Take 3 Thinning

Environmental Assessment and Finding of No Significant Impact

Environmental Assessment DOI-BLM-OR-S040-2011-0004-EA

United States Department of the Interior
Bureau of Land Management, Oregon State Office
Salem District, Cascades Resource Area
Clackamas County, Oregon

T.3 S., R. 5 E., Sec. 11, 13 W. M.

Responsible Agency:	USDI - Bureau of Land Management
Responsible Official:	Leanne Mruzik, Acting Field Manager Cascades Resource Area 1717 Fabry Road SE Salem, OR 97306 (503) 315-5969
For further information, contact:	Alisa Tanner, Team Lead/ EA Editor Cascades Resource Area 1717 Fabry Road SE Salem, OR 97306 (503) 589-6844

BLM
Salem District

As the Nation's principal conservation agency, the Department of Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering economic use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/AE-12/042+1792

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FINDING OF NO SIGNIFICANT IMPACT

The Bureau of Land Management (BLM) has conducted an environmental analysis for a proposal to thin approximately 342 acres of 30-96 year old forest stands. The project is located on BLM lands in T. 3 S., R. 5 E. section 11 and 13; W.M. in Clackamas County, Oregon. The Take 3 Thinning Environmental Assessment (EA) (# DOI-BLM-OR-S040-2011-0004-EA) documents the environmental analysis of the proposed commercial thinning activity. The EA is attached to and is incorporated by reference in this Finding of No Significant Impact (FONSI) determination. The EA and FONSI will be made available for public review from November 7, 2012 through December 7, 2012.

The analysis in this 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 proposed thinning activities have been designed to conform to the *Salem District Record of Decision and Resource Management Plan*, May 1995 (RMP) and related documents, which direct and provide the legal framework for management of BLM lands within the Salem District (EA Section 1.3). Approximately 314 of these acres are in the Matrix land use allocation (LUA), and 38 acres are in the Riparian Reserve LUA as described in the RMP.

Draft Finding of No Significant Impact[1]

Based upon review of the Take 3 Thinning EA and supporting documents, I have determined that the proposed action is not a major federal action; and would not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No 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 in the RMP/FEIS in the form of a new environmental impact statement is not needed. This finding is based on the following discussion:

Context [40 CFR 1508.27(a)]***:*** Potential effects resulting from the implementation of the proposed action have been analyzed within the context of the project area boundaries, and the following 6th field watersheds: North Fork Eagle Creek and Upper Eagle Creek. The project would affect approximately one percent of the 35,180 acre combined 6th field watersheds listed above.

Intensity refers to severity of impact [40 CFR 1508.27(b)]. The following text shows how that the proposed project would not have significant impacts with regard to ten considerations for evaluating intensity, as described in 40 CFR 1508.27(b).

1. *[40 CFR 1508.27(b) (1)] –* **Impacts that may be both beneficial and adverse:** The effects of commercial thinning are unlikely to have significant (beneficial and adverse) impacts (EA section 3.0) for the following reasons:
    - *Project design features* described in EA section 2.2.3 would reduce the risk of effects to affected resources to be within RMP standards and guidelines and to be within the effects described in the RMP/FEIS.

[1] This section of the Take 3 Thinning EA is the Draft Finding of No Significant Impact (FONSI). The Cascades Field Manager will finalize the FONSI in the Decision Rationale document after the public comment period.

