water Assessments for both cities (ODEQ a&b 2003). Activities listed that could have potential impacts are cutting and yarding of trees, improper use of pesticides or fertilizers, road building and maintenance, and road usage. The proposed action does not include the use of pesticides.

Some fertilizer would be used as part of erosion control treatment in disturbed areas. However, there would be a negligible effect to water quality or drinking water. Even with whole-forest fertilization, studies have shown that neither drinking water standards nor aquatic toxicity thresholds are exceeded in most applications (Bisson et. al. 1992). The proposed project would require a one-time application to disturbed areas during summer or fall. Disturbed areas include new and reconstructed roads, decommissioned roads, and landings. These areas would be seeded, mulched and fertilized to prevent soil erosion and increased sediment. Fertilizer would be applied at the rate of approximately 32 lbs. available nitrogen + 40 lbs. available phosphoric acid per acre. There would be approximately 10 acres of disturbed area across the entire project that would need fertilization. This amount of fertilizer (320 lbs. nitrogen and 400 lbs. phosphoric acid) would not affect water quality and would not be measureable or detectable in drinking water supplies. A much larger amount of fertilizer is applied to agricultural lands and populated areas (lawns and gardens) in the DWPAs.

Environmental Justice

This project includes the preservation and enhancement of beargrass. Survey has shown the presence of this resource within the project area. Thus, the proposed area of activity could be used for this specific cultural activity in the future. However, the conduct of this project will enhance, not degrade, the resource. Therefore, the intent of the Environmental Justice Executive Order (EO 12898) is met. The enhancement of this resource may bring gatherers to this area, but their presence should not result in disproportionately high or adverse human health or environmental effects because of the proposed action(s).

Forest Fuels/ Fire Regime Condition Class

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural (historical) regime (Hann and Bunnell 2001, Hardy *et al.* 2001, Schmidt *et al.* 2002). The departure is measured in three classes and are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3). Within the analysis area, most of the area shows a moderate degree of departure, and is classified as FRCC 2. Mechanical treatments such as logging in conjunction with activity fuel treatments would assist in maintaining the same FRCC and/or help shift the analysis area towards a FRCC 1 condition.

Hazardous Materials

Activity resulting from the Action Alternative would be subject to the State of Oregon Administrative Rule No. 340-108, *Oil and Hazardous Materials Spills and Releases*. This specifies the reporting requirements, cleanup standards and liability that attaches to a spill or release or threatened spill or release involving oil or hazardous substances. Normal contract administration would also include site monitoring for solid and hazardous waste. When applicable, the BLM would apply the *Coos Bay District Hazardous*

Materials Contingency Plan and Spill Plan for Riparian Operations if a release threatens to reach surface waters or is in excess of reportable quantities.

Peak Flows and Forest Harvest[15]

Based on LIDAR data, the proposed harvest unit is located between 1,400 – 1,900 feet in elevation, within the rain-dominated zone. In rain-dominated areas, peak flows are caused by large rainfall events. These large events, that are typically several inches of rain a day, overwhelm any reduction in transpiration from forest harvest. A recent synthesis of forest harvest effects on peak flows (Grant *et al.* 2008), based primarily on small, paired-watershed studies, concluded that rain dominated regions are less susceptible to peak flow increases compared with those in the rain-on-snow region. When flow increases did occur, they primarily affected smaller peaks flows. Study results of harvest treatments for the rain-dominated zone included the effects of roads and other harvest practices (primarily through soil compaction) that can also increase peak flows (see Peak Flow and Roads p.49). They suggest there would be even a higher threshold for harvest alone without the influence of roads. In the only rain-dominated catchment without roads (Deer 4, Alsea River, OR), no increase in peak flow could be detected even with 90% of the area clear-cut. The authors noted that most of the studies involved clear-cutting a large portion of small catchments (< 4 mi^2) and likely represented the maximum effect possible. The authors of the study state that effects to flow should diminish, or at most remain constant, with increasing watershed size. In rain-dominated zones, reported increases in peak flows for subwatershed scale and larger basins have been less than the inter-annual variation in streamflow for the same period.

The outcome of several other paired-watershed studies in various climate regimes have found that the first precipitation events and consequent peak flows in the fall are usually small and are inconsequential to channel morphology (Rosgen 1996, Ziemer 1998). The forest soils of the Coast Range experience large moisture deficits during the summer. Forest harvest can reduce this soil moisture deficit (increase water stored in the soil) at the site level by removing trees that transpire water. This makes more water available for runoff as streamflow during the first fall precipitation events and can thereby increase these small peak flows. Statistical increases to small, fall peak flow events have not been proven to modify stream channel form or increase risks to flooding.

The Grant *et al.* (2008) synthesis set the minimum, peak flow detection level for rain-dominated watersheds at about 29% of the watershed harvested. The authors recommended using an Equivalent Clearcut Area (ECA) approach to determine whether a proposed harvest would approach this 29% threshold. An ECA calculation conducted for this analysis (see Annual Yield and Low Flow below) resulted in an existing percent harvested area of 14%. This is well below the minimum reported detection level for an increase in peak flows.

Peak flows would not be affected by the proposed project. Since the proposed harvest is below the rain-on-snow zone as described above, it is not expected that snow accumulation would be large enough to increase peak flows due to rain-on-snow effects from the proposed harvest. The proposed treatment is for small patch cuts in less than 1% of the affected subwatersheds. As noted above, only 57 acres of the proposed harvest area is connected to the stream network. This is approximately 0.3% (57 acres/17,052 acres) of the Brewster Canyon 6th field watershed and 0.07% (57 acres/85,923 acres) of the East Fork Coquille (EFC) 5th field watershed. The project would increase the equivalent percent harvest in the analysis area by approximately 0.8% with a post-project value of approximately 14.7% for the Brewster Canyon subwatershed (Table III/IV-10). This level of harvest is below the 29% minimum threshold suggested by Grant *et al.* (2008) to reach a detectable level of increase in peak flow for rain-dominated catchments. The 29% level is a very conservative number. In fact, the authors state that the "first

[15] All information here has been summarized from the water resources report, incorporated by reference.

detectable reported value [in the paired watershed studies] occurs at 40 percent. The response line for mean reported change crosses the detection limit at 45 percent harvest."

A cumulative impact analysis was also completed for the larger East Fork Coquille (USDI 2005, p. 59-60) proposed project in the same area. That analysis used a method developed for the Oregon Watershed Assessment Manual (WPN 1999) and concluded that the risk of increasing peak flows was "low" and that any increases to small peak flows would be "inconsequential to the hydrologic processes of the East Fork Coquille Watershed" (p.60). A detailed analysis completed for the Western Oregon Plan Revision FEIS based on the Grant et al. 2008 synthesis cited above also showed that the East Fork Coquille Watershed is not susceptible to detectible peak flow increases under current and planned harvest levels (USDI 2008, p. 753-758).

Stream Temperature

The proposed project would not affect stream temperature. No harvest would occur within 220 feet (one site potential tree height) of any streams but one. Since shade would not be reduced along these streams, there would be no effect to stream temperature. The five acres of Riparian Reserve treatments would open the canopy outside of a 35-foot no-treatment zone. However, this treatment area is located on the north bank of the stream, and thinning trees outside this no-treatment zone would have little or no effect on solar radiation reaching the stream. Therefore, there would be no effect on stream temperature adjacent to this riparian treatment area (Water Resources Report p.2).

Unaffected Resources

None of the following critical elements of the human environment are located in the project area or within a distance to be affected by implementation of either alternative:

- Farmlands, Prime or Unique
- Flood Plains (as described in Executive Order 11988)
- Areas of Critical Environmental Concern
- Wild and Scenic Rivers, Wilderness Values

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List of Agencies and Persons Contacted

The public was notified of the planned EA through the publication of the Coos Bay District's planning update, a scoping notification on the District web site, and advertisement of scoping in *The World* newspaper.

