Rickard Creek Timber Sale
2012 Revised Environmental Assessment and Finding of No Additional Significant Impact

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United States Department of the Interior
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Salem District
Marys Peak Resource Area

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BLM
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BLM/OR/WA/AE-12/002+1792

2012 REVISED RICKARD CREEK TIMBER SALE
ENVIRONMENTAL ASSESSMENT

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1.0 INTRODUCTION

This Environmental Assessment (EA) is a revision of the Revised Rickard Creek Timber Sale EA that the Bureau of Land Management (BLM) published and made available for public review from December 16, 2009 to January 8, 2010. This EA includes and expands upon information from the 2009 Revised EA, and is therefore a standalone EA.

This 2012 Revised Rickard Creek EA (DOI-BLM-OR-S050-2011-0002), hereafter referred to as this EA, addresses Survey and Manage compliance and analyzes two additional alternatives to meeting the purpose of and need for the project. Potential impacts to affected resources (Section 3.0) have been updated to address the two additional alternatives.

This EA will analyze the impacts of proposed regeneration harvest, commercial thinning, and density management operations and connected actions on the human environment in the Marys River 5th field watershed. The EA will provide the decision-maker, the Marys Peak Resource Area Field Manager, with current information to aid in the decision-making process. It will also determine if there are significant impacts not already analyzed in the Environmental Impact Statement for the Salem District's Resource Management Plan (RMP) and whether a supplement to that Environmental Impact Statement is needed or if a Finding of No Additional Significant Impact is appropriate.

Section 1 provides a context for what will be analyzed in the EA, describes the kinds of action we will be considering, defines the project area, describes what the proposed actions need to accomplish, and identifies the criteria that the decision-maker will use for choosing the alternative that will best meet the purpose and need for this proposal.

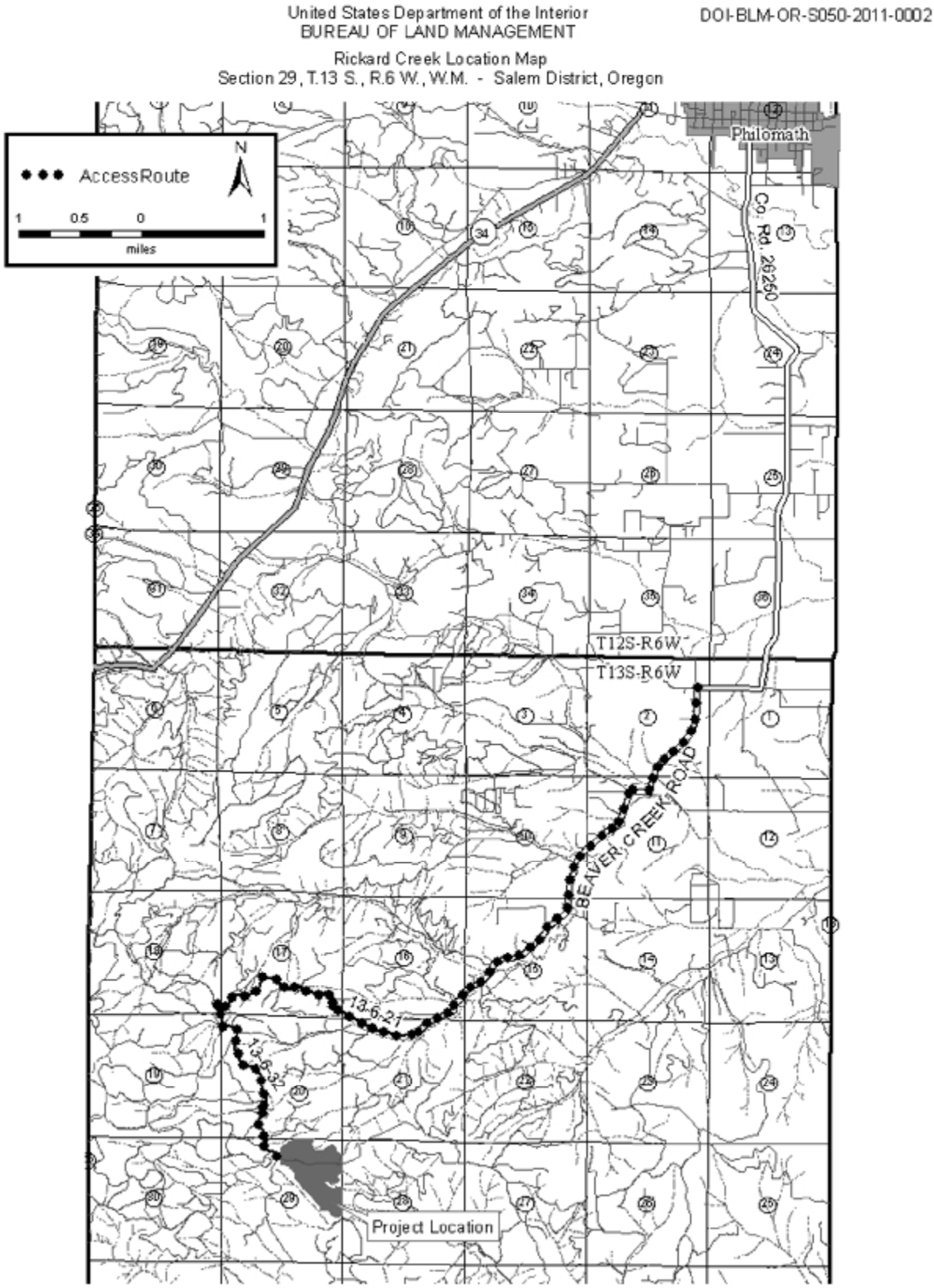
1.1 Project Covered in this 2012 Revised EA

One project will be analyzed in this EA. The 2012 Revised Rickard Creek Timber Sale Project is a proposal to perform regeneration harvest on approximately 92 acres of stands which are about 80 years old within Matrix (General Forest Management Area); commercial thinning on approximately four acres of a 74 year old stand within Matrix; and density management on approximately 15 acres of an 80 year old stand within Riparian Reserve (RR) Land Use Allocations (LUAs).

1.2 Project Area Location

The project area is located approximately nine air miles southwest of Philomath, Oregon, in Benton County on forested land managed by the Marys Peak Resource Area, Salem District BLM. The project area lies within the Marys River 5th field watershed and is within Township 13 South, Range 6 West, Section 29, Willamette Meridian (Map 1).

Map 1. Vicinity Map



1.3 Conformance with Land Use Plans, Policies, and Programs

The Salem District initiated planning and design for this project to conform and be consistent with the Salem District's 1995 Resource Management Plan. 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 Salem District's 2008 Record of Decision and Resource Management Plan (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, the selected alternative contains some design features not mentioned specifically in the 2008 ROD and RMP. The 2008 ROD and RMP did not preclude use of these design features, and the use of these design features is clearly consistent with the goals and objectives in the 2008 ROD and RMP. Accordingly, this project is consistent with the Salem District's 1995 RMP and 2008 ROD/RMP.

The proposed action is located outside the coastal zone as defined by the Oregon Coastal Management Program.

Survey and Manage Review

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 Rickard Creek Project is consistent with the Salem District Resource Management Plan/Forest Land and 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.

The Rickard Creek Timber Sale project meets the provisions of the last valid Record of Decision, specifically 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 (not including subsequent Annual Species Reviews). Details of the project surveys are described below.

Northern Spotted Owl (NSO) Status Review

The following information was considered in the analysis of the proposed activities: a/ *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004); b/ *Status and Trends in Demography of Northern Spotted Owls,* 1985-2003 (Anthony et al. 2004); c/ *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and *Northwest Forest Plan – The First Ten Years* (1994-2003): d/ *Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

The Salem District analyzed reports regarding the status of the northern spotted owl and although the agencies anticipated a decline of NSO populations under land and resource management plans during

the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California.

The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats. West Nile Virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. This information has not been found to be in conflict with the NWFP or the RMP (Evaluation of the Salem District Resource Management Plan Relative to Four Northern Spotted Owl Reports, September 6, 2005).

Compliance with the Aquatic Conservation Strategy (ACS)

On March 30, 2007, the District Court, Western District of Washington, ruled adverse to the U. S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA-Fisheries) and USFS and BLM (Agencies) in *Pacific Coast Fed. of Fishermen's Assn. et al. v. Natl. Marine Fisheries Service, et al. and American Forest Resource Council,* Civ. No. 04-1299RSM (W.D. Wash)(PCFFA IV). Based on violations of the Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA), the Court set aside:

- the USFWS Biological Opinion (March 18, 2004),
- the NOAA-Fisheries Biological Opinion for the ACS Amendment (March 19, 2004),
- the ACS Amendment Final Supplemental Environmental Impact Statement (FSEIS) (October 2003), and
- the ACS Amendment adopted by the Record of Decision dated March 22, 2004.

Previously in *Pacific Coast Fed. Of Fishermen's Assn. v. Natl. Marine Fisheries Service*, 265 F.3d 1028 (9th Cir. 2001)*(PCFFA II)*, the United States Court of Appeals for the Ninth Circuit ruled that because the evaluation of a project's consistency with the long-term, watershed level ACS objectives could overlook short-term, site-scale effects that could have serious consequences to a listed species, these short-term, site-scale effects must be considered. Section 5.0 of the EA shows how the 2012 Revised Rickard Creek Timber Sale Project meets the Aquatic Conservation Strategy in the context of PCFFA IV and PCFFA II. In addition, project design features (Section 2.6) would provide protection measures to meet ACS objectives.

1.4 Decision to be Made

The Marys Peak Resource Area Field Manager will use the following criteria in selecting the alternative to be implemented. The Field Manager will select the alternative that best meets these criteria. The selected action would:

- Meet the purpose and need of the project (Section 1.7)
- Be consistent with the Salem District's 1995 RMP and the 2008 ROD (Section 1.3)
- Would not have significant impact on the affected elements of the environment beyond those already anticipated and addressed in the RMP EIS.

1.5 Public Involvement

A scoping letter, dated May 19, 2005, was sent to 55 potentially affected and/or interested individuals, groups, and agencies. Two responses were received during the scoping period. In addition, the original EA and FONSI document was made available for public review between March 17, 2008 and April 15,

2008. Eight comment letters/emails were received during the original EA comment period. The Revised Rickard Creek Timber Sale EA was released for public comment on December 14,2009. Five comment letters/emails were received during the revised EA comment period.

The scoping and EA comment letters/emails are available for review at the Salem District BLM Office, 1717 Fabry Rd SE, Salem, Oregon.

1.6 Relevant Issues

The Interdisciplinary Team (IDT) identified relevant issues based on applicable law, management direction contained in the RMP, and information gathered during the scoping and project planning process. Issues are analyzed in detail if the analysis of the issue is necessary to make a reasoned choice between alternatives or if the issue is associated with potentially significant impacts or analysis is necessary to determine the significance of the impacts. Analysis of these issues provides a basis for comparing the environmental effects of action alternatives and the no action alternative and aids in the decision-making process. The IDT considered the following issues as it developed and refined the project alternatives, identified Project Design Features (PDFs), and analyzed the environmental effects.

Issue 1: Has the BLM identified and analyzed a reasonable range of alternatives?
Elements of the issue identified in scoping: a variety of alternatives to meet purpose and need.
The elements of this issue are addressed in the following sections of this EA: 2.0

Issue 2: What effects would the proposed roads have on wildlife and water quality?
Elements of the issue identified in scoping: new road construction and location of roads, water quality impacts from sediment from roads, disturbance to wildlife.
The elements of this issue are addressed in the following sections of this EA: 3.3, 3.4, 3.5, 3.7

Issue 3: What effects would the proposed actions have on coarse woody debris (CWD), large woody debris (LWD) recruitment, and snags?
Elements of the issue identified in scoping: ecosystem services of CWD, LWD, and snags, captured mortality from thinning prescriptions, long-term consequences of harvest activities.
The elements of this issue are addressed in the following sections of this EA: 3.3, 3.4, 3.6

Issue 4: What effects would the proposed actions have on ACS objectives?
Elements of the issue identified in scoping: effects of thinning on shade and LWD recruitment, effects of thinning on growth of large trees in the Riparian Reserves, impacts to non-fish aquatic organisms.
The elements of this issue are addressed in the following sections of this EA: 3.4, 3.6, 5.0

Issue 5: How would the proposed actions affect off highway vehicle (OHV) use and how might changes in recreation levels impact resource values?
Elements of the issue identified in scoping: effects of harvest activities on recreation opportunities, displacement concerns, cumulative effects of harvest activities and OHV use on soil, water, wildlife.
The elements of this issue are addressed in the following sections of this EA: 3.8, 4.5, 4.7, 4.8

Issue 6: What effects would the proposed actions have on wildlife habitat for Special Status (SS) Species?
Elements of the issue identified in scoping: effects of harvest activities on Special Status Species and their habitat in the Marys River Watershed.
The elements of this issue are addressed in the following sections of this EA: 3.7, 4.7

Issue 7: What effects would the proposed actions have on air quality, fire risk, and fuel loading?
Elements of the issue identified in scoping: post-harvest fuel loading.
The elements of this issue are addressed in the following sections of this EA: 3.1, 4.1

Issue 8: What effects would the proposed actions have on carbon sequestration and climate change?
Elements of the issue identified in scoping: emissions from proposed activities
The elements of this issue are addressed in the following sections of this EA: 3.2, 4.2

Issue 9: How would the proposed action affect Late Successional forest characteristics and distribution in the Marys River Watershed?
Elements of the issue identified in scoping: age class distribution, condition of late-seral forests.
The elements of this issue are addressed in the following sections of this EA: 3.6, 4.6

Issue 10: What effects would the proposed action have on Threatened and Endangered (T&E), Bureau Special Status or survey and manage botanical and fungal species?
Elements of the issue identified in scoping: effects of harvest activities on known sites of T&E, special status and survey and manage species.
The elements of this issue are addressed in the following sections of the EA: 3.6, 4.6

Issue 11: Would the implementation of the proposed action lead to a significant increase in noxious weed species?
Elements of the issue identified in scoping: mitigation measures to minimize creation of new noxious weed habitat and measures to minimize transportation of noxious weed seed within the project area.
The elements of this issue are addressed in the following sections of the EA: 3.6, 4.6

1.7 Purpose of and Need for Action

Matrix

The purpose of timber harvest in this land use allocation is defined in the Salem District RMP:

- To contribute to the long-term sustainable supply of timber and other forest products which would contribute to local and state economic diversity (RMP, pp. 20, 46-48), while maintaining future forest management options and protecting other resource values.

- To perform regeneration harvest on stands which have reached or are nearing Culmination of Mean Annual Increment (CMAI) (typically between 70 and 110 years of age) to produce maximum average annual growth over the lifetime of the timber stand and develop a desired age class distribution across the landscape (RMP, p. 48).

- To provide early successional habitat (RMP, p. 20), and to maintain a well-distributed pattern of early, mid, and late-successional forest across the matrix (RMP, p. 46).

- To perform commercial thinning on suitable managed timber stands to promote tree growth and survival (RMP, pp. 46-48).

The need for regeneration is based on data collection in 2011 and growth modeling (ORGANON v.9.0 Hann et al., 2006) that indicates the 80 year old stand is in the period of slowing volume growth near CMAI.

The RMP (p. 46) prescribes management direction for timber resources in the Matrix LUA to "Maintain a well-distributed pattern of early, mid-seral and late-seral; successional forest across the matrix." There is a need to meet this direction by increasing the early-seral age class component within the Marys River 5th field watershed. Currently, only 145 acres (2.5%) of BLM-managed forest in this watershed are under 20 years old. Early successional habitat on adjacent private lands generally lack ecologically valuable structural components such as down logs, snags, and large trees required on BLM-managed lands (RMP p. 20) (see vegetation report: Section 3.6).

The need for commercially thinning the 74 year old stand is based on stand exam data that indicates a dense stand with slowing growth and declining health and vigor. Volume is being lost through density mortality that could be captured to meet RMP objectives. Growth modeling indicates the stand can be released for better growth and stand health.

Riparian Reserve Management

The purpose of the density management timber harvest in the RR LUA is as follows:

- To restore large conifers in the RR LUA (RMP, p. 7)
- To improve structural and spatial stand diversity on a site-specific and landscape level in the long-term (RMP, D-6).

Trees in this stand are densely stocked and are exhibiting decreasing crowns and slowing growth. Older overstory trees are declining and losing lower crown structure as younger trees grow to shade them. There is a need to release the declining older forest legacy and dominant overstory trees that are undergoing encroachment from these densely-stocked younger conifers. There is a need to create structural diversity by retaining legacy and dominant overstory trees and their large limbs and deep wide crowns. In addition, there is a need to create spatial diversity by maintaining legacy and dominant overstory trees on the landscape and introducing early seral habitat in small gaps within the density management area where understory development vegetation and shade tolerant tree species can establish.

Road Management

Direction for road management is provided as follows:

- Provide an adequate transportation system to manage timber resources and serve other management needs on federal, state, and private lands in a safe and environmentally sound manner (RMP, p. 62).

Road access is required for harvest operations. There is a need to construct roads to access the timber stands and to renovate and improve the current road system. The current road system has culverts in need of replacement and improvements to be made to road drainage.

2.0 ALTERNATIVE DEVELOPMENT

Pursuant to Section 102 (2)(E) of NEPA (National Environmental Policy Act of 1969, as amended), Federal agencies shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."

Unresolved conflicts concerning a reasonable range of alternatives and the management of red tree voles were used to develop two alternatives in addition to the original proposed regeneration harvest. Therefore, this EA will analyze the effects of Alternative 1 (No Action), Alternative 2 (Proposed Action), Alternative 3 (Regeneration Harvest with Red Tree Vole Buffers), and Alternative 4 (Commercial Thinning and Density Management).

2.1 Alternative 1 – No Action

The No Action Alternative describes the environmental baseline against which the effects of the action alternatives can be compared; i.e. the existing conditions in the project area and the continuing trends in those conditions if the BLM does not implement any of the proposed actions. Consideration of this alternative also answers the question: "What would it mean for the objectives to not be achieved?" The "No Action Alternative" means no timber management actions or connected actions would occur. If this alternative were selected, the following items would not be done in the project area at this time:

- Silvicultural treatments
- Timber harvest
- Road construction, renovation, improvement, or decommissioning
- Fuel reduction treatments

Only normal administrative activities and other uses (e.g. road use, programmed road maintenance, harvest of special forest products) would continue on BLM-managed lands within the project area. On private lands adjacent to the project area, forest management and related activities would continue to occur. Selection of the No Action Alternative would not constitute a decision to change the land use allocations of these lands. Selection of the No Action Alternative would not set a precedent for consideration of future action proposals.

2.2 Alternative 2 – Proposed Action

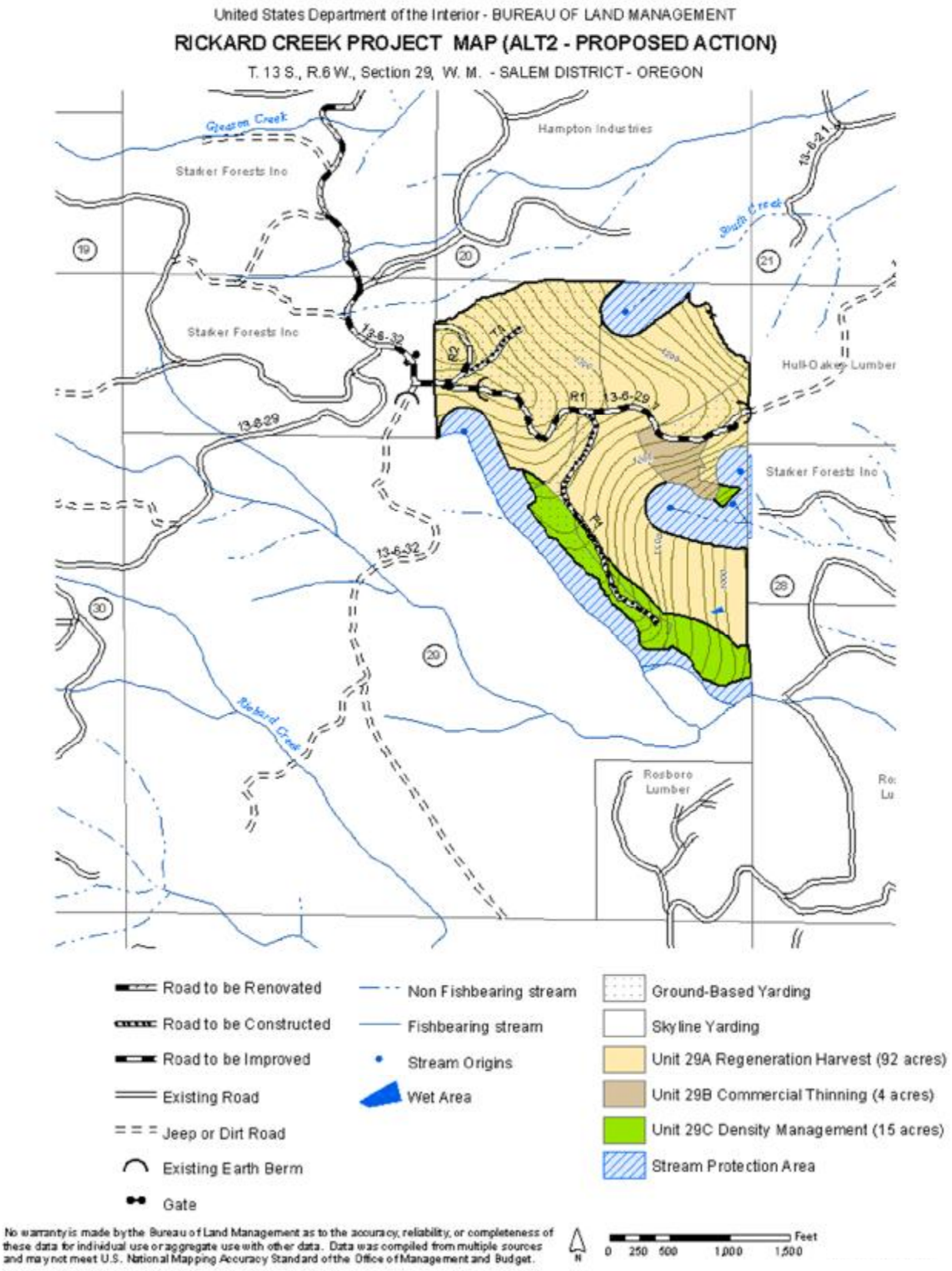
This project would consist of:

- Conducting density management on approximately 15 acres of 74 and 80 year old stands within RR LUA. The boundary of RR LUA is two site potential tree heights (420 feet) from fish bearing streams and one site potential tree height (210 feet) from non fish bearing streams.
- Conducting commercial thinning on approximately four acres of 74 year old stands within Matrix LUA, and
- Conducting regeneration harvest on approximately 92 acres of stands which are about 80 years old within Matrix LUA. Within the regeneration harvest unit, between 9 and 11 trees per acre would be reserved from harvest to meet the following objectives:
    - ü minimize the potential deficit of large hard snags and down logs in the post-harvest stand and;
    - ü provide for structural diversity and wildlife values in the post-harvest stand.

This project would occur through one timber sale (Rickard Creek). Within the density management area, gaps would be created around dominant overstory and legacy trees to create structural diversity. Trees within the commercial thinning area would be thinned to an average 52 trees per acre (TPA) of all conifers greater than 7 and less than 40 inches DBH (see marking guide, Appendices B and C).

Trees would be skyline yarded on approximately 71 acres and ground-based yarded on approximately 40 acres. New road construction (2,960 feet), road renovation (12,408 feet), road improvement (4,176 feet), and road decommissioning on new and some improved roads would also occur.

Map 2. Alternative 2 – Proposed Action



2.3 Alternative 3 – Regeneration Harvest with Red Tree Vole Buffers

This alternative was developed to address concerns for potential impacts to red tree voles, which have been documented to occur in the affected forest stand. Under the Survey and Manage 2001 ROD, the red tree vole is a Category C species, whereby the BLM is required to:

- Identify and manage high-priority sites to provide for reasonable assurance of species persistence.
- Until high-priority sites can be determined, manage all known sites.

Since high priority sites have not been previously identified in this watershed, this alternative would manage for full protection of red tree vole nests that have been identified through the protocol survey effort. A Habitat Area for red tree vole protection would be established and timber harvest and new road construction would be excluded from the Habitat Area.

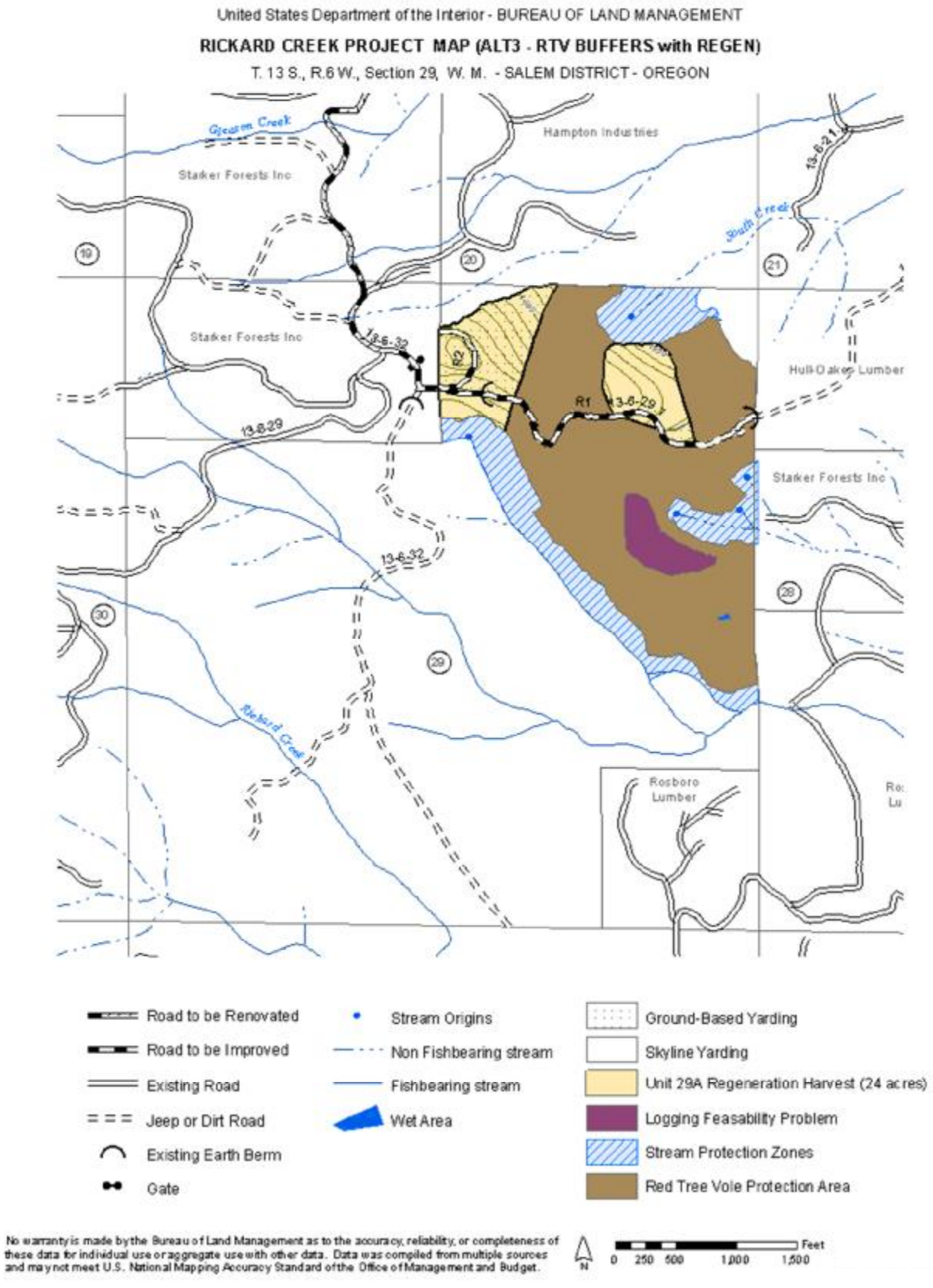
This project would consist of:

- Conducting regeneration harvest on approximately 24 acres of stands which are about 80 years old within Matrix LUA. Within the regeneration harvest unit, between 9 and 11 trees per acre would be reserved from harvest to meet the following objectives:
    - ü minimize the potential deficit of large hard snags and down logs in the post-harvest stand, and
    - ü provide for structural diversity and wildlife values in the post-harvest stand.

This project would occur through one timber sale (Rickard Creek).

Trees would be skyline yarded on approximately 11 acres and ground-based yarded on approximately 13 acres. Road renovation (12,408 feet), road improvement (3,835 feet), and road decommissioning on some existing roads are also a part of the proposed action. No road construction would occur.

Map 3. Alternative 3 – Regeneration Harvest with RTV Buffers



2.4 Alternative 4 – Commercial Thinning and Density Management

This alternative was developed in response to public encouragement to consider an alternative to regeneration harvest to meet the purpose and need for the project.

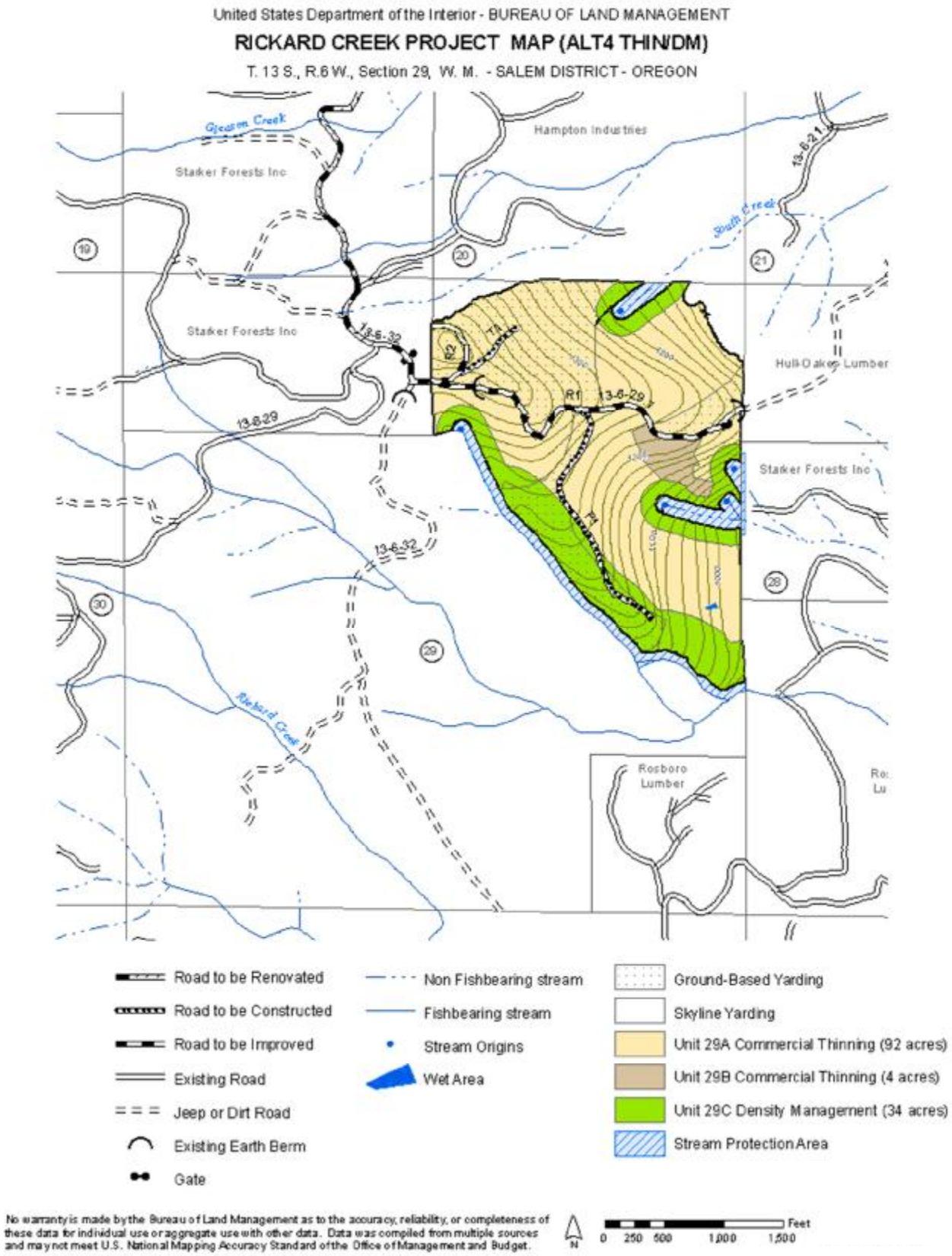
This project would consist of:

- Conducting density management on approximately 34 acres of 74 and 80 year old stands within RR LUA. The boundary of RR LUA is a distance of two site potential tree heights (420 feet) from fish bearing streams and one site potential tree height (210 feet) from non fish bearing streams.
- Conducting commercial thinning on approximately 96 acres of 74 and 80 year old stands within Matrix LUA.

This project would occur through one timber sale (Rickard Creek). Within the density management area, gaps would be created around dominant overstory and legacy trees to create structural diversity, with an estimated residual 41 TPA. Trees within the commercial thinning area would be thinned to an average 69 TPA (Unit 29A) and 52 TPA (Unit 29B) of all conifers greater than seven and less than forty inches DBH.

Trees would be skyline yarded on approximately 84 acres and ground-based yarded on approximately 46 acres. New road construction, road renovation, road improvement, and road decommissioning on new and some improved roads would also occur.