- *Vegetation and Forest Stand Characteristics (EA section 3.3.1)*: Effects to this resource are not significant because: 1/ the proposed action would retain a forested environment with at least 40 percent average canopy cover (see wildlife); 2/ the proposed action would not adversely affect BLM Special Status or Survey & Manage Species because no suitable habitat for any species known or likely to occur would be lost or altered to a degree that may impact these species. Therefore, the project would not contribute to the need to list a species as Threatened or Endangered; and 3/ Noxious Weeds – Increases in the number of invasive/non-native plants are not expected with the application of Project Design Features. (*EA section 2.2.3*), and native species would naturally revegetate after thinning activities reducing the suitable habitat for invasive species.
- *Hydrology; Fisheries and Aquatic Habitat; and Soils (EA sections 3.3.2-3.3.3,3.3.4):* Effects to this resource are not significant because: 1/ Road construction would occur on gentle slopes with stable, vegetated surfaces; 2/ Stream protection zones (minimum of 100 feet on perennial streams, 50 feet on intermittent streams) would maintain current stream temperatures by retaining the current vegetation in the primary shade zone and most of the current levels of shading in the secondary shade zone. Stream protection zones (SPZ) are also expected to prevent sediment as a result of overland flow or surface erosion in logging units from reaching streams; 3/ Timber haul, road construction, decommissioning and road maintenance project design features would prevent turbidity increases at stream/road junctions from exceeding Oregon Department of Environmental Quality (ODEQ) requirements; and 4/ Sediment delivery to Eagle Creek tributaries would be reduced over the long term by decommissioning 0.47 mile of road 3-5E-13; the proposed action would meet ODEQ water quality standards.
- *Soils (EA section 3.3.4):* Effects to this resource are not significant because no measurable reduction in overall growth and yield in the thinning area would be expected because analysis and decades of BLM experience with similar projects demonstrate that soil compaction and road construction would cause little difference in the average tree spacing, site utilization or overall stand stocking.
- *Wildlife (EA section 3.3.5):* Effects to this resource are not significant because: 1/ Stands proposed for thinning are not presently functioning as old growth habitat; 2/ Existing snags, large diameter trees (36 inches diameter or larger) and coarse woody debris (CWD) would be reserved. The small number (≤ 10 percent) of large (≥ 15 inches diameter and ≥ 15 feet tall) snags expected to be felled for safety or knocked over by falling and yarding operations would be retained as CWD; 3/ No suitable forest type for BLM Special Status Species known or likely to be present would be changed. Therefore, the project would not contribute to the need to list any BLM Special Status species; 4/ Thinning would not significantly change species richness (a combination of species diversity and abundance) of the Migratory and Resident Bird community. No species would be extirpated in stands as a result of thinning; and 5/ See # 9, for effects to northern spotted owl.
- *Air Quality and Fire Hazard/Risk (EA section 2.2.2, 3.3.6):* Effects to this resource are not significant because the proposed project would comply with State of Oregon Air Quality Standards by strict adherence to smoke management regulations. For example, pile burning would take place when wind and air movement patterns would dissipate smoke within one to three days, reducing the effect of smoke on air quality. Overall, the risk of a fire starting because of the proposed project is expected to be low and the ability to suppress any fire that does start is good.

Potential for human caused ignition would be reduced by treating the fuels most likely to be ignited by human activities, especially fine fuels adjacent to roads that are open to public access. Within one year fire risk would diminish as the highly flammable "red needles" drop and ground cover/understory vegetation "greens up".

- *Recreation, Visual Resources, and Rural Interface (EA section 3.3.7):* Effects to this resource are not significant because changes to the landscape character would be low and would comply with Visual Resource Management guidelines because the project area would maintain a forested setting. Some disturbance to vegetation would be observable after thinning activities and would be expected to develop an undisturbed appearance within five years. The proposed project's effects on recreation are not significant; access to BLM lands would remain unchanged from current conditions after operations are completed. Residents within rural interface areas were notified of thinning operations and these areas have historically experienced private timber management operations, thus no effect to this resource.

2. *[40 CFR 1508.27(b) (2)]* - **The degree to which the proposed action affects public health or safety:** The proposed project would not adversely affect public health or safety because the public would be restricted from the project area during operations and the project would not create hazards lasting beyond project operations (Table 15, EA section 3.3.9).