The following public agencies and interested parties were notified directly:

American Forest Resources Council
Association of O&C Counties
Cascadia Wildlands
Coast Range Association
Coos County Commissioners
Coquille Indian Tribe
Division of State Lands
Douglas Timber Operators
Friends of the Coquille
Governor's Natural Resource
Klamath-Siskiyou Wildlands Center
NOAA National Marine Fisheries Service
NW Environmental Defense Council
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon Wild
Plum Creek Timberlands
Umpqua Watersheds
Numerous Private Citizens
All adjoining landowners

This pilot project also has a web page with more information about the overall project and posted weekly updates for interested parties. These were informational only and are not part of the official NEPA notification process.

Wildlife Species Survey and Site Management Summary

Coquille Indian Tribe and Coos Bay District Bureau of Land Management

Project Name: Wagon Road Pilot
Prepared By: Jason Robison
Project Type: Variable Retention Harvest, Density Management Thinning and Alder Conversion
Date: September 2011
Location: T. 28 S., R. 10 W., Section 17
S&M List Date: 2011 Settlement Agreement

The BLM/CIT compiled the species listed below (Table 1) from the 2011 Settlement Agreement. The list includes those vertebrate and invertebrate species with pre-disturbance survey requirements whose known or suspected range includes the Coos Bay District.

Tribal biologists conducted modified line transects surveys using the *Survey Protocol for the Red Tree Vole Version 2.1* between May 11 and June 2, 2011. A minimum of 90 meters (approximately 300 feet) of transect line per acre of survey area was searched. A transect detection width of approximately 15 meters (49 feet) on each side of the transect line was used. The Sample Method for Calculating Transect Spacing for Red Tree Vole Surveys was used to insure that the length of the transects provide a good assessment of the presence or absence of voles within the stands.

Trees identified as having possible nest structures, were re-evaluated by CIT, BLM, and a Tree Climbing Contractor to verify the presence or absence of red tree voles. Tree climbing was used to determine nest and activity status if other options were not successful or feasible. While in the tree, the climber performed a 330 feet (100 meters) survey to determine the extent of the site, and to identify other possible nest structures within the area.

The survey results will be entered into the GEOBOB database in the next update cycle and copies of the survey forms are located within the project record file.

Table A-1 Wildlife S&M species list for the Wagon Road Pilot project.

Species	S&M Category	Survey Triggers			Survey Results			Site Management
		Within Range of the Species?	Contains Suitable habitat?	Habitat Disturbing*?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	
Vertebrates								
Red Tree Vole (*Arborimus longicaudus*)	C	Yes	Yes	Yes	Yes	6/2011	3	Yes
Great Grey Owl (*Strix nebulosa*)	A	Yes	No	Yes	No	N/A	N/A	N/A

**"Habitat disturbing" and thereby a trigger for surveys as defined in the 2001 ROD S&Gs (p. 22).*

Thirteen RTV nests (7 Active, 6 inactive) were located during surveys. The ID Team delineated three Habitat Areas using the best habitat surrounding the sites (*Management Recommendations for the Oregon Red Tree Vole Arborimus longicaudus, Version 2.0,* September 27, 2000). The largest Habitat Area is 14

acres and contains four active nests and one inactive nest. The Habitat Area in the west contains one active nest and two inactive nests and the buffer incorporates an older stand of trees and the Riparian Reserve. The east Habitat Area contains two active nests and three inactive nests and the buffer incorporates the 450-year-old unsurveyed suitable habitat (mamu). In all Habitat Areas, the edge of the buffer is at least one site-potential tree from any nest (active or inactive).

Pre-disturbance surveys for Great Gray Owls are not required since there is no suitable nesting habitat within the project area or within proximity of the project area that would be impacted by disturbance. The required habitat characteristics of suitable habitat include: (1) large diameter nest trees, (2) forest for roosting cover, and (3) proximity [within 600 feet] to openings that could be used as foraging areas (*Survey Protocol for the Great Gray Owl within the range of the Northwest Forest Plan v3.0*, USDA and USDI 2004) and mitigation language in the 2011 Settlement Agreement Species List. The stands in the Wagon Road Pilot project do not have proximity to natural-openings $\geq$ 10 acres (Jason Robison, CIT Biological and Environmental Services Coordinator, September 2011) and pre-disturbance surveys are not suggested in suitable nesting habitat adjacent to man-made openings at this time.

Statement of Compliance: The CIT/Coos Bay District BLM applied the 2011 Settlement Agreement Species List to the CBWR Pilot project, completing pre-disturbance surveys and management of known sites required by Survey Protocols and Management Recommendations to comply with the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines (2001 ROD S&Gs).*

Summary of Survey Results

Pre-disturbance surveys resulted in the identification of 28 possible RTV sites. Another site was identified during other field surveys. Upon additional field analysis, nine sites were eliminated from consideration. Seventeen trees were climbed to make the final determination of which four nests were for other species, seven nests were active and six nests were inactive for red tree voles.

/s/ Jason Robison — *10/5/2011*

Jason Robison — Date

Biological

Appendix B – Survey & Manage Tracking Form – Botany

Botany Species Survey and Site Management Summary

Project Name: Wagon Road Pilot
Project Type: Regeneration Harvest & Alder Conversion
Location: T. 28 S., R. 10 W., Section 17

Prepared By: Tim Rodenkirk, Botanist
Date: 31 October 2011
S&M List Date: 2011 Settlement Agreement

Table A. Survey & Manage Botany Species. Species listed below were compiled from the 2011 Settlement Agreement and include those species whose known or suspected range includes the Coos Bay District according to:

- "Survey Protocols for Survey and Manage Component 2 Bryophytes, Version 2.0" (BLM-Information Bulletin No. OR-98-051);
- "Survey Protocols for Seven Protection Buffer Fungi, Version 1.3" (BLM-Instruction Memorandum Number OR-2000-018);
- "Survey Protocols for Component 2 Lichens, Version 2.0" (BLM-Instruction Memorandum Number OR-98-38), and
- BLM Conservation Assessments.

Surveys methodology involves using the intuitive controlled method where high likelihood habitats are surveyed more intensively than other areas within the project. The publications listed above detail this protocol.

No S&M plant species were found on the proposed project area. Species with an * are also Bureau Sensitive special status species.

The survey results will be entered into the GEOBOB database in the next update cycle and copies of the survey forms are located within the project record file.

Table B-1 Botany S&M species list for the Wagon Road Pilot project

Species	S&M Category	Survey Triggers			Survey Results			Site Management
		Within Range of the Species?	Project Contains Suitable habitat?	Project will affect species/ habitat?	Surveys Required?	Survey Dates	Sites Found?	
Fungi								
Bridgeoporus nobililssimus	A	Yes	No	No	No	N/A	No	N/A
Lichens								
Bryoria pseudocapillaris	A	No	No	No	No	N/A	No	N/A
Bryoria spiralifera	A	No	No	No	No	N/A	No	N/A
Cladonia norvegica	C	Yes	Yes	Yes	Yes	May-August 2011	No	N/A
Hypogymnia duplicata	C	No	Yes	No	No	N/A	No	N/A
Leptogium cyanescens*	A	Yes	Yes	Yes	Yes	May-August 2011	No	N/A
Lobaria linita*	A	Yes	Yes	Yes	Yes	May-August 2011	No	N/A
Nephroma occultum	A	No	Yes	No	No	N/A	No	N/A
Niebla cephalota	A	No	No	No	No	N/A	No	N/A
Pseudocyphellaria perpetua	A	Yes	Yes	Yes	Yes	May-August 2011	No	N/A
Teloschistes flavicans	A	No	No	No	No	N/A	No	N/A

Bryophytes								
Schistostega pennata*	A	Yes	Yes	Yes	No	May-August 2011	No	N/A
Tetraphis geniculata*	A	Yes	Yes	Yes	Yes	May-August 2011	No	N/A
Vascular Plants[1]								
Bensoniella oregana	A	Yes	No	No	No	N/A	No	N/A
Eucephalis vialis	A	No	Yes	No	No	N/A	No	N/A

[1]Although this timber sale does not contain habitat and/or is not in the range of any S&M vascular plant species, vascular plant surveys were completed on all units during May through August of 2011. The target species during these surveys were several special status plant species that are not included in the S&M program. No special status or S&M vascular plant species were found on any of the surveys.