Map 4. Alternative 4 – Commercial Thinning and Density Management



2.5 Summary of Action Alternatives and Connected Actions

Table 1. Comparison and Summary of Action Alternatives and Connected Actions

	Alternative 2 Proposed Action	Alternative 3 Regen w/ RTV buffers	Alternative 4 Commercial Thinning and Density Management
Total Acres	111	24	130
Regeneration harvest (acres)	92 acres (29A)	24 acres (29A)	-
Residual TPA	9-11	9-11	-
Commercial Thinning (acres)	4 acres (29B)	-	96 acres. (29A, 29B)
Residual TPA	52	-	69 (29A), 52 (29B)
Density Management (acres)	15 acres (29C)	-	34 acres (29C)
Residual TPA	N/A (legacy release)	-	41
Road Construction (ft.)	2,960	-	2,960
Road Renovation (ft.)	12,408	12,408	12,408
Road Improvement (ft.)	4,176	3,835	4,176

Road Construction: A portion of new road construction (P1 spur) would be surfaced with approximately six to eight inches of rock and a portion (T1 spur) would receive no surfacing. Following harvest all the new construction would be decommissioned.
Road Renovation: All of the road renovation would be surfaced with 4 to 10 inches of rock. Three culverts would be replaced on Road 13-6-21 (Beaver Creek Road).
Road Improvement: Road improvement would range from no surfacing to the application of 4 to 10 inches of rock. Following harvest approximately 2,800 feet of Road 13-6-29.1 (R1) would be decommissioned.

Fuels Treatments

Post-harvest fuels hazard surveys would be conducted and site-specific treatments would be recommended. Fuel treatment strategies would be implemented to reduce both the intensity and severity of potential wildfires in the long term (after fuels reduction has occurred) and for site preparation in regeneration and commercial thinning harvest units, at landings, or along roads and property lines.

2.6 Project Design Features

The following is a summary of the design features common to all action alternatives that reduce the risk of effects to the environment. These design features would be achieved through enforcement of a timber sale contract.

Table 2. Season of Operation and Operating Conditions

Season of Operation or Operating Conditions	Applies to Operation	Objective

During periods of low tree sap flow, generally July 15 to April 15	Cable yarding outside of road right-of-ways in commercial thinning and density management areas	Protecting the bark and cambium of residual trees
During periods of low precipitation, generally May 1 to October 31	Road Construction, renovation, improvement, decommissioning	Minimize soil erosion
During periods of low soil moisture, generally July 15 to October 15	Ground-based yarding (Tractor)	Minimize soil erosion/compaction
During periods of low soil moisture[1], generally June 15 to October 31	Ground-based yarding (Harvester/Forwarder and Hydraulic Loader)	Minimize soil erosion/compaction
July 1 to August 31	In-stream work period (culvert installation and/or removal)	Minimize soil erosion/stream sedimentation
June 15 to October 15	Hauling over unsurfaced roads	Minimize stream sedimentation

[1]Low soil moisture is generally defined as less than 15%

Project Design Features by RMP Objectives

To contain and/or reduce noxious weed infestations on BLM-managed lands using an integrated pest management approach

- All soil disrupting equipment moved into the project area would be required to be clean and free of dirt and vegetation as directed by the contract administrator.
- All large areas of exposed mineral soil (roads to be constructed, cat/skid roads, landings), as determined by the contract administrator would be grass seeded with Oregon Certified (blue tagged) red fescue (*Festuca rubra*) as a rate equal to 40 pounds per acre or sown/planted with other native species as approved by the resource area botanist.

To minimize soil erosion as a source of sedimentation to streams and to minimize soil productivity loss from soil compaction, loss of slope stability, or loss of soil duff layer

- All logging activities would utilize the Best Management Practices (BMPs) required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) (RMP Appendix C pp. C-1 through C-10). Following are the specific BMPs that apply to this project:
  - Ground-based yarding would take place generally on slopes less than 35 percent.
  - Within ground-based yarding areas, existing skid trails would be used as much as practical.
  - Harvester/forwarder use would require that logs be transported free of the ground. The equipment would be either rubber tired or track mounted, and have rear tires or tracks greater than 18 inches in width. Skid trails would be spaced approximately 60 feet apart and be less than 15 feet in width. Logging debris would be placed in skid trails in front of equipment to minimize the need for machines to drive on bare soil.
  - Crawler tractor use would require utilization of pre-designated skid trails spaced at least approximately 150 feet apart where they intersect boundaries and utilize existing skid trails as much as practical.
  - Other ground-based yarding equipment could be utilized as long as it meets Best Management Practices and results in equivalent or less than the level of impacts analyzed for the project.

- Waterbars would be constructed where they are determined to be necessary by the contract administrator.
- In the skyline yarding area, one end suspension of logs would be required over as much of the area as possible to minimize soil compaction, damage to reserve trees, and disturbance. Yarding corridors would average approximately 150 feet apart where they intersect boundaries and be 15 feet or less in width. Lateral yarding up to 75 feet from the skyline using an energized locking carriage would be required.
- During periods of heavy rainfall, the contract administrator may restrict log hauling where the road surface is deeply rutted or covered by a layer of mud or where runoff from that road segment is causing a visible increase in turbidity to adjacent streams. To minimize water quality impacts, the purchaser may also be required to install silt fences, barkbags, or additional road surface rock.

To meet the objectives of the Aquatic Conservation Strategy in the Riparian Reserves (ACS Component #1)

- Stream protection zones (SPZs), where no cutting is permitted, would be established along all streams and identified wet areas within the harvest area. These zones would be a minimum of approximately 50 feet from the high water mark.
- To protect water quality, all trees within one tree height of SPZs would be felled away from streams. Where a cut tree does fall within a SPZ, the portion of the tree within the SPZ would remain in place.
- No yarding would be permitted in or through any SPZs within the harvest area.
- No regeneration harvest would occur within Riparian Reserves LUA.

To protect and enhance stand diversity and wildlife habitat components

- Priorities for tree marking within the commercial thinning areas would be based on Marking Guidelines (Appendix B).
- Within density management and commercial thinning areas, except in yarding corridors/skid trails or where they pose a safety risk, species diversity would be maintained by reserving all trees (merchantable and non merchantable) other than Douglas-fir and a minor component of bigleaf maple.
- Within density management and commercial thinning areas, all open grown trees with high wildlife value, existing snags and CWD would be reserved, except where they pose a safety risk or affect access and operability. Any snags or logs felled or moved for these purposes would remain on site within the project area.
- Within density management areas (Alternative 4), inputs of CWD would be achieved by indirect harvest activities (e.g. breakage, limbs and tops). In addition, up to two trees per acre that are intended to be part of the residual stand but are incidentally felled or topped (i.e. tailtrees, intermediate supports, guyline anchors, hang-ups) would be left on site to function as CWD. The trees which are intended to be retained as CWD would be stand average diameter breast height outside bark (DBHOB) or larger.
- Three to five years after harvest operations have been completed within the density management area, CWD would be evaluated and a decision made as to whether more is needed, up to five per acre would be added.
- Within the density management areas (Alternative 4), trees within 60 to 80 feet of dominant overstory trees would be cut (approximate ¼ to ½ acre gap created). These gaps would average up to one per two acres. The cut trees would be harvested.

- Within the regeneration harvest unit, between 9 and 11 trees per acre would be reserved from harvest to meet the following objectives:
  - ü Green Tree Retention. Approximately six to eight conifer trees per acre, (representative of the co-dominant and dominant trees), would be retained to provide for structural diversity and wildlife values in the post-harvest stand. Preference in green tree selection would be given for those trees located safely away from landings and right-of-ways, and for the oldest trees, or trees with complex structure, crown defects, deeply furrowed bark, or which have visible nest structures.
  - ü Future snags and down logs. Approximately two conifer trees per acre would be retained to minimize the potential deficit of large hard snags and down logs in the post-harvest stand. Site preparation and post harvest processes (e.g. wind, insect, disease) would likely convert some or all of this allotment into snags and down logs within the first decade.
  - ü Habitat Diversity. Up to one hardwood tree per acre (primarily large bigleaf maples) would be retained to provide for post harvest wildlife habitat diversity. All other hardwoods would be felled and could be removed.
- Within the regeneration harvest unit, all existing down logs would be retained where possible. Down logs in decay class 1 and 2 that are greater than 20 inches DBHOB on the large end would be retained.
- Within the regeneration harvest unit, all existing snags would be retained on site except where they pose a threat to on-site workers or are within rights-of-ways and landings. Any snags felled for these purposes would remain on site within the project area.

To protect air quality, reduce fire risk, and manage fuels

- A Prescribed Fire Burn Plan would be initiated and signed by the Authorized Officer prior to any prescribed burning activity.
- Burning would be conducted in accordance with the Salem District RMP, *Oregon State Implementation Plan* and *Oregon Smoke Management Plan* as administered by the Oregon Department of Forestry and would comply with the provisions of the Clean Air Act. It would be conducted under good atmospheric mixing conditions to lessen the impact on air quality in Smoke Sensitive Receptor Areas.
- Harvest units in which prescribed broadcast burning is applied would have all brush greater than two feet in height cut (slashed) following yarding. Hand firelines would be constructed, existing snags adjacent to control lines would be felled, and no new snags would be created adjacent to control lines. In addition, where slash accumulations are heavy adjacent to thin barked reserve trees slash would be pulled back or handpiled to facilitate survival of these trees.
- Broadcast burning, swamper burning, or hand, machine, and landing pile construction and burning may be used individually or in combination in areas where fuel loading is heavy, the fire risk is determined to be high, or site preparation is required to help facilitate tree planting in regeneration harvest units, *Phellinus weirii* pockets, or gaps.
- Large woody debris greater than six inches in diameter would not be piled.
- Hand piles should be located at least 10 feet from green trees to minimize damage, or on top of Bigleaf maple stumps to help prevent resprouting.
- Machine and landing piles would only be constructed within 25 feet of designated roads and landings. Equipment used in the construction of machine piles or landings would remain on the roads or landings during the construction.
- Machine and landing piles should be located as far as practical from reserved trees to minimize damage.

- Hand, machine, and landing piles would be covered with .004 mil. thick black polyethylene plastic. The plastic shall not exceed 100 square feet in size and would be placed and anchored to help facilitate the consumption of fuels during the high moisture fall/winter burning periods.
- Lopping and scattering of fuels would be incorporated in areas where fuel loading is relatively heavy but not heavy enough to warrant burning.
- Pullback of fuels would be incorporated in areas where fuel loading is relatively light (especially along roads and property lines) and not heavy enough to warrant burning.
- Utilization of small diameter slash for firewood or energy production from biomass would be incorporated where appropriate. If biomass removal occurs in lieu of prescribed burning within commercial thinning/density management ground-based harvest areas; only logging debris accessible from existing roads and landings would be available for removal. If biomass removal occurs in lieu of prescribed broadcast burning in regeneration harvest areas only slash less than six inches in diameter would be available for removal.
- Warning signs would be posted during project activities to inform the public
- Signs would be posted in the project area to inform and caution the public of project activities.

To provide reforestation in the regeneration harvest area

- Following site preparation, the area would be planted with a mixture of Douglas-fir, western hemlock, Willamette Valley ponderosa pine, and western red-cedar at a rate of approximately 200-400 trees per acre.

To protect ESA listed, special status, or survey and manage terrestrial animals

- Standards outlined in the applicable letters of concurrence or biological opinions in place at the time of implementation would be followed to prevent or minimize adverse effects to ESA listed terrestrial wildlife species.
- A wildlife biologist shall participate in the planning and design of all implementation activities that may affect any ESA listed, special status, or survey and manage species and would include surveys to protocol if required. Appropriate management recommendations would be followed or protection measures undertaken to prevent or minimize adverse effects.
- Required pre-disturbance surveys and known-site management for any special status or survey and manage animal species would be accomplished in accordance with BLM Manual 6840 - *Special Status Species Management,* and the *2001 Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines as modified by the 2011 settlement agreement in Conservation Northwest v. Sherman* (Case No.08-CV-1067-JCC) or successive guidance.
- To supplement previous outdated survey effort from 2004 and 2005, two more years of protocol surveys for marbled murrelets would be completed prior to project implementation (Section 3.7).
- The resource area biologist would be immediately notified if any federally-listed, special status, or survey and manage animal species are encountered while implementing proposed project activities so timely protection measures can be incorporated, as deemed feasible.

To protect ESA listed, Special Status, or Survey and Manage Plants and Fungi

- Required pre-disturbance surveys and known-site management for any special status or survey and manage plant/fungal species would be accomplished in accordance with BLM Manual 6840 - *Special Status Species Management*, and the *2001 Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other*

Mitigation Measures Standards and Guidelines as modified by the2011 settlement agreement in Conservation Northwest v. Sherman (Case No.08-CV-1067-JCC) or successive guidance.

- Pre-disturbance surveys would generally be accomplished through intuitive controlled methods, field clearances, field reconnaissance, inventories, database searches, known site maps and records and/or habitat examinations and in accordance with species survey protocols. Clearances for fungi are considered "not practical" and surveys are not required.
- The resource area botanist would be immediately notified if any federally-listed, special status, or survey and manage plant/fungal species are encountered while implementing proposed project activities so timely protection measures can be incorporated, as deemed feasible.

To protect public safety during harvest and fuel treatment operations

- Oregon Occupational Safety and Health Administration and the BLM would require the operator to place signs, temporarily block roads with vehicles or moveable barricades, and/or use flaggers to ensure public safety during active logging, hauling, and fuel treatment operations.

To protect Cultural Resources

- The project area occurs in the Oregon Coast Range. Survey techniques are based on those described in Appendix D of the *Protocol for Managing Cultural Resource on Lands Administered by the Bureau of Land Management in Oregon*. Post-project survey would be conducted according to standards based on slope defined in the Protocol appendix. Project activities would be suspended if archaeological or historical materials are discovered during project work until an archaeologist can assess the significance of the discovery.

2.7 Alternatives Considered but not Analyzed in Detail

Commercial thinning was a previous alternative considered, but not analyzed in detail in the Revised 2009 Rickard Creek EA. Based on comments received on the EA and an internal IDT review of the viability of such an alternative, a thinning only alternative was fully developed and analyzed. No additional alternatives were considered, but not analyzed in detail.

2.8 Comparison of Alternatives With Regard To Purpose and Need

Table 3. Comparison of Alternatives by Purpose and Need

Purpose and Need (EA Section 1.6)	No Action (Alternative 1)	Proposed Action (Alternative 2)	Regeneration Harvest with RTV Buffer (Alternative 3)	Commercial Thinning and Density Management (Alternative 4)
Perform commercial thinning on suitable managed timber stands to promote tree growth and survival.	No commercial thinning would occur. Trees would remain at high density, resulting in slow growth and greater mortality.	Commercial thinning would occur on **four acres** to increase diameter growth and open stand conditions to preserve limbs and high crown ratios.	Same as the No Action alternative.	Commercial thinning would occur on **96 acres** to increase diameter growth and create growing space to preserve limbs and high crown ratios.
Contribute to the long-term sustainable supply of timber while maintaining future forest management options and protecting other resource values.	Does not meet this purpose and need. No timber harvest would occur under this alternative, thus no contribution to a supply of timber would occur.	Offers approximately 7,727 MBF of timber for sale through 4 acres of commercial thinning, 15 acres of density management and 92 acres of regeneration harvest.	Offers approximately 1,944 MBF of timber for sale through 24 acres of regeneration harvest.	Offers approximately 6,314 MBF of timber for sale through 96 acres of commercial thinning and 34 acres of density management.
Perform regeneration harvest on stands which have reached CMAI to produce maximum average annual growth.	No regeneration harvest would occur, Unit 29A would reach CMAI within a few years, and growth will slow.	92 acres of regeneration harvest would occur. Achieves maximum MAI for the stand.	24 acres of regeneration harvest would occur. Achieves maximum mean annual increment for the stand.	No regeneration harvest would occur.

Purpose and Need (EA Section 1.6)	No Action (Alternative 1)	Proposed Action (Alternative 2)	Regeneration Harvest with RTV Buffer (Alternative 3)	Commercial Thinning and Density Management (Alternative 4)
Provide early successional habitat and maintain a well-distributed age class distribution across the matrix.	Would not provide early successional habitat. GFMA land would remain at 21% early seral forest (aged <40 years), but only 2.5% aged < 20 years.	Adds 92 acres to the early seral component of the land base. GFMA lands in early seral forest would increase by1.6% to total 23%, late seral forest would decrease from 37% to 35.5%.	Adds 24 acres to the early seral component of the land base. Very slight increase in early seral forest (0.4%).	This stand would not contribute to the early seral component of the land base. No change in forest seral stage.
To restore large conifers in the RR LUA (RMP p. 7). To improve structural and spatial stand diversity on a site-specific and landscape level in the long-term (RMP D-6).	Does not meet purpose and need. Acceleration of growth on large conifers within RR LUAs would not occur. Improved structural and spatial stand diversity would not occur beyond what would occur naturally.	Creates patch openings with adjacent clumps of trees. Retains existing limbs on open grown and/or legacy trees through selective cutting. Some larger trees felled for safety or operational reasons would be retained for CWD. Increases quality and value of wildlife habitat.	Same as Alternative 2, but on fewer acres.	Within the density management area, gaps would be created around dominant overstory and legacy trees to create structural diversity
Provide an adequate transportation system to manage timber resources and serve other management needs in a safe and environmentally sound manner.	Road construction, renovation and improvement would not occur. Drainage features, culverts of the 13-6-21 and 13-6-28 roads would continue to degrade and impair aquatic habitat.	Renovates approximately 12,408 feet, improves approximately 4,176 feet, and constructs approximately 2,960 feet of new road.	Renovates approximately 12,408 feet of road, and improves approximately 3,835 feet of road	Renovates approximately 12,408 feet, improves approximately 4,176 feet, and constructs approximately 2,960 feet of new road.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

Those elements of the human environment determined to be affected are air quality, fire risk and fuels management, carbon sequestration and climate change, fisheries and aquatic habitat (except ESA listed species/habitat), recreation and rural interface, soils, vegetation, water, and wildlife. This section describes the current condition and trend of those affected elements, and the environmental effects of the alternatives on those elements.

3.1 Air Quality, Fire Risk, and Fuels Management

(IDT report incorporated by reference: Mortensen, 2011. Rickard Creek Air Quality, Fire Risk, and Fuels Management Report.)

Affected Environment

Air Quality

The major source of air pollutants within the Rickard Creek project area would come from potential wildfire starts and from associated resource management activities including prescribed burning (broadcast, swamper burning, hand, machine, and landing piles), and dust from the use of natural-surfaced roads in association with proposed project activities.

Fire Risk

The climate in Northwest Oregon is generally mild and wet in the winter. Occasionally, snowfall will remain at higher elevations for an extended period of time. Summers are warm with periods of dry weather. Summer temperatures during this period average approximately 60° F with high temperatures reaching the mid to upper 90s, and occasionally topping 100° F for short periods of time. During average weather years the conditions under the forest canopy remain relatively moist.

Humans and lightning are the two main causes of wildfire starts across Oregon. Dry lightning (lightning without accompanying moisture) that occurs during the summer months is rare in Northwest Oregon. Within the Oregon Department of Forestry's West Oregon District no fire starts over the last 10 years in the analysis area are attributed to lightning (http://oregon.gov/ODF/FIRE/HLCause.pdf). Section 29 is located behind locked gates; however much of the area may be accessible to the public via rocked roads during harvest operations on adjacent private land or during hunting season. OHV use on drivable and unimproved roads and trails is prevalent even when gates are locked.

Fire Regime and Condition Class (FRCC)

The modeling predictions for fire regime and condition class come from the LANDFIRE Rapid Assessment Vegetation Models located at:
(http://www.fs.fed.us/database/feis/fire_regime_table/fire_regime_table.html)

The fire regime classifies the role fire would play across the landscape in the absence of modern human intervention. The analysis area falls within two different Fire Regimes. Fire Regime III is characterized by a moderate to low fire return interval with a mixed severity and is associated with south and west facing slopes. Fire Regime V is characterized by a low fire return interval with a high severity and is associated with north facing slopes. The Condition Class classifies the amount of

departure from the natural fire regime. The timber stands in the analysis area generally fall within Condition Class 1 with species composition and structure functioning within their natural (historical) range. Some stands are moving into Condition Class 2 with moderate increases in tree density, recent fire exclusion, and replacement of shrubs with woody fuels and litter.

Timber Stand and Fire History

Although not well documented, it is likely that in pre-settlement times (prior to the 1700s) major stand replacement fire events occurred in the analysis area. As with most areas located on the eastern slope of the coast range adjacent to the Willamette Valley fringe, it is likely that the analysis area also experienced more frequent low to mid-severity fire return intervals because of the manipulation of the environment by Native Americans in pre-settlement times.

It has been several decades since the most recent man-caused disturbance (logging) occurred, and although fire has been excluded from the landscape, the analysis area is still well within the range of a normal fire return interval.

Environmental Effects

Alternative 1 – No Action

Air Quality

In the short term (0-1 year) there would be no need for prescribed burning and no localized effects to air quality. In the long term (1-100 years) as the bottom and middle layers of the timber stands continue to grow, the increase in understory trees and associated ladder fuels would cause the stands to become more susceptible to a stand replacement fire event that would burn an area larger than the proposed project area and subsequently a larger input of smoke would be created than if prescribed burning had been implemented to reduce the hazardous fuels accumulations within the project area.

Fire Risk and Fuels Management

The analysis area would continue on its current trend. The current risk of a fire start would remain low. There would be a slow increase in the coarse woody fuel load (1000 hour fuels) as well as the fine fuel load (1, 10, and 100 hour fuels) in these timber stands as stress-induced mortality within the stands increases. Areas infected with the root disease *Phellinus weirii* would see larger increases in fuel loading than non root disease areas as infected Douglas-fir tree roots are weakened and the trees fall in small 1 to 2 acre pockets. Ladder fuel densities would increase as understory trees grow larger and new understory trees begin to grow. The potential for these stands to eventually succumb to a wildfire would continue to increase as they near the maximum fire return interval and the condition class departs from the natural fire regime.

Alternative 2 – Proposed Action

Air Quality

Hauling would occur over BLM and other roads. Dust created from vehicle traffic from proposed project activities on gravel or natural-surface roads would contribute short-term effects to air quality. None of these management activities would create dust above threshold (the intensity level that is just barely perceptible) levels. These effects would be localized to the immediate vicinity of the operations.

If the increased fuel load resulting from the proposed activities is determined to be a fire hazard through post harvest surveys or by the use of the Stereo Photo Series for Quantifying Forest Residues in Coastal Forests (General Technical Report PNW-GTR-231), or to significantly reduce the ability to reforest, then prescribed burning would be conducted and smoke would be generated.

Following harvest, there would be approximately 5,500 total tons of slash in the project area. Prescribed burning treatments would remove approximately half of this fuel load. Swamper burning, hand or machine pile burning, and landing pile burning would occur during the fall/winter time period, while broadcast burning would occur outside the fall/winter time period, usually in the spring under moist soil conditions.

All prescribed burning would require a project level Prescribed Fire Burn Plan to address adherence to smoke management and air quality standards, meet the objectives for land use allocations, and maintain or restore ecosystem processes or structure. The burn plan would comply with the NWOR Fire Management Plan for the Eugene District BLM, Salem District BLM, Siuslaw National Forest, and the Willamette National Forest dated May 20, 2009. All burning would be coordinated with the local Oregon Department of Forestry office, and would be conducted in accordance with the Oregon State Implementation Plan and Oregon Smoke Management Plan. These plans limit or prohibit burning during periods of stable atmospheric conditions. Burning would be conducted when the prevailing winds are blowing away from SSRAs (Smoke Sensitive Receptor Areas) in order to minimize or eliminate the potential for smoke intrusions. The potential for smoke intrusion would be further reduced by burning under atmospheric conditions that favor good vertical mixing so that smoke and other particulate matter is borne aloft and dispersed by upper elevation winds.

Prescribed burning would cause short term impacts to air quality within one-quarter to one mile of units that would persist for one to three days. None of the harvest units are sufficiently close to any major highways that motorist safety would be affected. The overall effects of smoke on air quality is predicted to be local and of short duration. Activities associated with the proposed action would comply with the provisions of the Clean Air Act.

Fire Risk

Fire is a natural disturbance process in the analysis area. Initially, the fuel load, risk of a fire start, and the ability to control a fire, would all increase as a result of the proposed action, and would be greatest during the first season following harvest when needles dry but remain attached to tree limbs.

Wildfire or prescribed fire has a major influence on vegetation in the analysis area. It affects seedbed preparation, nutrient cycling, successional pathways, fish and wildlife habitat, vegetative species composition, age, and structure, insect and disease susceptibility. All harvest projects would see a short term (1-5 year) increase in fire ignition potential because of the increase of fine dead fuels.

The first strategy to reduce the risk of a fire is to reduce fuels in accessible areas. Although the majority of the project areas are located behind locked gates, these gates are often open during logging operations on adjacent private industrial forest land. In addition, many of these gates are open during hunting season, leaving the project areas accessible to the public after the close of fire season when fuels are often still highly ignitable.

Proposed harvest activities would remove ladder fuels and decrease tree crown density (or crown bulk density) to levels that would be unlikely to sustain a high intensity crown fire. A relative density of 35-45 has been identified as the point where crown bulk density is unlikely to sustain a high intensity

crown fire (Agee, 1996). The silvicultural prescription for all of the units in the analysis area falls within or below this range (Snook, 2011).

Surface fuel reduction in harvest units, in strategic locations such as landing areas, and along roads and along property lines within harvest units would further reduce the risk in accessible areas. Increasing the height to the live crown base, opening canopies, and reducing surface fuels would result in lower fire intensity, and a lower probability of torching and of an independent crown fire.

For the short term, the fire risk associated with the harvested stands within the analysis area would remain low. Over the long term, the fuel load would steadily increase, primarily as a consequence of increased mortality of diseased (*Phellinus weirii* infected) and other stressed trees in the stands, but also as a result of the wildlife trees left as snags and other trees left for future CWD recruitment.

Fuels Management

The fuel load would increase as a result of the proposed action. Slash created by the harvest of timber, and the addition of coarse woody debris for wildlife habitat, would add an estimated 26 - 40 tons per acre of dead fuel to the regeneration and density management harvest units and 20 - 25 tons per acre to the commercial thinning harvest units. Treatment of selected, high hazard fuel concentrations would occur for hazard reduction and site preparation.

Fuels treatments would reduce potential fire starts in areas with elevated risk of human-caused ignition. Fuels treatments adjacent to areas with high value resources, such as riparian habitat and private lands, would reduce potential costs associated with fire suppression. The proposed fuels treatments associated with prescribed burning would result in small (<0.25 acre), scattered, localized areas of severe soil disturbance.

Prescribed burning and biomass removal would potentially alter nutrient availability, soil infiltration, and soil structure. Vegetation in burned areas would be expected to re-establish entirely within one to two growing seasons, and the vegetation buffer adjacent to streams would filter any sediment delivered from upslope areas. Burning would not occur in Riparian Reserves or Stream Protection Zones.

Areas identified for broadcast burning may incorporate other fuel treatments such as slash pullback around thin barked trees or along unit boundaries, hand or machine pile construction and burning to lessen the intensity of the broadcast burn. To mitigate potential damage, broadcast burning would be conducted during the late winter through the spring or early summer, depending on soil moisture. Pile burning would be conducted during the fall with wet soil conditions, when soil resources are less vulnerable to impacts.

Prescribed burning, biomass removal, or other fuels management treatments would help to mitigate the fire risk from the additional fuel load. Following harvest, but prior to the addition of CWD and snag creation, approximately 50 tons of slash per acre (4,600 total tons) would be within the regeneration harvest area. There would be approximately 45 tons of slash per acre (675 total tons) in the density management area due to a slightly smaller addition of post-harvest logging debris, and approximately 17 tons per acre (68 total tons) within the commercial thinning area. The total fuel load across all harvest areas is approximately 5,379 tons. Approximately 2,787 total tons of logging debris would be consumed during broadcast, hand, machine, and landing pile burning.

Alternative 3 – Regeneration Harvest with Red Tree Vole Buffers

Air Quality

Alternative 3 would have the same general impacts to air quality as Alternative 2, but to a lesser degree because of the decrease in the regeneration harvest acres and the elimination of commercial thinning and density management.

Approximately 1,200 tons of additional fuel loading would be in the project area following harvest. Prescribed burning treatments would remove approximately 504 total tons of this fuel load. If the increased fuel load resulting from the regeneration harvest project is not partially removed for biomass, and is determined to be a fire hazard through post harvest fuels surveys or by the use of the Stereo Photo Series for Quantifying Forest Residues in Coastal Forests (General Technical Report PNW-GTR-231), or to significantly reduce the ability to reforest, then prescribed burning would be conducted and smoke would be created. The overall effects of smoke on air quality would still be predicted to be local to the immediate vicinity of the operations and of short duration.

Fire Risk

Alternative 3 would have the same general impacts as Alternative 2, but to a lesser degree because of the decrease in the regeneration harvest acres and the elimination of commercial thinning and density management. See Alternative 2 for a detailed description of the environmental effects wildfire or prescribed fire would have on the analysis area, and the effects that timber harvest would have to reduce the potential for a stand replacement fire. The strategies for reducing the risk of a fire would be the same as those identified in Alternative 2.

The additional fuel load created by the harvest of timber and the addition of coarse woody debris for wildlife habitat within harvest units would add an estimated 26 - 40 tons acre of dead fuel to the regeneration harvest areas. For the short term (0-5 years), the fire risk associated with the harvested stands would increase but still remain low. Over the long term (5-100 years) as the vegetation reestablishes and young trees become established, the fire hazard would lessen even more.

Fuels Management

The fuel load would increase following harvest. Prescribed burning, biomass removal, or other fuels management treatments would help mitigate the additional fire risk. Following harvest, but prior to the addition of CWD and snag creation, there would be approximately 50 tons of slash per acre (1,200 total tons) within the regeneration harvest area. Approximately 504 total tons of logging debris would be consumed during broadcast, hand, machine, and landing pile burning.

Alternative 4 – Commercial Thinning and Density Management

Air Quality

Alternative 4 would have the same general impacts as Alternative 2, but to a lesser degree. If the increased fuel load resulting from management activities is determined by the BLM to be a fire hazard, then prescribed burning in the form of swamper burning, hand or machine piling and burning, or landing burning would be conducted and smoke would be created. Broadcast burning would not occur. The overall effects of smoke on air quality would still be predicted to be local to the immediate vicinity of the operations and of short duration.

Fire Risk

See Alternative 2 for a detailed description of the environmental effects wildfire or prescribed fire would have on the analysis area, and the effects timber harvest would have on reducing the potential for a stand replacement fire. Strategies for reducing the risk of a fire would also be the same as those identified in Alternative 2. Surface fuel reduction would only occur at landing areas and along roads and property lines.

For the short term (0-5 years), the fire risk associated with the harvested stands would increase but still remain low. Over the long term (5-100 years), the fuel load would steadily increase, primarily as a consequence of increased mortality.

Fuels Management

The fuel load would increase as a result of the density management and commercial thinning. Slash created by project activities would add an estimated 20 - 40 tons per acre of dead fuel to the density management and commercial thinning harvest units, for a total of approximately 6,198 tons of fuel loading. Prescribed burning treatments would only be implemented on high risk areas adjacent to property lines, along roads, and at landings and would remove approximately 136 tons of this additional fuel load..

Comparison of Alternatives

Table 4, below, lists the estimated tons per acre and total tons of post harvest fuels, the estimated tons per acre and total tons of post prescribed burning fuels, and the estimated tons per acre and total tons that would be consumed by the various prescribed burn treatment prescriptions.

Table 4. **Comparison of Dead Fuel Loading by Action Alternative**

Action Alternative	Harvest Type / Ac.	Tons/acre post harvest[1]	Total tons post harvest[1]	Tons/acre post prescribed burning [2]	Total Tons post prescribed burning [2]	Tons/acre consumed[3]	Total Tons consumed[3]
Alternative 2: Proposed Action	Regen - 92 CT - 04 DM - 15	50 17 45	5358	20 15 44	2560	25	2775
Alternative 3: Regen with RTV Buffers	Regen - 24	50	1200	29	696	21	504
Alternative 4: CT and DM	CT - 92 CT - 04 DM - 34	50 17 45	6198	44	5720	4	136

[1] Total of all current CWD and post harvest logging debris.
[2] Total of all current CWD and post harvest logging debris left on site following prescribed burning.
[3] Total tons of post harvest logging debris consumed following prescribed burning.
* Includes 75% of DC Type 1 & 2 logging debris.

3.2 Carbon Sequestration (Storage) and Climate Change

(IDT report incorporated by reference: Snook, 2011. Carbon Sequestration (Storage) and Climate Change.)

This EA is tiered to the PRMP FEIS (1994) which concluded that all alternatives analyzed in the FEIS, in their entirety including all timber harvest, would have only slight (context indicates that the effect would be too small to calculate) effect on carbon dioxide levels. Responsive to public comment, the BLM considers it prudent to include project level analysis of carbon storage and emissions for this project.

Resource Specific Methodology

The BLM calculated estimates of existing carbon stores, of carbon to be removed by the proposed action, of storage of removed carbon, and of future carbon storage in the remaining and regenerated trees in the stand. The estimates are based on data from BLM stand exams analyzed with the Forest Vegetation Simulator (FVS) (Crookston, 1997) and ORGANON (Hann et al., 2006) program, analysis of carbon storage in the FEIS for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (WOPR Ch. 3 pp. 220-224 and Ch. 3, pp. 537-543, Appendix C, p. 30, and literature review.