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 because all known cultural resources that require protection are outside of the unit boundaries and would not be affected by operations. Any cultural resources discovered in the future would be protected as determined by the BLM Archaeologist. The Proposed project would not affect parklands, prime farmlands, wild and scenic rivers, wilderness, or ecologically critical areas because these resources are not located within the project area (EA Section 3.3.7, 3.3.8,).

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 are highly uncertain or involve unique or unknown risks:** The BLM has experience implementing similar actions in similar locations and has designed the project, including project design features, to avoid highly uncertain, unique and unknown risks (EA section 2.2.3). See # 4, above.

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 in the scope of proposed activities document in the RMP EIS; and 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, 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 (IDT) evaluated the project area in context of past, present and reasonably foreseeable actions and determined that the proposed action would be expected to temporarily increase stream turbidity as a result of road renovation, road maintenance, road decommissioning and road use. (*EA Sections 3.3.2, 3.3.3*). These effects are not expected to be significant because any turbidity increase resulting from road renovation, road maintenance, road decommissioning and road use would not exceed ODEQ water quality standards, would dissipate within 800 meters downstream, and would decrease quickly over time, returning to current levels within minutes or hours. Cumulatively, the proposed action and connected actions would be unlikely to result in any detectable change for water quality on a sixth or seventh field watershed scale and would be unlikely to have any effect on any designated beneficial uses, including fisheries (*EA Section 3.3.3*).

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 these resources because no features eligible for or listed in this register are in the project area and cultural resource inventory have found no scientific cultural or historical resources that could be affected by the project. If any such resources were to be found, operations would cease immediately until adequate protection is implemented. (EA section 3.3.8).

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 - Northern spotted owl (EA Section 3.3.5):* Effects to the species are not significant because: 1/The project is not located in Late Successional Reserve, Critical Habitat, or stands which meet the criteria for Recovery Action 32 for the northern spotted owl; 2/ The project maintains 342 acres of dispersal habitat. 3/ Habitat conditions are expected to improve as thinned stands mature (>20 years); and 4/ Residual trees would increase in size and be available for recruitment or creation of large diameter (>15 inches) snags, culls and coarse woody debris (CWD) for prey species and nesting opportunities, particularly in Riparian Reserves, sooner than would be expected without treatment. ESA Consultation is described in EA section 5.1.1.

   - *ESA Fish – LCR Chinook salmon, LCR coho salmon, and LCR steelhead trout (EA Section 3.3.3).* Effects to ESA fish are not significant because thinning is not expected to affect these species both because: 1/No actions would be taken that would affect salmon and steelhead habitat and 2/ Project design features minimize impacts from tree thinning and road renovation and maintenance on stream channels, water quality, and fish habitat as described in the Hydrology; Fisheries and Aquatic Habitat; and Soils section, above. Additionally, new road construction would be located in stable locations and would not contribute to degradation of aquatic habitat. ESA Consultation is described in EA section 5.1.2

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 thinning activities have been designed to follow Federal, State, and local laws (*EA sections 1.2, 3.3.10*)

Approved by: _____ _____

Leanne Mruzik Date

Acting Cascades Resource Area Field Manager

TAKE 3 THINNING ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

This Environmental Assessment (EA) will analyze the impacts of proposed commercial thinning operations and connected actions on the human environment. The EA will provide the decision-maker, the Cascades 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 Significant Impact (FONSI) is appropriate.

Section 1 of this EA for the proposed Take 3 Thinning project provides a context for what will be analyzed in the EA, describes the kinds of actions the BLM will be considering, defines the project area, describes what the proposed actions need to accomplish, and identifies the criteria that the BLM will use for choosing the alternative that will best meet the purpose and need for this proposal.