Statement of Compliance

The Coos Bay BLM District applied the 2011 Settlement Agreement Species List to the Wagon Road Pilot project, completing pre-disturbance surveys and management of known sites, required by Survey Protocols and Management Recommendations to comply with the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines*.

There are currently no known sites of S&M botanical species that require management within the project area.

/s/ Tim Rodenkirk — *10/31/2011*

Tim Rodenkirk, Botanist — Date

Myrtlewood Field Office

Appendix C – Special Status Botany Species List

Table List of Botany Special Status Species possibly occurring within the analysis area. Low ≤ 2 known sites, Moderate = 3-9 sites, High = 10+ sites on District. For species with known sites nearby the project area likelihood is increased; species with sites away from the area and primarily coastal zone, likelihood has been decreased.

Scientific and Common Name	Documented (D) or Suspected (S) on Coos Bay District	Likelihood of Occurring in the Project Area
VASCULAR PLANTS		
Adiantum jordanii (California maidenhair fern)	D	Low. Only one site on District.
Carex gynodynama (wonderwoman sedge)	D	Low. Preferred habitat is scarce in the project area.
Cimicifuga elata var. *elata* (tall bugbane)	S	Low. Present directly adjacent on Eugene and Roseburg BLM lands
Erigeron cervinus (Siskiyou daisy)	S	Low. Preferred habitat is scarce in the project area.
Iliamna latibracteata (California globe mallow)	D	Low. One known site on District prefers areas with more light- openings in the forest, recent burns, roadsides, etc.
Pellaea andromedifolia (Coffee fern)	D	Low. Preferred habitat is scarce in the project area.
Polystichum californicum (California sword fern)	D	Low. Rare on District but could potentially show up almost anywhere in forest habitat.
Romanzoffia thompsonii (Thompson's mist maiden)	D	Low. Preferred habitat is scarce in the project area.
Scirpus pendulus (drooping bulrush)	S	Low. Preferred habitat is scarce in the project area.
Sidalcea malviflora ssp. *patula* (coast checker bloom)	D	Low. Only one site on District.
Trillium kurabayashii (=*T. angustipetalum*) (giant purple trillium)	D	Low. Only one site on District.
NON-VASCULAR PLANTS (SURVEYS PRACTICAL)		
Bryoria subcana	D	High. One site found within the project area.
Calicium adspersum	S	Low. Few legacy trees in project area.
Heterodermia leucomela	D	Low. All sites found on immediate coast.
Hypogymnia duplicata	S	Low. No known sites on District.
Hypotrachyna revoluta	D	Low. Several locations found closer to the coast on the District.
Leptogium cyanescens	S	Low. No known sites on District.
Lobaria linita	S	Low. No known sites on District.
Niebla cephalota	D	Low. All sites on immediate coast.
Cryptomitrium tenerum	S	Low. No known sites on District.
Diplophyllum plicatum	D	High. One site found within the project area.
Metzgeria violacea	D	Moderate. Several sites on District.
Orthotrichum bolanderi	S	Low. No known sites on District.
Porella bolanderi	S	Low. No known sites on District.
Schistostega pinnata	S	Low. No known sites on District.
Tayloria serrata	S	Low. No known sites on District.
Tetraphis geniculata	S	Low. No known sites on District.
NON-VASCULAR PLANTS/FUNGI (SURVEYS NOT PRACTICAL)		
Arcangeliella camphorata	D	Moderate. Three sites have been found on District.
Boletus pulcherrimus	S	Low. Recent site from Blacklock Point area of Curry County.
Cortinarius barlowensis (=C. azureus)	S	Low. No known sites on District.
Cudonia monticola	D	Moderate. Three sites on District including younger stands on Burnt Ridge.
Gomphus kauffmanii	D	Low. One site on District in a 50 yr. old Doug-fir plantation.
Leucogaster citrinus	S	Low. One site adjacent to Coos Bay District.
Otidea smithii	S	Low. No known sites on District.
Phaeocollybia californica	D	Moderate. Nine sites on District.
Phaecollybia dissiliens	D	High. Eleven sites on District
Phaeocollybia olivacea	D	High. Twenty-four sites on District.
Phaecollybia oregonensis	D	Moderate. Three sites on District.
Phaeocollybia pseudofestiva	D	High. Twelve sites on District.
Phaecollybia scatesiae	D	Moderate. Five sites on District.
Phaeocollybia sipei	D	High. Thirty-eight sites on District.
Phaeocollybia spadicea	D	High. Twenty-eight sites on District.
Ramaria largentii	S	Low. No known sites on District.
Ramaria gelatiniaurantia	D	Moderate. Four sites on District.
Rhizopogon exiguus	S	Low. Habitat is present – site near Mapleton on Siuslaw N.F.

Appendix D – Fungi

This is the list (Table D-1) of fungal species (Both S&M and Special Status) for which the project is within the range of the species, contains suitable habitat and the project could affect but for which surveys are not required. Low is ≤ 2 sites known on District; Moderate is 3 to 9 sites and High is ≥ 10 sites.

Table D-1 Special Status and S&M Fungal species list for the Wagon Road Pilot project.

Species	Bureau Sensitive Species	S&M Category	Documented or Suspected on CBD	Likelihood of Occurring in the Project Area
Albatrellus avellaneus	Yes	B	S	Low. No known sites on District.
Asterophora parasitica	No	B	S	Low. No known sites on District.
Boletus pulcherrimus	Yes	B	S	Low. No known sites on District.
Catathelasma ventricosa	No	B	S	Low. No known sites on District.
Chalciporus piperatus	No	D	D	Low. Two known sites on District.
Chamonixia caespitosa	Yes	B	S	Low. No known sites on District.
Clavariadelphus occidentalis	No	B	D	High. 10 known sites on District.
Clavariadelphus truncatus	No	B	S	Low. No known sites on District.
Clavulina castaneopes var. lignicola	No	B	S	Low. No known sites on District.
Collybia racemosa	No	B	D	Low. One known site on District.
Cortinarius barlowensis	Yes	B	S	Low. No known sites on District.
Cortinarius valgus	No	B	S	Low. No known sites on District.
Cudonia monticola	Yes	B	D	Moderate. Three known sites on District.
Endogone oregonensis	No	B	S	Low. No known sites on District.
Fayodia bisphaerigera	No	B	S	Low. No known sites on District.
Galerina atkinsoniana	No	D	S	Low. No known sites on District.
Galerina heterocystis	No	B	S	Low. No known sites on District.
Gasteroboletus turbinatus	No	B	S	Low. No known sites on District.
Gomphus kauffmanii	Yes	E	S	Low. No known sites on District.
Helvella elastica	No	B	S	Low. No known sites on District.
Leucogaster citrinus	Yes	B	S	Low. No known sites on District.
Leucogaster microsporus	No	B	S	Low. No known sites on District.
Mycena tenax	No	B	S	Low. No known sites on District.
Otidea smithii	Yes	B	S	Low. No known sites on District.
Phaeocollybia attenuata	Yes	D	D	High.66 known sites on District.
Phaeocollybia californica	Yes	B	D	Moderate. Nine known sites on District.
Phaeocollybia dissiliens	Yes	B	D	High.11 known sites on District.
Phaeocollybia fallax	Yes	D	D	High.37 known sites on District.
Phaeocollybia kauffmanii	Yes	D	D	High.17 known sites on District.
Phaeocollybia olivacea	Yes	D	D	High. 26 known sites on District.
Phaeocollybia oregonensis	Yes	B	D	Moderate. Three known sites on District.
Phaeocollybia piceae	Yes	B	D	High.18 known sites on District.
Phaeocollybia pseudofestiva	Yes	B	D	High.12 known sites on District.
Phaeocollybia scatesiae	Yes	B	D	Moderate. Seven known sites on District.
Phaeocollybia sipei	Yes	B	D	High.40 known sites on District.
Phaeocollybia spadicea	Yes	B	D	High.32 known sites on District.
Pholiota albivelata	No	B	S	Low. No known sites on District.
Ramaria araiospora	No	B	D	High.13 known sites on District.
Ramaria aurantiisiccescens	No	B	D	Moderate. Three known sites on District.
Ramaria celerivirescens	No	B	D	Moderate. Five known sites on District.
Ramaria conjunctipes var. sparsiramosa	No	B	D	Moderate. Five known sites on District.
Ramaria cyaneigranosa	No	B	D	Moderate. Nine known sites on District.
Ramaria gelatiniaurantia	Yes	B	D	Moderate. Four known sites on District.
Ramaria hilaris var. olympiana	No	B	D	Low. One known site on District.
Ramaria largentii	Yes	B	S	Low. No known sites on District.
Ramaria rainierensis	No	B	D	Low. Two known site on District.