Context – Greenhouse Gases, Climate Change and the Spatial Scale for Analysis
Uncertainty about the nature, effects and magnitude of the greenhouse gases and global climate change interrelationship is evident in a wide range of conclusions and recommendations in the literature reviewed. However, Forster et al. 2007 (pp. 129-234), which is incorporated here by reference, concluded that human-caused increases in greenhouse gases are extremely likely to have exerted a substantial effect on global climate. The U.S. Geological Survey, in a May 14, 2008 memorandum to the U.S. Fish and Wildlife Service, summarized the latest science on greenhouse gases and concluded that it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location. This defines the spatial scale for analysis as global, not local, regional or continental. That memorandum is incorporated here by reference. Based on the BLM's review of statutes, regulations, policy, plans and literature, the BLM accepts the conclusions above as appropriate context for a reasoned choice among alternatives.

Context – Temporal Scale for Analysis
The BLM has selected 80 years as the time frame for analysis of carbon storage and climate change for this project. Eighty years is the approximate rotation length of the stand in the project, and rotation length of 70-110 years is directed (RMP, p. D-1). Eighty years represents the full cycle of carbon storage and release for this project and would likely be similar for future rotations.

Context – Calculations of Carbon Storage, Project Area Scale
The BLM used site specific data from stand exams as input to the Forest Vegetation Simulator (FVS) and ORGANON models (forest stand models designed to incorporate site specific stand exam data) to calculate carbon flow on the project area and the direct effects of the proposed action alternatives, using calculations from Smith et al., 2006 and DOE, 2007 cited in WOPR Appendix C. Greenhouse gas emission from harvest operations were calculated based on equipment production rates from the empirical appraisal for the Rickard Creek timber sale. The purpose of the calculations is to provide a basis for determining significance of carbon storage relative to the temporal and spatial scale.

Affected Environment

The proposed action (Alternative 2) is to conduct regeneration harvest on approximately 92 acres of trees aged about 80 years old, commercial thinning on 4 acres of 74 year old trees, and release of wildlife trees on 15 acres. Alternatives to the proposed action are regeneration harvest on approximately 24 acres of trees aged 80 years (Alternative 3), and 130 acres of commercial thinning

and density management including both the 80 and 74 year old stands. Carbon storage analysis pertains only to the regeneration harvest and commercial thinning in each alternative because regeneration and commercial thinning treatment areas represent nearly all the changes in carbon storage for the project. The release of wildlife trees on 15 acres involves relatively minor changes to carbon storage.

Under average historic conditions (WOPR, p. 3-211), BLM-managed lands in western Oregon stored 576 million tonnes of carbon, 35% more than is currently stored in forests and harvested wood in these forests today. This is due to the greater proportion of younger stand structural stages in BLM-managed lands in western Oregon today (WOPR, p. 3-224).

The following show quantities of carbon in forest ecosystem vegetation[1] worldwide, in the United States, and in the Rickard Creek project area:

- Total carbon, forest ecosystem vegetation, Worldwide (Matthews et al., 2000, p. 58) = 132-457 Gt[2]
- Total carbon, forest ecosystem vegetation, United States (US EPA, 2009) = 27 Gt
- Total carbon, forest ecosystem vegetation, Pacific northwest, Coast Range 1.8-2 Gt (Hudiburg, et al. 2009).
- Total carbon, forest ecosystem vegetation, Rickard Creek Project Area = 28,000 tonnes or 0.000028 Gt. This represents .000001 percent of the United States total or .000014 percent of the Coast Range total.
- The annual accumulation of carbon from forest management in the United States is 191 million tonnes. Implementation of current management on BLM-managed lands in western Oregon would result in an average annual accumulation of 1.69 million tonnes over the next 100 years, or 0.9 percent of the current U.S. accumulation. (WOPR, p. 4-537).

Environmental Effects

Alternative 1 – No Action

Under the no action alternative, no greenhouse gases would be emitted from harvest operations or fuels treatments. Carbon stored in live trees would not be converted to the harvested wood carbon pool. A portion would be converted to the forest "carbon other than live trees" pool through ongoing processes of tree mortality.

After 80 years of growth, live tree carbon would increase to 26,500 tonnes, an increase of 6,900 tonnes from the current level of 19,600 tonnes. The no action alternative would result in greater net carbon storage over the 80 year analysis period than the proposed action by approximately 3,200 tonnes.

All Action Alternatives

Total carbon in forest ecosystem vegetation can be divided into three pools: live trees (foliage, branches, stems, bark and live roots of trees), forest carbon other than live trees (dead wood and roots, non-tree vegetation, litter and soil organic matter) and harvested wood products. The proposed action would cause direct effects on greenhouse gas levels by emitting greenhouse gases (specifically, carbon dioxide) from harvest operations and fuel treatment.

[1] Carbon contained in both above ground and below ground parts of trees and forest vegetation, and downed wood, litter and duff. It does not include mineral carbon in soil, nor fossil fuels.
[2] A Giga-tonne (Gt) is one billion tonnes, or metric tons.

Live Trees
Live trees would be removed, moving carbon to the other two pools. Harvest and fuel treatment would reduce total forest ecosystem vegetation carbon in the project area from 28,000 tonnes to 14,000 tonnes in Alternative 2, and to 24,000 tonnes in Alternative 3. Alternative 4 includes a slightly larger project area, and vegetation carbon would drop from 29,200 tonnes to 14,500 tonnes.

Forest Carbon Other Than Live Trees
Some would be converted to forest carbon other than live trees - dead material that would store carbon and slowly release it through decay. The rate of decay or long-term storage is unknown, and is not included in this analysis. Prescribed burning after harvest would result in 1,600 tonnes of material burned and emitted as carbon dioxide in Alternative 2. In Alternative 3 would result in emissions from fuel treatment of 400 tonnes. In Alternative 4, approximately 120 tonnes would be emitted.

Harvested wood
Some carbon in live trees is stored as harvested wood. Harvested saw log gross volume at Rickard Creek under Alternative 2 of 7,303 MBF equals 9,500 tonnes (1 MBF = 1.3 tonnes carbon). Over the 80 year analysis period, approximately 3,200 tonnes (34%) would be emitted without energy capture. The balance, approximately 6,300 tonnes (66%) of the carbon would remain stored in products still in use and in landfills, or emitted with energy capture (based on regional averages, Smith, et al., 2006, WOPR, Appendix C:30). In Alternative 3, approximately 1,970 MBF, or 2,563 tonnes of carbon would result in 870 tonnes of emission and 1,691 tonnes of storage. In Alternative 4, harvest of 6,370 MBF, or 8,447 tonnes carbon would result in 944 tonnes of emissions, and 5,578 tonnes of storage.

Harvest Operations
Harvest operations would emit greenhouse gases. In Alternative 2, equipment use is necessary to harvest and transport the timber to the nearest mill (Philomath, Oregon) was estimated at approximately 5,400 hours (Rickard Creek Timber Sale empirical appraisal, on file, Marys Peak Resource Area). Fuel consumption would total an estimated 9,100 gallons, or total emissions of 90 tonnes of greenhouse gases. In Alternative 3, fuel consumption is estimated at 24 tonnes, and in Alternative 4, 46 tonnes.

Greenhouse Gas Emissions
To summarize, total greenhouse gas emissions resulting from harvest, fuel treatment and harvested wood for each alternative would include the following:

- Alternative 2: 4,900 tonnes
  - Harvest operations emissions totaling about 90 tonnes
  - Fuel treatment (burning) emissions totaling 1,600 tonnes
  - Emissions from harvested wood, over 80 years of 3,200.
- Alternative 3: 1,335 tonnes
  - Harvest operations emissions totaling about 25 tonnes
  - Fuel treatment (burning) emissions totaling 440 tonnes
  - Emissions from harvested wood, over 80 years of 870.
- Alternative 4: 1,110 tonnes
  - Harvest operations emissions totaling about 46 tonnes
  - Fuel treatment (burning) emissions totaling 120 tonnes
  - Emissions from harvested wood, over 80 years of 944.

Future Carbon Storage

Following regeneration harvest in Alternative 2, some of the largest trees would remain and seedlings would be planted. These trees would store carbon as they grow. Carbon emissions resulting from the proposed action (4,900 tonnes) would be offset by carbon storage in tree growth approximately 25 years after harvest. Live tree carbon would equal the pre-treatment level after 65 years of growth. After 80 years of growth, carbon stored in live trees would be 22,000 tonnes, an increase of 2,400 tonnes from the current (pre-harvest) level of 19,600 tonnes. In addition, 6,300 tons would remain stored in harvested wood. Total storage is calculated at 8,700 tonnes over the 80 year analysis.

In Alternative 3, the same effects would occur, but on fewer acres, totaling 2,349 tonnes of carbon storage over the 80 year analysis.

In Alternative 4, after 80 years of growth, live tree carbon net carbon increase would be 4,420 tonnes. Combined with 5,578 tonnes of carbon stored in harvested wood, total storage would be 9,990.

Greenhouse gas emissions and carbon storage over the 80 year analysis period resulting from all alternatives are displayed in Table 5, below.

Table 5. Greenhouse Gas Emissions and Carbon Storage, Rickard Creek All Alternatives

Source	Alt. 2 Tonnes C	Alt. 3 Tonnes C	Alt. 4 Tonnes C	No Action Tonnes C	Notes
Emissions, 2010-2090[1]	4,900	1,335	1,110	0	Logging/fuel trmts. harvested wood emissions.
Live tree storage, 2090	22,000	5,940	33,670	26,500	80 years stand growth
Live tree storage, 2009 (current conditions)	19,600	5,292	29,250	19,600	78 year old stand
Net increase, live trees	2,400	648	4,420	6,900	Tree growth 2010 to 2090
Harvest. wood storage, 2090	6,300	1,701	5,578	0	66% of harvested wood carbon, 80 years
Total storage increase	**8,700**	**2,349**	**9,990**	**6,900**	**Storage: live trees and harvested wood**
Net Carbon Storage Total	**3,800**	**1,014**	**8,880**	**6,900**	**Storage minus emissions, 2010-2090**
Net Carbon Storage, Per Acre	**40**	**42**	**68**	**73**	

[1] Approximate: Alternatives 2 and 3 modeled 2010 to 2090, Alternative 4 modeled 2011 to 2091.

3.3 Fisheries and Aquatic Habitat

(IDT report incorporated by reference: Snedaker, 2011. 2011 Rickard Creek Project Environmental Assessment Fisheries.)

Affected Environment

The relevant fish bearing streams affected by the proposed project are Reese Creek and Beaver Creek. The proposed haul route for the project would cross Reese and Beaver as well as Duffy Creek. Barriers to fish passage have altered species presence and distribution in the Marys River 5th field watershed. However, the magnitude of effect fish barriers has had on fish production in the project area is unknown. Based on field review cutthroat trout are known to be present in the project area tributary on the southwest side of the treatment units. Fish presence in all other tributaries is at least ½ mile

downstream of the project area. Field review of the stream crossings associated with the proposed haul route within the Beaver Creek sub-watershed indicated three fish bearing crossings.

No anadromous species are known to reside in or near the project area. Chinook salmon reside over 32 miles downstream in Muddy Creek, over 5.3 miles downstream in Beaver Creek, and over 2.9 miles from the nearest unpaved haul route crossing. Steelhead may utilize the Marys River for rearing and spawning. However, distribution does not reach the project area. This species is nearly 17 miles downstream of the Upper Beaver Creek treatment area and more than 43 downstream in the Upper Reese Creek treatment area. The coho salmon are returning to many tributaries of the western side of the Willamette River including the Marys River, typically concurrent with winter steelhead distribution downstream of the project area. Native cutthroat trout are common within the watershed and are present in the project area, in a tributary to Reese Creek. Other native fish species also reside within the Marys River watershed; however, only sculpin species occur within the project area.

No habitat surveys were located for the streams within project area. During field review of stream channels in the project area, the southwest perennial channel was observed to be functioning within the range expected for this type of forest stream (Wegner, 2011). The southwest perennial stream channel is hydrologically connected during high flows to a small headwater channel draining the southeast corner of the proposed treatment unit. Due to this connection, the headwater stream is likely to carry migrating fish during some portion of the high flow season and is considered fish bearing.

Aquatic habitat survey of Beaver Creek was conducted along a portion of the unpaved haul route. The survey indicated undesirable levels of fine sediment in Beaver Creek. Stream shade and width to depth ratio were meeting benchmark conditions. Woody debris pieces per 100 meters and percent gravel conditions are marginal in condition. Pool habitat abundance as a percentage of the stream is typically in desirable conditions, largely due to beaver activity. Due to the age of the survey, key wood (24 inch diameter by 33 foot length) was not tracked as part the survey.

Rare, Threatened, and Endangered Species

The Upper Willamette River (UWR) winter steelhead trout is listed as threatened under the Endangered Species Act (64 FR 14517-14528). The Marys River is not designated Critical Habitat for UWR winter steelhead (70 FR 52851). The nearest designated Critical Habitat for UWR winter steelhead occurs in the Willamette River at least 34 miles downstream of the project area and over 28 miles downstream from the nearest unpaved haul route. No effects are anticipated to UWR winter steelhead, or its habitat, due to distance to occupied habitat, and this species will not be addressed further in this analysis.

The National Marine Fisheries Service (NMFS) has listed Spring Chinook salmon in the Upper Willamette River Evolutionarily Significant Unit (ESU) as threatened under the Endangered Species Act (64 FR 14308-14328). Designated Critical Habitat for UWR Spring Chinook salmon includes portions of the Marys River and Beaver Creek (70 FR 52724). Designated Critical Habitat for UWR Spring Chinook salmon in Beaver Creek is over 2.9 miles downstream from the haul route and over 5.3 miles downstream from the treatment area. No effects are anticipated to UWR Spring Chinook salmon or its habitat, due to distance to occupied habitat, and this species will not be addressed further in this analysis.

Oregon Chub historically resided in the lower portions of the Marys River (Scheerer, 1999). Oregon chub is listed as endangered under the Endangered Species Act (58 FR 53800-53804). Critical Habitat for Oregon Chub has not been designated. Currently there are several known chub populations in the Marys River watershed, most residing in the Finley Wildlife Refuge (Scheerer et al., 2005). These

populations are at least 19 stream miles from of the project area and are located in drainages unconnected to project streams but for their confluence with Muddy Creek. No effects are anticipated to Oregon chub or its historic habitat; therefore it will not be addressed further in this analysis.

Environmental Effects

Alternative 1 – No Action

Current timber stand conditions would be maintained. Expected benefits of thinning riparian stands, accelerating the growth rates of retained timber, subsequently increasing the average diameters of trees available for future LWD recruitment, would not be realized. The existing road network would remain unchanged, with no new construction. Drainage features or culverts of the 13-6-21 road and the 13-6-28 road would continue to degrade. Beneficial actions intended to prevent road prism failure on the Beaver Creek Road would not occur. The risk of failure would be expected to increase over time as the culvert conditions worsen. Culvert failure, specifically those within ½ mile of fish bearing habitat, could result in short-term negative impacts to water quality (Foltz et al., 2008) and cause short-term impacts to aquatic habitat (Furnis et al., 1991).

Alternative 2 – Proposed Action

Falling and Yarding

Flow effects
No discernible affects to fish and aquatic habitat within the treatment area are anticipated. The proposed action would affect 0.06 percent of the forest cover in the Marys River 5th field watershed. The hydrology analysis of the proposed action was considered unlikely to detectably alter stream flows (Wegner, 2011). Undetectable changes in peak and base flows would be unlikely to affect fish habitat downstream.

Temperature effects
No changes to stream temperature would be anticipated in the north side streams in Unit 29A because no changes to shade associate with these streams are anticipated. Protection of stream shade is the critical component in protecting stream temperature regimes (Beschta et al. 1989, Belt et al. 1992, Moore et al. 2005). A full site potential tree buffer was applied (210 feet) excluding all of the riparian reserves from treatment to the three non-fish bearing stream on the north side of the project area. As stream temperature is not expected to be impacted no impacts to fish habitat would be expected.

Proposed treatments in riparian areas to the headwater streams to the east of the treatment area in Unit 29C are located on non-fish bearing streams. Channels in this portion of the project area are intermittent/ephemeral and not subject to summer solar warming. The stream shade sufficiency analysis done for the proposed treatment indicated the proposed SPZ would be sufficient to protect critical shade in the primary shade zone (Snook, 2011). The proposed vegetation treatment in the secondary shade zone (extends approximately one tree height from the stream) would not result in canopy reduction of more than 50 percent. Retention of the 75 foot SPZ buffer and the location of treatments adjacent to intermittent channels would be not be expected to affect stream temperatures and highly unlikely to affect fish habitat downstream.

Proposed density management treatments in riparian areas to the Southwest/Southeast are located on two fish bearing streams in Unit 29C. The headwater of the primary stream is non-fish bearing and intermittent. The proposed minimum no-entry stream protection zones (SPZ) of 75 feet is expected to protect critical shade in the primary shade zone (Snook, 2011). Within the treatment area the no

treatment widths approach the minimum 75 foot width at one location and typically exceed 200 feet. Only minor vegetation treatment may occur in the secondary shade zone (approximately one tree height from the stream); therefore, affects to the existing canopy are expected to be very small. With protection of existing shade adjacent to streams in the project area, no changes to water temperatures are anticipated (Wegner 2011). Based on the shade sufficiency analysis, the hydrology report water quality analysis, and the PDFs, proposed actions are highly unlikely to affect fish habitat downstream.

LWD effects

Loss of CWD and LWD due to harvest can affect the stability and quality of aquatic habitat. Proposed treatments would avoid the RR of the north side streams and proposed treatments in the south and east side streams would provide for minimal thinning. Treatments in the northern areas in Unit 29A would be approximately one site potential tree height (210 feet) away from non-fish bearing streams. With the protection of one site potential tree buffer width in the northern RRs, CWD and LWD recruitment is not anticipated to be affected by the proposed action.

All treatments in the southern and eastern areas in Unit 29C would be at least 75 feet upslope from fish bearing streams. Most south side riparian treatments occur more than 200 feet from the stream edge. No tree removal is proposed on steep, unstable slopes (Wegner 2011). Proposed treatments associated with the southern fish bearing RR is predominately located on a ridge top, or is draining away from the fish bearing stream to the opposite side of the ridge. Protection of riparian areas greater than one site potential tree buffer widths (210 feet) from the stream to treatment areas are not anticipated to affect CWD and LWD recruitment. Generally, treatments less than 1 SPT may remove source wood for future LWD or CWD recruitment to stream channels. Studies have shown that approximately 70 percent of down wood is recruited within 65 feet of stream edge, 90 percent of down wood is recruited within 100 feet from the stream edge, and virtually 100 percent of wood is recruited within 200 feet of the stream edge (McDade et al. 1990, Van Sickle and Gregory 1990, May and Greswell 2003). Approximately 0.45 acres, limited to two small areas, may be affected within 100 feet of stream channels. With incorporation of 75 foot no treatment buffers more than 70 percent of the wood recruitment zone would be protected. Proposed density management thinning from below would retain 31 percent of the existing trees post-treatment within the outer band of the wood recruitment zone (Snook 2011). Based on the tree per acre retention rate the proposed action would retain at least 80 percent of the trees available for wood recruitment to the stream. Most of the woody debris would continue to fall from within the untreated stream protection zones, and short-term recruitment of the existing CWD is expected to be largely maintained. Therefore, the proposed actions are not expected to cause any short-term affects to aquatic habitat at the site or downstream.

Assuming actions in the southern tributaries in Unit 29C are limited to removal of sub-dominant trees surrounding 11 legacy trees, impacts to LWD would be expected to result in lesser affects than the proposed density management.

Beneficial effects to fish habitat from enhanced wood growth could be realized in the event of wood movement (debris torrents) which could improve LWD abundance. Distance of fish habitat varies in the project area from adjacent to ½ mile downstream from the RR treatment areas. The Benton Foothills Watershed Analysis Area (BLM 1997) assessed mass movement risk in the watershed, including the project area. This analysis indicted the risk of movement was low (BLM 1997 see Map #19). Therefore, transport of large wood more than ½ mile downstream would be considered unlikely and affects to fish habitat beyond site level impacts would be highly unlikely.

Proposed thinning in the RR treatment areas is anticipated to increase the average size of the remaining trees by up to 1.9 inches over a 50 year timeframe (Snook 2011). As the treated stands reach heights of 200 feet, the larger diameter wood could be recruited from farther up the slopes to stream channels.

Over the long-term beneficial growth in the size of trees within riparian could beneficially affect LWD recruitment to the stream channel, thus potentially improving the quality/complexity of aquatic habitat adjacent to the treatment areas.

Sediment effects
The proposed project is unlikely to increase sediment delivery to the stream network (Wegner 2011). Vegetated buffer widths ranging from 40 to100 feet are sufficient to prevent sediment from reaching streams (Burroughs and King 1989, Corbett and Lynch 1985, Swift 1985). Buffers of the north streams exceed 200 feet, and buffers on the southern and eastern streams are at least 75 feet. The proposed 75 to 200 foot buffers would be expected to capture sediment prior to reaching stream channels. These buffers combined with residual slash remaining following treatment should obstruct flow paths and keep sediment movement to a minimum. Slash, limbs and non-merchantable material left following harvest activities, within treatment areas can substantially reduce the magnitude of sediment movement (Burroughs and King 1989, Swift 1985). As the proposed actions are not likely to measurably alter water quality characteristics at the treatment sites, it would be unlikely to affect aquatic habitat at the site or fish habitat downstream from the project area.

Hauling

Flow, Temperature, and LWD effects
No impacts to flow, temperatures, or woody debris habitat elements are anticipated by proposed hauling and fish and aquatic habitat would not be affected.

Sediment effects
The potential for timber hauling to generate road sediment is minimized by project PDFs. Winter haul would occur on rocked road surfaces only. Any native surface roads would be restricted to dry season use only. Haul routes from the treatment units reach a paved road within approximately six miles. The unpaved route includes at least 15 cross-drains and 13 intermittent and perennial stream crossings. Spot rocking and minor road grading may occur to maintain road surface conditions. Hauling operations would be suspended if weather or environmental conditions pose an imminent risk of road sediment flowing in road ditches.

The haul route includes three fish bearing stream crossings, including crossing Beaver Creek in two locations and an unnamed tributary once. The lower half of unpaved haul route is used for residential access as well as private forestry management. The crossings over Beaver Creek are bridges and are paved for short distances on either side of the affected streams. The stream crossing over the unnamed tributary is a culvert, and potentially a fish passage barrier (Streamnet 2007). The Beaver Creek stream crossings are in excellent condition and on nearly flat locations in the valley bottom. The road is well maintained by Benton County in the area of the stream crossings and the ditch lines are covered with vegetation. Low gradient roads with heavily vegetated ditch lines would have limited potential to transport sediment (Luce and Black 1999). Based on the condition of the crossings and vegetated ditch lines it is highly unlikely that project hauling would negatively affect fisheries habitat.

Road Construction and Renovation

Flow effects
Proposed new roads are unlikely to increase drainage network in the watershed as the new construction is located on ridge top away from any stream channels, and no new construction would cross any existing stream channels. The majority of the proposed road construction, approximately 1,760 feet, is located outside of the RR. The remaining 1,200 feet of new road would be constructed in the outer half of the fish bearing RR of the Upper Reese Creek Drainage. Construction would not occur closer than

300 feet from stream channels, and the majority of the new road would drain away from the fish bearing stream. As no hydrologic connection exist, no changes in stream flows would be anticipated, thus no affects to fish or aquatic habitat would be expected.

Temperature effects
Construction would be located outside of the primary and secondary shade zones; therefore stream shade would be unaffected. As no affects to stream temperature are expected no impacts to aquatic habitat would be anticipated.

LWD effects
Affects to large wood recruitment to the fish bearing portion of Reese Creek Tributary as a result of proposed road construction is highly unlikely. Stand exam data indicates tree heights to be 160 feet in the riparian reserve treatment unit where road construction may occur. Relative to the new construction the tree heights of the treatment area are shorter than the 300 foot buffer from the stream of the proposed road location. Trees in the area could not be recruited to the stream channel based on the buffer distance. Transport potential of LWD in the affected streams is extremely low, due to road location and mild channel topography at the project site.

Sediment effects
The 300 foot buffer would be expected to capture any sediment generated from site level disturbance to soils. Vegetated buffer widths ranging from 40 to100 feet are sufficient to prevent sediment from reaching streams (Burroughs and King 1989, Corbett and Lynch 1985, Swift 1985). No affects to fisheries and aquatic habitat in Reese Creek tributary is anticipated from the proposed action.

Approximately 6,758 feet of road renovation and 4,176 feet of road improvement would occur as part of the proposed action. Drainage improvement or replacements would occur on two cross-drains and one stream crossing. These would improve drainage and road surface conditions and result in less erosion into surrounding streams (Wegner 2011). Proposed road work would result in a minor short-term increase in erosion, until reestablishment of vegetation occurs in the following growing season.

Treatments are at least 0.6 miles from fish habitat in Duffy Creek, at least 200 feet from fish habitat in Beaver Creek, and at least 750 feet from fish habitat in upper Reese Creek. Construction in the stream channels would be limited to the in-stream working periods as defined by Oregon Department of Fish and Wildlife (ODFW) guidance (ODFW, 2008). During renovation, flows are expected to be very minimal or dry channels, and sediment is unlikely to reach fish downstream. No direct impacts to fish habitat downstream would be anticipated during implementation. In the following winter, sediment from the proposed actions may reach fish habitat during freshet events. The amount of transported sediment is expected to be negligible against background turbidity levels in the winter. In addition, the majority of coarse sediment would likely be captured in the low gradient ponded stream channels downstream of the treatment sites before reaching fish habitat (Swanston 1991, Duncan et al. 1987). Therefore, sediment is unlikely to measurably increase where fish reside and no impacts to fish habitat are anticipated.

Broadcast Burning and Pile Burning

Flow, Temperature, and LWD effects
No impacts to flow, temperatures, or woody debris are anticipated by proposed fuels treatments. Project design features would limit the risk of fuel treatment impacting flow, temperature, or LWD conditions. No broadcast burning would occur in the riparian and fire line construction would provide fuel brakes to prevent fire creep into the riparian. As no affects to these habitat features are anticipated no affects to fish or aquatic habitat would be anticipated.

Sediment effects
Pile burning is not expected to result in short-term or long-term affects to fish. A short-term effect on soil infiltration is possible at the site of the burn piles resulting in surface runoff (Wegner 2011). Pile building would not be allowed within SPZs. Vegetated buffer areas from 40 to100 feet appear to prevent sediment from reaching streams (Burroughs and King 1989, Corbett and Lynch 1985, Swift 1985). The SPZs associated with the project, between 75 and 200 feet, would be expected to provide sufficient distance from the streams to capture any surface erosion from pile burning treatments.

The Rickard Creek Hydrology Report (Wegner 2011) indicated a low risk of sediment, shade loss, or nutrients affecting the stream channels as a result of proposed broad cast burning. Implementing broadcast burn PDFs, burning only the upland regeneration would further reduce the possibility of sedimentation and nutrients reaching the stream channel and protects shade to the extent practicable. The project implementation is not expected to result in effects in the short or long-term to any fish bearing streams.

Alternative 3 – Regeneration Harvest with Red Tree Vole Buffers Alternative

Falling, Yarding, Hauling, Road Construction/Renovation, Broadcast/Pile burning

Flow, Temperature, and LWD effects
This alternative would affect less forest cover than the proposed action (0.01 percent of the forest cover in the Marys River Watershed) and would not be anticipated to alter stream flows. No treatment in RR would be proposed, thus impacts to stream temperature and LWD would not be anticipated. No affects to fish and aquatic habitat would be anticipated as project impacts to these habitat elements are not anticipated

Sediment effects
The proposed falling, yarding, road construction and renovation, and burning would not occur within the RR and would not be anticipated to affect fish and aquatic habitat due to distance to fish and aquatic habitat.

Hauling may cross fish bearing streams. Due to the reduced volume of logs to be hauled the potential duration of the effect would be reduced compared to the proposed action. The probability of site level sediment generation would be the similar to the proposed action, which was considered unlikely. Therefore, sedimentation affects to fish and aquatic habitat would be unlikely.

Alternative 4 – Commercial Thinning and Density Management Alternative

Falling and Yarding

Flow effects
No discernible affects to fish and aquatic habitat within the treatment area are anticipated. Alternative 4 project would affect less than 0.07 percent of the forest cover in the Marys River Watershed, which is slightly more disturbance area than the proposed action. The hydrology analysis of Alternative 4 indicated harvest was unlikely to detectably alter stream flows (Wegner 2011). Undetectable changes in peak and base flows would be unlikely to affect fish habitat downstream.

Temperature effects
The northwestern most non-fish bearing stream in Unit 29A is protected by a full site potential tree buffer, excluding all of the RR from treatment. This buffer is the same as the proposed action, no

impacts to fish habitat would be expected to this stream. All other stream channels in the project area are buffered with at least a 75 foot SPZ. Except for the southern fish bearing streams in Unit 29C, all the project area streams are intermittent and not subject to thermal warming during summer months. The impacts would be the same as the proposed action analysis in proximity to these streams. Alternative 4 thinning would be unlikely to alter stream temperature at the site along these intermittent non-fish bearing streams and highly unlikely to affect fish and aquatic habitat downstream.

Stream shade within riparian areas proposed for density management adjacent to fish bearing streams to the Southwest/Southeast in unit 29C should be mitigated by increasing tree density compared to the proposed action (Wegner 2011). Based on the shade sufficiency analysis, the hydrology report water quality analysis, and the PDFs, Alternative 4 actions are highly unlikely to affect fish and aquatic habitat downstream.

LWD effects
The northwestern most non-fish bearing stream in Unit 29A is protected by a full site potential tree buffer, excluding all of the Riparian Reserves from treatment. This buffer is the same as the proposed action, no impacts to fish habitat would be expected to this streams.

Proposed thinning treatments in Unit 29C may remove timber which is at least 75 feet away from the fish bearing and non-fish bearing streams to the east, south, and southwest. Approximately 90 percent of down wood to streams is recruited within 100 feet from the stream edge (McDade et al. 1990, Van Sickle and Gregory 1990, May and Greswell 2003). Approximately 4.1 acres, limited to a 25 foot wide band, may be affected from this 100 foot wood recruitment zone. The acreage treated within 100 feet of streams under the thinning alternative is 3.6 acres more than the proposed action. Proposed density management thinning would retain 31 percent of the existing trees per acre post-treatment within the treated outer band of the wood recruitment zone (Snook 2011). Generally, the larger diameter dominate trees would be retained based on a thin from below prescription. Based on the tree per acre retention the proposed action would retain at least 80 percent of the trees available for wood recruitment to the stream. Impacts to large wood are anticipated to be undetectable in the adjacent streams in the short-term based on the small fraction of the wood source near the stream likely affected. The watershed analysis indicated the risk of mass earth movement was low (BLM 1997). Therefore, transport of large wood downstream would be considered highly unlikely and affects to fish habitat beyond site level impacts would be highly unlikely. The low risk of mass movement and undetectable changes to wood recruitment in stream channel is not expected to measurably affect aquatic habitat at the site or downstream.

Alternative 4 thinning in the RR areas is anticipated to increase the average size of the remaining trees by up to 1.9 inches over a 50 year timeframe (Snook 2011). As the treated stands grow the larger diameter wood could be recruited farther up the slopes from the stream channels. Over the long-term, growth of trees within riparian areas would beneficially affect LWD recruitment to the stream channel, thus potentially improving the quality and complexity of aquatic habitat adjacent to treatment areas.

Sediment effects
The proposed project is unlikely to increase sediment delivery to the stream network (Wegner 2011). Buffers of the northwest stream in Unit 29A exceed 200 feet; buffers on the southern and eastern streams in Unit 29C are at least 75 feet. Buffers would be expected to capture sediment prior to reaching stream channels. Buffers, combined with residual slash remaining following treatment, should obstruct flow paths and keep sediment movement to a minimum. Slash and limbs plus other non-merchantable material left following harvest activities, within treatment areas can substantially reduce the magnitude of sediment movement (Burroughs and King 1989, Swift 1985). As the proposed

actions are not likely to measurably alter water quality characteristics at the treatment sites, it would be unlikely to affect aquatic habitat at the site or fish habitat downstream from the project area.

Hauling, Road Construction and Renovation, Broadcast and Pile burning

Hauling, road construction, and road renovation under Alternative 4 would be the same as the proposed action, thus impacts to fish and aquatic habitat would the same as described under the proposed action.

No broadcast burning would occur under the thinning alternative. Burning piles could produce small areas susceptible to erosion and restricted infiltration. Proposed burn areas would be surrounded by buffers and no burning would occur in SPZs. Vegetated buffer areas from 40 to100 feet appear to prevent sediment from reaching streams (Burroughs and King 1989, Corbett and Lynch 1985, Swift 1985). The PDF requiring 100 feet between streams and any piles combined with 75 foot minimum SPZs, would be expected to provide sufficient distance of undisturbed soils and vegetation to capture any surface erosion from pile burning treatments.

Rare, Threatened, and Endangered Species

The NMFS has listed spring Chinook salmon and winter steelhead in the Upper Willamette River ESU as threatened under the Endangered Species Act. The nearest forest treatment is at least 5.3 miles upstream from listed Spring Chinook occupied habitat or Critical Habitat. Nearest unpaved crossing is at least 2.9 miles upstream from the listed Spring Chinook occupied habitat or Critical Habitat. UWR Winter Steelhead Critical Habitat was not designated in the Marys River. Nearest listed Critical Habitat for winter steelhead is over 28 miles downstream from project area in the Willamette River at the Calapooia River junction near Albany, Oregon. Based on site level analysis and existing literature "No Effects" are anticipated to UWR Spring Chinook salmon and winter steelhead primarily due to distance to occupied habitat, at least 2.9 miles downstream. Due to the "No Effect" determination no consultation with NOAA Fisheries is required for this project.