1.1 Proposed Action

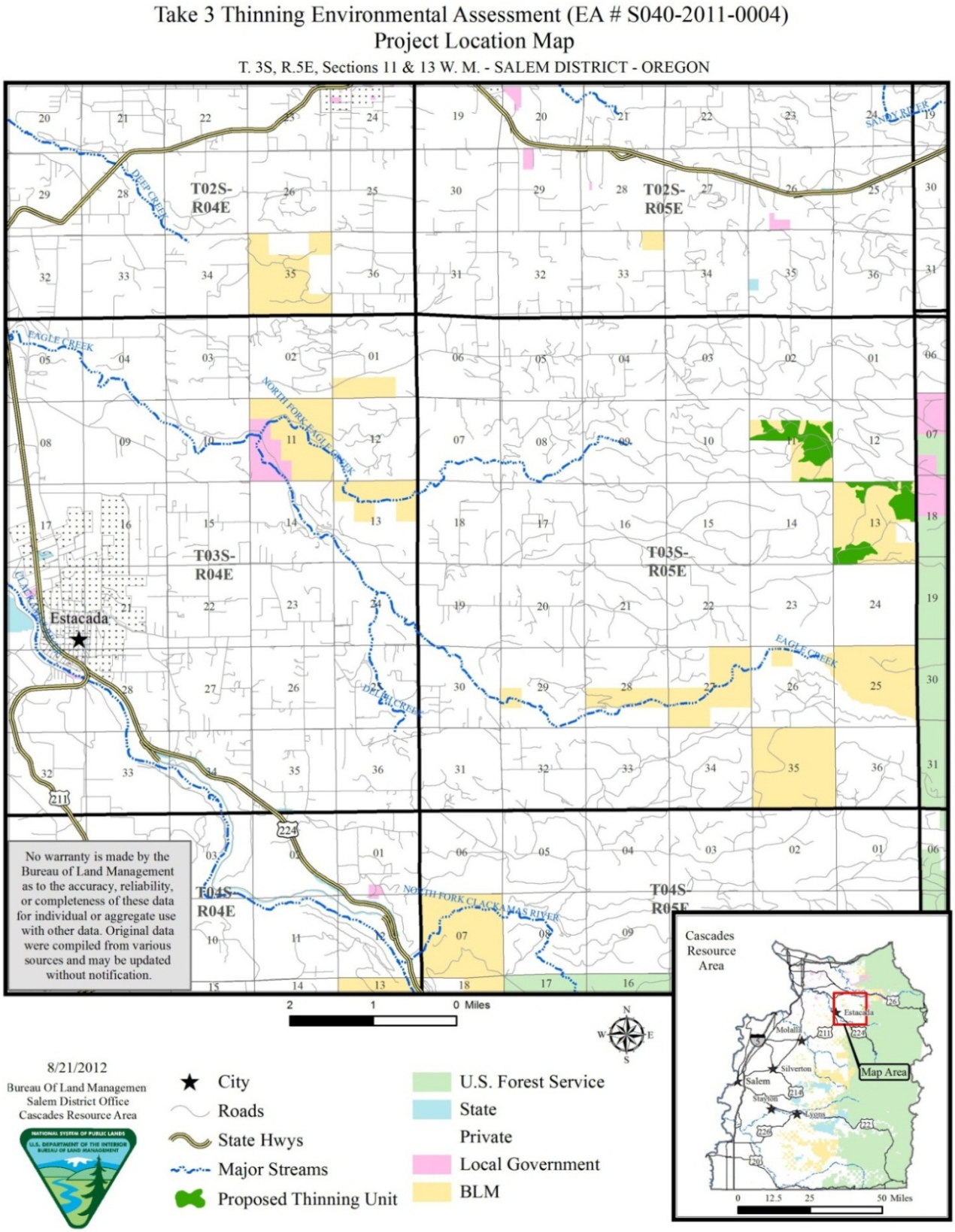
The Cascades Resource Area, Salem District Bureau of Land Management (BLM), proposes to thin approximately 342 acres of 30-96 year old forest stands. Connected actions associated with this project would include the decommissioning or renovation of existing roads and fuels management and a small amount of permanent new road construction. Approximately 0.15 miles of permanent new road would be constructed. Approximately 1.10 miles of temporary road would be constructed and decommissioned after operations. An additional 0.47 miles of existing road would be decommissioned. Approximately 1.55 miles of existing road would be renovated, and one gate would be installed (*EA Section 2.2*).