Species	Bureau Sensitive Species	S&M Category	Documented or Suspected on CBD	Likelihood of Occurring in the Project Area
Ramaria rubribrunnescens	No	B	D	Low. Two known site on District.
Ramaria rubrievanescens	No	B	D	Low. One known site on District.
Ramaria rubripermanens	No	D	D	Low. Two known site on District.
Ramaria stuntzii	No	B	D	High.16 known sites on District.
Rhizopogon exiguus	Yes	B	S	Low. No known sites on District.
Rhizopogon truncatus	No	D	S	Low. No known sites on District.
Rickenella swartzii	No	B	D	Moderate. Four known sites on District.
Sarcodon fuscoindicus	No	B	S	Low. No known sites on District.
Sparassis crispa	No	D	D	High.14+ known sites on District.
Tremiscus helvelloides	No	D	S	Low. No known sites on District.
Tylopilus porphyrosporus	No	D	D	Low. One known site on District.

Breeding Bird Surveys
The objective of the monitoring project would be to compare the number of breeding bird species in early seral habitat created by the post-harvest Wagon Road Pilot variable retention harvest area versus a traditional regeneration harvest where few aggregates or wildlife trees are left in the logged area. We hypothesize that avian species richness would be greater and longer lived in the Pilot project area than on a traditional regeneration harvest where few aggregates or individual wildlife trees would be retained.

Study Design and Survey Protocol
Using standard protocols for monitoring bird populations (Ralph et al. 1995), as many points as possible would be set up post-harvest/burning in the Pilot project area. Given the limited size of the project area, there would likely only be about five points, as they need to be separated by at least 250 meters to prevent double counting bird species. A second recently harvested stand in the same area would also be chosen; there are private lands currently being regeneration harvested almost adjacent to this stand that contain similar tree species and are at about the same elevation- one of these units that was close to the same size as the proposed Pilot project area would be ideal.

The survey period for point counts would be from mid-May through June. Three surveys would be completed at each point. One survey would be completed in May and two surveys would be completed in June at an individual point, and each of the three surveys would need to be at least a week apart. Surveys would begin at sunrise and be completed no later than four hours after sunrise. Survey duration would be 10 minutes per point. The surveys would be completed by an experienced birder with an intimate knowledge of songs and calls of all potential breeding bird species.

A species would be considered a breeder if it was detected two of the three visits at an individual point. Surveys would begin the spring after the harvest and site prep (e.g. burning) was completed in each of the timber sale areas, and would be done for at least five years thereafter. A tally of total breeding species found in the Pilot variable retention regeneration harvest and the traditionally harvested regeneration unit (reference) would be compared to see if there is a difference in breeding bird species and, if such a difference existed, to see how long it persisted. Thus, five years would be a minimum period for this monitoring project.

Silviculture
Monitoring would occur for a **minimum** of 12 years as stated on p.19. The monitoring objective in the 12th year is to ensure that the trees are established and free-to-grow and to schedule precommercial thinning in the near future if warranted. If the stand were pre-commercially thinned, it would be monitored again following precommercial thinning. Monitoring would be done by BLM foresters who would determine trees per acre and relative density for the stand. Precommercial thinning would take place if the amount of trees and the size of trees prematurely interfering with seral conditions by creating too much shade. Thinning treatments would be included in the District's annual silvicultural budget.

Photo Points
The objective of establishing permanent photo points is to document the current forest stands through the early to mid-seral stages over time. Approximately 15 permanent photo-monitoring points would be installed. These plots would be established with a permanent center plot, have aluminum tags at the base of the trees pointing towards plot center and a GPS point taken for location reference. Sites would be visited at pre-harvest, post-harvest, 1 year after planting, 5th year, 10th year and 15th year. Sites would also be visited after any other silvicultural activities, such as pre-commercial thinning.

Appendix F – Reforestation

Tree planting on the Coos Bay Pilot project will be done at an average of 200 trees per acre. This is half of what would be the normal and customary practice. The goal of this treatment is to allow for the development of early successional ecosystems by delaying the establishment of a forest canopy[16]**.** Planting 200 trees per acre would meet minimum mandated requirements for reforestation and Johnson and Franklin have agreed the intent of their principles would still be met.

Planting on the Pilot project is not meant to replace natural regeneration, but rather act as a hedge where natural regeneration likely would fail to occur. To rely strictly on natural regeneration for this project was deemed too risky of an undertaking by BLM foresters based upon experience. Comments received from the Society of American Foresters further echo this opinion[17]. Gratkowski *et al.* (1973) estimated that there were 2.4 million acres of land in the highly productive Coast Range and Cascade foothills of Washington and Oregon occupied by shrubs and brush because conifers naturally failed to regenerate.

There are inherent risks in not meeting reforestation targets using natural regeneration methods in an Oregon coast range setting (Hobbs *et al.* 1992, Stein 1995, Zaerr *et al.* 1981). The risks identified in relying on natural regeneration included site-preparation not exposing a mineral soil seed bed, inconsistent conifer seed crops (including predation of the seed crop), and a microclimate environment unsuitable for seed germination and initial seedling establishment (Stein 1995). Less extensive site-preparation would lead to a rapid reoccupation of the site by herbaceous and shrub cover that further reduces the likelihood of natural regeneration being successful (Stein 1995). In the Coast Range, brush species can become a serious competition problem within two years.