The U.S. Fish and Wildlife Service listed Oregon chub as endangered under the Endangered Species Act. Existing populations of chub are known to occupy ponds in Finley Wildlife Refuge within the Marys River watershed. These ponds are not connected to project area streams. The proposed project would have "No Effects" to this isolated population and no effects are anticipated to Oregon chub historic habitat. Due to the "No Effect" determination, no consultation with USFWS is required for this project.

The Magnuson-Stevens Act (MSA) of 1976, as amended, requires identification of Essential Fish Habitat (EFH) for commercial fish species of concern. Chinook salmon and coho salmon are included under the MSA-EFH provisions. The distributions of Chinook salmon are downstream from project activities in the affected sub-watersheds, between 2.9 miles (Beaver Creek) and 32 miles (Muddy Creek). In general, coho salmon are further downstream from the proposed actions than habitat occupied by Chinook. Due to the distance from EFH of project activity no adverse affects to EFH is anticipated. Based on the no adverse affects determination no consultation with NOAA Fisheries is necessary for MSA-EFH.

3.4 Hydrology

(IDT report incorporated by reference: Wegner, 2011. Rickard Creek Hydrology Environmental Assessment.)

Affected Environment

The project area lies in headwaters of the Marys River 5th-field Watershed. Tributaries in the project area discharge into Oliver Creek, and a small portion of the area flows into Beaver Creek (both tributaries of Muddy Creek).

The project area receives approximately 75 to 80 inches of rain annually. Most runoff is associated with winter storm events that result from low pressure fronts moving inland from the southwest off the Pacific Ocean. Peak stream flow events are concentrated in the months of November through March when Pacific storm fronts are strongest. As a result of little or no snow pack accumulation and infrequent rainfall, stream flow in the summer is typically a fraction (less than 20 percent) of winter levels and many headwater channels retreat to subsurface flow or go dry. At a distance of over 30 miles from the ocean, and east of the Oregon Coast Range summit, fog and fog drip are not substantial contributors to watershed hydrology in the project area.

Elevation in the project area ranges from approximately 1,000 to 1,320 feet and is generally mountainous to the east and flatter ridge tops in the northwest portion of the project area. The entire project area is located below the 2,000 foot elevation which is considered the transient snow zone in the Oregon Coast Range (U.S.D.I. 1995). The transient snow zone is that area considered to be capable of accumulating snow for periods during the winter but is not cold enough to develop a snow pack that would remain for the entire winter season. Because of this ability to accumulate snow, the transient snow zone can also release all the water in the snow pack when the area is subsequently hit by a warmer rain event. The resulting stream flows from a rain-on-snow precipitation event can be extreme and very quickly flood the stream channel. Large flood events are not predicted in the project area because the project location is not in an area prone to this type of rain-on-snow precipitation events.

Project Area Streams

The project area includes perennial and intermittent 1st order tributaries to Upper Beaver Creek and Upper Reese Creek. These tributaries are Rosgen type A source channels: 4 to 10 percent gradient, low width/depth ratio, and low sinuosity (Rosgen, 1994). Channels are typically narrow (less than 10 feet wide) with low to moderate side slopes, which braid at valley flats creating small marshes which sustain hydric vegetation. The project area also contains one small (less than half an acre) water feature, which is surrounded by conifers. This area fluctuates between a wet and dry state depending upon the season and amount of precipitation occurring in the water year.

Project Area Water Quality

Fine sediment and turbidity

During field review of stream channels in the project area, the perennial channel along the southwest edge was observed to be mostly stable (not experiencing channel changes outside the expected range of natural variability) and functional (the size of stream substrate and woody debris amounts are similar to reference streams in the Coast Range province). Sediment supplies are in the range expected for its stream type (Rosgen, 1994). Channel substrates are typically sand, with some pebbles and gravels. Some channel reaches contain large amounts of CWD. The remaining channels contained sections of discontinuous flow where water went subsurface.

Stream Temperature

No stream temperature data was available for this analysis. The only channel that displays perennial flow characteristics is located on the southwestern boundary of the project area and the upper portion of this channel has a 300 foot no harvest buffer proposed. The remaining channels are generally shaded by alder, conifer, ferns, and brush. Stream shading varies between dense canopy (greater than 80

percent angular canopy density) cover by conifers to open canopy (50 to 60 percent angular canopy density) at flatter reaches or along the boundary with private lands where younger stands exist (Brazier and Brown, 1972). The flatter stream reaches had discontinuous flow and no surface flow, so no impacts to water temperature would occur. No streams on the northern and eastern boundary of the project area have perennial flow until the very edge of the unit.

Streams in the project area are classified by the Benton Foothills Watershed Analysis (Map Plate 9, USDI 1997) as having a "low" risk of detrimental changes in water temperature based on stream bank vegetation shading. In addition, there has been no stream side vegetation removal within the project area since the completion of the BFWA in 1997. Instead only streamside vegetation growth has occurred, thus resulting in an increase in vegetation shading.

Municipal and Domestic Water Rights
There are no known municipal or domestic water users in the project area. The nearest existing domestic water rights are located approximately 1.1 miles downstream from the project area on Reese Creek and approximately 1.4 miles downstream in Beaver Creek. Additional water rights are listed further downstream on Beaver Creek for power, irrigation, and domestic use (Water Rights Information System, 2003).

Environmental Effects

Alternative 1 – No Action

The No Action alternative would result in a continuation of the condition and trends of water resources as described under the BFWA and Affected Environment section of this report. During field review of stream channels in the project area, the perennial channel was observed to be mostly stable (not experiencing channel changes outside the expected range of natural variability) and functional (the size of stream substrate and woody debris amounts are similar to reference streams in the Coast Range province). Sediment supplies are in the range expected for its stream type (Rosgen, 1994). Channel substrates are typically gravel, with some pebbles and sand. Some channel reaches contain large amounts of CWD. The remaining channels all contained sections of discontinuous flow where water went subsurface. No reduction of forest canopy would take place. No additional disturbance to flow paths resulting from timber harvest and road work/use would occur. Streams disturbed from past management would continue to display the above referenced stable conditions.

Alternative 2 – Proposed Action

Stream Flows
Increases in mean annual water yield following the removal of watershed vegetation have been documented in numerous studies around the world (Bosch et al., 1982). Measurable increases (greater than 10 percent) in water yield would be expected to last approximately 20 to 30 years based on the above cited studies. Vegetation would intercept and evapotranspire precipitation that would otherwise become runoff. Thus, it can be assumed that the action considered under this proposal would likely result in some small increase in water yield (including a small increase in summer base flow) which correlates with the removal of a portion of the conifer overstory in the watershed. Based on the amount of harvest (leaving approximately 9-11 trees per acre) in this proposal the level of water yield increase would be well below 10 percent and would not be able to be detected from the natural range in variability in flow levels on a year to year basis.

A buffer would be applied to the small wet area in Unit 29A, and its position on the south-east facing hillside would likely enhance the duration of a higher water table in this area. The south-east facing

slope has a low energy input from the sun and it does not experience the most intense solar heating during the growing season, thus the removal of vegetation on this slope would allow the water that the trees would have been using to remain in the soil and help enhance the water table in this part of the unit. However, because the perennial portion of this pond is so small, and accumulates runoff from a relatively small upland area, the perennial portion of the pond would be more susceptible to becoming dry in mid to late summer due to an increase in air temperature than it presently experiences. Anderson et al. (2007), found increased temperatures and evaporation inside harvest units after regeneration harvest. Although a buffer would be placed around this wet area, there would be an increased amount of direct sunlight due to the loss of shade from harvested trees outside the wet area. Because the wet area is within the regeneration harvest unit it is likely, based on Anderson et al. (2007), that the air temperature within the wet area would increase. Because the wet area would have a buffer, and the presence of 9-11 large trees per acre, the potential temperature increase would be less than those found by Anderson et al., and thus have a lower risk of affecting the function of the wet area.

Water Quality

Fine sediment and Temperature

The creation of temporary roads, skidding corridors, and the mechanical removal of trees are unlikely to significantly increase sedimentation into project area streams because all new road construction would be located outside riparian areas and wetlands, harvest generated slash would be maintained in the skidding corridors, minimizing the need for machines to travel on bare soil. Slash, limbs, and non-merchantable material left following harvest activities, within treatment areas can substantially reduce the magnitude of sediment movement (Burroughs and King 1989, Swift 1985). The trees in the project area have ample crowns, so there should be adequate slash on the ground to protect soils from erosion during skidding activities. Also, ground-based equipment would only be allowed on slopes less than 35 percent. Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams due to harvest activities and mass wasting are unlikely to result from this action.

BMPs and PDFs, as described previously, would be implemented to eliminate and/or minimize sediment generation and delivery to stream channels from the proposed project activities. The creation of temporary roads, yarding corridors, and the mechanical removal of trees are unlikely to significantly increase sedimentation into project area streams because harvest generated slash would be maintained in the yarding corridors minimizing the need for machines to travel on bare soil. Broadcast burning is proposed in the skyline portion of the regeneration harvest area. This burning would be completed when fuel moisture conditions met the burning prescriptions so that not all the slash would be consumed in the treatment, leaving some of it to help with erosion abatement on the steeper slopes of the harvest area. Also, ground-based equipment would only be allowed on slopes less than 35 percent.

Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams due to harvest activities and mass wasting are unlikely to result from this action. Because there is no measurable increase to stream flow expected from this activity, there is no expected increase in sediment generation or delivery to streams and no expected effect to existing beneficial uses of the project watersheds including the existing water rights users.

In addition, SPZs in riparian areas of all three units have high surface roughness, which can function to trap any potential overland flow and sediment before reaching streams. Ground-based skidding would occur during periods of low soil moisture (less than 15 percent) with little or no rainfall, in order to minimize soil compaction and erosion.

For the protection of stream channels and aquatic resources, riparian buffers or no-treatment zones were applied to all stream channels and "high water table areas" (small wet areas, ponds, marshes, etc.) in the project area. These zones were determined in the field by BLM personnel following the protocol outlined in the *Northwest Forest Plan Temperature Implementation Strategies* (2005). Stream buffers extend a minimum of 50 feet from stream channels and to the extent of the riparian vegetation around "wet areas". This zone would be extended upslope during field surveys as far as deemed necessary to protect aquatic resources (the average width of the proposed stream buffers are 200 feet). This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, vegetation heights, etc.

Stream shading would exceed the widths required by the Oregon DEQ stream temperature TMDL standard to maintain a minimum of 80 percent effective shade resulting in no change to water temperature from the activities proposed in this project. Based on field observations (current streamside vegetation that is overhanging the stream and valley topography that blocks the sun in the hottest part of the day appears adequate to shade surface waters during summer base flow), aerial photo reviews of streams completed for the analysis of this EA, and modeling runs for the project area, it is likely that stream temperatures consistently meet the Oregon state standard (18 degrees Celsius) .

Existing OHV use in the project area is not having a detrimental impact on water quality through sediment introduction to stream channels. The proposed closing of the project skid trails and the decommissioning on one rutted road that is currently used by OHV riders would result in an overall decrease in OHV use in the project area. The existing OHV use is allowed under the current RMP.

Channel Morphology

This project is unlikely to affect stream channel stability and function as all field identified streams and wet areas would be protected with at least a 50-foot SPZ. No yarding would occur across streams. No bank stabilizing vegetation would be removed. This project would remove trees outside the no cut buffer along approximately 1,700 feet of a fish bearing stream. However, density management is proposed to produce larger trees over time that would fall into the streams adding additional structure and complexity to the channel and a minimum of 150 feet of unharvested stream buffer would remain along the stream.

Burning

The majority of slash associated with this project in the tractor yarding areas would be left on site. Where large amounts of slash are found along roads and landings, it would be piled and burned. Burning piles could produce small areas without soil cover that are more susceptible to erosion. Burning could also produce patches of bare soil with altered properties that restrict infiltration. Burn piles would occupy very small areas surrounded by larger areas that would absorb runoff and trap any sediment that moved from the burn sites.

The proposal also includes broadcast burning 60 acres of the regeneration harvest skyline unit. No broadcast burning would occur within the RR LUA of that harvest unit. Based on previous burning projects, this burned area would be expected to reestablish vegetation entirely within one to two growing seasons. Broadcast burning is completed at a time of the year when soil moistures are higher and the soil is resistant to impacts by low intensity burning. This lower heat type of burn does not kill the shallow roots of shrubs and forbs and the short-term flush of nutrients from the ash helps to generate a healthier understory component in the unit. Based on previous burning projects, it is not expected that any erosion would occur from this unit due to the burning and thus there should be no impact to sediment generation or nutrient levels available to the remaining vegetation which would maintain the productivity of the stand.

Road Work and Hauling
Approximately 2,960 feet of new road construction is proposed on or near ridge top locations. The proposed new constructions would occur on moderate to low gradient slopes, with no stream crossings. Although the majority of the road construction is located outside the riparian reserve, approximately 1,200 feet is located within the standard riparian reserve width criteria. This portion of new road would be located on the opposite side of a nose ridge from the stream in a dry draw that has no physical connection to the stream. The proposed final road system is located in a stable geologic landform and there is no risk of road related landslides. The placement of roads on the landscape is an average of more than 300 feet from existing streams and the road locations are on topographic divides where any road generated water or sediment would have no impact on drainages in the project area.

The risk of impacts to water quality from road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ BMP techniques to reduce concentration of runoff and sediment, such as outsloping, ditch lines, and water-bars on steeper sections of road. New roads would be decommissioned after use. Road construction, use, and decommissioning would result in no expected additions of sediment to stream channels in the project area.

Drainage on existing roads would be improved including adding 4 to 10 inches of rock surfacing on 12,408 feet of road renovation, and 4,176 feet of road improvement of project haul roads. Approximately 1,000 feet of spur roads would not receive road surfacing. The 13-6-29.1 road would also see 2,800 feet of road decommissioning activities after the sale is completed. Road maintenance activities (brushing, blading, spot rocking) are unlikely to measurably impact channel morphology over the long term because the activities all take place on established roads that are elevated above stream channels. Proposed road renovation, including ditch line reconstruction and stream crossing replacement, would result in a minor short-term increase in erosion, until reestablishment of vegetation occurs in the following growing season. Drainage improvements would likely improve water quality over existing conditions by reducing road generated sediment inputs to streams.

Timber hauling would be permitted year-round on rock-surfaced roads. Timber hauling during periods when water is flowing on roads and into ditches could potential increase stream turbidity if flows from ditches flowed long enough to enter streams. All hauling would be restricted by the BLM sale administrator at any time of the year necessary to avoid increases in erosion and sedimentation to streams. Based on the road locations and the project design features there are no expected impacts on water quality from the project proposal.

Alternative 3 – Regeneration Harvest with RTV Buffers

Stream Flows
Potential stream flow effects would be lower with this alternative since there would only be 24 acres of harvest. The level of impacts to the water resource would be similar to those discussed in Alternative 2 but at a decreased level due to the lower amount of harvest. The small wet area would not have harvest around it so it would continue to function in its current state.

Water Quality
Fine sediment and Temperature:
Because only 11 acres of the proposed harvest is remotely close to stream channels (300 feet), the no harvest buffer would act to isolate the harvest effects from the channels. This would result in the potential effects to water quality to mimic the existing condition and no effects would be expected

Channel Morphology

This alternative is unlikely to affect stream channel stability and function as noted above and the channel morphology is expected to remain in its existing good condition.

Burning
The proposal includes broadcast burning 11 acres of the regeneration harvest skyline unit. No broadcast burning would occur within the RR LUA of that harvest unit. Based on previous burning projects, this burned area would be expected to reestablish vegetation entirely within one to two growing seasons. Effects would be less than those discussed for Alternative 2.

Road Work and Hauling
No new road construction is proposed with this alternative. The proposed final road system is located in a stable geologic landform and there is no risk of road related landslides. The existing road network is an average of more than 300 feet from existing streams and the road locations are on topographic divides where any road generated water or sediment would have no impact on drainages in the project area.

Potential effects from road renovation and improvement would be much less than those listed for Alternative 2 because spur road P1 and 341 feet less of road improvement work would occur.

Alternative 4 – Commercial Thinning and Density Management

Stream Flows
Potential stream flow effects would be similar to Alternative 2 because the amount of harvest increases to 130 acres, but the harvest is limited to thinning. The level of impacts to the water resource would be similar to those discussed in Alternative 2, but at a decreased level due to the higher amount of leave trees in all three units (20 average dbh trees per acre).

The small wet area in Unit 29A would have a buffer and the harvest around it would be at a reduced level from the thinning treatment but it is expected that the effects would be more similar to those described in Alternative 2.

Water Quality

Fine sediment and Temperature:
Effects to sediment and water temperature would be similar to those discussed in Alternative 2, although the level is expected to be less because of the greater tree density after harvest is completed. Buffers would be narrower around the stream corridors but the increased tree density compared to Alternative 2 would help mitigate impacts to both shade and erosion conditions in the stand.

Channel Morphology
Effects to channel morphology would not be immediately measurable when compared to Alternative 2, but in the long term, the narrower stream buffers would likely result in a lower amount of recruitable large woody debris to the stream systems in the sale area.

Burning
This alternative would not include any broadcast burning of the harvest area. There would be pile burning at the landing areas and those effects would be similar to those discussed in Alternative 2.

Road Work and Hauling
Road impacts would be the same as discussed in Alternative 2.

3.5 Soils

(IDT report incorporated by reference: Wegner, 2011. 2011 Revised Rickard Creek Timber Sale Soils Report.)

Affected Environment

The predominant soil series on and around the project area are Honeygrove and Hemcross. Slopes on most of the skyline yarding areas vary from 30 percent to 50 percent; a few included areas have slopes up to 60 percent for short distances. Slopes on the ground-based yarding areas vary from 5 percent to 35 percent.

Moderate to heavily compacted soils still exist in scattered skid trails that date back to the original tractor logging done in the proposed project area in the 1940s. Less than three percent of the proposed project area is occupied by distinguishable skid trails. The old skid trails contain trees and brush and have partially recovered. The skid trails and old haul roads are generally less than 12 feet in width.

The existing rocked road surfaces within the proposed project area are stable. A few sections of natural surfaced roads show signs of limited surface erosion where surface water accumulates and runs down the compacted road surface. No areas were found that had a high risk of contributing large amounts of sediment to streams through surface erosion or mass failure.

The major management concern with the soils is their sensitivity to compaction when moist or wet and its subsequent reduction in infiltration rate when compacted. On steeper sites (greater than 25 percent) runoff rates and hazard of erosion can be high for bare soil.

Environmental Effects

Alternative 1 – No Action

This alternative would result in no change to the affected environment. Short-term impacts to soils would be avoided.

Alternative 2 – Proposed Action

<u>Roads and Trails</u>

Compaction, disturbance, and displacement of soil
Constructing 2,960 feet of new spur roads would result in loss of top soil and compaction of sub-soil on approximately 1.5 acres (about 1.3 percent of the total project area). Forested land would be converted to non-forested. The roads to be constructed are on gentle topography and the total clearing width would be approximately 14 feet. The road to be constructed within the RR would be located outside the drainage area of the stream in a dry draw that does not have a physical connection to the stream channel, so no erosion from the road surface is expected to reach the stream. All new construction would be decommissioned and blocked to vehicle traffic following harvest and some recovery back to a forested condition would occur in this area over time. Approximately 2,800 feet of the 13-6-29.1 road would also be decommissioned and blocked to vehicle traffic following harvest.

Based on previous project work, the spot road renovation and improvement of existing roads would not change the existing amount of current non-forest land. Some encroaching vegetation along these older roads would be removed for safety concerns and surface rock would be added where needed. The renovations and improvements would include BMP upgrades where needed to provide better drainage and road surface conditions resulting in less road surface erosion into the surrounding area or streams.

The 12,408 feet of renovation and 4,176 feet of improvement work is expected to result in some minor short term roadside erosion where established vegetation in the ditch and culvert catchment areas are removed during the cleaning and reshaping or culvert installation operations. Litter fall accumulations and growth of vegetation generally re-establishes within two seasons and erosion rates return to near natural levels thereafter. The replacement of two cross drains and one stream crossing culvert and the road surface reshaping would reduce the volume of water flowing on the road surfaces and would result in less future erosion.

There are existing OHV trails in the project area. These trails are allowed under the current RMP and are not having long-term detrimental impacts to the soils resource. There is no effect to water because the incised trails do not generate sediment that reaches a water source. There is no effect to soil productivity because the road prism is not considered "timber management ground". The ruts do display that compaction has occurred but it is on such a small scale in the project area that it is considered to be in the normal range of amount of compacted ground, such as game trails or areas where trees have blown over. The project would block off skid trails with logging slash and decommission one rutted road that is currently being used by OHV riders. Due to the road improvement this would result in a net decrease in OHV soil disturbance in the project area.

Logging

Compaction and disturbance and displacement of soil

Soil compaction can be expected in harvest units associated with this project. A study on the effects of compaction on soil bulk densities by Page-Dumroese (1993) found that intensive timber removal activities using ground-based equipment resulted in a 25 percent increase in compaction in yarding corridors and was considered “heavy or intense” compaction. Moderate levels of timber removal activities using forwarder-type equipment resulted in an 18 percent increase in bulk density, and skyline-based timber removal resulted in an 11 percent increase in yarding corridors. The regeneration harvest would retain approximately 10 of the largest trees per acre and would more closely resemble a heavy thinning harvest than a typical regeneration harvest. All proposed timber removal activities were designed to ensure the total yarding corridor area remains below the cumulative level of 10 percent aerial extent of soil disturbance from the RMP (Timber harvest BMPs, Appendix C-2).

Following completion of this proposed action, over 95 percent of the understory vegetation and root systems would remain, along with surface soil litter and slash from the harvested trees. Expected additional amounts of surface soil displacement, surface erosion and dry ravel resulting from harvest operations beyond those discussed below are not expected.

Approximately 2.0 acres in landings and 1.7 acres in skid trails would be utilized for this harvest. About half of the surface area used for landings would be the existing road surface. The existing skid trails would be reused, this would result in a cumulative detrimental disturbance level of 4.2 percent in the sale area units. The areal extent and degree of disturbance would remain within RMP guidelines of less than 10 percent disturbance (Timber harvest BMPs, Appendix C-2).

For all of the landings, a portion of the existing haul road or the harvest road is used for equipment operations. Some additional ground adjacent to the road surface is used to turn equipment around, and

to sort and deck logs until transport. Areas where equipment turns or backs around multiple times would experience heavy compaction and disturbance to the topsoil layer. These areas would not readily support new vegetation or tree growth in the first 10 years after work is completed.

The estimated reduction in growth rate for trees in Unit 29A on moderate to heavy impacted areas is 15-30 percent during the first 10-20 years of growth. As trees age and become established, the negative effect on growth from soil compaction and displacement becomes less pronounced and growth rates may approach that of trees on similar, undisturbed sites. This is especially true where the area of compaction or displacement tends to be in narrow strips (four to eight feet wide) as is the case with skyline yarding corridors and small landings. Because the proposed amount of skyline yarding corridors in the sale units is well below the allowable limit in the RMP of 10 percent (Timber harvest BMPs, Appendix C-2), soil disturbance levels are expected to remain at an insignificant level.

Skyline yarding corridors usually result in light compaction of a narrow strip less than 4 feet in width. This is especially true for this type of project where there would be adequate slash on the ground in the corridors to yard over. Measurable long term effects on site productivity from this type of disturbance are minimal to none because the extent of the disturbance to tree roots, soil compaction and soil productivity are so small and the roots of the surrounding vegetation helps to keep the soil in a productive condition (Harrison, 2009). This applies to approximately 50 acres of Unit 29A, all of Unit 29B, and about 7 acres of Unit 29C.

Ground-based yarding impacts would vary depending on whether a harvester/forwarder system or crawler tractors are used, how dry the soils are during heavy equipment operation, and how deeply covered with slash the soils in the skid trails are. Impact analysis also included the additional area used for landings. In crawler tractor ground-based skid trails, expect a moderate amount of top soil displacement approximately eight feet wide and moderate to heavy soil compaction to occur depending on the amount of use. The estimated reduction in growth rate for trees on moderate to heavy impacted areas is 15-30 percent during the first 10-20 years of growth. As trees age and become established, the negative effect on growth from soil compaction and displacement becomes less pronounced and growth rates may approach that of trees on similar, undisturbed sites. In harvester/forwarder skid trails soil displacement is generally light to moderate because the equipment travels on top of slash and does not dig into the soil, which would result in an immeasurable level of growth reduction from natural variability. Ground-based yarding impacts in that portion of Unit 29C would be considered light due to the thinning only treatment.

Some of the potentially impacted acreage listed above, includes already existing skid trails from previous logging in the late 1930 to 1940 period. Where practical, portions of these existing roads would be reused for skid trails, which would reduce the level of new disturbance required to skid the harvested trees to the landings.

Site Productivity

Soil impacts in skid trails are expected to result in light compaction in narrow strips less than 4 feet in width. Because the trees in the project area have ample crowns, there should be adequate slash on the ground to yard over thus lowering the amount of compaction. The effect on overall site productivity from light compaction is expected to be low (less than 10 percent) and result in no measurable reduction in overall yield for the project area because of the design features.

For harvester/forwarder systems, the following PDFs are proposed: soils are fairly dry (less than 15 percent soil moisture), equipment operates on an adequate layer of slash (80 percent soil coverage), and full suspension of logs. Soil impacts in skid trails are expected to result in light to moderate compaction due to slash covering the trails. Slash, limbs, and non-merchantable material left following

harvest activities within treatment areas can substantially reduce the magnitude of sediment movement (Burroughs and King 1989, Swift 1985). The trees in the project area have ample crowns, so there should be adequate slash on the ground to protect soils during skidding activities. With the implementation of PDFs, this system is expected to result in light to moderate compaction (10 to 15 percent) with no expected measurable reduction in overall yield for the project area.

For tractor skidding and associated landings the following PDFs are proposed: soils are dry (less than 15 percent soil moisture) and equipment operates on harvest activity generated slash. Soil impacts are expected to result in moderate to heavy, fairly continuous compaction within the landing areas and the main skid trails. Impacts would be light to moderate and less continuous on less traveled portions of skid trails. Previous project monitoring has indicated a maximum of 20 percent productivity loss under the most severe circumstances. The overall sale area effect resulting from the impacted acres is expected to be less than 5 percent detrimentally disturbed area for the timber sale units which is well below the 10 percent level allowed in the RMP (Timber harvest BMPs , Appendix C-2).

The estimates in reductions of overall yield are based on studies and observations done in Western OR and WA and are by no means conclusive. Observation and study results vary widely. Studies recently being done by Weyerhaeuser Co. indicate that negative effects from compacted soil on growth of young trees become negligible within 8-12 years of planting (Harrison, 2009). Effects from top soil loss or displacement may have more long term significance than the associated compaction.

In order to avoid damage to existing tree roots, we would not plan on ripping skid roads to mitigate compaction. Mitigation would only be in the form of limiting soil disturbance and compaction by skidding on top of slash as much as possible and doing ground based skidding during periods of low soil moisture (less than 15 percent) with a minimum of skid trails (less than 10 percent of the unit area) (Timber harvest BMPs, Appendix C-2).

Soil Erosion

No measurable amounts of surface erosion are expected from the forested lands treated under the proposed action. With timber hauling restricted to the dry season on native surfaced roads, the amount of sediment produced from roads and entering streams would be negligible to none. There would be no measurable cumulative impact to the soils resource outside the project area.

The proposal includes broadcast burning of the skyline portions of the regeneration harvest units. These burned areas would be expected to reestablish ground vegetation (grasses and shrubs) within one to two growing seasons. No burning from either treatment would occur within SPZs to protect water resources and the remaining vegetated buffer would filter out any sediment delivered from upslope areas. Broadcast burning is completed at a time of the year when soil moistures are higher and the soil is not likely to be impacted by the low intensity heat generated from the burning. This lower heat burn does not kill the shallow roots of shrubs and forbs and the short-term flush of nutrients from the ash would help to generate a healthier understory component in the treated units.

Observations over three decades of pile burning in this area of the coast range has resulted in no evidence of surface erosion from areas where piled slash has been burned. Based on this local experience, no increase in surface erosion is expected from the proposed actions. It is not expected that any additional erosion would occur from these units and landings and thus there should be no impact to sediment generation or nutrient levels available to the remaining vegetation which would maintain the productivity of the stand. With slash and existing undergrowth being left on nearly all of the area, no measurable amounts of surface erosion are expected from the forested lands treated under this proposed action.

Placement of water bars in skid trails would promote out-slope drainage and prevent water from accumulating and running down the skid trail surfaces in large enough volumes to cause erosion that could reach streams. A small amount of localized erosion can be expected on some of the tractor skid trails the first year or two following skidding. Eroded soil is not expected to move very far from its source (less than 100 feet) and would be diverted by the water bars or out sloping to spread out in the vegetated areas adjacent to the trails and infiltrate into the ground. After several seasons, the accumulated litter fall on the skid trails would reduce the impact of rain droplets on the soil surface further reducing the potential erosion of the skid trails. Existing OHV use in the area would be reduced by the decommissioning of one road and the skid trail blocking work described above.

Alternative 3 – Regeneration harvest with RTV buffers

Compaction, disturbance, and displacement of soil

Roads and Trails
No new road construction would occur under this Alternative. Impacts from road renovation and trails would be the same as Alternative 2 except that there would be 341 feet less of road improvement work. The haul route renovations and improvements would include BMP upgrades where needed to provide better drainage and road surface conditions resulting in less road surface erosion into the surrounding area or streams. Road spur P1 would not be constructed in this alternative.

Logging

Compaction, disturbance, and displacement of soil
Impacts from harvest would mimic those of Alternative 2 but to lesser extent. A smaller amount of total soil compaction would be expected to result in the harvest unit associated with this alternative because only 24 acres would be treated. Unit 29A includes approximately 12 acres of ground-based yarding which would result in moderate compaction and 12 acres of skyline yarding which is expected to result in light compaction. The regeneration harvest would retain approximately 10 of the largest trees per acre and would more closely resemble a heavy thinning harvest rather than a typical regeneration harvest, see the silviculture write up for a more detailed description of the stand components. Because of the reduced size of the harvest unit and the need for skyline corridors and ground based skid trails to remove the timber the cumulative percent of the harvest area would be closer to the RMP limit of 10 percent soil disturbance in those areas treated. (Timber harvest BMPs, Appendix C-2).

Approximately 1.2 acres in landings and 0.7 acres in skid trails would be utilized. About half of the surface area used for landings would be the existing road surface. Because the existing skid trails would be reused, this would result in a cumulative detrimental disturbance level of 7.9 percent in the sale area. The areal extent and degree of disturbance would remain within RMP guidelines of less than 10 percent disturbance (Timber harvest BMPs, Appendix C-2).

Site Productivity
Estimates in reductions of overall yield are based on studies and observations done in Western Oregon and Washington and are by no means conclusive. Observation and study results vary widely. Studies recently being done by Weyerhaeuser Company indicate that negative effects from compacted soil on growth of young trees become negligible within 8-12 years of planting (Harrison, 2009). Effects from top soil loss or displacement may have more long term significance than the associated compaction.

Soil Erosion

No measurable amounts of surface erosion are expected from the forested lands treated under the proposed action. Ground-based skidding would only occur during periods of low soil moisture (less than 15 percent). With timber hauling restricted to the dry season on native surfaced roads, the amount of sediment produced from roads and entering streams would be negligible to none.

The proposal includes broadcast burning of the 11 acres of skyline regeneration harvest units. These burned areas would be expected to reestablish vegetation entirely within one to two growing seasons. No burning from either treatment would occur within SPZs to protect water resources and the remaining vegetated buffer would filter out any sediment delivered from upslope areas. Broadcast burning is completed at a time of the year when soil moistures are higher and the soil is not likely to be impacted by the low intensity heat generated from the burning. This lower heat type of burn does not kill the shallow roots of shrubs and forbs and the short-term flush of nutrients from the ash would help to generate a healthier understory component in the treated units.

Alternative 4 – Commercial thinning and Density Management

Compaction and disturbance and displacement of soil

Roads and Trails
Impacts from road construction, renovation, and improvement would be the same as Alternative 2. The existing OHV trail impacts are also the same as Alternative 2. The renovations and improvements would include BMP upgrades where needed to provide better drainage and road surface conditions resulting in less road surface erosion into the surrounding area or streams.

Logging

Compaction and disturbance/displacement of soil:
Impacts from harvest would more closely mimic those of the thinned portions of units from Alternative 2. An increased amount of light to moderate soil compaction would be expected to result in the harvest units associated with this alternative because 130 acres would be treated rather than the 112 acres in Alternative 2. The increased size of the harvest unit is because the stream buffers are reduced in size due to the thinning harvest prescription. The 3.8 percent of cumulative soil disturbance area in the harvest unit would remain well below the RMP limit of 10 percent soil disturbance in those areas treated. (Timber harvest BMPs, Appendix C-2).

Approximately 2.1 acres in landings and 2.8 acres in skid trails would be utilized. About half of the surface area used for landings would be the existing road surface. The existing skid trails would be reused, and this would result in a cumulative detrimental disturbance level of 3.8 percent in the sale area units. The areal extent and degree of disturbance would remain within RMP guidelines of less than 10 percent disturbance (Timber harvest BMPs, Appendix C-2).