1.2 Project Area[2] Location and Vicinity

The project area is within the Eagle Creek 5th field Watershed near Estacada in Clackamas County, Oregon. The Eagle Creek Watershed contains about 57,500 acres; the BLM administers 4,004 of those acres. This project would thin approximately 342 acres. BLM-administered land is intermixed with privately-owned, county and U.S. Forest Service (USFS) land. The project is located within Township 3 South, Range 5 East, Sections 11 and 13. The nearest town to the project area is Estacada, Oregon. (*See Figure 1: Project Location Map*).

[2] Project Area is defined as that area that is directly affected by project operations (e.g. thinning units, area cleared for landings, roads and rights-of-way). The area around the Project Area, especially BLM managed lands in the same contiguous block of ownership, is referred to as the project area vicinity or similar term.

Figure 1: Project Location map



1.1 Purpose of and Need for Action

1.1.1 Need for the Action

Lands within the Matrix/General Forest Management Areas (GFMA) Land Use Allocation (LUA) are primarily designated for the sustained production of timber. BLM staff members have analyzed forest inventory data and conducted field examinations to identify specific forest stands in the project area vicinity that need forest management actions to continue meeting land use objectives defined in the Salem District RMP. The proposed stands are either currently overstocked, or will soon grow into an overstocked condition. Overstocked stands generally have more trees than the sites have water, nutrients and growing space to sustain. If these overstocked stands are not managed, growth rates decline, the health and vigor of the trees and other vegetation decline, and the stands begin to "self thin" as the smaller, less vigorous trees die. This typically results in lower timber productivity and delays development of complex stand structure used by late successional associated wildlife species.

Lands within the Riparian Reserve LUA are designated for restoring and maintaining the ecological health of watersheds and aquatic ecosystems (*RMP p. 5*), and for providing habitat for terrestrial species (*RMP p. 9*). The forest stands identified for treatment in this LUA are also overstocked, with declining growth rates that result in delayed development of large diameter snags and other habitat characteristics associated with late-successional forests that are beneficial to many wildlife species.

The Northwest Forest Plan (NWFP) (p. C-32) and the RMP (p.11) direct the BLM to apply silvicultural practices in the Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy (ACS) objectives. The RMP (p. D-6) states that merchantable logs may be removed "where such action would not be detrimental to the purposes for which the Riparian Reserves were established". EA section 3.3.10 describes the project's compliance with the Aquatic Conservation Strategy, including the nine ACS objectives. The NWFP (p. B-31) states that "active silvicultural programs will be necessary to restore large conifers in Riparian Reserves".

The proposed action would contribute to higher timber productivity and value as well as increased stand complexity benefitting fish and wildlife species. These desired traits move the proposed forest stands toward a condition that would meet the objectives defined in the Salem District RMP (*EA 1.3.2 and RMP pp. 46-48*).

1.1.2 Purpose (Objectives) of the Project

This project has been designed under the Salem District Record of Decision (ROD) and Resource Management Plan, May 1995 (RMP) and related documents which direct and provide the legal framework for management of BLM lands within the Salem District (*EA 1.2.2).*

The proposed project area is within the GFMA and Riparian Reserve land use allocations (*RMP p. 5; NWFP p. A-4, A-5; EA 1.3*). The following RMP and NWFP objectives would be applied to achieve the purpose of this project.