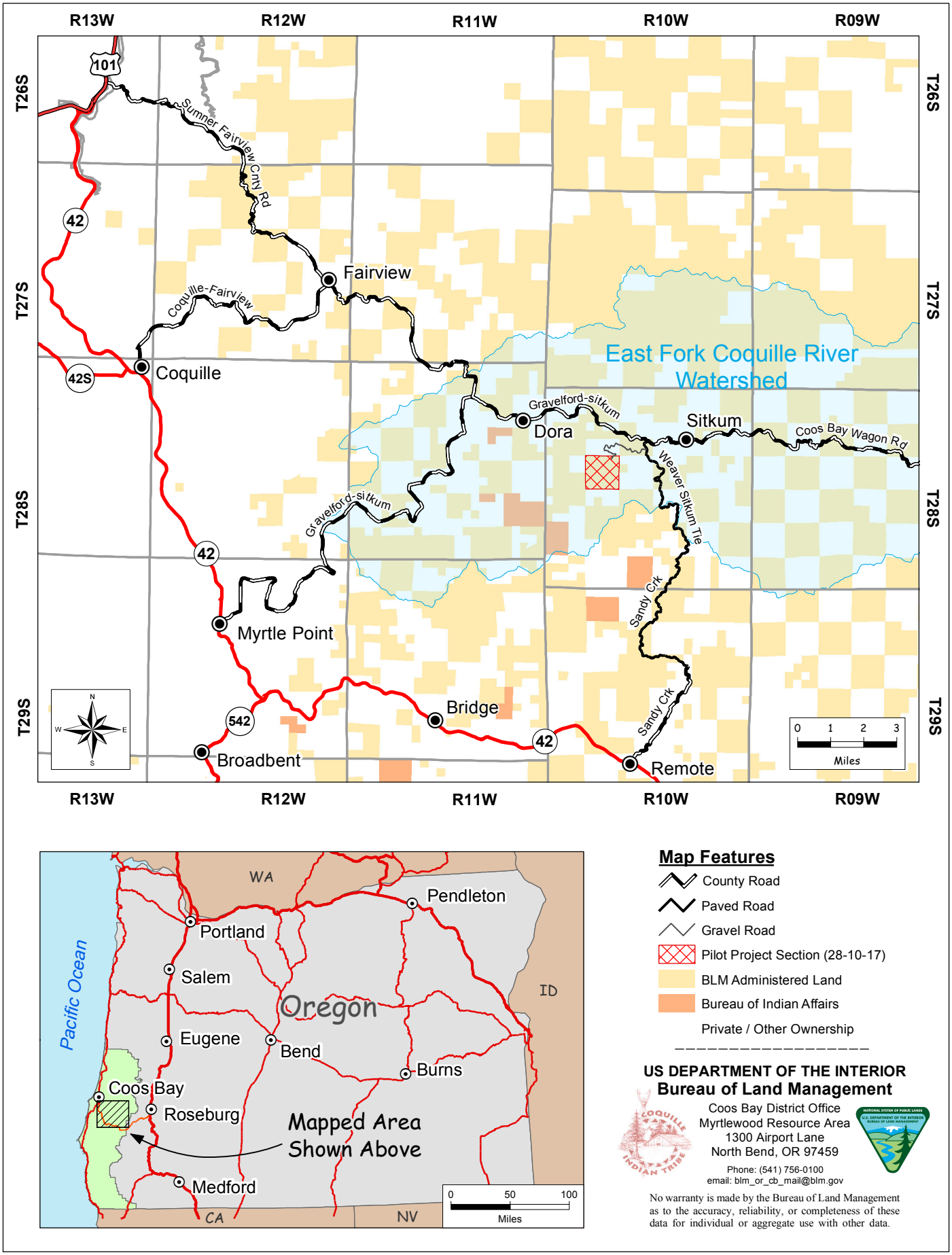
If conditions were such that abundant natural regeneration would occur along with planting, precommercial thinning would be undertaken. This would be an easy and simple solution to reduce the amount of excess trees to allow the development of an early successional ecosystem to continue (Hobbs *et al.*1992). On the other hand, if the project were to rely strictly on natural regeneration and conditions were such that it did not happen, an attempt to plant would be difficult and expensive. This would be due to a well-developed and established shrub and brush layer that can out-compete seedlings for light and moisture, which would especially limit Douglas-fir regeneration by creating severe shade (USDA 1990). The logical path, weighing in the risks associated with natural regeneration, would be to plant at a low level of 200 trees per acre. Then, should natural regeneration occur, thin excess trees if needed to prolong early successional conditions.

Maps

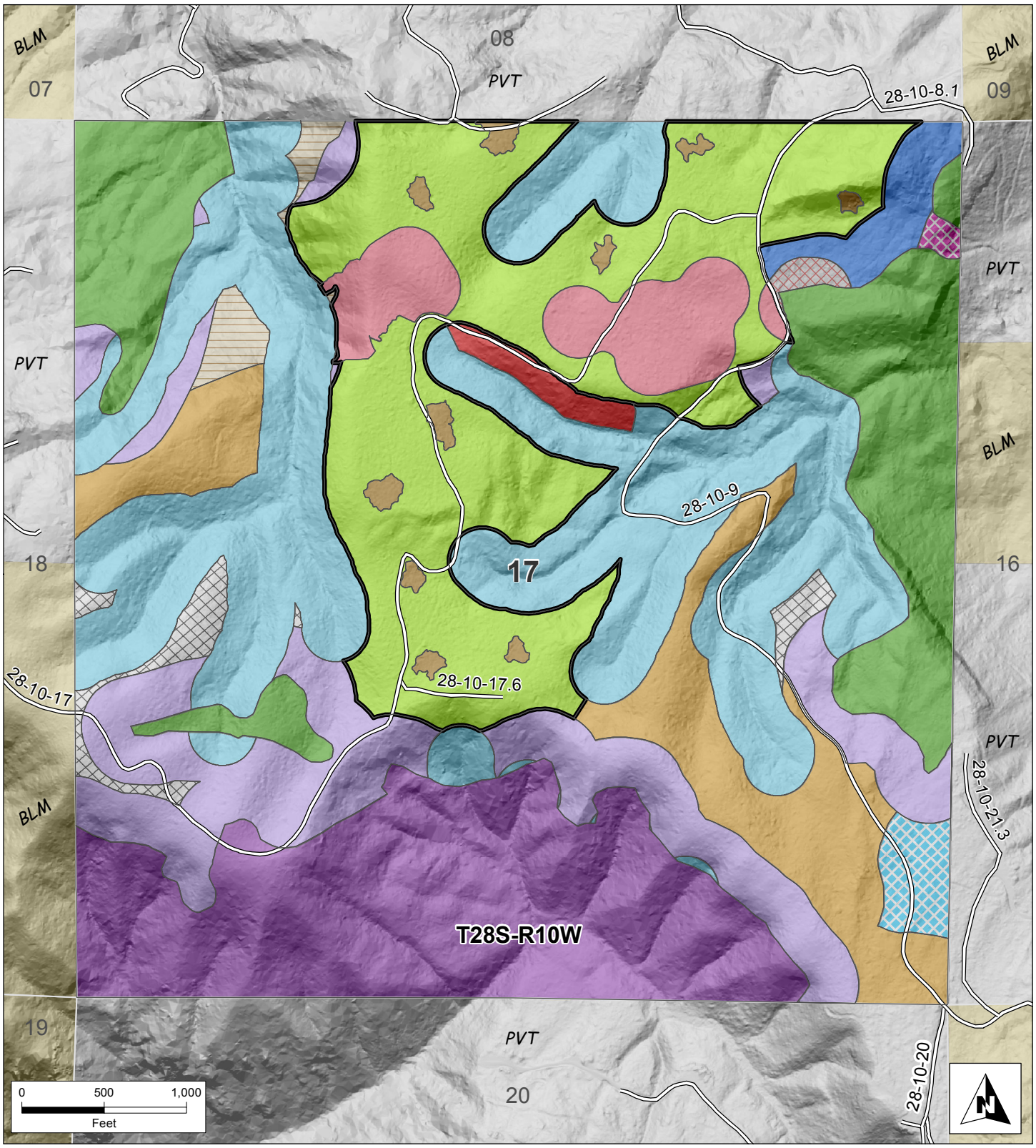
[16] Conversations with Drs. Franklin and Johnson in IDT meetings and field tours during project development and public meetings.

[17] June 8 and September 15 2011. Comments from the Coos Chapter, Oregon Society of American Foresters on the Wagon Road Pilot Project to the Coos Bay District BLM.

Map 1: Vicinity Map - Wagon Road Pilot EA (T28S-R10W-Sec 17)



Map 2: Pilot Project Stand Classifications - T28S-R10W-Sec 17



- Starting Baseline Acres
- Variable Retention Harvest Area
- Density Management Area
- Density Mgmt / Alder Conversion Area
- Deferred for Later Harvest
- Marbled Murrelet Buffer
- Marbled Murrelet Occupied Habitat
- Marbled Murrelet Habitat (Unsurveyed Suitable)
- Scattered Aggregates
- Red Tree Vole Aggregate
- Riparian Reserve
- TPCC Withdrawal
- Red Tree Vole Buffer
- Older Stand w/ Residuals
- Younger Stand
- Not Practicable