Site Productivity
Effects to site productivity would be the same or slightly less than Alternative 2 because more trees would be left in the harvest unit. Estimates in reductions of overall yield are based on studies and observations done in western Oregon and Washington, and are by no means conclusive. Observation and study results vary widely. Studies recently done by Weyerhaeuser Company indicate that negative effects from compacted soil on growth of young trees become negligible within 8-12 years of planting (Harrison, 2009). Effects from top soil loss or displacement may have more long term significance than the associated compaction.

Soil Erosion

No measurable amounts of surface erosion are expected from the forested lands treated under the proposed action. Ground-based skidding would only occur during periods of low soil moisture (less than 15 percent). With timber hauling restricted to the dry season on native surfaced roads, the amount of sediment produced from roads and entering streams would be negligible to none. There would be no measurable cumulative impact to the soils resource outside the project area.

The proposal does not include any broadcast burning of the thinned stand. Projected impacts from burning would not occur in this alternative.

3.6 Vegetation

(IDT reports incorporated by reference: Snook, 2011. Silvicultural Prescription for Rickard Creek Regeneration, Commercial Thinning, and Density Management, and Exeter, 2011. Botanical Report Rickard Creek.)

Affected Environment

Structure and Species Composition

A single story stand is present over most of the regeneration harvest area and over the entire density management area along the southwest side of the project area. This stand is about 80 years old in 2011. Douglas-fir is the primary species with scattered hardwoods also present in the stand. Scattered throughout the project area are legacy old-growth (less than 200 years old) and several large Douglas-fir of similar age or slightly older than the majority of the stand.

A six acre two-story stand is present within the regeneration harvest area along the western edge. This six acre stand is also about 80 years old but it has a component of these larger diameter mature trees. These stands have not received intensive management and the 2003 updated forest survey indicates slowing growth rates.

A single story 74 year old stand is present within the commercial thinning area and along the east side of the density management area. Douglas-fir is the primary species in this stand although scattered hardwoods are also present. Scattered dominant Douglas-firs are present. Very little CWD is present and most consists of hardwoods.

Most of the ground cover on the project area is moss with scattered salal and sword fern.
Stand inventory found that CWD, including snags and down logs, are present in moderate amounts for a stand of this age.

Forest Health

Stand exam data included disease and insect presence in the stand. There are no known threats to forest health beyond the following endemic processes in the proposed project area, discussed briefly in the 2007 Silvicultural Prescription (Caldwell, 2007) and Riparian Reserves Report (Haynes, 2007), and expanded here.

Red ring rot is one of the most common and widespread heart rots, caused by the *Phellinus pini* fungus. It is found in a few Douglas-fir in the project area. It decomposes cellulose and lignin in a white pocket rot in the heartwood. Like most heartrots, it enters the tree as airborne spores through wounds.

Laminated root rot, caused by the fungus *Phellinus weirii*, is a native root pathogen that spreads through root to root contact between live, susceptible trees, including Douglas-fir and grand fir. It kills trees by destroying their roots, which then leads to windthrow. It is a natural part of many forest ecosystems (Thies and Sturrock, 1995), and contributes snag and downed wood habitat to affected stands over time. "Isolated pockets" of Phellinus tree mortality are noted in the project area (Caldwell, 2007). The mortality can be expected to spread outward at a rate of about a foot per year.

Douglas-fir bark beetles are endemic in the project area. Bark beetles feed on the cambium under the bark of live and very recently (1-2 years) dead trees, and lay eggs there that hatch and mature under the bark, emerging as adults. Recently downed Douglas-fir trees encourage the build-up of beetle populations, which subsequently attack and kill standing Douglas-fir trees. Douglas-fir trees weakened by root disease infection are more likely to be attacked by the beetle (Hadfield, 1986). In stands under 100 years old, the risk of mortality to healthy green trees is low, even when beetle populations may be quite high.

The risk of windthrow from severe winter storms always exists, and the upper lee slopes of major southeast- to northwest-running ridges generally experience the highest degree of windthrow in the Oregon Coast Range. Clearcutting along boundaries with private land has occurred in the last 15 years, resulting in minor windthrow.

Stand and Tree Growth

Currently the stands in the project area are in a mid to late-seral condition, at high density and are undergoing density mortality. The stands are in the "stem exclusion" phase (Oliver and Larson, 1996) of development, and average .60 to .69 relative density index (RDI). Relative Density Index (Reineke, 1933) is a measure of density of trees per acre relative to the maximum density possible. Above a relative density index of .55, the most crowded trees succumb to density mortality. Under such competition, crowns recede from below due to shading, and stems become taller and more slender as height growth continues but diameter growth slows in response to the loss of crown. Trees become less mechanically stable and more susceptible to pests.

Unit 29A, 29C (Stand 010/040)
Data collection in 1996, 2003, and 2011 in this stand can be compared to show trends. In 1996, 5-year radial growth (one-half of diameter growth) was measured at 0.44 inches. In 2003 sampled trees averaged 0.35 inches radial growth, and in 2011 radial growth was measured at 0.45 inches. Radial growth responds to annual climatic growing conditions as well as overall tree condition resulting from inter-tree competition and other factors. Many of the sample trees in 2011 were in a dominant canopy position, averaging 5 inches greater diameter than those sampled in 1996, and are likely undergoing lower competitive stress relative to the majority of the stand. From the data, it can be concluded that diameter growth of dominant trees is maintaining the same as the average tree diameter growth in 1996. It is possible that average tree diameter growth is declining, as the 2003 sample shows, but the sampled trees in 2011 are not of comparable canopy position. Diameter growth of dominant trees is not in decline, but diameter growth of crowded trees is almost certainly in decline. Overall stand volume growth in 2011 is calculated at 193 cubic feet per acre per year. This means that in 80 years of growth, the total volume accumulation has been about 15,440 cubic feet. This is relatively productive growth, and is the peak growth predicted for the current stand by the growth model.

Unit 29B (Stand 030)
In 1996, 5-year radial growth was measured in 42 trees and averaged at 0.53 inches. In 2011, it was measured in 10 trees and averaged 0.59 inches. Again, this may be due to more favorable climatic

conditions in the sampling period. At this time, diameter growth does not appear to be in decline. Overall stand volume growth in 2011 is calculated at 145 cubic feet per acre per year.

Seral Stage Distribution

Project Area Vicinity
The Rickard Creek project lies within a 520-acre parcel (Township 13 South, Range 6 West, Section 29) of BLM-managed land bounded by private lands. Section 29 contains 32 acres of late-successional forest and another 45 acres of late-successional forest occur about a half-mile from the project area on BLM-managed land in Section 21.

Mid-seral habitat which includes the Rickard Creek stands (at 80 years old in 2011 are passing into late-seral), are very abundant in the vicinity of the project area, making up 488 acres of the 520 acres of BLM-managed lands in Section 29, and a majority of BLM-managed lands in the nearest sections to the south, west, and northwest.

Early-seral stands resulting from BLM regeneration harvests on five units in the Marys River Watershed over the past 20 years total 145 acres. Nine acres of that occurs within the sections nearest the project area, within approximately two miles. Early-seral forest is not spatially aggregated near the project area.

Marys River 5th - Field Watershed
Of the 193,810 acres in the Marys River 5th-field watershed, 6,610 acres (3%) is managed by the BLM. GFMA LUA totals 5,789 acres. Seral stage analysis is responsive to the purpose and need to create early seral habitat in a well-distributed pattern, an objective of the GFMA LUA from the RMP. Analysis and discussion of the seral stage composition of the Marys Rivers 5th field watershed, including all BLM-managed lands is appropriate for effects to wildlife, as wildlife effects are not specific to the GFMA LUA, but span all land use allocations and ownerships.

Specific to the GFMA objectives, an analysis of seral stage distribution of BLM-managed lands in the GFMA LUA in the Marys River 5th-field watershed shows the following composition by 20 year age class (Table 6).

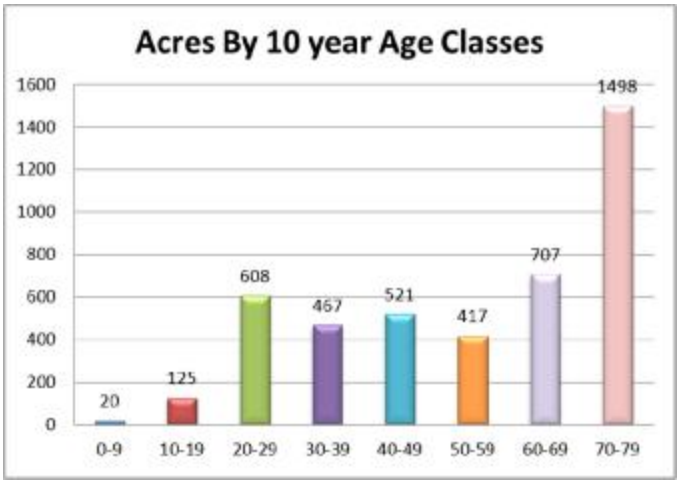
Table 6. Current 20 Year Age Class Distribution, and Seral Stage Percentages, GFMA (Matrix) LUA BLM-Managed Lands in the Marys River 5th-Field Watershed.

AGE CLASS DISTRIBUTION ON MATRIX LANDS IN THE MARYS RIVER 5th-FIELD WATERSHED, 2011			
Age	**Seral Stage**	**Acres**	**Percentage**
0-19	Early	145	Early 21%
20-39	Early	1075	
40-59	Mid	939	Mid 54%
60-79	Mid	2204	
80-99	Late	1087	
100-119	Late	82	Late 25%
120-199	Late	183	
200+	Late	74	

Total		**5789**	**100%**

A closer look at early and mid-seral age class by 10 year categories shows that very few stands are aged 0-9 years and many stands are approaching late-seral age class (Figure 1). Only 145 acres (2.5%) of the GFMA lands are aged less than 20 years, and only 20 acres(0.3%) are aged less than 10 years.

Figure 1. Early and Mid-Seral Age Class Distribution by 10 Year Age Class, GFMA LUA in the Marys River 5th-Field Watershed, 2011.



Botany

There is a small, less than 1/10th acre, wet area within the project area (indicated on the EA map). This wet area is dominated by the slough sedge and immediately surrounded by robust salal. The presence of these two species growing closely together indicates a fairly abrupt transition period from wet to dry. Within the center of the area dominated by the slough sedge is a small area, approximately 10 feet by 10 feet, dominated by the moss *Fontinalis antipyretica*. This moss generally indicates perennial water or where the soil remains saturated during all portions of the year. In years with below average precipitation, this wet area likely dries up. *Fontinalis antipyretica* is fairly common and widespread in western Oregon in perennial lakes, ponds and rivers and can tolerate short seasonal dry periods. There is nothing unique about this wet area and there are no unique habitat areas (caves, cliffs, meadows, waterfalls, ponds, lakes) within the proposed project area.

ESA listed, Bureau SS and S&M Botanical and Fungal Species

Inventory of the project area for ESA listed, bureau SS, and S&M vascular plant, lichen, bryophyte and fungal species were accomplished through review of; 1) existing survey records and spatial data, 2) habitat evaluation and evaluation of species-habitat associations and presence of suitable or potential habitat, and 3) field clearances, field reconnaissance and inventories utilizing intuitive controlled surveys, in accordance with survey protocols for the specific groups of species. Specific field surveys for these species were accomplished on: August 30, September 9, 2004 and July 5, 2011.

There are no "known sites" of any ESA listed, bureau SS or S&M vascular plant, lichen, bryophyte or fungi species within the project area nor were any found during surveys.

Non-native plants and listed noxious weeds

The following Oregon state listed noxious weeds are known from within or adjacent the project area, Armenian and European blackberry (*Rubus armeniacus* and *R. vestitus*), bull and Canadian thistles (*Cirsium vulgare* and *C. arvense*), False brome (*Brachypodium sylvaticum*), Shining and herb Robert Geranium (*Geranium lucidum* and *G. robertianum*), Scot's broom (*Cytisus scoparius*), St. John's wort (*Hypericum perforatum*), and Tansy ragwort (*Senecio jacobaea*).

All noxious weeds species known to occur near the project area are regionally abundant and widespread throughout western Oregon, with the exception of false brome. Recent BLM inventories indicate false brome is widespread throughout Benton County. The noxious weed species are classified by the Oregon Department of Agriculture (ODA) as "B" designated weeds. ODA's recommended primary control method for "B" designated noxious weed species without a fully integrated statewide management plan is biological control (when available). A fully integrated statewide management plan has not been implemented for any of these species which occur within the project area.

Environmental Effects

Alternative 1 – No Action

Stand and Tree Growth

Stand structural conditions would remain on the current trajectory of increasing density and decreasing individual tree growth rates. Stand growth projections were made using the ORGANON growth and yield computer simulation model, Edition 9.0 (Hann, et al., 2006). In 50 years without treatment, the relative density (percentage of maximum density) of stand 010/040 (Unit 29A and Unit 29C) would increase from the current relative density of .69 to an average of .94, and in stand 030 (Unit 29B), from the current relative density of .60 to .77. At these relative densities, average tree growth slows due to competition, and suppressed trees die. In 50 years without treatment, stand basal area would increase from the current 306 square feet to 391 square feet in stand 010/040 and from 229 square feet to 326 square feet.

Without treatment, stand structure would become increasingly uniform, except for gaps created by disturbance. Hardwood tree species would become overtopped and most of them lost from the stand. The main input of coarse woody debris would come from density mortality, disturbance events and endemic levels of insects and disease, resulting in more snags and downed logs than with treatment. In general, the quantity of mortality would be much greater than if the stands were treated, but dead trees would be smaller in size. Density mortality is predicted (ORGANON 9.0) to average 22 trees per acre of about 13" DBH in the next 50 years without treatment in stand 010/040 (Unit 29A and 29C), and 11 trees per acre of 12.5" DBH in stand 030 (Unit 29B). The modeling provides a basis for comparison but does not include mortality from disturbance and stochastic events.

Culmination of mean annual increment is a period of slowing growth that occurs over a period of time. Though it is projected to occur in a certain year, it could occur year sooner or later and is not a precise point in time. It is calculated from the projected growth data (ORGANON 9.0) to occur without treatment at age 90. At age 90, annual cubic foot volume growth (periodic annual increment) begins to drop, bringing the lifetime (mean annual increment) average volume growth down. Stand volume growth in stand 010/040 would decline from the current 193 cubic feet per acre per year to 133 cubic feet per acre annually.

Understory development would be very limited: very few new understory trees would establish, and existing understory trees would die or slow in growth due to increasing competition.

Crown ratio, the proportion of the tree crown height to the total tree height, is directly related to the health and vigor of the tree. As the canopy closes and lower limbs are lost to shading, ORGANON modeling predicts crown ratios would decrease from the current average of 30% to 20% in 50 years. Wind firmness and individual tree stability would also decrease.

Legacy trees, especially those with broken tops, may succumb to competition mortality as dense younger trees shade their crown. Loss of limbs and large crown structure would continue, removing important structural elements of wildlife habitat.

Seral Stage Distribution

Under the No Action Alternative, the pattern of seral stage distribution within the vicinity of the project would show an increase of 120 acres in late-seral stand, a corresponding reduction in mid-seral stands (as Rickard stand 010/040 is now 80 years old), and no change to the very small proportion of early seral stands. The RMP direction to maintain a well-distributed pattern of seral stage distribution would not be best met through the no-action alternative.

This alternative does not meet the objectives for speeding development of large diameter trees or forest structure in Riparian Reserves. In the upland, this alternative does not meet the objectives of producing a supply of timber, providing early successional habitat, or maintaining a distribution of seral stages across the matrix.

Treatments are described in the following section. Thinning treatments shown in Table 8 list the residual square feet basal area and if trees will be removed from the lower diameter classes ("below") or from all diameter classes (proportional or "pro").

Characteristics of stands in the Rickard Creek project for 50 years from present with and without treatment as projected by ORGANON are compared in Table 7 on the following page.

Table 7. Stand Characteristics (per acre) with Treatment vs. No Treatment **50 years in the future (ORGANON growth model projections to year 2061)**

Stand/Unit/ Treatment	Treatment (Tmt.)	Age[1] (yrs.)	TPA[2]	% Douglas Fir	BA[3] (ft^2)	QMD (in.)[4]	Ft^3 Vol Growth+ Harvest	Ft^3 Vol Growth per Year	RDI[5]
010/040/ Unit 29A Regen Alt 2 & 3	Regen& Plant	130	266	82%	279	13.9	7,887	157	0.86
	No Tmt.	130	106	85%	391	26	8,131	163	0.94
010/040/ Unit 29A Commercial Thinning Alt. 4	150BA Pro.	130	65	77%	256	26.8	7,537	151	0.61
	No Tmt.	130	106	85%	391	26	8,131	163	0.94
010/040/ Unit 29C Density Mgmt. Alt. 4	150BA Below	130	39	60%	234	33.2	6,001	120	0.51
	No Tmt.	130	106	85%	391	26	8,131	163	0.94
030/ Unit 29B Commercial Thinning Alts. 2 & 4	130BA Pro.	124	51	100%	237	29.1	7,557	151	0.55
	No Tmt.	124	81	100%	326	27.2	8,466	169	0.77

[1] Modeled from stand age in 2011 to 2061.
[2] Trees per acre >7" dbh.
[3] Basal area in square feet: cross-sectional area occupied by tree boles on each acre, a measure of density
[4] QMD=quadratic mean diameter, the DBH of tree of mean basal area.
[5] Relative Density Index, the density of trees per acre relative to the maximum density possible (Reineke, 1933).

ESA listed, bureau SS and S&M botanical and fungal species
Not affected, since no known sites are known from within the project area.

Non-native plants and listed noxious weeds
Under this alternative several soil disrupting activities would continue to occur within and adjacent the project area. Examples of forest management activities and natural events within the watershed that would create soil disturbance, increase available light, and increase soil temperatures, all of which influence the spread of noxious weeds include: regeneration harvests, commercial and pre-commercial timber density management projects; young stand maintenance; road construction, maintenance, renovation, improvements, de-commissioning, vegetation control and culvert replacements; landslides, high flow sedimentation deposits; and OHV activities. Activities that do not necessarily create disturbance but influence the spread of weed seeds are recreational hiking, biking, horseback riding, fishing and hunting. Other sources of seed dispersal are from wildlife movement, water movement, natural dehiscence and wind. All of these activities increase the possibility of creating new habitat for the establishment of noxious weeds. However, the risk rating for the establishment of noxious weeds beyond the current level is low due to the implementation of the Marys Peak Resource Area noxious weed abatement program, and thorough other State, Federal and local landowner control efforts. In addition, educational programs have been developed to promote awareness of noxious weeds and provide tips for preventing the spread of noxious weed species.

Alternative 2 – Proposed Action

Regeneration harvest followed by site preparation and planting would provide early seral conditions and establish a new vigorous growing conifer stand. Retention of nine to eleven legacy and dominant overstory trees along with some hardwoods and CWD would provide for structure in the future stand.

Commercial thinning would remove suppressed and some co-dominant trees. This action would open the currently dense canopy allowing more light for tree and shrub growth. This would increase ground cover growth, and allow for development of vertical and horizontal structure in the stand while accelerating individual tree growth. Removal of cut trees would reduce favorable conditions for Douglas-fir bark beetle infestations.

Growth modeling indicates thinning would increase individual tree growth. If thinned, an increase in the average diameter and quality of tree, and the death of fewer trees would occur before regeneration harvest of the stand. Thinned stands are expected to have an average DBHOB of seven inches greater than un-thinned stands at eighty years of age.

Density management in both the 74 and 80 year old stands through the creation of small gaps (¼ to ½ acre) around dominant overstory and legacy trees would create stand structural diversity. Cutting trees adjacent to legacy trees would be designed to restore available light and growing space to the declining live crown of the legacy trees while maintaining existing snags, minor tree species, and shrubs.

Forest Health

Laminated root rot (*Phellinus weirii)* would be reduced by removing susceptible trees from around current infection centers, halting the spread of disease. Regeneration harvest would effectively eliminate it as long as infection centers were recognized and tree species of lower susceptibility were re-planted. It is possible that infection centers will be latent or not recognized, allowing continued spread, but harvest would not increase the rate of spread. The stand of young, vigorous trees of mixed conifer species resulting from regeneration harvest is likely to remain very healthy and vigorous over the 70-110 year rotation, if density is managed.

The potential for windthrow from winter storms would be higher for the first decade following treatment, primarily in the four acre commercial thinning area (Unit 29B). The risk would be reduced by selecting leave trees with deep, healthy crowns. Risk is greater near recent harvest on adjacent private land, and where aspect (the lee side of ridges from prevailing winds), topography, and shallow soils increase risk. In similar projects, studies show windthrow would be expected to reduce tree stocking by 20 percent or less for the first decade after treatment over the treated area (Busby et. al, 2006).

Stand and Tree Growth

Regeneration of Unit 29A (stand 010/040) in Alternative 2 would meet objectives of providing maximum sustained timber yield. Total stand growth over 50 years is predicted (ORGANON 9.0) to average 157 cubic feet per acre per year, about 81% of the current growth rate. Retaining important wildlife structural components including about 8 green trees per acre, downed wood and snags would result in high quality early seral habitat.

After harvest, Unit 29A (stand 010/040) would remain at .13 relative density index, or 13% of maximum stocking (25% of full stocking, or .55 RDI). About 62 square feet of basal area of live trees (20% of current) would remain. Remaining trees would have no competition and would be free to grow until the planted understory begins to shade their lower limbs in about 30 years.

The stand in Unit 29B (030) would benefit from the thinning treatment by increasing individual tree growth, increasing tree stability, and improving wildlife habitat. It would better meet the objective of increasing volume growth for the GFMA Land Use Allocation by capturing volume that would occur as density mortality in the stand without treatment. The stand would not reach CMAI for 30 years, so commercial thinning is appropriate at this time.

Large legacy trees would be maintained and released from competition on all 111 acres, as green leave trees in the regeneration area (Unit 29A), and by thinning around them in the commercial thinning area (Unit 29B) the density management area (Unit 29C). Treatment would maintain the large limbs and full crowns of these trees and prevent competition mortality.

Seral Stage Distribution

Regeneration meets the objective of providing early seral habitat. Early seral habitat that contains important habitat features of large green trees, hardwood trees, snags, downed wood and abundant shrub, grass and forb layers are uncommon on the landscape. Early seral habitat less than 20 years old before crown closure of young trees allows growth of flowering, fruiting, and forage vegetation species. Early seral habitat on privately-managed forest lands typically contain very little of these habitat components, and intensive vegetation management practices accelerate the development of closed canopy young stands, abbreviating the period that early seral habitat is useable to many species.

Currently, the youngest early seral habitat makes up only 2.5% of the 5,798 forested BLM-managed acres in the Marys River 5th-field watershed. Of that, only 20 acres (0.3%) is aged 0-9 years. Regeneration of 92 acres would increase early seral habitat (age 0-19) from 2.5% to 4%, and it would all be open habitat aged 0-9, increasing that from 0.3% to almost 2% of the watershed. Because there is so little recently created early seral habitat in the watershed, and so little of it has “high quality” characteristics of abundant vegetation, coarse wood, snags, and large green trees this is a relatively important increase.

Wet Area

If the implementation of the project causes the water feature to become dry for extended periods (see water report), the *Fontinalis* moss species could be replaced by upland moss species or vascular vegetation. *Fontinalis* moss is generally restricted to perennial aquatic systems, however it can withstand dry periods as it is often located stranded adjacent receding lakes and ponds in mid to late summer. It is not known how long this moss species can survive in dry habits. *Fontinalis* moss is a common aquatic moss and the loss of this species in this small area would not lead to its listing as a SS species.

ESA listed, bureau SS and S&M botanical and fungal species

This project would not directly affect any ESA listed, bureau SS or S&M vascular plant, lichen, bryophyte or fungi species since there are no known sites within the project area or adjacent to the project.

This project could affect any species that are not practical to survey for and known sites were not located during subsequent surveys. These species mainly include special status hypogeous fungal species. However, the majority of these species have no known sites within the Marys Peak Resource Area or the Northern Oregon Coast Range Mountains.

Non-native plants and listed noxious weeds

In addition to the environmental effects described in Alternative 1, this alternative would create additional noxious weed habitat through road construction, renovation and maintenance activities. Proposed conifer management activities such as commercial thinning, density management and regeneration harvests would also create additional habitat for the establishment of noxious weeds. Exposed mineral soil areas created through the implementation of this project pose the greatest risk for the establishment of noxious weed species. However, project design features have been incorporated into this proposal to minimize the creation of new noxious weed habitat.

Any adverse effects from the establishment of Armenian and European blackberry, bull and Canadian thistles, false brome, shining and herb Robert geraniums, Scot's broom, St. John's wort, tansy ragwort or other new invader noxious weeds within or near the project area are not anticipated. The risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area is low because;

1) mitigation measures have been incorporated into this project to minimize the amount of exposed mineral soil,
2) the size of the project area is small compared to the entire watershed and any disturbance is considered localized,
3) the implementation of the Marys Peak Resource Area noxious weed control utilizing glyphosate EA (EA# DOI-BLM-OR-S050-2010-0005), and the Westside Salem integrated non-native plant management plan EA (EA#OR080-06-09) as amended by the documentation of land use plan conformance and NEPA adequacy (DNA # OR080-08-01). These documents allow for monitoring project area for noxious weed infestations and targeting noxious weeds for removal,
4) the known noxious weeds species which occur in the project area are regionally abundant and occur widespread throughout the Oregon Coast Range Physiographic Province, and control measures generally consist of biological control,

5) the anticipated noxious weed species to become established in the project area often persist for several years after becoming established but soon decline as native vegetation increases within the project areas, and
6) there are no other Oregon listed noxious weed species that are anticipated to become established through the implementation of this project.

Sowing seed on exposed soil areas tends to abate the establishment of noxious weeds. If the contract is not administered correctly and the seed sown is not Oregon certified seed, or the species recommended, the sowing may increase the amount of non-native species in the project area and may lead to a greater infestation of noxious weeds than anticipated.

Alternative 3 – Regeneration Harvest with RTV Buffers

Forest Health

Effects would be similar to those described for regeneration harvest (Unit 29A) but would only occur on 24 acres, or 26% of the acreage in Alternative 2. For the remaining 66 acres, the effects would be similar to the No Action Alternative.

Stand and Tree Growth

Effects would be similar to those described for regeneration harvest (Unit 29A) for 24 acres, or 26% of the acreage in Alternative 2. For the remaining 66 acres, the effects would be similar to the No Action Alternative. Under Alternative 2, 66 acres not treated by regeneration harvest would remain near CMAI, and stand volume growth would slow within a decade.

No commercial thinning or density management would take place, and the effects would be the same as the No Action Alternative. The vigor, structure and longevity of legacy trees would be diminished, compared to Alternative 2. Density mortality would contribute to coarse wood on site, but would not contribute to GFMA objectives for timber production.

Seral Stage Distribution

Regeneration of 24 acres meets the objective of providing early seral habitat, but only on 26% of the acreage in Alternative 2. This would be less than one percent increase in early seral habitat aged 0-39 years in the watershed, but an increase from 0.3% to 0.7% of very early seral habitat aged 0-9 years.

ESA listed, bureau SS and S&M botanical and fungal species

This project would not directly affect any ESA listed, bureau SS or S&M vascular plant, lichen, bryophyte or fungi species since there are no known sites within the project area or adjacent to the project.

This project could affect any species that are not practical to survey for and known sites were not located during subsequent surveys. These species mainly include special status hypogeous fungal species. However, the majority of these species have no known sites within the Marys Peak Resource Area or the Northern Oregon Coast Range Mountains.

Non-native plants and Listed Noxious Weeds

This proposal has fewer impacts than Alternative 2 which would disturb and expose mineral soil, but

more impacts than Alternative 1. As discussed under Alternative 1 and 2, both of those alternative have a risk rating from any anticipated adverse effects from the establishment of noxious weeds as low. This Alternative also has a risk rating of low for the same reasons discussed under Alternative 2. However, with fewer acres of disturbed mineral soil under this Alternative compared to Alternative 2, the number of individual noxious weed species to become established under this Alternative would be reduced.

Alternative 4 – Commercial Thinning and Density Management

Forest Health

Laminated root rot (Phellinus weirii) would be reduced by removing susceptible trees from around current infection centers, halting the spread of disease. Commercial thinning harvest would effectively eliminate it as long as infection centers were recognized and tree species of lower susceptibility were re-planted. In density management treatment, it would not be appropriate to create openings near streams, so infection centers there would not be treated by clearing susceptible trees. Treatments would increase tree growth, vigor and resiliency to pathogens and disturbance.

The potential for windthrow from winter storms would be higher for the first decade following treatment on 130 acres. The risk would be reduced by selecting leave trees with deep, healthy crowns. Risk is greater near harvest on adjacent private land has occurred, and where aspect (the lee side of ridges from prevailing winds), topography, and shallow soils increase risk. Wind throw is not expected to reduce tree stocking by more than 20 percent for the first decade after treatment over the treated area (Busby et. al, 2006).

Alternative 3 effects to forest health are greater better than Alternative 2, because conditions would be improved on 19 acres more than Alternative 2.

Stand and Tree Growth

Total stand growth over 50 years is predicted (ORGANON 9.0) to average 151 cubic feet per acre per year in Unit 29A (proportional commercial thinning in Alternative 4). This is 4% less average annual volume growth than Alternative 2, somewhat less effective at meeting maximum sustained timber yield.

After thinning, the stand would remain at .40 relative density index, or 72% of full stocking (.55 RDI). The leave trees would total about 151 square foot basal area, about 50% of current basal area. The proportional thinning would leave trees of all size classes that have viable crowns, resulting in a relatively deep canopy and moderate inter-tree competition, allowing limited individual tree growth.

The stand in Unit 29B (030) would be treated the same as in Alternative 2 and would have the same effects.

In Alternative 4, Unit 29C would benefit from the thinning treatment by increasing individual tree growth, increasing tree stability, and improving wildlife habitat. It would meet the objective of increasing tree growth for the Riparian Reserve Land Use Allocation. Improvements to stand and tree structure would be more comprehensive in Alternative 4, because an additional 19 acres would be treated due to a narrower stream buffer, and density management would release all residual trees, not just selected legacy trees. Greater improvement to tree and stand structure would occur in Unit 29C in Alternative 4 than the other action alternatives. However, density mortality would be reduced, resulting in recruitment of fewer small snags and coarse wood.

In Alternative 4, large legacy trees would be maintained and released from competition on all 130 acres, by thinning around them in the commercial thinning area (Unit 29A and Unit 29B) and the density management area (Unit 29C). Treatment would maintain the large limbs and full crowns of these trees and prevent competition mortality.

Seral Stage Distribution

Alternative 4 would not meet the objectives of creating early seral habitat or a well-distributed seral stage pattern. All 130 acres would soon move into late-seral successional stage, and no early seral habitat would be created. Compared to Alternative 2, by 2021 two percent of the watershed acreage would move into late seral stage (currently 25% to total 51% in 2021), rather than early seral habitat (dropping from 21% to 13%).

ESA listed, bureau SS and S&M botanical and fungal species

This project would not directly affect any ESA listed, bureau SS or S&M vascular plant, lichen, bryophyte or fungi species since there are no known sites within the project area or adjacent to the project.

This project could affect any species that are not practical to survey for and known sites were not located during subsequent surveys. These species mainly include special status hypogeous fungal species. However, the majority of these species have no known sites within the Marys Peak Resource Area or the Northern Oregon Coast Range Mountains.

Non-native plants and listed noxious weeds

Like the other action alternatives, this proposal has a low risk rating for any adverse effects from the establishment of noxious weeds for the same reasons as discussed under Alternative 2. However, this proposal in general would have fewer impacts from the establishment of noxious weed species when compared to Alternatives 2 and 3 due to the absence of regeneration harvest proposals, but would have an increase in impacts when compared to Alternative 1.

3.7 Wildlife

(IDT report incorporated by reference: Hopkins, 2011. Biological Evaluation.)

Affected Environment

Landscape and Stand Level Habitat Conditions

A Watershed Analysis covering BLM lands in this portion of the Marys River 5th Field Watershed was completed in 1997 (USDI-BLM 1997). BLM lands (6,610 acres) make up about 3% of the Marys River watershed (193,810 acres). About half of this watershed is composed of lowland and valley agriculture habitat types. Over the past 150 years since settlement, extensive timber harvest has resulted in the loss and fragmentation late-successional forest conditions on the upland portion of this watershed. Private forest lands in this part of the Oregon Coast Range are dominated by early-seral and mid-seral forest stands that are currently being managed on short harvest rotations of 40-60 years (Cohen et al., 2002, Kennedy and Spies 2004, Ohmann et al., 2007). Almost all remaining late-seral and old-growth forest stands (LSOG) in this watershed are on BLM and Forest Service lands. About

37% of the federal lands (Forest Service and BLM ownership) in the watershed are composed of late-seral forest stands.

The proposed regeneration harvest, commercial thinning, and density management areas would occur on BLM-managed lands within mid-seral forest stands aged 70 to 80 years old. Numerous open-grown late-seral trees and several old-growth trees are scattered across the combined harvest area (about 5.0 trees per acre that are >36 inch DBHOB, and 0.4 TPA >45 inch DBHOB). The majority of the regeneration harvest area is about 80 years old, which along with the scattered old-growth and larger overstory trees are beginning to acquire the structural characteristics of a late-seral forest stand.

The Salem District RMP (p. 20) calls for creation of early successional habitat through regeneration harvests in General Forest Management Areas (GFMA). Early seral habitats can support high diversity of wildlife species (Swanson et al., 2011, Hagar 2007b, Betts et al., 2010), but they are transitional and temporary (usually <10 years). Approximately 145 acres of regeneration harvest has occurred on BLM-managed lands within the watershed since 1995.