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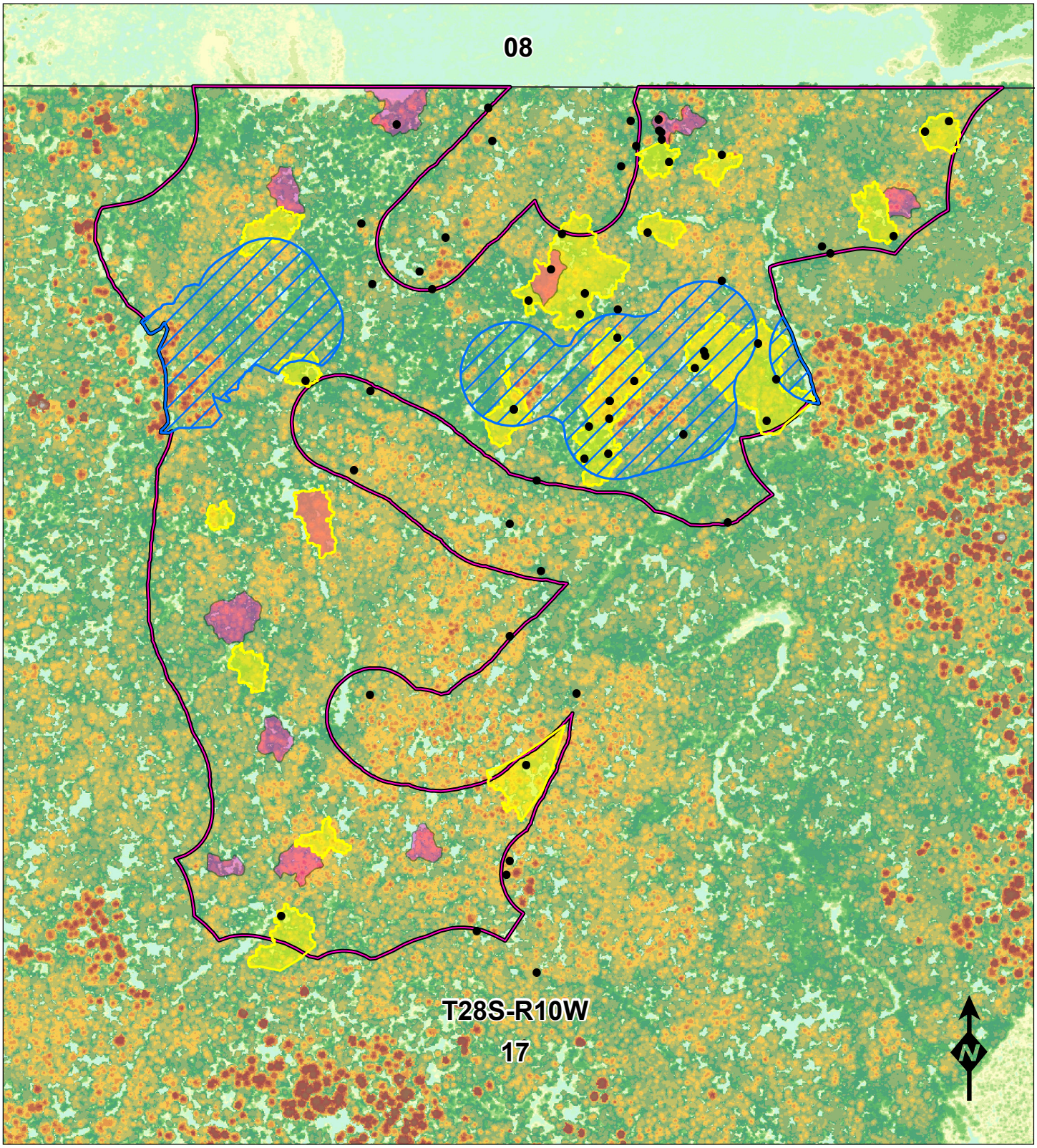
Map 3: Aggregate Blocks Initial and Final Design



- CIT Features of Interest
- Starting Baseline Acres
- Red Tree Vole Aggregate
- Final Aggregate Block Proposal
- Initial Aggregate Block Proposal

Vegetation Height
High
Low

0 500 1,000
Feet

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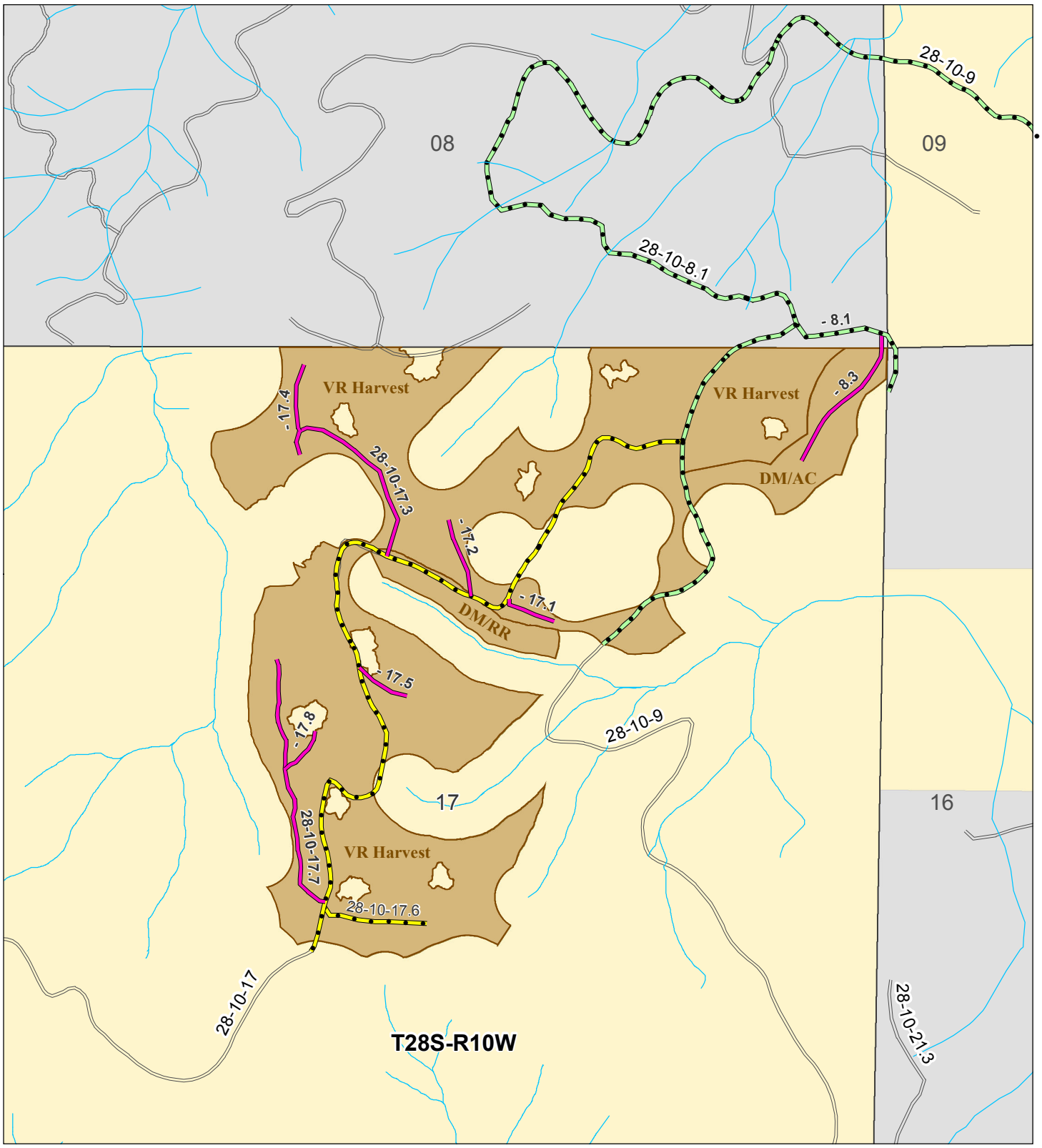
Map 4: Pilot Project Road Work



Proposed Action Acres
New Construction
Improvement
Reno and/or Reconstruction
Other Roads
Area Streams
BLM Administered Land
Private or Other Lands

0 500 1,000
Feet

N

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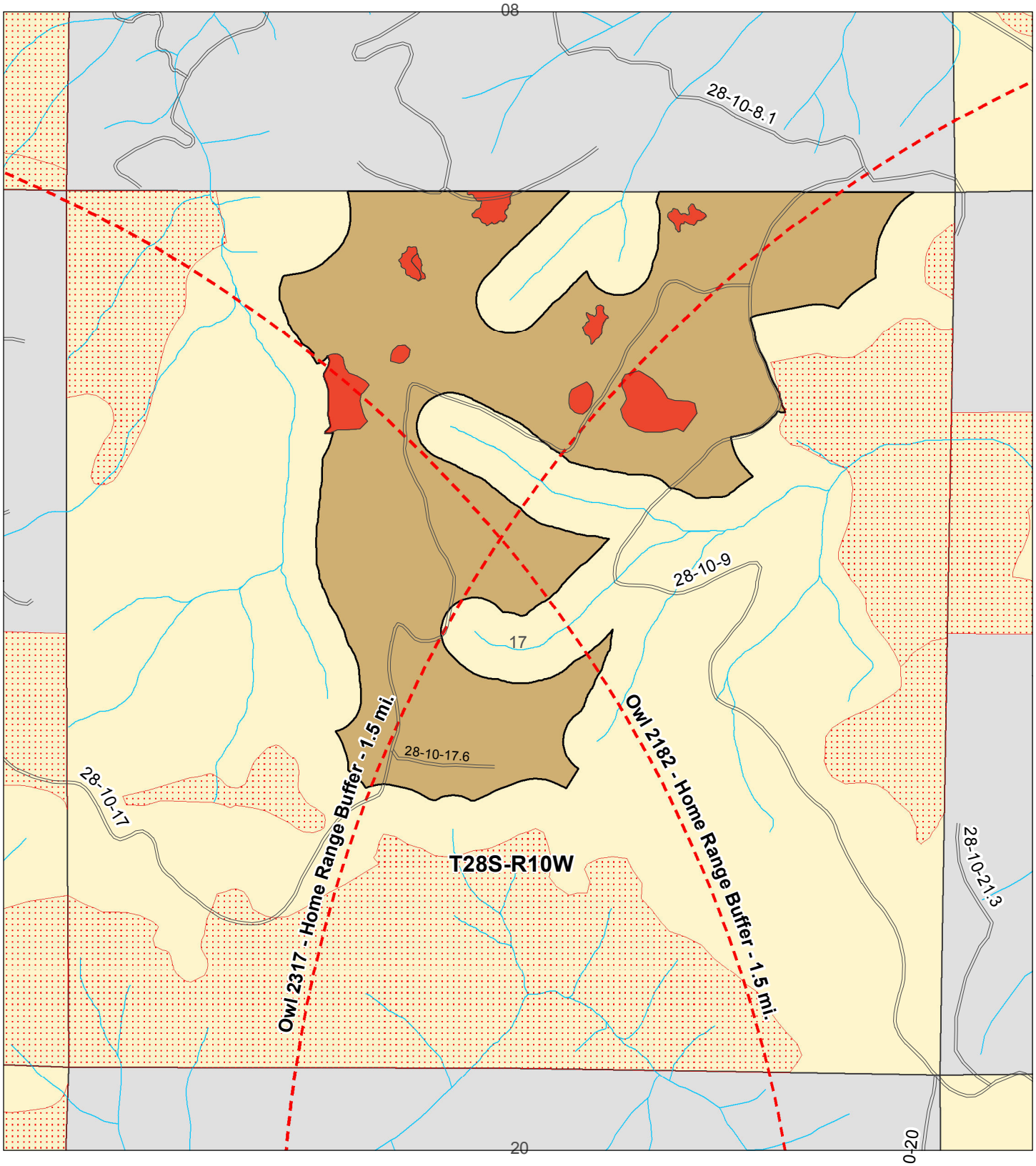
Map 5: Northern Spotted Owl Habitat Relative to the Pilot Project Area



Suitable NSO Habitat Within Baseline Area

Suitable NSO Habitat

NSO Home Range - 1.5 mile circle

Existing Roads

Area Streams

Starting Baseline Acres

BLM Administered Land

Private or Other Lands

0 500 1,000
Feet

N

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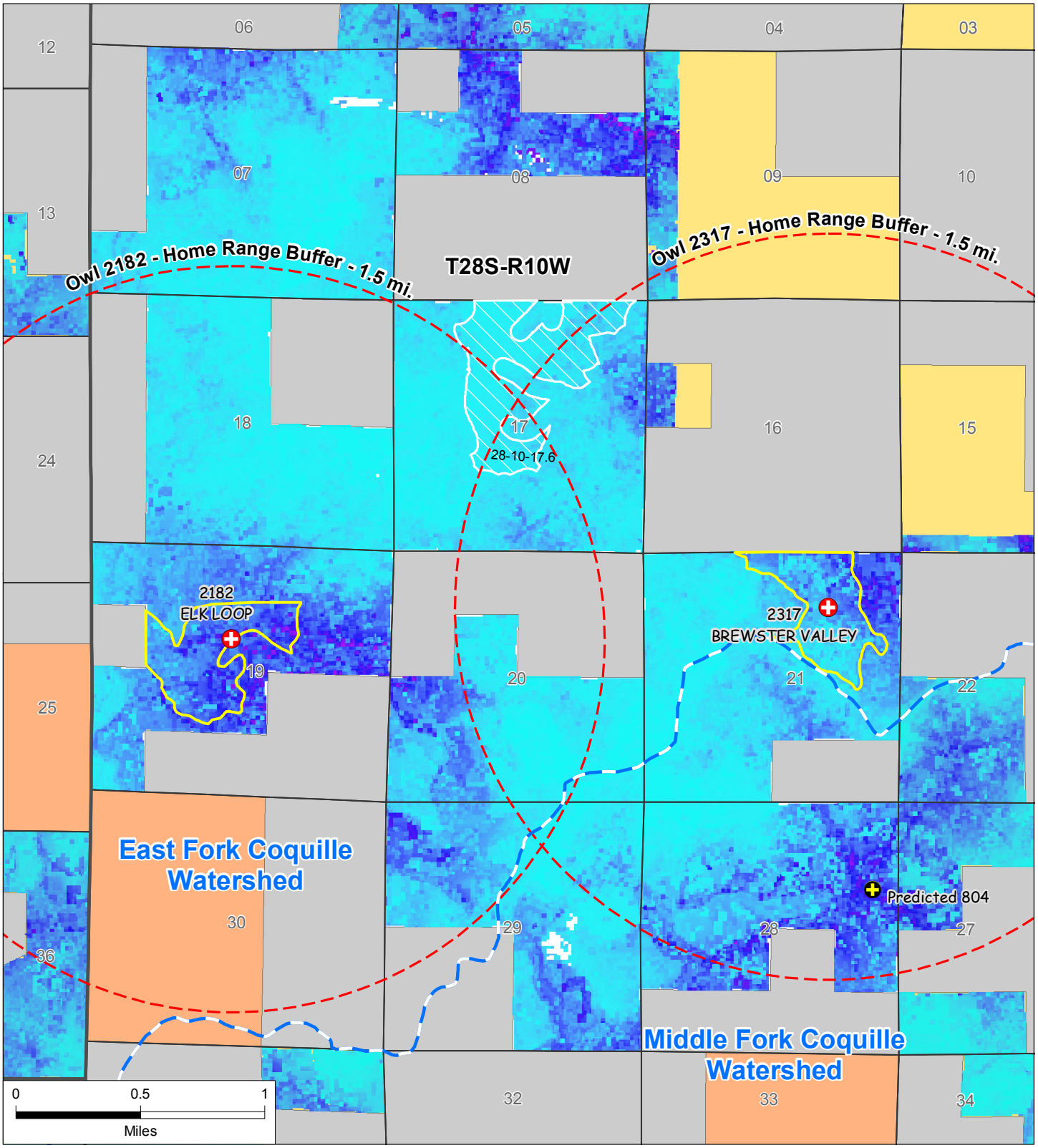
Map 6: MaxEnt Northern Spotted Owl Habitat Probability Model



Known Owl Site

Predicted Owl Site

Owl Site "100-ac" Cores

NSO Home Ranges 2182 & 2317

NSO MaxEnt Probability of Occupancy

Higher Probability

Lower Probability

Starting Baseline Acres

BLM Lands Not Modeled
(Due to lack of lidar coverage)