Special Habitats and Habitat Components

There is a very small wet area (less than $1/10^{th}$ acre) in the eastern part of the regeneration harvest area but no substantial special habitats exist within the harvest areas. Special habitats (e.g. wetlands and seeps) do exist in the adjacent SPZs and outside of the proposed harvest areas.

The abundance of large decaying wood is a defining feature of forest ecosystems, and is a key habitat component that can enhance ecosystem diversity and productivity (Mellen et al. 2006, Rose et al. 2001). Stand inventory data collected in 1996 and 2004 found 4,210 linear feet per acre of downed conifer logs in the proposed regeneration harvest area (including the southwestern portion of the density management area), and 586 linear feet per acre of downed conifer logs in the eastern portion of the proposed density management area. Most of this dead wood is composed of small diameter logs (less than 20 inch DBHOB) that are in advanced stages of decay. Stand sampling did not encounter large pieces of hard down logs that meet the RMP's down log retention requirements (decay class 1 and 2, >20 inches on large end and >20 feet in length). Storms during the winter of 2007 and 2009 put down an additional pulse of hard logs with many of these in the larger size class (greater than 20 inch). But it is unknown if this additional material exceeds the RMP requirement. Snags greater than 10 inches DBHOB and 10 feet high averaged 32 per acre on the regeneration area, and 28 per acre in the density management area. All sizes and decay classes of snags are represented; however, the majority of snags are in the smaller size classes (10 to 19 inches DBHOB).

Threatened and Endangered Wildlife Species

The marbled murrelet and northern spotted owl are two federally threatened wildlife species that may occur in the vicinity of the project. The project area is located 32 miles inland from the ocean, in the foothills of the Willamette Valley. Very few occupied murrelet sites are found beyond 30 miles inland in this part of the Northern Oregon Coast Range (Benton County and northward). The nearest occupied murrelet site is located on BLM lands about 5.9 miles west of the project area. Most of the older forest patches in the vicinity of project area (within two miles) have been surveyed for murrelets over the past 15 years (94 surveys visits), without having any murrelet detections. The proposed harvest units are not considered suitable habitat because the structure of the dominant stand (80 years old) lack large limbs and platforms for nesting. But some of the scattered old-growth trees do possess potential nesting structure (large mossy branches with adjacent canopy cover). A small cluster of old-growth trees (<4 acres) just outside of the harvest unit does meet the definition of a suitable habitat patch. During 2004 and 2005 surveys for marbled murrelets were conducted within the regeneration harvest

unit and adjacent old-growth patch. Murrelets were not detected on any surveys. Surveys in 2011 also found no murrelet detections. These survey results indicate the probable absence of murrelets from this project area. This project area is not within Critical Habitat that has been designated for this species (USDI-FWS 1996 and USDI-FWS 2011b).

This proposed action does not affect any Critical Habitat that has been designated for the spotted owl (USDI-FWS 2008). There is one active spotted owl site, known as Oliver Valley (3036C), in the project vicinity. The owls at this site have been color-banded and monitored yearly since 1991. In 1996, the monitoring of this site was incorporated into the Coast Range Demographic Study Area (McCafferty, 2011). Over the years, the resident owl pair has moved around, establishing four separate activity centers that have been located in Sections 31 and 32 of Township 13S, Range 6W, and Section 05 of Township 14S, Range 6W. While the initial project planning for Rickard Creek timber sale was in progress (2004 to 2008), these resident owls were utilizing an activity center in Section 5 (about 1.7 miles south of the timber sale units). Late in the 2008 breeding season, these owls were relocated in Section 31 (about 1.3 miles southwest of the project area). From 2008 thru 2011, these owls have remained in Section 31. They nested successfully in 2008 (two juveniles found in July, nest tree was not identified); were confirmed non-nesting in 2009 and 2011; and had a failed nesting attempt in 2010. During the project planning phase, incidental surveys for spotted owls detected a nesting pair of barred owls in the proposed harvest unit in 2004. The barred owls have been detected in the same area every year through 2011. The recent expansion of barred owls into the range of the spotted owl has been recognized as serious threat to the recovery of spotted owl populations (Courtney et al. 2004, USDI-FWS 2011a). No spotted owls were ever detected during these incidental surveys of the proposed units. In the past 21 years of monitoring and surveying for spotted owls in this vicinity, the closest spotted owl detection to the Rickard Creek units was a single observation of a male spotted owl located at night in 2003 about 0.6 miles southwest of the regeneration harvest unit.

To assess the current condition of habitat available for the Oliver Valley owl pair, forested stands on all ownerships were evaluated within 1.5 mile radius (median provincial home range) of the owl site center (USDI and USDA 2008). In the Oregon Coast Range, owl sites that have less than 40% suitable habitat within 1.5 mile radius are less likely to support spotted owl occupancy, survival and reproduction in the long-term (USDI and USDA 2008). The overall condition within the home range (4,523 acres) of this pair is currently at 43.1% suitable habitat, which includes 8.1% suitable habitat contributed by private lands. Most of the suitable habitat conditions on BLM and private lands within this home range are stands that are barely 80 years old, with some scattered older cohort similar to the proposed harvest area. The highest quality suitable habitat exists in small patches of old-growth forest on BLM managed lands, mostly within the core area of the site (0.5 mile radius).

Other Special Status Wildlife Species

A great variety of wildlife species may utilize mid-seral and late-seral habitats that are part of the proposed harvest area (O'Neil et al. 2001). All current Special Status Species (SSS) including Survey and Manage Species (SMS) were reviewed to determine potential impacts that might be caused by the proposed action (Appendix A of Wildlife Report). Almost all of these species are unlikely to suffer any appreciable effect that would contribute to their potential listing for one or more of the following reasons:

- They are not known to occur or are unlikely to occur within the watershed, project vicinity, or affected habitat types;
- They are wide ranging species that utilize a variety of habitat conditions that would not be detectably diminished by the scale of the proposed action;
- The proposed design features would leave untreated areas, maintain no cut buffers, and retain

existing down logs and snags to minimize any potential short-term and localized impacts.

The red tree vole is the only Bureau Sensitive Species (BSS) and Survey and Manage Species (USDA-FS and USDI-BLM 2001, and 2011 S&M Settlement Agreement) that may be affected by the proposed action. The red tree vole is a small arboreal rodent that feeds primarily on Douglas-fir needles and has been found to be closely associated with late-seral and old-growth forests (LSOG). This species appears to have limited dispersal capabilities and there is concern for isolation of populations due to fragmentation of LSOG habitat. The life history and current status of red tree voles has been well described in the Final Supplement to the 2004 FSEIS To Remove or Modify the Survey and Manage Mitigation Measure (USDA-FS and USDI-BLM 2007). In response to a 2008 listing petition, the status of a Distinct Populations Segment (DPS) of the red tree vole in the northern Oregon Coast Range has recently been evaluated in the 12-month finding published by the U.S. Fish and Wildlife Service (USDI-FWS 2011b). The decision to list this DPS as threatened or endangered was determined to be warranted but precluded by higher priority listing actions. This DPS of the red tree vole is now a Candidate Species for listing. BLM policy requires that Candidate Species are to be treated as Bureau Sensitive Species. The Marys River watershed (including the project area) lies within the southern portion of the range of the DPS (USDI-FWS 2011b).

Populations of red tree voles south or Highway 20 (including this project area) are believed to be more abundant and well distributed (USDA-FS and USDI-BLM 2007, USDI-FWS 2011b) than areas farther north in the Oregon Coast Range. Data compiled from the GeoBOB dataset (BLM corporate dataset, accessed 7/22/2011) and other incidental vole detections (unpublished Salem District data) show numerous vole locations that are well distributed in both the Marys River and adjoining Upper Alsea River watersheds. Data from spotted owl pellet analysis (Forsman et al., 2004) found that red tree voles were detected in relatively high proportions at the majority of spotted owl sites within the central portion of the Oregon Coast Range (including this watershed). In fact, all 17 spotted owl sites within 10 miles of the Rickard Creek harvest unit had moderate to high incidence or red tree vole remains in the sampled pellets (Forsman et al., 2004). The proposed harvest units were surveyed for red tree voles in 2010 in accordance with BLM policy guidance (BLM-IM-OR-2003-003). Survey efforts and incidental detections resulted in finding 28 trees that had evidence of red tree vole use. Applying current management recommendations to protect red tree vole sites (BLM-IM-OR-2000-086) would create one large contiguous Habitat Area (120 acres) that would overlay most of the proposed harvest area in Alternative 2 and 4.

Birds of Conservation Concern

All of western Oregon, including this project area, lies within the Northern Pacific Forests Bird Conservation Region. Within this region there are several migratory land birds which are considered Bird of Conservation Concern (BCC) because they appear to be exhibiting downward population trends for several years (Altman 2002; Rich et al. 2004, USDI-FWS 2008). Thirty-four of the 89 landbird species that regularly occur in the Marys Peak Resource Area (MPRA) are considered BCC species (Table 8). Sixteen of the BCC species have a high likelihood of occurring within the Rickard Creek project area. Incidental observations during marbled murrelet surveys and related field work have confirmed that two of these 16 BCC species have nested within the project units; 8 have been confirmed present during the breeding season and are likely nesting; and 6 have a high likelihood of breeding but have not been confirmed present. See Appendix B of Wildlife Report for all currently listed migratory birds and Birds of Conservation Concern that occur in the Marys Peak Resource Area.

Table 8. **Bird Species Likelihood of Occurrence within the Rickard Creek Project Area**

Bird Species Grouping	Within MPRA	Likelihood of occurrence in Project Area			
		High	Moderate	Low	Not Present
Bird Species of Conservation Concern	34	16	8	9	1
Other Regularly Occurring Landbirds	55	24	11	14	6
Total bird species	89	40	19	23	7

Environmental Effects

Alternative 1 – No Action

This alternative would not conduct any harvest or related actions within the forest stands of the proposed harvest units. There would be no loss of LSOG forest conditions within BLM lands in this watershed. The combined federal ownership within Marys River 5th Field Watershed would remain at about 37%; which is the well above the 15% threshold required for Matrix land-use allocation from the NWFP.

Stand development processes would continue unaltered within the forest stands of the project area. A steady incremental increase in snags and down logs would be expected in the smaller size classes due to continuing stem-exclusion processes. Windthrow events, insect damage, and disease processes would contribute irregular pulses of snags and down logs in a wider range of size classes in the short-term (next 10 years). Over the long-term (next 50 years), the affected forest stands would be expected to slowly increase their structural complexity and progress from late-seral forest conditions toward old-growth forest conditions. Some of the old-growth legacy trees that have broken tops and declining crowns (10-20% of legacies) would be at risk of loss due to crown encroachment from the more vigorously growing dense canopy of the 80 year old cohort. Due to the current rate of harvest on adjacent private industrial forest lands, the landscape in the immediate vicinity is expected to remain highly fragmented and dominated by early seral and mid-seral forest conditions. The no action alternative would not create any early seral habitat conditions on BLM-managed lands.

The No Action alternative would allow the forest stands in this project area to continue development of more structural diversity, which over time would enhance the suitability of habitat conditions for marbled murrelets, spotted owls, and other species associated with older forests. There are no known murrelet sites that would be affected by this alternative. The proposed harvest units do not currently have any know use by spotted owls. Barred owls currently reside within the project units, and their presence may have a deterrent effect on spotted owl use of the proposed harvest area (Forsman et al. 2011, Gutiérrez et al. 2007, Olson et al. 2005, Wiens 2011). Dispersal habitat conditions for spotted owls would remain unchanged on BLM lands in the vicinity of this action. Retention of late-seral habitat and increasing quality and quantity of CWD over the long term could benefit numerous wildlife species including red tree voles. Some nesting structure for red tree voles would be lost when the declining, broken top legacy trees die due to competition for light and soil moisture with the dominant 80-year-old cohort. But, overall, the local red tree vole population would likely persist within the proposed harvest area and would retain connectivity with voles that occupy similar or better habitat on BLM lands to the northeast and southwest of this project area.

Alternative 2 – Proposed Action

Landscape and Stand Level Habitat Conditions

The proposed action and associated activities would change the existing forest structure of the planned

harvest unit. Since the proposed regeneration harvest unit is composed of a late seral stand (80 years old) that has recently begun to acquire late seral forest characteristics, the removal of this habitat in considered a loss to late seral habitat conditions within this watershed. The primary direct and indirect effects anticipated to occur to wildlife habitat characteristics from the proposed action would include:

- The reduction of the late-seral forest component on all federal lands within the 5th Field Watershed from 37.0 % to 35.5% (well above the 15% threshold required by the NWFP).
- The conversion of 92 acres of a closed canopy late-seral forest to an open early-seral habitat patch (shrubs, slash, saplings) with numerous (9-11 TPA) large live overstory trees that would be retained (both scattered and clumped within the regeneration harvest unit).
- The reduction of mid seral forest canopy conditions on 4 acres of the commercial thinning treatment area (while retaining >40% closed canopy conditions)
- The retention of late-seral forest habitat conditions on 15 acres of density management unit, to include restoration of available canopy space around several legacy trees (11 small patch cuts) which would maintain >60% canopy closure across unit.
- Disturbance and loss of some existing coarse woody material (snags and down logs) resulting from felling, yarding, road construction, and fuels reduction.
- Recruitment of new coarse woody debris of larger size and higher quality from incidental green tree loss during harvest (at least 240 linear feet per acre remaining) and post-harvest loss of green trees due to harvest damage, disease, and windthrow.
- A change in the context of CWD habitat conditions: from moderate amounts within a closed canopy late-seral forest, to moderate amounts within an open early-seral habitat patch.

The regeneration harvest, commercial thinning, and density management harvest would collectively alter 111 acres of forested stands in one aggregate block. Many of the wildlife species that may currently use these forest stands would be diminished or displaced to adjacent mid-seral and late-seral forest stands. Wildlife species that prefer early seral habitats with a diversity of hardwood shrubs, scattered and clumped overstory trees, and moderate levels of snags and down logs would respond favorably to the short-term availability of this habitat, until a closed conifer stand developed (<20 years). The retention of green trees within the regeneration harvest unit (9-11 TPA or about 900 trees clumped and scattered across 92 acres), would meet or exceed RMP requirements and add considerable structural complexity to the open early-seral habitat created by the harvest.

Structural complexity would also be enhanced and retained within the density management unit where prominent overstory trees and declining legacy trees would be released; thereby rejuvenating their live crown structure and reinitiating understory shrub layer diversity which enhances the quality of habitat for numerous wildlife species.

Special Habitats and Habitat Components

No special habitats would be affected by the proposed action. The CWD component would remain at moderate to high levels for this landscape since existing snags and logs are reserved from harvest and since high quality snags and down logs would be recruited from reserved green trees due to post-harvest mortality (Busby et al. 2006). Project design features would ensure retention or creation of at least 240 linear feet per acre of larger sized hard down logs that meet RMP requirements.

Threatened and Endangered Species

The proposed action in this Alternative would have “no effect” to marbled murrelets, since the harvest unit in not considered suitable habitat, no potential structure would be lost, and survey efforts in the proposed harvest area and at nearby suitable habitat patches have indicated the probable absence of

murrelets (no murrelet detections on 94 surveys visits).

Total habitat modification resulting from the proposed harvest in this Alternative would have the following direct effects in the harvest area:

- Loss of 92 acres of suitable spotted owl habitat from regeneration harvest;
- Maintain 4 acres of dispersal habitat from commercial thinning; and,
- maintain and enhance 15 acres of suitable habitat within the density management unit with small patch cuts designed to improve the vitality and longevity of declining old legacy trees while maintaining >60 canopy closure.

Within the home range of the Oliver Valley owl site, direct effects of the proposed harvest action would include:

- Loss of 65 acres of suitable spotted owl habitat from regeneration harvest, which would reduce the total home range suitable habitat from 43.1% to 41.7%;
- Maintain 2 acres of dispersal habitat, which would have a negligible effect on the dispersal habitat conditions within the home range; and,
- Maintain and enhance 14 acres of suitable habitat within the density management unit; which would have no direct effect on habitat suitability, but should have a beneficial effect on habitat conditions over the long-term (indirect effect).

The loss of suitable habitat from the proposed action would still provide more than 40% suitable habitat in the affected home range of the Oliver Valley owl site. Spotted owl sites with >40% suitable habitat within their home range and >50% suitable habitat in their core area have the highest likelihood to contribute to the long-term demographic performance of the owl populations (USDI-FWS 2011a). The loss of 1.4% of the suitable habitat of the affected owl site would occur at the outer perimeter of the home range. Because spotted owl home ranges are not likely to be perfectly circular (Glenn, et al. 2004) as modeled for this analysis, it is possible that the actual home range of the Oliver Valley owl pair may not include any portion of the proposed harvest area since:

- there has been no known historic use documented since surveys began in this vicinity;
- there were no detections of spotted owls during 6 project planning years; and,
- the presence of breeding barred owls may have a deterrent effect on spotted owl use of the harvest area (Forsman, et al. 2011, Gutiérrez, et al. 2007, Olson, et al. 2005, Wiens 2011).

The proposed action would have no effect on habitat conditions within the nest patch (remaining at 96% suitable) or core area (remaining at 64% suitable) of the Oliver Valley owl site. The potential for disturbance to owls from the connected actions (road renovation and post-harvest broadcast burning) is unlikely since these actions would most likely occur outside of the critical breeding season and are located a considerable distance away from the current site center (1.3 miles).

The proposed harvest may displace the resident barred owls in the action area. If this action resulted in the resident barred owls shifting their home range closer to the Oliver Valley spotted owl site, there could be an indirect effect of increased competitive interaction that may negatively affect the spotted owl pair. A barred owl pair has been detected (2004) closer to the Oliver Valley site, so it is unknown if displacement of barred owls in the action area would have any measurable effect on the Oliver Valley spotted owl pair, or perhaps it would increase the competitive interaction among adjacent barred owl pairs.

The direct and indirect effects of this alternative may affect, and would likely adversely affect spotted owls due to the loss of 92 acres of suitable habitat within the northern Oregon Coast Range where suitable habitat conditions are limiting. Direct and indirect effects of the proposed action are unlikely

to result in "harm" of the resident spotted owls currently occupying the Oliver Valley site, since the amount of suitable habitat within the home range would remain above 40% (USDI-FWS 2011a).

To address concerns for potential effects to spotted owls, this alternative has been analyzed in a Biological Assessment (BA) to enable consultation with the U.S. Fish and Wildlife Service, as required under Section 7 of the Endangered Species Act. The proposed action has incorporated all appropriate design standards from the BA. Upon completion of consultation, any additional design standards set forth in the pending Biological Opinion would be incorporated into the final project design prior to issuance of a decision record for this EA.

Other Special Status Wildlife Species

The proposed harvest in this Alternative would disrupt and change the current pattern of wildlife use in the project area. The change in habitat conditions over most of the project area would benefit those wildlife species that prefer more open and shrubby habitats in the short-term, and would hamper the retention and recovery of older-forest associated species in this immediate vicinity. As reviewed in Appendix A of Wildlife Report, very few SS wildlife species are likely to occur within the project area. Populations of the few SS species that may occur within the project area (amphibians and mollusks) are unlikely to be affected because the proposed project design (e.g. minimal ground disturbance inside Riparian Reserves, no-cut stream protection zones, retention of existing snags and CWD, and retention of >60% canopy closure in the density management unit) would protect microclimates and retain functional habitat components for these species.

Individual red tree vole nests would be lost as a result of the proposed harvest action. The Habitat Area (120 acres) intended to protect red tree vole nest trees found during surveys would incur the following impacts:

- 62 acres of late-seral forest in the Habitat Area would be lost due to regeneration harvest;
- 4 acres of mid-seral forest would be degraded in the commercial thinning;
- 15 acres of late-seral forest would retain suitable structure and canopy cover in the density management unit, although some nest structure may be lost in 11 small patch cuts; and,
- 39 acres of late-seral forest in the Habitat Area would be reserved from harvest.

The harvest within a red tree vole Habitat Area would require designation as non-high priority site as outlined in 2001 Survey and Manage Record of Decision (BLM-IM-OR-2006-047). An analysis and determination of non-high priority site status for red tree voles within the Rickard Creek project area was completed and approval was received by the U.S. Fish and Wildlife Service on January 11, 2012 (see Appendix C of Wildlife Report). That analysis concludes the proposed would meet all four criteria to ensure continued persistence of this species at the watershed scale because:

- Numerous vole sites and incidental detections, along with a high incidence of vole remains found at spotted owl nest sites indicate that vole populations appear to be well distributed within the Marys River and adjoining Upper Alsea watershed;
- A high percentage of federal lands (Forest Service and BLM) in the Marys River (81%) and Upper Alsea (89%) watersheds are in reserve land-use allocations (LSR and RR);
- Most of the LSOG forests on federal lands which best support persistent vole populations, lie within the reserved allocations in the Marys River (98%) and Upper Alsea (97%) watersheds;
- Locally voles are likely to persist in the untreated LSOG stands on BLM lands adjacent to the harvest units where 39 acres of the Habitat Area would be left untreated and 350 acres of unsurveyed BLM stands would continue to provide similar quality habitat as the proposed harvest units (likely to be occupied).

Birds of Conservation Concern

In the central Oregon Coast Range the majority of birds complete their breeding cycle within the April 15 to July 15 time period, while some birds (eagles, owls, hawks, woodpeckers) begin breeding as early as February or March and others (flycatchers, finches) do not finish breeding until August. Due to the ubiquitous nature of breeding birds within their suitable habitat, it is reasonable to expect that soil disturbance (affecting ground-nesting birds) and vegetation removal would have a direct negative impact on bird nesting success if it occurs during the breeding season. Felling and yarding trees during the breeding season in the proposed units would likely destroy some nests and disrupt normal breeding behavior of any BCC species that nest or forage in these units.

Following harvest operations in the regeneration harvest unit (92 acres) habitat conditions would be unfavorable to some bird species, while benefitting numerous species that prefer open shrubby early seral habitats that have a prominent snag component (Betts et al. 2010, Swanson et al. 2011). The resulting habitat conditions within the thinning (4 acres) and density management (15 acres) units would still provide similar habitat conditions for species that might currently nest in those stands.

The proposed action represents a very small proportion of the LSOG forests at the watershed scale where the cumulative loss on federal lands has reduced late-seral forests from 37% to 35.5% over the past 10 years (remaining well above the 15% threshold required by the Northwest Forest Plan).

Of the BCC birds that utilize LSOG habitats, most species (besides the northern spotted owl and marbled murrelet, which have been discussed elsewhere) are also found in other seral stages or utilize structural components (snags, hardwoods, etc.) that are found in several seral stages. All of the BCC species are widely distributed throughout the conifer-dominated forests of this Bird Conservation Region (Altman 2002). Thus, the potential negative impacts to BCC bird populations resulting from the proposed action would likely be very minor and localized, and thus, would not be discernible at the regional scale.

Alternative 3 – Regeneration Harvest with RTV Buffers

Landscape and Stand Level Habitat Conditions

Alternative 3 would remove only 24 acres of late seral forest by means of regeneration harvest, creating a rather small amount of early-seral habitat. The effects to habitat conditions at the landscape and stand level would be similar to Alternative 2 (proposed action), but with considerably less habitat loss (<30% of proposed action amount). The amount of late-seral forests on federal lands within the Marys River watershed would be reduced by about 0.5% to about 36.5%. At the stand scale, the loss of 24 acres of late-seral forest would occur in two small patches of about 15 and 9 acres respectively. These two patches had the lowest density of older legacy trees compared to other portions of the adjacent stand.

Special Habitats and Habitat Components

No special habitats would be affected by this alternative. Like Alternative 2, the CWD component would remain at moderate to high levels because existing snags and logs would be reserved from harvest, and high quality snags and down logs would be recruited from reserved green trees due to post-harvest mortality (Busby et al. 2006). Project design features would ensure retention or creation of at least 240 linear feet per acre of larger sized hard down logs that meet RMP requirements.

Threatened and Endangered Species

Alternative 3 would have “no effect” on marbled murrelets, since the harvest unit in not considered suitable habitat and no murrelets were detected in this vicinity. The 24 acres of regeneration harvest would remove 16 acres of suitable habitat from the home range of the Oliver Valley spotted owl site. This would reduce the amount of suitable habitat within the home range by a negligible amount (from 43.1% to 42.7%). The loss of spotted owl suitable habitat within the northern Oregon Coast Range where such habitat is limited is likely to adversely affect spotted owls. But because such habitat loss is minimal, would occur along the outside perimeter of the owl pair’s modeled home range (1.5 miles), and would occur in a project area that has no history of spotted owl use during the past 21 years, this alternative is unlikely to result in harm to the resident spotted owls. Since less suitable habitat would be removed by this alternative (compared to Alternative 2), the anticipated effects would not exceed those analyzed in the Biological Assessment which is currently pending consultation.

Other Special Status Wildlife Species

The only Special Status Species or Survey and Manage Species that would be affected by Alternative 3 is the red tree vole. Two small patches of suitable vole habitat would be lost (15 and 9 acres). But these two patches have a lower density of older legacies than the adjacent forest. All active and inactive red tree vole nests that were found during surveys would be protected in a Habitat Area which would be reserved from harvest. Since no vole nests were found within the two small harvest units (24 acres), existing vole nests are protected in the Habitat Area (120 acres), and adjacent unsurveyed habitat would be left untreated (350 acres), this alternative would not affect the persistence of this species at this site or at the watershed scale.

Birds of Conservation Concern

Similar to Alternative 2, the loss of late seral forest resulting from Alternative 3 would be relatively small and localized, and there would be negligible impacts to BCC bird populations at the regional scale.

Alternative 4 – Commercial Thinning and Density Management

Landscape and Stand Level Habitat Conditions

Alternative 4 would modify 130 acres by means of commercial thinning (96 acres) and density management (34 acres). No regeneration harvest would occur, thus there would be no loss of late seral forest habitat. The amount of late seral forests on federal lands within the Marys River watershed would remain unchanged at 37%. The thinning harvest would degrade the quality of late seral forest structure because canopy closure would be reduced (to about 40%), some existing snags would be toppled, future snag recruitment would be curtailed, and understory conifers, hardwoods, and shrubs would be damaged. This degraded condition would recover slowly (<20 years) for most structural attributes except snag recruitment. No early seral habitat would be created.

Special Habitats and Habitat Components

No special habitats would be affected by Alternative 4. This alternative would also retain moderate to high levels of CWD because existing snags and logs would be reserved from harvest. Thinning and density management would diminish future snag recruitment for the long term (>20 years). But some high quality snags and down logs would be recruited from reserved green trees due to post-harvest mortality (Busby et al. 2006). Project design features would ensure retention or creation of at least 240 linear feet/acre of larger sized hard down logs that meet RMP requirements.

Threatened and Endangered Species

Alternative 4 would have "no effect" on marbled murrelets, since the harvest unit is not considered suitable habitat and no murrelets were detected in this vicinity. The commercial thinning and density management would temporarily downgrade 75 acres of suitable habitat within the home range of the Oliver Valley spotted owl site. Downgraded suitable habitat would provide lower quality habitat (marginal canopy closure, reduced prey populations) than if these stands were left untreated. But the treated stands would still provide dispersal habitat for owls and would likely recover suitable habitat conditions within 20 years since nearly all legacy trees would be retained and canopy closure would increase above 60%. This alternative would temporarily reduce the amount of suitable habitat within the Oliver Valley owl pair's home range by a small amount (1.7%) to 41.4%. The modification of spotted owl suitable habitat within the northern Oregon Coast Range where such habitat is limited is likely to adversely affect spotted owls. But because this downgraded habitat condition would be temporary (<20 years), minimal in size, would occur along the outside perimeter of the owl pair's modeled home range (1.5 miles), and would occur in a project area that has no history of spotted owl use during the past 21 years, this alternative is unlikely to result in harm to the resident spotted owls. Since no suitable habitat would be removed by this alternative (compared to Alternative 2), the anticipated effects would not exceed those analyzed in the Biological Assessment which is currently pending consultation.

Other Special Status Wildlife Species

The only Special Status Species or Survey and Manage Species that would be affected by Alternative 4 is the red tree vole. Commercial thinning and density management would degrade the 130 acres of suitable vole habitat. 98 acres of the project would fall within the Habitat Area which is intended for protection of active and inactive vole nests found during survey efforts. While this alternative would likely reduce the current number of active vole nest in the treatment area, it is unlikely to diminish the persistence of this species at the watershed scale because:

- Numerous vole sites and incidental detections, along with a high incidence of vole remains found at spotted owl nest sites indicate that vole populations appear to be well distributed within the Marys River and adjoining Upper Alsea watershed;
- A high percentage of federal lands (Forest Service and BLM) are within reserve land-use allocations (LSR and RR) in the Marys River (81%) and Upper Alsea (89%) watersheds;
- Most of the LSOG forests on federal lands which best support persistent vole populations, lie within reserved allocations in the Marys River (98%) and Upper Alsea (96%) watersheds;
- Locally, voles are likely to persist in the untreated LSOG stands on BLM lands adjacent to the harvest units where 32 acres of the Habitat Area would be left untreated, the thinned areas would recover suitability in <20 years, and 350 acres of unsurveyed BLM stands would continue to provide similar quality habitat as the proposed harvest units.

Birds of Conservation Concern

The thinning and density management harvest in Alternative 4 would degrade, but not remove, 130 acres of late seral forest where BCC species may nest. Because the treated stand would be temporarily degraded (< 20 years), and the treatment area is relatively small and localized, there would be negligible impacts to BCC bird populations at the regional scale.

3.8 Recreation, Rural Interface, Visual Resource Management

(IDT report incorporated by reference: Drake, 2011. Recreation, Rural Interface, VRM Report.)

Affected Environment

Recreation
The project area is a forested landscape accessed by gravel and paved roads. Recreational activities common in the area include hunting, target shooting, collection of special forest products and OHV use, primarily from a local motorcycle group call the Flat Mountain Riders Association, who also maintains trails within the area.

Rural Interface
The Salem District RMP (p. 39) considers the project area within a rural interface zone. Logging activities are common within the local area.

Visual Resource Management (VRM)
The project area is rated as VRM 4. The level a change to the characteristic landscape can be high. Management activities which require major modification of the existing character of the landscape are acceptable. Activities may dominate the view and may be the focus of viewer attention.

Environmental Effects

Alternative 1 – No Action
Current recreational activities would continue to take place within the project area. The project area would not be considered a destination point for recreational users, potential for increased or decreased recreational use is dependent upon trends within the local commuting area.

Alternative 2 – Proposed Action

Recreation
Recreational activities would be limited during periods of operation and has potential for distributing use to other areas. Motorized or OHV use within the project area would be further limited for one year following harvest operations or red needle stage. Following harvest activities, current recreational activities would continue with potential of increased hunting and OHV use due to the opening of corridors and building of skid roads for harvest activities.

VRM
The proposed project would comply with VRM Class 4 management outlines. No portion of the project is observable from major roads or observation points.

Alternative 3 – Regeneration Harvest with RTV Buffers

Recreation
Recreational activities would be limited during periods of operation and has potential for distributing use to other areas. Motorized or OHV use within the project area would be further limited for one year following harvest operations or red needle stage. Following harvest activities, current recreational activities would continue with potential of increased hunting and OHV use due to the opening of corridors and building of skid roads for harvest activities. Route P 1 is currently receiving OHV use. The opportunity to enhance this route and repair existing trail rutting would not be considered under this Alternative.

VRM
The proposed project would comply with VRM Class 4 management outlines. No portion of the project is observable from major roads or observation points.

Alternative 4 – Commercial Thinning and Density Management

Recreational activities would be limited during periods of operation and has potential for distributing use to other areas. Motorized or OHV use within the project area would be further limited for one year following harvest operations or red needle stage. Following harvest activities, current recreational activities would likely continue along the established route. A potential for increased hunting is likely to follow harvest and reforestation activities.

VRM
The proposed project would comply with VRM Class 4 management outlines. No portion of the project is observable from major roads or observation points.

4.0 CUMULATIVE EFFECTS

4.1 Air Quality, Fire Risk, and Fuels Management

(IDT report incorporated by reference: Mortensen, 2011. Rickard Creek Air Quality, Fire Risk, and Fuels Management Report.)

Alternative 1 – No Action

Under the no action alternative there would be no commercial harvest of timber, no log hauling, and no prescribed burning, and therefore no cumulative effect to air quality or fire risk. The timber stands would continue on their trajectory toward a natural return of fire as the main disturbance mechanism with the fuel load slowly increasing over time and with it the potential for producing large quantities of smoke associated with a wildfire.

Alternative 2 – Proposed Action

Under the proposed action alternative, air quality issues would be local and of short duration during timber harvest, prescribed burning, and biomass removal. With the current trend in the public's activities on federal lands the potential for wildfire starts would be expected to remain the same or increase slightly if recreational activities increase. The density management and commercial thinning units within the analysis area would likely see a decrease in use as a result of the slash created during harvest. The regeneration harvest unit would likely see an increase in activity because it is a short walk from the gate and easily accessible to the public. As the area greens it would provide early seral habitat for deer and elk until trees are reestablished and the canopy shades out brush species used for browse. There would be a decrease in the potential for wildfire moving from surface fuels into the crowns with the removal of ladder fuels, however there would be a cumulative short term one to five (1-5) year increase in the risk of a fire start due to the residual fuel load left following harvest. This increase would be somewhat mitigated by the prescribed burning. Cumulative potential for a wildfire start would decrease in the longer term over the next few decades as the logging slash decays, and because the potential natural increase in the fuel load as a result of suppression mortality would not be present following harvest.

Alternative 3 – Regeneration harvest with Red Tree Vole buffers

The cumulative effects on air quality, fire risk, and fuels management under Alternative 3 would be the same as for Alternative 2 but to a lesser degree due to the reduction in unit size and the removal of density management and commercial thinning prescriptions.

Alternative 4 – Commercial Thinning and Density Management

Air quality issues would be local and of short duration during timber harvest, prescribed burning, and biomass removal. With the current trend in the public's activities on federal lands the potential for wildfire starts would be expected to remain the same or increase slightly if recreational activities increase. The density management and commercial thinning units would likely see a decrease in use as a result of the slash created during harvest. There would be a decrease in the potential for wildfire moving from surface fuels into the crowns with the removal of ladder fuels, however there would be a cumulative short term (1-5) year increase in the risk of a fire start due to the residual fuel load left following harvest. This increase would be somewhat mitigated by prescribed burning. Cumulative potential for a wildfire start would decrease in the longer term over the next few decades as logging slash decays, and because the potential natural increase in the fuel load as a result of suppression mortality would not be present following harvest.

4.2 Carbon Sequestration and Climate Change

(IDT report incorporated by reference: Snook, 2011. Carbon Sequestration (Storage) and Climate Change.)

Alternative 1 – No Action

This increase of 6,900 tonnes of live tree carbon would contribute to an annual average of 86 tonnes, or .000004% to the U.S. annual accumulation of carbon from forest management of 191 million tonnes. The WOPR (p. 4-538), which is incorporated here by reference, states that by 2056, the No Harvest benchmark analysis (no future harvest of BLM-managed lands in the analysis area) would result in a total carbon storage of approximately 588 million tonnes, 2% higher than average historic conditions (576 million tonnes, WOPR, 3-224).

Action Alternatives

Greenhouse gases resulting from the proposed action would total 1,100 to 4,900 tonnes of carbon dioxide. Current global emissions of carbon dioxide total 25 billion tonnes (IPCC 2007, p. 513), and current U.S. emissions of carbon dioxide total 6 billion tonnes (EPA 2007, p 2-3). Therefore, the emissions from the proposed action would constitute .0000002 percent of current global emissions and .0000008 percent of current U.S. emissions.

Tree growth following harvest would offset greenhouse gases and result in net storage of 1,014 to 8,880 tonnes of carbon. This would contribute an annual average of 12 to 111 tonnes to the U.S. annual accumulation of carbon from forest management of 191 million tonnes. The 2008 EIS (p. 4-538), which is incorporated here by reference, states that by 2106, the No Action Alternative (management under the 1995 RMP) would result in a total carbon storage of approximately 628 million tonnes for all western Oregon BLM-administered lands, 9 percent higher than average historic conditions (576 million tonnes, WOPR, 3-224, as reanalyzed in November 6, 2009 memo). The incremental effect of the action alternatives, over time, would be net storage of carbon.

Comparison of Alternatives

Eighty years after harvest:

- There is a range in net carbon storage between the action alternatives, in general the least intensive harvest results in greatest carbon storage over time.
- The no action alternative has 7% to 82% more carbon storage than the proposed action alternatives.
- Reasons for the differences include carbon emissions under the action alternatives that do not occur under the No Action Alternative. In additions, some components of the carbon cycle are not included here, such as density mortality and wood decay that would occur in the no action alternative.

4.3 Fisheries and Aquatic Habitat

(IDT report incorporated by reference: 2011 Rickard Creek Project Environmental Assessment Fisheries.)

The Marys River 5th Field basins have been altered from agricultural and forestry practices of the last century. BLM managed land is in a checker board fashion that is managed by private commercial logging companies and the BLM. Lower in the basin, private land owners have converted the floodplain to areas of agricultural production and urban areas.

The proposed stand treatments for all action alternatives are not expected to alter large woody debris (LWD) recruitment, stream bank stability, and sediment supply to channels at the 5th field watershed scale in the short-term or long-term with the implementation of stream-side no entry zones.

The only road construction proposed in the RR, for both the proposed alternative and thinning alternative, is near the affected fish bearing stream to the Southwest of the RR010 unit. Alternative 3 would exclude new construction. Project Design Features would limit proposed road construction to ridge tops at least 300 feet from stream channels. Stand exam data indicates tree heights to be 160 feet in the treatment area where road construction may occur. Relative to the new construction, tree heights of the treatment area are less than the 300 foot distance from the proposed road location to the stream. Trees in the area of new construction would not be recruited to the stream channel due to buffer distance. Therefore, the removal of trees from proposed road construction is not anticipated to affect LWD recruitment to stream channels at the site level and no cumulative effects are anticipated to in-stream structure. Ridge top roads are highly unlikely to cause sediment transport to streams at the site level and no cumulative effects are anticipated to sediment regimes in Marys River Watershed. Proposed road renovation activities associated with the project may result in localized sediment transmission to intermittent streams. These affects were not anticipated to reach fish habitat downstream and would not be expected to contribute to any cumulative effects.

Proposed timber hauling for all action alternatives on unpaved roads would cross three fish bearing stream channels. Hauling may contribute a minor amount of sediment to the one unnamed fish bearing stream in Beaver Creek. The other two crossings over Beaver Creek are highly unlikely to contribute fine sediment due to the paved approaches over the crossings and the high filtration rate anticipated in the vegetated ditch lines. The small magnitude of sediment anticipated from the one unpaved crossing would be limited to a short distance downstream of the crossing. Research has demonstrated that relatively short segments of small ephemeral and intermittent streams (300 to 400 feet) can effectively store coarse sediment washed from roads which would in turn contribute to protection of water quality in fish bearing habitat downstream (Duncan et al., 1987). The small scale local affects which may occur due to proposed hauling is not anticipated to contribute to cumulative effects at the fifth field

level as these impacts are not anticipated to result in increase sediment transport rates downstream which could combine with other sediment source areas and create additive impacts.

Cumulative impacts to fishery resources could occur if any proposed actions result in alterations in runoff contributing to changes in flows where fish reside. Based on the Rickard Creek Hydrology Cumulative Effects Analysis, the probability of altering peak flows in the project area for all action alternatives was considered low to very low and would be highly unlikely to contribute to cumulative effects (Wegner 2011); therefore, no cumulative effects to aquatic resources are anticipated.

The Hydrology report indicated that the proposed project was unlikely to have detectable effects on stream temperatures and not expected to result in any cumulative effects (Wegner, 2011). Alternative 3 would exclude treatments in the RR and have no effects on temperatures. No cumulative effects are anticipated from peak flows, stream banks, and in-stream structure which could affect temperature. Since no cumulative effects were anticipated for temperature, stream bank conditions, and peak flows these issues would not result in cumulative effects for fisheries resources.

Overall the action alternatives are highly unlikely to have any impacts outside the action area; therefore, no cumulative impact on fish or fish habitat would occur. No cumulative impacts are anticipated due to the small size of the project, large no-entry buffers between proposed actions and fish habitat, all new ridge top roads are hydrologically disconnected from stream networks, and thinning in the RRs are anticipated to improve the function and complexity within the RRs.

4.4 Hydrology

(IDT report incorporated by reference: Wegner, 2011. Rickard Creek Hydrology Environmental Assessment.)

The risk of increases to peak flows based on the most impactful alternative (Alternative 2) falls well below the level indicating a potential risk of peak flow enhancement. Alternatives 3 and 4 were also reviewed and found to be well below the level indicating a potential risk of peak flow enhancement. Based on the cumulative effects analysis (Wegner 2011), the risk of peak flow enhancement for all of the alternatives was determined to be low to very low and cumulative impacts are not expected to be measurable either in the project watershed or downstream of the project watershed.

Using information based on a recent report by Grant (2008), an analysis was completed that totaled the existing amount of lands in the Upper Marys River watershed for all land ownerships. That analysis found that approximately 30.7 percent of the watershed was in an “open” condition, meaning that the lands were either harvested and currently had less than 30 percent crown cover or were naturally open (meadows, rock slopes, etc.). Using the envelope curves developed by Grant, the predicted change in peak flow increases for the existing level of basin harvest in the rain dominated hydro-region falls below the detection level for peak flow changes established by Grant.

Grant’s peak flow increase detection level was set at 10 percent based on measurement error in natural stream systems and natural variability in stream systems. Adding in the maximum proposed Rickard Creek harvest acres (Alternative 2), the percent of the watershed in an open condition increases to 31.5 percent, which would roughly relate to a mean predicted increase of 7 percent in peak flows, which is still below the 10 percent detection level. The peak flow range does extend up to 10.9 percent based on the regression line data shown in the envelope curve developed by Grant. Alternatives 3 and 4 resulted in predicted increases between 6 and 7 percent.

The analysis assumes no recovery of past harvest stands, that the current level of harvest activity on private lands remains the same, and that all the acres in the sale are resulting in less than 30 percent crown cover when completed. Based on these side boards, it is still expected that the addition of the proposed Rickard Creek harvest activity in the Upper Marys River watershed would still fall into the immeasurable level for peak flow increases on the Grant envelope curve.

4.5 Soils

(IDT report incorporated by reference: Rickard Creek Timber Sale Soils Report.)

All Action Alternatives

The analysis indicates that project activities are considered unlikely to have detectable affects on soil erosion or soil productivity. There would be no measurable cumulative impact to the soils resource outside the project area.

4.6 Vegetation

(IDT reports incorporated by reference: Snook, 2011. Silvicultural Prescription for Rickard Creek Regeneration, Commercial Thinning, and Density Management, and Exeter, 2011. Botanical Report Rickard Creek.)

Age Class

Due to ecological succession and forest management (mostly private land harvests), the amount of habitat in each seral stage within this watershed is not stagnant, but in constant transition. Ecological succession would advance early-seral forest plantations toward mid-seral conditions, just as current and expected future harvests of mid-seral stands would return these patches to early-seral conditions.

Fire history and intensive forest management on both private and public lands over the past several decades has greatly reduced the amount of LSOG forests and the quality and quantity of coarse woody debris in western Oregon forests (Moeur et al., 2005 and Hagar, 2007). The prevailing management regime on private lands which dominate this watershed would likely involve alternating between mid-seral and early-seral habitat conditions over time without retaining any late-seral forests patches for the foreseeable future (Ohmann et al., 2007). Also, harvest practices on private lands would likely preclude any in-growth of their mid-seral stands into late-seral stands for the foreseeable future.

BLM has conducted regeneration harvest on five units in the Marys River 5th field watershed over the past 10 years, totaling 145 acres (2% of BLM lands in the watershed). This small proportion of early seral habitat created in the watershed is not responsive to the GFMA LUA objective for providing early seral habitat. All remaining late-seral forest habitats are on federal lands within this watershed, and no foreseeable future harvest (next 5 years) is anticipated. The proposed action represents a very small proportion of the late-seral forest in this watershed where the cumulative loss on federal lands would reduce late-seral forests from 37% to 35.5% over the past 15 years (remaining well above the 15% threshold required by the NWFP). Over the next twenty years, approximately 1,150 acres in reserve land-use allocations on BLM managed lands in this watershed are projected to grow into late seral forest conditions (currently 60-70 year old conifer stands). This projected in-growth would offset (by more than 13 times) the relatively small loss of late-seral habitat (92 acres) by this proposed action. The proposed action would provide an additional 92 acres of high quality early seral habitat to the 145 acres of prior regeneration harvests on BLM-managed lands, which represent just 4% of the GFMA land use allocation in the watershed. Over time, private forest lands generally maintain at least 20% to 25% of their ownership in early-seral conditions. However, the quality of early seral habitat on private

lands is often diminished by the lack of legacy retention, minimal CWD retention, and herbicide treatments (Swanson et al., 2011).

The Proposed Action and Alternative 3 would result in a small incremental loss (92 acres and 24 acres, respectively) of late-seral forest within this watershed which would reduce key features of wildlife habitat such as snags, down logs, and late seral forest canopy cover. Most of the private forest lands in this watershed appear to be managed on short rotations (40-60 years between harvests) that provide no late seral forest cover and retain very few snags and down logs after harvest. Small diameter snags and down logs are often abundant in mid seral stands on private lands, but they provide lower quality habitat structure for most wildlife species as compared to the coarse woody debris (equal or greater less than 20 inches DBHOB) that would be found in late seral forests (Rose et al., 2001). Currently, and for the foreseeable future, private harvest of mid seral stands would contribute very little to loss of higher quality CWD within this watershed, because the higher quality material is generally not created or maintained through management regimes on private lands.

Native Vegetation

Most of the common perennial vascular plant species would persist within the project areas post treatment and many of the common forbs, herbs, bryophytes and lichen species would become established within approximately 20 to 50 years.

In a recent report by Grant (2008), approximately 30.7 percent of lands in the Upper Marys River watershed for all land ownerships are in an “open” condition, meaning that the lands were either harvested and currently had less than 30 percent crown cover or were naturally open (meadows, rock slopes, etc.). Open areas resulting from regeneration harvesting would generally have a higher proportion of early seral species, annual species, and non-native species. However, most of the native species are perennials and would persist on the sites. Studies have shown that native understory species associated with forest cover compose at least 50 percent of the ground vegetation in early seral stages and reach pre-harvest levels of species diversity and species abundance before the forest stand matures (Zamora, 1981), and native plant cover increases with time after regeneration harvest (Lemkuhl, 2002).

Bureau Special Status Botanical and Fungal Species

This project area currently provides suitable habitat for rare or uncommon botanical and fungal species. However, any coniferous forest over approximately 50 years of age and located in the northern Oregon Coast Range Mountains provides suitable habitat for rare or uncommon botanical or fungal species. Coniferous forests over 50 years of age are common and widespread in northwestern Oregon. It would take approximately 50 years for this area to once again provide suitable habitat for bureau special status botanical and fungal species. Although this area is considered suitable habitat, there are no known bureau special status botanical or fungal species known from this area.

Invasive and Non-native Plant Species (including Noxious Weeds)

Examples of forest management activities and natural events within the Benton Foothills Watershed that would create soil disturbance, increase available light, and increase soil temperatures, all of which would influence the spread of non-native plants (NNPs) are:

- commercial and pre-commercial timber density management projects
- young stand maintenance
- road construction, maintenance, renovation, decommissioning and culvert replacements

- landslide, high flow sedimentation deposits; and OHV activities.

Activities that do not necessarily create disturbance but influence the spread of weed seeds are recreational hiking, biking, horseback riding, fishing and hunting. Other sources of seed dispersal are from wildlife movement, water movement, natural dispersal, and wind. Many past and present management and non-management activities tend to open dense forest settings and disturb soils, therefore providing opportunities for widespread NNP infestations to occur. Most NNPs are not shade tolerant and would not persist in a forest setting as they become out-competed for light as tree and/or shrub canopies close and light to the understory is reduced. The implementation of this project would likely increase the number of common and widespread NNP species that are known to occur within the Benton Foothills Watershed. However, as discussed above the risk rating for any adverse cumulative effects to the Benton Foothills Watershed or any adjacent watersheds would remain low.

4.7 Wildlife

(IDT report incorporated by reference: Hopkins, 2011. Biological Evaluation.)

Alternative 1 – No Action

The no action alternative would have no detrimental cumulative effects to wildlife habitats or species.

Alternative 2 – Proposed Action

Project Design Features for retaining existing coarse woody debris along with post-harvest loss of some reserved green trees would minimize the cumulative impact to snag and down log habitat component within the watershed. The retention of considerable late-seral forest on federal lands in the watershed (35.5 percent) and the projected in-growth of comparable late-seral habitat over the next 20 years (1,150 acres) provide context to the localized impacts of the proposed action (92 acres of late seral forest loss and 25 acres of thinning) which would be considered minor. Therefore, the cumulative effects to populations of wildlife species that may utilize these forest habitats, such as cavity nesting species and migratory birds, would likely be negligible, and this action would not contribute to the need to list any special status wildlife species.

Because marbled murrelets are probably absent from the project area and no designated critical habitat would be affected by this action, there would be no detrimental cumulative effects to this species.

Within the home range of the Oliver Valley spotted owl site, there have been no regeneration harvests on BLM lands in the past 20 years. On private lands, approximately 750 acres of have been harvested over the previous decade (2000-2010). Because of the limited amount of remaining harvestable stands, the prior rate of harvest, and clearcut adjacency rules, it is likely that private harvest actions within the next 10 years would remove some amount of suitable and dispersal habitat within the Oliver Valley home range. But predicting the exact amount of private harvest would be speculative. Private harvest, if any, would mostly occur within the outer perimeter of the Oliver Valley home range (beyond 0.5 miles), whereby the core area of the home range would remain above 64% suitable habitat due to the amount of BLM managed land that is currently in reserved status. The condition of the nest patch would also remain unchanged due to its reserved status. The ingrowth over the next decade of current BLM forest stands that may substitute as foraging habitat (290 acres), dispersal habitat (150 acres), and facilitate connectivity with adjacent suitable patches on BLM, may offset any private land harvest within the home range of the owl pair.

Detrimental cumulative effects to red tree voles would be negligible at the watershed scale because relatively little late seral forest habitat would be removed, nearly all legacy trees within the treatment unit would be retained, substantial ingrowth of late seral forest habitat on federal reserved lands is anticipated within 20 years (1,150 acres), and there are no foreseeable future harvests expected in LSOG forests on federal lands within this watershed.

Alternative 3 – Regeneration Harvest with Red Tree Vole Buffers

The cumulative effects to wildlife habitats and habitat components (snags and down logs) from Alternative 3 would be similar, but considerably less, than those described for Alternative 2. The cumulative loss of late seral forests on federal lands in this watershed (the only place late seral forests occur in the watershed) would result in a minimal drop from 37% to 36.5% over the past 15 year period (remaining well above the 15% threshold required by the NWFP). The cumulative effects to populations of wildlife species that may utilize late seral forest habitats in this watershed such as cavity nesting species and migratory birds, would likely be negligible. The cumulative amount of early seral habitat created by this regeneration harvest and prior BLM harvests would be 3%. This alternative would not contribute to the need to list any special status wildlife species.

There would be no detrimental cumulative effects to marbled murrelets since the species has not been detected on surveys in this vicinity and since no designated critical habitat would be affected. The cumulative effects of harvest within the home range of the Oliver Valley owl site would be discountable since this alternative would not appreciably reduce the available suitable habitat (remaining above 40 percent), the habitat conditions in the nest patch and core area would remain unchanged, and the location and rate of potential future harvest on private lands is highly speculative. There would be no detrimental cumulative effects to red tree voles since no vole nests were detected within the treatment unit (24 acres), occupied vole habitat would be reserved from harvest (120 acres), substantial ingrowth of late seral forest habitat on federal reserved lands is anticipated within 20 years (1,150 acres), and there are no foreseeable future harvests expected in LSOG forests on federal lands within this watershed.

Alternative 4 – Commercial Thinning and Density Management

There would be no cumulative loss of LSOG forest conditions from Alternative 4, since the proposed thinning would retain and not remove habitat within the proposed units. The amount of late seral forests on federal lands in this watershed would remain at 37 percent (well above the 15 percent threshold required by the NWFP). There would be no cumulative increase in early seral habitat. The cumulative effects to populations of wildlife species that may utilize LSOG forest habitats such as cavity nesting species and migratory birds, would likely be negligible, and this action would not contribute to the need to list any special status wildlife species.

There would be no detrimental cumulative effects to marbled murrelets since the species has not been detected on surveys in this vicinity and since no designated critical habitat would be affected. The cumulative effects of harvest within the home range of the Oliver Valley owl site would be discountable since this alternative would not reduce the available suitable habitat below 40%, the treated stands would recover suitability within 20 years, the habitat conditions in the nest patch and core area would remain unchanged, and the location and rate of potential future harvest on private lands is highly speculative.

Detrimental cumulative effects to red tree voles would be negligible at the watershed scale because late seral forest habitat would not be removed, nearly all legacy trees within the treatment unit would be

retained, substantial ingrowth of late seral forest habitat on federal reserved lands is anticipated within 20 years (1,150 acres), and there are no foreseeable future harvests expected in LSOG forests on federal lands within this watershed.

4.8 Recreation, Rural Interface, Visual Resource Management

(IDT report incorporated by reference: Drake, 2011. Recreation/Rural Interface/VRM Report.)

All Action Alternatives

Current recreation use of the project area would be restricted in the short-term during harvest activities. OHV use within the area would be further limited for one-year following operations during the red-needle stage of the downed wood. Upon project completion, recreational use would be expected to return to current use levels. During project activities, use would likely move to other locations within the general vicinity.

5.0 COMPLIANCE WITH THE AQUATIC CONSERVATION STRATEGY

Existing Watershed Condition

The project area is in the Marys River 5th Field Watershed, which drains into the Willamette River. Three percent of the Marys River Watershed is managed by BLM, four percent is managed by the U.S. Forest Service, two percent of the watershed is managed by the U.S. Fish and Wildlife Service and ninety-one percent is managed by private land owners. Approximately 12 percent of the total BLM-managed lands consist of stands greater than 80 years old and approximately 22 percent of BLM-managed lands are located in riparian areas (within 100 feet of a stream).

Review of Aquatic Conservation Strategy Compliance

Review of this analysis indicates that the project meets the Aquatic Conservation Strategy in the context of PCFFA IV and PCFFA II [complies with the ACS on the project (site) scale]. The following is an update of how this project complies with the four components of the ACS. The project would comply with:

Component 1 – Riparian Reserves: Maintaining canopy cover along all streams and wetlands would protect stream bank stability and water temperature. Riparian Reserve boundaries would be established consistent with direction from the Salem District Resource Management Plan. Proposed RR LUA activities are intended to enhance riparian condition. Approximately 1,200 feet of temporary new road construction would occur within RR LUA but outside the drainage area of the streams.

Component 2 – Key Watershed: The Rickard Creek timber sale is not within a key watershed.

Component 3 – Watershed Analysis: The BFWA (1997) describes the events that contributed to the current condition such as early hunting and gathering by aboriginal inhabitants, road building, agriculture, wildfire, and timber harvest. The following are watershed analysis findings that apply to or are components of this project:

- Historically, landslide frequency has been low. Although harvest activities are expected to increase due to the LUA, substantial increases in land sliding rates are not expected (p. 4).
- Surface erosion is accelerated when low growing ground cover and/or duff layer are removed. Thinning, regeneration harvest, and spring burning for site preparation leave the majority of the soil surface protected or undisturbed (p. 4).
- BLM RRs in the analysis area lack older forest characteristics. Approximately 1,636 acres (78 percent) of the RRs are in early and mid-seral age stands. Many of these stands tend to be overstocked, and lack vertical structure. Density management thru the creation of gaps would benefit structural diversity (p. 7).
- Management activities in the RRs can be used to promote older forest characteristics, attain ACS objectives and move the RRs on a trajectory toward older forest characteristics. Desired riparian characteristics include: Diverse vegetation appropriate to the water table, diverse age classes (multi-layered canopy); mature conifers where they have occurred in the past; and dead standing/down wood (p. 9).
- Water quality conditions in the forested uplands appear to be generally good, but there is little data to verify this. The parameter of greatest concern is turbidity and suspended sediment, particularly chronic inputs of fine sediments from road and trail surfaces (p. 12).
- Dispersal by highly mobile wildlife species and habitat to allow dispersal to adjacent areas is not a significant issue within the analysis area (p. 13).
- Watershed Analysis identified regeneration harvest as a tool for forest management in this watershed. A high amount of acreage currently in the 60 year age class is moving into the 70 year age class next decade and would be potentially available for regeneration harvest. More than a decade has passed since completion of the watershed analysis and the stand age for the regeneration harvest has moved into the 70 year age class (p. 14).
- Drainage structures on many of the BLM controlled roads are deteriorating and/or are inadequately sized for 100-year flood events. Replacement of failing culverts is included in the Rickard Creek timber sale project (p. 16).
- In general, new road construction would be avoided in RRs to meet ACS objectives. The current planning process for new road construction requires the involvement of affected resource specialists, including the hydrologist, soils scientist, botanist, wildlife biologist and/or aquatic biologist, and road engineer. At the present time, the BMPs are being used to help determine the road location, general road design features, design of cross drains and stream crossings, as well as the actual road construction (p. 17).
- Use of public lands by OHVs is extensive and virtually unmanaged (p. 18).

Component 4 – Watershed Restoration: The project would improve habitat conditions for coho salmon, steelhead and cutthroat trout and assist in restoring and improving ecological health of watersheds and aquatic systems by replacing failing culverts and reducing road related adverse effects for the long-term restoration of the aquatic system

Density management would restore watershed conditions by providing a gradual transition in structural characteristics of treated stands that would more closely resemble late-seral forest and promote stand diversity, provide more light to accelerate growth of selected conifers, and promote species diversity.

Table 9. **Consistency with the Nine Aquatic Conservation Strategy Objectives**

Aquatic Conservation Strategy Objectives (ACSOs)	2012 Revised Rickard Creek Timber Sale and Associated Actions
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.	Does not prevent the attainment of ***ACSO 1***. Addressed in Text (*EA section 3.3 and 3.7*). In summary: **No Action Alternative:** The No Action alternative would maintain the development of the existing vegetation and associated stand structure at its present rate. The current distribution, diversity and complexity of watershed and landscape-scale features would be maintained. Faster restoration of distribution, diversity, and complexity of watershed and landscape features would not occur. **Action Alternative:** Density management through the creation of small gaps around dominant overstory and legacy trees would create stand structural diversity. Cutting trees adjacent to legacy trees would be designed to restore available light and growing space to the declining live crown of the legacy trees while maintaining existing snags, minor tree species, and shrubs sooner than would result from the No Action Alternative. Woody debris would continue to fall from within the untreated SPZ, and short-term recruitment of the existing CWD is expected to be largely maintained. Therefore, the proposed actions are not expected to cause any short term effects to aquatic habitat at the site or downstream. Proposed density management is anticipated to increase the average size of the remaining trees by up to seven inches (Caldwell, 2007). As the treated stands reach heights of 200 feet, the larger diameter wood could be recruited from farther up the slopes to stream channels. In the long-term, beneficial growth in the size of trees in eastside RR LUA could beneficially affect LWD recruitment to the stream channel, thus potentially improving the quality/complexity of aquatic habitat adjacent to the treatment areas. Since RRs provide travel corridors and resources for aquatic, riparian dependent and other late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features.
2. Maintain and restore spatial and temporal connectivity within and between watersheds.	Does not prevent the attainment of ***ACSO 2***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** The No Action alternative would have little effect on connectivity except in the long term within the affected watershed. **Action Alternative:** Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development. In time, the RR LUA would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as the RR LUA develops late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom	Does not prevent the attainment of ***ACSO 3***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** It is assumed that the current physical integrity would be maintained. **Action Alternative:** For the protection of stream channels and aquatic resources, riparian

Aquatic Conservation Strategy Objectives (ACSOs)	2012 Revised Rickard Creek Timber Sale and Associated Actions
configurations.	buffers or no-treatment zones were applied to all stream channels and "high water table areas" (small wet areas, ponds, marshes, etc.) in the project area. These zones were determined in the field by BLM personnel following the protocol outlined in the *Northwest Forest Plan Temperature Implementation Strategies* (2005). Stream buffers extend a minimum of 50 feet from stream channels and to the extent of the riparian vegetation around "wet areas". This zone would be extended upslope during field surveys as far as deemed necessary to protect aquatic resources (the average width of the stream buffer is 200 feet). This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, vegetation heights, etc. Road maintenance activities (brushing, blading, spot rocking) are unlikely to measurably impact channel morphology or water quality over the long term because the activities all take place on established roads that are elevated above stream channels.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.	Does not prevent the attainment of ***ACSO 4***. Addressed in Text (*EA sections 3.3 and 3.7*). In summary: **No Action Alternative:** It is assumed that the current condition of the water quality would be maintained. **Action Alternative:** Stream temperature: Stream shading would exceed the widths recommended to maintain a minimum of 80 percent effective shade resulting in no change to water temperature from the activities proposed in this project. Based on field observations (current streamside vegetation that is overhanging the stream and valley topography that blocks the sun in the hottest part of the day appears adequate to shade surface waters during summer base flow), aerial photo reviews of streams completed for the analysis of this EA between 2004 and 2006, and modeling runs for the project area, it is likely that stream temperatures consistently meet the Oregon state standard (18 degrees Celsius) for these waters.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.	Does not prevent the attainment of ***ACSO 5***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** It is assumed that the current levels of sediment into streams would be maintained. **Action Alternative:** The creation of temporary roads, yarding corridors and the mechanical removal of trees are unlikely to significantly increase sedimentation into project area streams because harvest generated slash would be maintained in the yarding corridors, minimizing the need for machines to travel on bare soil. Also, ground-based equipment would only be allowed on slopes less than 35 percent. Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams due to harvest activities and mass wasting are unlikely to result from this action. In addition, SPZs in riparian areas have high surface roughness, which can function to trap any overland flow and sediment before reaching streams. Ground-based skidding would occur during periods of low soil moisture with little or no rainfall, in order to minimize soil compaction and erosion. Existing OHV use in the project area is not having a detrimental impact on water quality through sediment introduction to stream channels. The proposed closing of the project skid

Aquatic Conservation Strategy Objectives (ACSOs)	2012 Revised Rickard Creek Timber Sale and Associated Actions
	trails and the decommissioning on one rutted road that is currently used by OHV riders would result in an overall decrease in OHV use in the project area. The proposed buffers combined with residual slash, and use of existing skid trails should keep sediment movement to a minimum. As the proposed action is not likely to measurably alter water quality characteristics at the treatment sites, it would be unlikely to affect aquatic habitat downstream from the project area. The potential for timber hauling to generate road sediment is minimized by PDFs such as winter haul occurring on rocked road surfaces only and any native surface roads would be restricted to dry season use only. Also, hauling operations would be suspended if weather or environmental conditions pose an imminent risk of road sediment flowing in ditches.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing.	Does not prevent the attainment of ***ACSO 6***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** No change in in-streams flows would be anticipated. **Action Alternative:** The risk of increases to peak flows based on the proposed management activity falls well below the potential risk of peak flow enhancement from the Oregon Watershed Assessment Manual Analysis. Therefore, based on the cumulative effects analysis report, the risk of peak flow enhancement based on the proposed management activity was determined to be low to very low and cumulative impacts are not expected to be measurable either in the project watershed or downstream of the project watershed. For the protection of stream channels and aquatic resources, riparian buffers or no-treatment zones were applied to all stream channels and "high water table areas". Stream buffers extend a minimum of 50 feet from stream channels and to the extent of the riparian vegetation around "wet areas". This zone would be extended upslope during field surveys as far as deemed necessary to protect aquatic resources.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.	Does not prevent the attainment of ***ACSO 7***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** No change in in-streams flows would be anticipated. **Action Alternative:** For the protection of stream channels and aquatic resources, riparian buffers or no-treatment zones were applied to all stream channels and "high water table areas" (small wet areas, ponds, marshes, etc.) in the project area. These zones were determined in the field by BLM personnel following the protocol outlined in the *Northwest Forest Plan Temperature Implementation Strategies* (2005). Stream buffers extend a minimum of 50 feet from stream channels and to the extent of the riparian vegetation around "wet areas". This zone would be extended upslope during field surveys as far as deemed necessary to protect aquatic resources (the average width of the stream buffer is 200 feet). This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, vegetation heights, etc.
8. Maintain and restore the species composition and structural	Does not prevent the attainment of ***ACSO 8***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** The current species composition and structural diversity of plant communities would continue along the current trajectory. Diversification would occur over

Aquatic Conservation Strategy Objectives (ACSOs)	2012 Revised Rickard Creek Timber Sale and Associated Actions
diversity of plant communities in riparian areas and wetlands.	a longer period of time. **Action Alternative:** The actual riparian areas along streams would be excluded from treatment during the project by designating SPZs, and only the upslope portions of the RR LUA would be included in the density management treatment. Riparian Reserves would be excluded from the regeneration harvest and commercial thinning management treatment.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.	Does not prevent the attainment of ***ACSO 9***. Addressed in Text (*EA section 3.7*). In summary: **No Action Alternative:** Habitats would be maintained over the short-term and continue to develop over the long-term with no known impacts on species currently present. **Action Alternative** Habitat to support well distributed riparian-dependent and riparian associated species would be restored by reducing overstocked stands, moderating tree species diversity, altering forest structural characteristics and amending CWD conditions.

6.0 LIST OF PREPARERS

Name	Resource
Steve Cyrus	Engineering
Debra Drake	Recreation, Rural Interface, Visual Resource Management
Ron Exeter	Botany
Andy Frazier	Logging Systems
Scott Hopkins	Wildlife
Stefanie Larew	NEPA Coordinator
Kent Mortensen	Air Quality, Fire Risk, and Fuels Management
Scott Snedaker	Fisheries and Aquatic Habitat
Hugh Snook	Silviculture and Riparian Ecology
Heather Ulrich	Cultural Resources
Steve Wegner	Hydrology and Soils

7.0 CONTACTS AND CONSULTATION

7.1 Agencies, Organizations, and Persons Consulted (ESA Section 7 Consultation)

United States Fish and Wildlife Service

To address concerns for potential effects to spotted owls, this timber sale has been analyzed in a Biological Assessment (BA) to enable consultation with the U.S. Fish and Wildlife Service, as required under Section 7 of the Endangered Species Act. The proposed action has incorporated all appropriate design standards from the BA. Upon completion of consultation, any additional design standards set forth in the pending Biological Opinion would be incorporated into the final project design prior to issuance of a decision record for this EA.

National Marine Fisheries Service (NMFS)
Consultation with NMFS is required for projects that "may affect" listed species. Protection of Essential Fish Habitat (EFH) as described by the Magnuson/Stevens Fisheries Conservation and Management Act and consultation with NMFS is required for all projects which may adversely affect EFH of Chinook salmon. The proposed Rickard Creek Timber Sale is not expected to affect EFH due to distance of all activities associated with the project from occupied habitat.