Bureau of Indian Affairs

Private or Other Lands

Watershed Boundary

N

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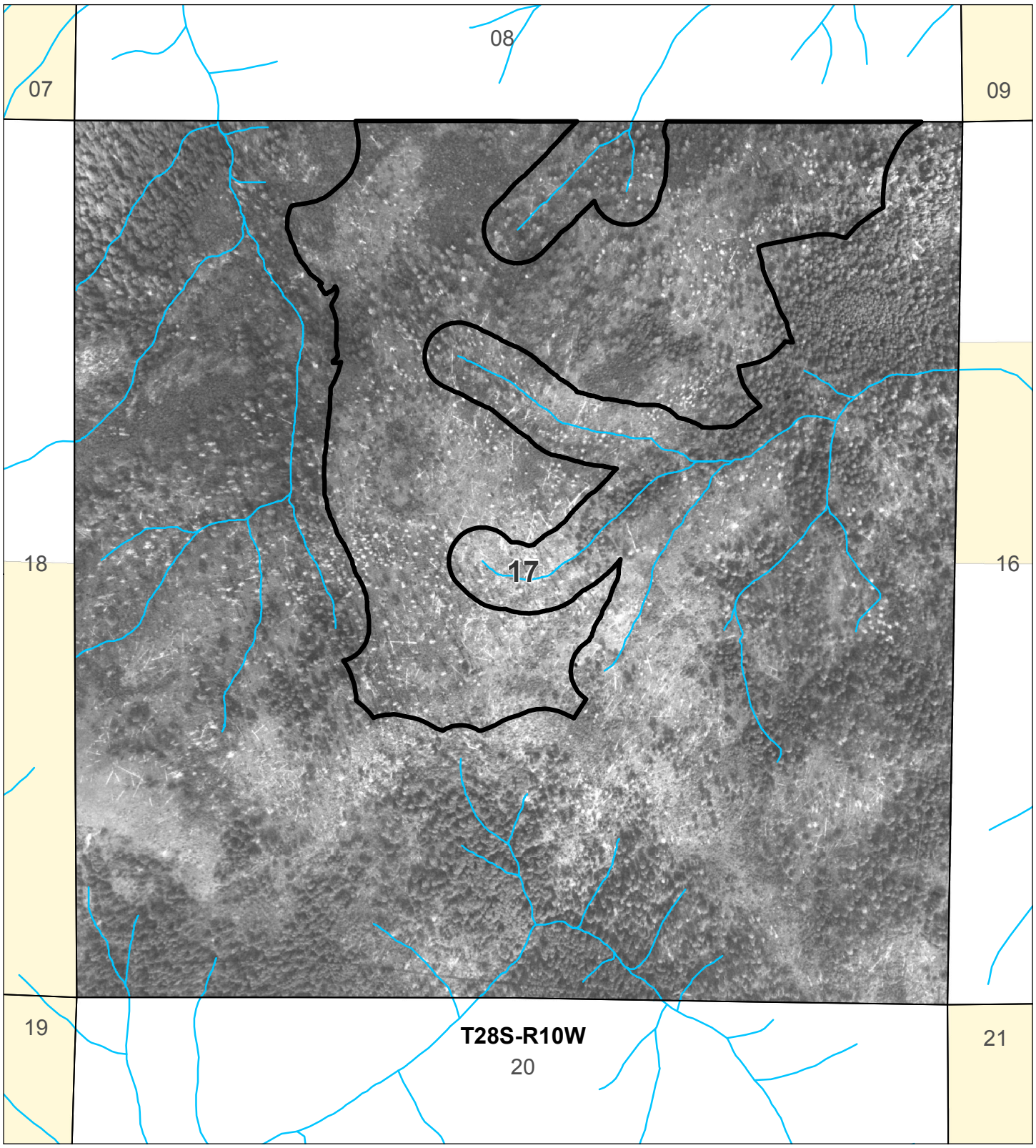
Map 7: Post-Fire Map - Circa 1950 Aerial Photo



Starting Baseline Acres

Area Streams

Adjacent BLM Administered Land

Adjacent Private or Other Land

N

0 500 1,000

Feet

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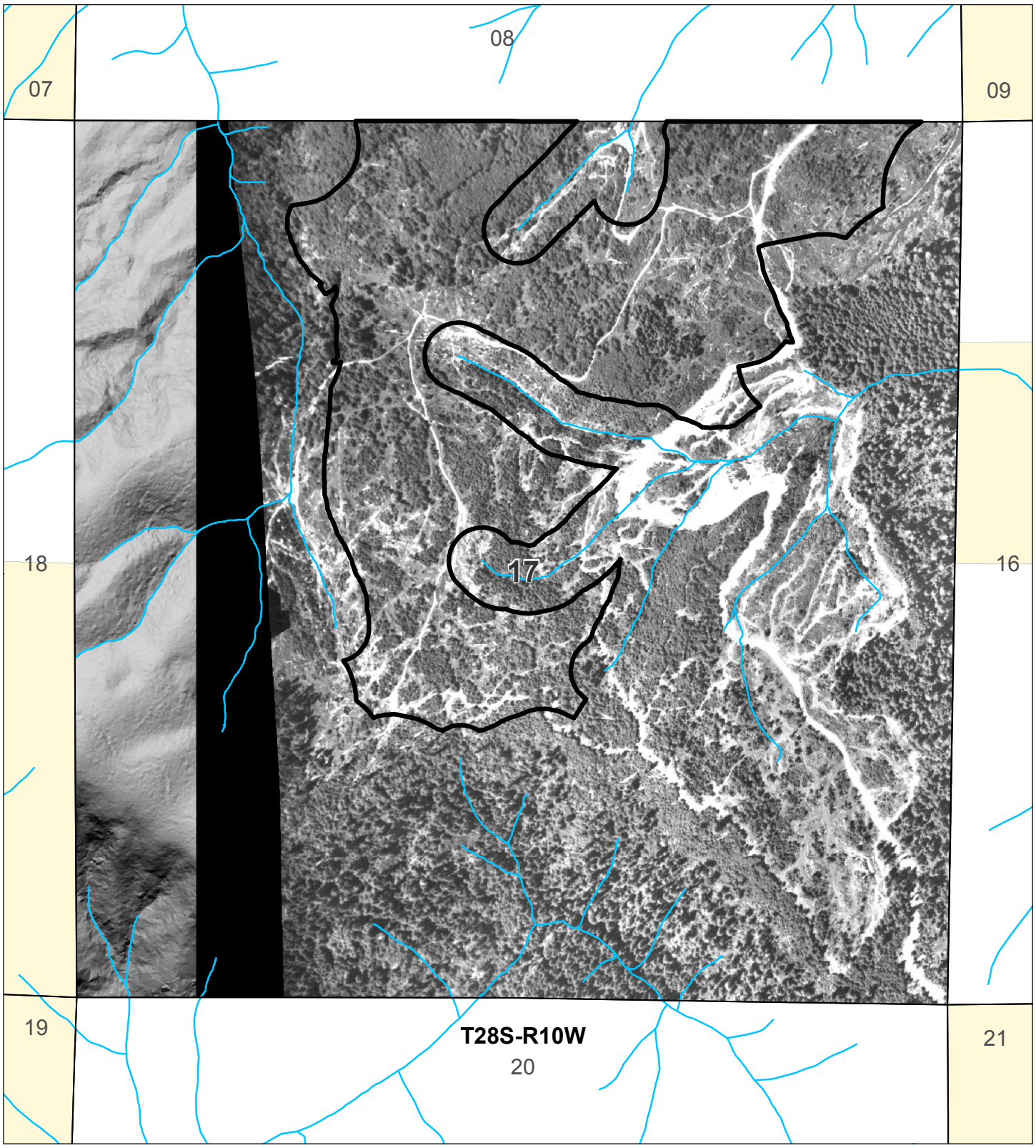
Map 8: Post-Salvage Map - Circa 1959 Aerial Photo



Area Streams

Starting Baseline Acres

Adjacent BLM Administered Land

Adjacent Private or Other Land

0 500 1,000
Feet

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