A determination has been made that the proposed project would have "no effect" on UWR steelhead trout, Chinook salmon and Oregon chub. Generally, the "no effect" determination is based on the distance of a project to ESA listed fish habitat**.** The distance from ESA habitat is approximately two miles to project activities. Due to the "no effect" determination, this project would not be consulted upon with NMFS.

7.2 Cultural Resources - Section 106 Consultation and Consultation with State Historical Preservation Office

Survey techniques are based on those described in Appendix D of the *Protocol for Managing Cultural Resource on Lands Administered by the Bureau of Land Management in Oregon.* Post-project survey would be conducted according to standards based on slope defined in the Protocol appendix. Ground disturbing work would be suspended if cultural material is discovered during project work until an archaeologist assesses the significance of the discovery.

7.3 Public Scoping and Notification – Tribal Governments, Adjacent Landowners, General Public, and State, County, and local government offices

For information on project scoping and the original EA comment period, see *EA section 1.5*.

The 2012 Revised EA and FONASI would be made available for public review from February 15, 2012 to March 16, 2012 and posted at the Salem District website at http://www.blm.gov/or/districts/salem/plans/index.php. The notice for public comment would be published in a legal notice in the *Gazette-Times* newspaper. Written comments should be addressed to Rich Hatfield, Field Manager, Marys Peak Resource Area, 1717 Fabry Road S., Salem, Oregon, 97306. Emailed comments may be sent to rehatfie@blm.gov.

8.0 MAJOR SOURCES

8.1 Interdisciplinary Team Reports

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APPENDIX A – Glossary of Terms

ACS – Aquatic Conservation Strategy

Alternative – Proposed project (plan, option, or choice).

Anadromous Fish – Species that migrate to oceans and return to freshwater to reproduce.

Basal Area (BA) – The cross section area of a tree measured in square feet.

BLM – Bureau of Land Management. Federal agency within the Department of the Interior responsible for the management of 275 million acres.

Best Management Practices (BMPs) – Design features and mitigation measures to minimize environmental effects.

Biological Opinion (BO) – The document resulting from formal consultation that states the opinion of the Fish and Wildlife Service or National Marine Fisheries Service as to weather or not a federal action is likely to jeopardize the continued existence of a listed species or results in destruction or adverse modification of critical habitat.

Council on Environmental Quality (CEQ) – Established by the National Environmental Policy Act of 1969 (NEPA) to guide the implementation of NEPA.

Crown – The portion of a tree with live limbs.

Culmination of Mean Annual Increment – The age at which a stand produces the maximum average annual growth over the lifetime of a the timber stand. This age is typically between 70 and 110 years for Douglas-fir.

Cumulative Effects – Past, present, and reasonably foreseeable effects added together (regardless of who or what has caused, is causing, or might cause those effects).

Coarse Woody Debris (CWD) – Refers to a tree, or a portion thereof, that has fallen or been cut and left on the ground. Usually refers to pieces at least 20 inches in diameter as described in the Northwest Forest Plan

DBHOB – Diameter at breast height (4.5 feet) outside bark.

Density Management – Reduction in composition of trees in a stand for purposes other than timber production.

Environmental Assessment (EA) – A systematic analysis of site-specific activities used to determine whether such activities have a significant effect on the quality of the human environment.

Endangered Species – Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

Essential Fish Habitat (EFH) – Anywhere Chinook or coho salmon could naturally occur.

Ephemeral Streams – Streams that contain running water only sporadically, such as during and following storm events or snow melt.

Endangered Species Act (ESA) – Federal legislation that ensures federal actions would not jeopardize or elevate the status of living plants and animals.

Fish-bearing stream – Any stream containing any species of fish for any period of time.

Fuel Loading – The amount of combustible material present per unit of area, usually expressed in tons per acre (dry weight of burnable fuel).

Fuels – Any natural combustible material left on site that is available for burning (i.e.: logs, limbs, needles, or other vegetation.

Girdle – Removal of the inner bark from the entire circumference of a tree, which typically results in the death of the tree within three to five years.

Ground-Based Yarding – Utilizing equipment operating on the surface of the ground to move trees or logs to a landing where they can be processed or loaded.

Harvester/Forwarder Equipment – Cut to length system which uses harvesters to fell, strip the tree of limbs, and cut it into logs, paired with a tracked forwarder with a long reach to gather up the logs and transfer them to a log truck. Many such systems are known for their low pounds per square inch (PSI) impact to the ground.

Hydric – Hydric soils are those that are wet enough in the upper layer during the growing season to develop anaerobic conditions.

Interdisciplinary Team (IDT) – A group of individuals of various disciplines assembled to solve a problem or perform a task.

Intermittent Stream – Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. Includes ephemeral streams if they meet these two criteria.

Invasive Plant – Any plant species that is aggressive and difficult to manage.

Landing – Any designated place where logs are placed after being yarded and awaiting subsequent handling, loading, and hauling.

Late-Successional Forest – A forest that is in its mature stage and contains a diversity of structural characteristics, such as live trees, snags, woody debris, and a patchy, multi-layered canopy.

Land Use Allocation – Northwest Forest Plan designated lands to be managed for specific objectives.

Large Woody Debris (LWD) – Woody material found within the bankfull width of the stream channel and is specifically of a size 23.6 inches diameter by 33 feet length (per Oregon Department of Fish and Wildlife – Key Pieces).

National Marine Fisheries Service (NMFS) – Federal agency within NOAA which is responsible for the regulation of anadromous fisheries in the United States.

Non-Native Plant – Any plant species that historically does not occur in a particular ecosystem.

Non-Point – No specific site.

Noxious Weed – Plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage, parasitic, a carrier or host of serious insects or diseases, or non-native, new, or not common to the United States.

Oregon Smoke Management Plan – The state of Oregon's plan for implementing the National Clean Air Act in regards to burning of forest fuels.

ORGANON – A computer-based program used to model projected tree growth, stand density, and crown ratio using existing stand tree species and size.

Perennial Stream – A stream that typically has running water on a year-round basis.

Regeneration Harvest – The harvest of mature timber from a stand, leaving some residual trees for legacy old-growth trees and recruitment for future snags and large coarse woody debris.

Riparian Reserves – Riparian Reserves (Northwest Forest Plan land use allocation). Lands on either side of streams or other water feature designated to maintain or restore aquatic habitat. The boundary of the RR is a distance of two site potential tree heights (420 feet) from fish-bearing streams and one site potential tree (210 feet) from non fish-bearing streams.

Road Decommissioning – Road is closed to vehicular traffic. Road is waterbarred to reestablish hillslope drainage patterns. May include removal of culverts, ripping, and seeding of roadbed.

Road Improvement – Road work which improves an existing road over its original design standard.

Road Reconstruction – Work done to restore a damaged or deteriorated road to a usable condition and possibly a new design standard. Roads are not drivable prior to reconstruction. May include realignment, slide and fill failure repair, and/or structure upgrades. It generally involves a higher degree of engineering than basic road improvement or renovation work.

Road Renovation – Work done to an existing road which restores it to its original design standard. May include blading and shaping, clearing brush from cut and fill slopes, cleaning or replacing culverts, and applying rock surfacing material to depleted surfaces. Roads are generally drivable prior to work commencing.

Rural Interface – BLM-managed lands within ½ mile of private lands zone for 1 to 20 acre lots. Areas zone for 40 acres and larger with homes adjacent to or near BLM-managed lands.

Seral – One stage of a series of plant communities that succeed one another.

Silviculture – The manipulation of forest stands to achieve desired structure.

Skid Trials – Path through a stand of trees on which ground-based equipment operates.

Skyline Yarding – Moving trees or logs using a cable system to a landing where they can be processed or loaded. During the moving process, a minimum of one end of trees and logs are lifted clear of the ground.

Snag – A dead, partially dead, or defective tree at least 10 inches DBHOB and 6 feet tall.

Soil Compaction – An increase in bulk density and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Productivity – Capacity or suitability of a soil, for establishment and growth of a specified crop or place species, primarily through nutrient availability.

Special Status Species – Any species included in the following categories; Threatened and Endangered, bureau sensitive, bureau strategic, and Survey and Manage.

Stand – An area of forest generally uniform in species composition or age

Stream Protection Zone (SPZ) – A buffer along streams and identified wet areas where no material would be removed and heavy machinery would not be allowed. The SPZ is measured to the slope break, change in vegetation, or 55 feet from the channel edge, whatever is greatest.

Succession – Stages a forest stand makes over time as vegetation competes and natural disturbances occur. The different stages in succession are often referred to as seral stages.

Topped – Completely severing the upper portion of a standing live tree. The typical purpose for this action is to enhance wildlife habitat by creating snags from standing live trees.

Visual Resource Management (VRM) – Lands are classified in the Salem District RMP from 1 to 4 based on visual quality ratings and the amount of modification allowed in the landscape.

Waterbars – A ridge of compacted soil or loose rock or gravel constructed across disturbed rights-of-way and similar sloping areas.

Watershed – The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to an identified outlet location, usually a stream or lake.

Weed – A plant considered undesirable and that interferes with management objectives for a given area at a given point in time.

Windthrow – Trees uprooted or blown over by natural events.

Yarding Corridors – Corridors cut through a stand of trees to facilitate skyline yarding. Cables are strung in these corridors to transport logs from the woods to the landing.

APPENDIX B – Updated Marking Guide for Rickard Creek Timber Sale

(T. 13 S., R. 6 W., Section 29)
August 31, 2011
See Marking Guides in Caldwell, 2007 and Haynes, 2007.
This document only contains new and clarifying information.

Stand/ Alternative	Total Acres (est.) [1]	Treatment Prescription (post-treatment values)			
		Leave Trees per Ac. [2] (> 7" DBH)	Leave Tree BA (Ft^2)	Marking Guide	Comments
Unit 29A Alt 2 Regeneration	**92**	**10**	**62**	Caldwell, 2007, p. 6	Retain 5 large Douglas-fir per acre, all WH and WRC, largest Big-leaf maple, 1-2 TPA
Unit 29C Alt 2 Density Mgmt.	**15**	**n/a**	**n/a**	Caldwell, 2007, p. 6	RR LUA – gaps surrounding legacy trees, as determined by wildlife biologist.
Unit 29A Alt 3 Regeneration	**24**	**10**	**62**	Caldwell, 2007, P. 6	Retain 5 large Douglas-fir per acre, all WH and WRC, largest Big-leaf maple, 2 TPA
Unit 29A Alt 4 CT (GFMA LUA)	**96**	**69**	**150**	Haynes, 2007 p. 11, modified	Modify by consistent density, and proportional thinning. Remove DF from all diameter classes, leave best crowns.
Unit 29C Alt 4 DM	**34**	**38-43**	**150-160**	Haynes, 2007 p. 11	RR LUA – Variable density, generally thinning from below.
Unit 29B Alt 2 CT	**4**	**52**	**120-140**	Caldwell, 2007, p. 6	Blend of low thinning and proportional thinning, to leave average 130 BA, 52 TPA.

[1] Includes road acres.
[2] Leave Trees per Acre: estimated remaining overstory trees (>7"dbh) of all species after thinning.

Retain minor species. Western hemlock and western red cedar are reserved and count toward BA targets. Hardwood trees of all species are reserved and do not count toward BA target, except in regeneration harvest, where bigleaf maple in excess of 1-2 trees per acre would be removed.

Meet target average basal area but VARY it within limits in density management.

Retain "unique" trees –leave relatively large trees that are full-crowned, large-limbed, "wolf" trees, broken-top, forked, deep crowns, evidence of wildlife use, and contain cavities or visible nests.

Required leave trees for all units

- Snags. In addition, protect snags that are ≥20" dbh and ≥40' height by leaving surrounding closest adjacent trees to reduce the necessity of falling the snag for safety reasons.
- All tree improvement parent trees. Marked with orange "T" and yellow signs.
- Trees less than seven (7) inches DBH do not mark. Where significant stocking of under-story conifers occurs, retain lower overstory BA.

APPENDIX C – Marking Guide For Rickard Creek Timber Sale

(Caldwell, 2007, P. 6)

A) Regeneration Area (010 & 040)(Unit 29A)

a) Leave either down logs or additional leave trees standing after harvest for at least 240 linear feet of logs per acre > 20 inches and twenty feet long (Decay Class 1&2) averaged over the area. A thirty inch and greater log and ten feet long or equivalent large log may substitute for a 20 inch log 20 feet long. This equates to 1-2 trees per acre.

b) Retain all existing snags and coarse woody debris unless felling is necessary for safety or operational considerations. If snags are in deficit, retain additional green trees in addition to those retained for green tree for future snag recruitment to meet RMP requirements.

c) Retain at least six to eight representative green conifer trees per acre average. Clumping is recommended for 50% of the trees to facilitate logging operations and preservation of the leave trees. The remaining trees shall be scattered to spread their effect throughout the stand.

d) Reserve low density species including cedar, chinquapin and dogwood not located in road right-of-way or having safety considerations.

e) Cut bigleaf maple not reserved by special mark in the regeneration areas to increase regeneration success for conifers and provide optimum light for the new regeneration. Require cutting hardwood stumps to a maximum of six inches to reduce sprouting.

f) Pull logging debris back five feet from reserve trees to reduce damage from the broadcast burn.

g) After harvesting, site prepare the area by slashing all brush and hardwoods not reserved greater than two feet in height and burn slash with a broadcast burn on slopes greater than 35%.

h) After harvesting, site prepare the area by grapple piling and burn debris piles on all area with slopes less than 35%.

B) Thinning Area (030) (Unit 29B)

a) Maintain on an average of 130 of square feet basal area (BA) or approximately 52 trees per acre of all conifers greater than seven and less than forty inches DBH with a range of 120 to 140 BA per acre for upland areas. Wildlife and other reserved trees may be in addition to the leave basal area per acre.

b) Leave dominant and co-dominant trees with consideration for spacing (Low Thinning). Approximately 80% of the trees to be cut should be from trees below the average leave tree diameter of 21 inches. Reserve all trees over 40 inches DBH where possible. Cut suppressed trees unless the tree is located in an opening and has > 35% crown. Cut Douglas-fir trees on the edge of Phellinus pockets if the tree shows signs of infection.

c) Spacing between trees maybe as low as 5 feet to maintain the desirable BA near openings.

d) Maintain species diversity by reserving hardwoods and low density conifers which are not safety hazards or located in haul or logging roads.

e) Reserve snags, trees with high wildlife value, and CWD where possible.

C) Riparian Reserve Area (010 & 030) **(Unit 29C)**

a) Designate ¼ to ½ acre gaps to enhance dominant and legacy trees in the area shown as density management in the Riparian Reserve. Gap selection will be made by the area wildlife biologist.

b) Buffer the wet area located in the eastern part of the regeneration area.

FINDING OF NO ADDITIONAL SIGNIFICANT IMPACT

Introduction

The Bureau of Land Management (BLM) published the Rickard Creek Timber Sale Environmental Assessment (EA) (EA# OR080-07-13) in March of 2007. The Rickard Creek timber sale was sold, but not awarded, on June 24, 2009. The BLM revised the Rickard Creek Timber Sale EA in December of 2009 after the Western Oregon Plan Revision was remanded (July 16th, 2009) to address protest issues regarding carbon sequestration and climate change. Following the outcome of litigation in Conservation Northwest v. Sherman, No. 08-1067-JCC (W.D. Wash.), the BLM again revised the EA in 2011 to address compliance with Survey and Manage.

The 2012 Revised Rickard Creek Timber Sale EA (DOI-BLM-OR-S050-2011-0002) is attached to and incorporated by reference in this Finding of No Additional Significant Impact determination (FONASI). The analysis in this 2012 Revised EA is site-specific and supplements analyses found in the *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement,* September 1994 (RMP/FEIS).

The Salem District initiated planning and design for this project to conform and be consistent with the Salem District's 1995 Resource Management Plan. 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 Salem District's 2008 Record of Decision and Resource Management Plan (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, the selected alternative contains some design features not mentioned specifically in the 2008 ROD and RMP. The 2008 ROD and RMP did not preclude use of these design features, and the use of these design features is clearly consistent with the goals and objectives in the 2008 ROD and RMP. Accordingly, this project is consistent with the Salem District's 1995 RMP and 2008 ROD/RMP.

This project is located on BLM-managed lands in Township 13 South, Range 6, Section 29, Willamette Meridian in Benton County, Oregon. The proposed action is to conduct regeneration harvest on approximately 92 acres of stands that are 80 years old, conduct commercial thinning on approximately 4 acres of 74 year old stands and conduct density management on approximately 15 acres of 74 to 80 year old stands. Approximately 92 of these acres are in the Matrix Land Use Allocation (LUA), and 19 are in the Riparian Reserve (RR) LUA.

The 2012 Revised EA and FONASI will be made available for public review from February 15, 2012 to March 16, 2012. The notice for public comment will be published in a legal notice in the *Gazette-Times* newspaper on or around February 15, 2012. Written comments should be addressed to Rich Hatfield, Field Manager, Marys Peak Resource Area, 1717 Fabry Road SE, Salem, Oregon, 97306. Comments may be emailed to rehatfie@blm.gov.

Finding of No Additional Significant Impact

Based upon review of the 2012 Revised Rickard Creek Timber Sale EA and supporting documents, I have determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No site-specific environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27. Therefore, supplemental or additional information to the analysis done

in the RMP/FEIS through a new environmental impact statement is not needed. This finding is based on the following information:

Context:

Potential effects resulting from implementation of the proposed action have been analyzed within the context of the Marys River 5th-field Watershed and the project areas boundaries. The proposed action would occur on approximately 111 acres of Matrix and Riparian Reserve (RR) land use allocation (LUA), encompassing less than 0.06 percent of the forest cover (all ownerships inclusive) within the Marys River Watershed [40 CFR 1508.27(a)].

Intensity:

1. [40 CFR 1508.27(b)(1)] – **Impacts that may be both beneficial and adverse**: The resources potentially affected by the proposed activities are: air quality, fire risk, and fuels management, carbon sequestration (storage) and climate change, fisheries and aquatic habitat, recreation, rural interface, and visual resources, soils, vegetation - invasive, non-native plant species, water, and wildlife. The effects of the proposed actions are unlikely to have significant impacts on these resources for the following reasons:

   Project Design Features described in EA section 2.6 would reduce the risk of effects to affected resources to be within RMP standards and guidelines within the effects described in the RMP/EIS.

   Vegetation and Forest Stand Characteristics *(EA sections 3.6 and 4.6):*

   Non-Native Plants and Noxious Weeds – Exposed mineral soil areas created through the implementation of this project pose the greatest risk for the establishment of noxious weed species. However, project design features have been incorporated into this proposal to minimize the creation of new noxious weed habitat. The risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area is low because:

   1) mitigation measures have been incorporated into this project to minimize the amount of exposed mineral soil,
   2) the size of the project area is small compared to the entire watershed and any disturbance is considered localized,
   3) the implementation of the Marys Peak Resource Area noxious weed control utilizing glyphosate EA (EA# DOI-BLM-OR-S050-2010-0005), and the Westside Salem integrated non-native plant management plan EA (EA#OR080-06-09) as amended by the documentation of land use plan conformance and NEPA adequacy (DNA # OR080-08-01). These documents allow for monitoring project area for noxious weed infestations and targeting noxious weeds for removal,
   4) the known noxious weeds species which occur in the project area are regionally abundant and occur widespread throughout the Oregon Coast Range Physiographic Province, and control measures generally consist of biological control,
   5) the anticipated noxious weed species to become established in the project area often persist for several years after becoming established but soon decline as native vegetation increases within the project areas, and
   6) there are no other Oregon listed noxious weed species that are anticipated to become established through the implementation of this project.

***Carbon Sequestration (Storage) and Climate Change** (EA sections 3.2 and 4.2)*: The 2012 Revised Rickard Creek EA is tiered to the PRMP FEIS (1994), (p. 3&4-50) which concluded that all alternatives analyzed in the FEIS, in their entirety including all timber harvest, would have only slight (context indicates that the effect would be too small to calculate) effect on carbon dioxide levels. The following show quantities of carbon in forest ecosystem vegetation[3] worldwide, in the United States, and in the Rickard Creek project area.

- Total carbon, forest ecosystem vegetation, Worldwide (Matthews et al, 2000, p. 58) = 132-457 Gt[4]
- Total carbon, forest ecosystem vegetation, United States (US EPA, 2009) = 27 Gt
- Total carbon, forest ecosystem vegetation, Pacific Northwest, Coast Range 1.8-2 Gt (Hudiburg, et al. 2009).
- Total carbon, forest ecosystem vegetation, Rickard Creek Project Area = 28,000 tonnes or 0.000028 Gt. This represents .000001 percent of the United States total or .000014 percent of the Coast Range total.
- The annual accumulation of carbon from forest management in the United States is 191 million tonnes. Implementation of current management on BLM-managed lands in western Oregon would result in an average annual accumulation of 1.69 million tonnes over the next 100 years, or 0.9 percent of the current U.S. accumulation. (WOPR, p. 4-537).

Carbon emissions resulting from the proposed action would total 1,100 to 4,900 tonnes. Current global emissions of carbon dioxide total 25 billion tonnes of carbon dioxide (IPCC 2007, p. 513), and current U.S. emissions of carbon dioxide total 6 billion tonnes (EPA 2007, p 2-3). Therefore, the emissions from the proposed action would constitute .0000002 percent of current global emissions and .0000008 percent of current U.S. emissions.

The BLM has selected 80 years as the time frame for analysis of carbon storage and climate change for this project. Eighty years is the approximate rotation length of the stand in the project, and rotation length of 70-110 years is directed (RMP, p. D-1). Eighty years represents the full cycle of carbon storage and release for this project and would likely be similar for future rotations.

Tree growth following harvest would offset greenhouse gases and result in net storage of 1,014 to 8,880 tonnes of carbon. This would contribute an annual average of 12 to 111 tonnes to the U.S. annual accumulation of carbon from forest management of 191 million tonnes. The WOPR EIS (Vol. 4, P. 538), which is incorporated here by reference, states that by 2106, the No Action Alternative (management under the 1995 RMP) would result in a total carbon storage of approximately 628 million tonnes for all Western Oregon BLM-administered lands, 9 percent higher than average historic conditions (576 million tonnes, WOPR, Vol. 3, P. 224, as reanalyzed in November 6, 2009 memo, on file, Marys Peak Resource Area). The incremental effect of the proposed action, over time, would be net storage of carbon.

***ESA listed, Bureau Special Status, and Survey and Manage Botanical and Fungal Species** (EA sections 3.6, and 4.6):* This project would not directly affect any Bureau Special Status (SS) vascular plant, lichen, bryophyte or fungi species since there are no known sites within or adjacent to the project area. Although implementation of this project would be detrimental to any bureau SS mycorrhizal fungal species in the project area, the likelihood of any occurring in the stand is

[3] Carbon contained in both above ground and below ground parts of trees and forest vegetation, and downed wood, litter and duff. It does not include mineral carbon in soil, nor fossil fuels.
[4] A Giga-tonne (Gt) is one billion tonnes, or metric tons.

low because the majority of these species have no known sites within the Marys Peak Resource Area or the Northern Oregon Coast Range Mountains.

Fisheries and Aquatic Habitat, Hydrology, and Soils *(EA sections 3.3, 3.4, 3.5, 4.3, 4.4, and 4.5)*: The creation of temporary roads, yarding corridors, and the mechanical removal of trees are unlikely to significantly increase sedimentation into project area streams because harvest generated slash would be maintained in the yarding corridors, minimizing the need for machines to travel on bare soil. Slash, limbs and non-merchantable material left following harvest activities within treatment areas can substantially reduce the magnitude of sediment movement (Burroughs and King 1989, Swift 1985). In accordance with the RMP guidelines, ground-based equipment would only be allowed on slopes less than 35 percent. Ground-based skidding would occur during periods of low soil moisture with little or no rainfall to minimize soil compaction and erosion.

Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams and mass wasting are unlikely to result from the proposed action. For the protection of stream channels and aquatic resources, riparian buffers or no-treatment zones were applied to all stream channels and "high water table areas" (small wet areas, ponds, marshes, etc.) in the project area. In addition, stream protection zones (SPZs) in riparian areas have high surface roughness, which would function to trap any overland flow and sediment before reaching streams. Therefore, increases in sediment delivery to streams are unlikely to result.

The proposed project would affect less than 0.06 percent of the forest cover in the Marys River Watershed (111 acres treated of the 193,748 acres in the Marys River) all located below the Transient Snow Zone. The hydrology analysis of the proposed action was considered unlikely to detectably alter stream flows (Wegner, 2007b). No discernible effects to fish and aquatic habitat within the treatment area are anticipated from undetectable changes in peak and base flows, and would be even less likely to affect fish habitat downstream.

Retention of the SPZ buffer and the location of treatments primarily adjacent to intermittent channels would be expected to maintain the existing stream temperature regimes. The proposed action is unlikely to increase in-stream temperatures at the site. Based on the shade sufficiency analysis, the hydrology report, water quality analysis, and the Project Design Features, the proposed action is unlikely to affect fish habitat downstream. Stream shading would exceed the widths required to maintain the Oregon DEQ stream temperature TMDL standard of a minimum of 80 percent effective shade resulting in no change to water temperature from the activities proposed in this project.

New road construction within the riparian reserve would be outside the drainage area of the stream in a dry draw that does not have a physical connection to the stream channel, so no erosion from the road surface is expected to reach the stream. All new construction would be decommissioned and blocked to vehicle traffic following harvest, so some recovery back to a forested condition would occur in this area over time. Approximately 2,800 feet of the 13-6-29.1 road would also be decommissioned and blocked to vehicle traffic following harvest.

Soils *(EA sections 3.5 and 4.5):* Approximately 2.0 acres in landings and 1.7 acres in skid trails would be required. Because the existing skid trails would be reused, this would result in a cumulative detrimental disturbance level of 3.3 percent in the sale area units. The aerial extent and degree of disturbance would remain within accepted RMP guidelines of less than 10 percent disturbance.

***Wildlife** (EA sections 3.7, and 4.7):* The retention of green trees within the regeneration harvest area (approximately 9 to 11 trees per acre clumped and scattered across 92 acres), would meet or exceed RMP requirements and add considerable structural complexity to the open early-seral habitat created by the harvest. Structural complexity would also be enhanced and retained within the 15 acre density management area (compared to no action) where prominent overstory trees and declining legacy old-growth trees would be released to rejuvenate their live crown structure and to reinitiate understory shrub layer diversity, which enhance the quality of habitat for numerous wildlife species. The coarse woody debris component would remain at moderate to high levels since existing snags and logs are reserved from harvest and since high quality snags and down logs would be recruited from reserved green trees due to post-harvest mortality.

Following the harvest operations in the regeneration harvest unit (92 acres) habitat conditions would be unfavorable to some bird species, while benefitting those species that prefer open shrubby habitats that have a prominent snag component. The resulting habitat conditions within the thinning and density management units (19 acres) would still provide similar habitat conditions for bird species that might currently nest in those stands.

Of the Birds of Conservation Concern that utilize late-seral and old-growth (LSOG) habitats, most species (besides the northern spotted owl and marbled murrelet) are also found in other seral stages or utilize structural components (snags, hardwoods, etc.) that are found in several seral stages. Because all of the Birds of Conservation Concern are widely distributed throughout the conifer-dominated forests of this Bird Conservation Region (Altman 2008); the potential negative impacts to these bird populations resulting from the proposed action would likely be very minor and localized.

An analysis and determination of non-high priority site status for red tree voles within the Rickard Creek project area was completed and approval was received by the. U.S. Fish and Wildlife Service on January 11, 2012 (see Appendix C of Wildlife Report). The analysis concluded the proposed would meet all four criteria to ensure continued persistence of this species at the watershed scale.

***Air Quality, Fire Risk, and Fuels Management** (EA sections 3.1 and 4.1):* The proposed projects would create an increased risk of fire from the slash generated during harvest operations. This risk would be mitigated by utilizing a variety of fuels treatments including the use of prescribed fire under controlled situations. The regeneration harvest area would be hand piled and burned and/or broadcast burned to reduce the risk of fire and for site preparation prior to tree planting. Commercial thinning harvest areas would be hand piled and burned if the fuel loading is determined by the BLM to be a hazard by post-harvest surveys. Slash pullback along roads that remain open to the public, and along property lines may occur where the opportunities for ignition are greatest. The fine fuels (fuels in the 1 and 10 hour size classes) would be consumed during broadcast burning or pile burning.

In areas where hazard reduction or site preparation does not occur, these fuels would decay within three to five years and the risk of surface fire would decrease to near current levels. The regeneration harvest would remove the majority of ladder fuels and the commercial thinning would remove most of the ladder fuels and decrease the crown bulk density, reducing the risk of a canopy fire. Prescribed fuels treatments would have a short duration impact on air quality. Strict adherence to smoke management regulations would result in little or no impact to the public.

***Recreation, Rural Interface, and Visual Resources** (EA sections 3.8 and 4.8):* The proposed project would comply with Visual Resource Management Class 4 management objectives as defined in the Salem District RMP (pp. 36-37). A forest setting and most of the canopy would remain in the density management and commercial thinning areas, but few trees would remain in the regeneration harvest area. Evidence of the density management and thinning portions of the project would not be observable within five years as understory vegetation returns to a more natural appearance and the remaining stand continues to mature. The regeneration portion would remain observable for several years until the seedlings are well established.

Recreational activities would be limited during periods of operation and has potential for distributing use to other areas. Motorized or OHV use within the project area would be further limited for one year following harvest operations or red needle stage. Following harvest activities, current recreational activities would continue with potential of increased hunting and OHV use due to the opening of corridors and building of skid roads for harvest activities.

2. [40 CFR 1508.27(b)(2)] – **The degree to which the proposed action affects public health or safety:** The project's effects to public health and safety would not be significant because the project occurs in a forested setting, removed from urban and residential areas, where the primary activities are forest management and timber harvest.

   Public safety along haul routes would be minimally affected because log truck traffic from forest management activities on both private and public land is common and the majority of the public using these haul routes are aware of the hazards involved in driving on these forest roads. In addition, project design features require use of signs, road blocks, and/or flaggers near project activities to provide for public safety (EA section 2.6).

3. [40 CFR 1508.27(b)(3)] – **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas:** The proposed project would not affect historical or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas, because these are not located within the project area.

4. [40 CFR 1508.27(b)(4)] – **The degree to which the effects on the quality of the human environment are likely to be highly controversial:** The proposed project is not unique or unusual. The BLM has experience implementing similar actions in similar areas without highly controversial effects.

5. [40 CFR 1508.27(b)(5)] – **The degree to which the possible effects on the human environment area highly uncertain or involve unique or unknown risks:** The effects associated with the project do not have uncertain, unique, or unknown risks, because the BLM has experience implementing similar actions in similar areas without these risks. Project Design Features (EA section 2.6) would minimize risks associated with the project.

6. [40 CFR 1508.27(b)(6)] – **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration:** The proposed action would not establish a precedent for future actions, nor would it represent a decision in principle about a further consideration for the following reasons: 1/ The project is within the scope of proposed activities documented in the Salem District RMP. 2/ The BLM has experience implementing similar actions in similar areas without setting a precedent for future actions or representing a decision about a further consideration. See #4 and #5, above.

7. [40 CFR 1508.27(b)(7)] – **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts**: The Interdisciplinary Team evaluated the project area in context of past, present, and reasonably foreseeable actions and determined that there is not a potential for significant cumulative effects on affected resources (EA section 4.0).

8. [40 CFR 1508.27(b)(8)] – **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources:** The project would not affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor would the project cause loss or destruction of significant scientific, cultural, or historical resources.

9. [40 CFR 1508.27(b)(9)] – **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (ESA) of 1973:** The proposed project is not expected to adversely affect ESA listed species or critical habitat for the following reasons:

   ***ESA Wildlife – Threatened and Endangered Species** (EA sections 3.7 and 4.7):* The proposed action would have "no effect" to marbled murrelets, since the harvest area is not considered suitable habitat and survey efforts have indicated a probable absence of murrelets in the proposed action area (nearest murrelet site is 5.9 miles west).

   The planned regeneration harvest would remove 92 acres of suitable foraging habitat for the spotted owl, but most of this loss would occur beyond the likely home range (1.5 miles) of the known active Oliver Valley owl site. Also, the continued presence of breeding barred owls in this vicinity is likely to preclude any substantial use of this area by spotted owls (Gutiérrez et al. 2007). The loss of suitable habitat from the proposed action would still provide more than 40% suitable habitat in the affected home range of the Oliver Valley owl site. Spotted owl sites with >40% suitable habitat within their home range and >50% suitable habitat in their core area have the highest likelihood to contribute to the long-term demographic performance of the owl populations (USDI-FWS 2011a).

   ***ESA Fish** (EA sections 3.3 and 4.3):* Protection of Essential Fish Habitat (EFH) as described by the Magnuson/Stevens Fisheries Conservation and Management Act and consultation with National Marine Fisheries Service is required for all projects which may adversely affect EFH of Chinook salmon. The proposed projects are not expected to affect EFH due to distance of all activities associated with the project from occupied habitat.
   A determination has been made in a biological assessment that this proposed project would have 'no effect' on Upper Willamette River steelhead trout, Chinook salmon and Oregon chub. Generally, the 'no effect' determination is based on the distance of a project to ESA listed fish habitat**.** The distance from ESA listed fish or critical habitat is over two miles to project activities.

10. [40 CFR 1508.27(b)(10)] – **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment**: The proposed project has been designed to follow Federal, State, and local laws (EA section 1.3).

Approved by: _____ _____
Rich Hatfield — Date
Marys Peak Resource Area Field Manager