Within the Matrix/GFMA LUA

1. Manage developing stands on available lands to promote tree survival and growth to: 1/achieve a balance between wood volume production, quality of wood, and timber value at harvest (RMP p. 46); 2/ increase the proportion of merchantable volume in the stand; 3/ produce larger, more valuable logs; 4/ anticipate mortality of small trees as the stand develops; and to 5/ maintain good crown ratios and stable, wind-firm trees. (*RMP p. D-2*)
2. Supply a sustainable source of forest commodities from the Matrix land use allocation to provide jobs and contribute to community stability (*RMP pp. 1, 46-48*).
3. Provide for important ecological function such as dispersal of organisms, including those associated with both late-successional and younger forest stands, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees (*RMP P. 20*).

Within the Riparian Reserve LUA

4. Provide habitat for special status, Supplemental Environmental Impact Statement (SEIS) special attention and other terrestrial species (*RMP P. 9*).
5. Maintain water quality standards (*RMP p. 2*) and improve stream conditions by:
    - Maintaining effective shade for streams pursuant to BLM's Total Maximum Daily Load (TMDL) agreement with the State of Oregon.
    - Develop large conifers to provide future recruitment opportunities for large coarse woody debris, large snag habitat and in-stream large wood.
6. Develop long-term structural and spatial diversity, and other elements of late-successional forest habitat, and control stocking (stand density) to acquire desired vegetation characteristics and improve diversity of species composition within the Riparian Reserve LUA.

Within Both Matrix/GFMA and Riparian Reserve LUA

7. Protect, manage, and conserve federal listed and proposed species, special status and SEIS special attention species and their habitats to achieve their recovery in compliance with the Endangered Species Act and Bureau special status species policies (*RMP p.9, 28*).
8. Maintain and develop a safe, efficient and environmentally sound road system (*RMP p. 62*) and reduce environmental effects associated with identified existing roads within the project area (*RMP p. 11*) by:
    - Providing appropriate access for timber harvest, silvicultural practices, and fire protection vehicles needed to meet the objectives above;
    - Perform proper road maintenance to prevent road deterioration or failure and to prevent road generated sedimentation that exceeds ODEQ turbidity standards.

1.1.3 Decisions to be made

The following decisions will be made through this analysis:

- To determine if an Environmental Impact Statement (EIS) should be prepared based on the potential for significant impacts to the human environment not already analyzed in the EIS prepared for the Salem District RMP and its amendments, or if a Finding of No Significant Impact (FONSI) is appropriate.
- To implement or not implement the thinning as proposed, or modify the proposed project.
- To implement or not implement proposed temporary road building, renovation, or decommissioning within the project area and/or outside of the proposed project units.
- To implement or not implement proposed fuels management projects on BLM-administered lands within the project area and/or outside of proposed project units.

1.1.4 Decision Factors

In choosing the alternative that best meets the purpose and need, the Cascades Resource Area Field Manager will consider the extent to which each alternative would:

1. Provide timber resources and revenue to the government from the sale of those resources (objectives 1 and 2);
2. Reduce the costs both short-term and long-term of managing the lands in the project area (objectives 1 and 2);
3. Provide habitat for special status, SEIS special attention and other terrestrial species (objective 4);
4. Provide habitat for a variety of organisms associated with both late-successional and younger forest (objective 3);
5. Provide safe, cost-effective access for logging operations, fuels management and fire suppression (objectives 2 and 8);
6. Reduce competition-related mortality and wildfire risk, and increase tree vigor and growth (objectives 1 and 6);
7. Reduce erosion and subsequent sedimentation from roads (objective 8);
8. Provide for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris (objectives 1, 3, 4 and 6);
9. Promote the development of healthy late-successional characteristics in the Riparian Reserve land use allocation (objective 6);

1.2 Conformance with Land Use Plan, Statutes, Regulations, and other Plans

This project has been designed under the Salem District Record of Decision and Resource Management Plan, May 1995 (RMP) and related documents which direct and provide the legal framework for management of BLM lands within the Salem District. In summary, the Take 3 thinning project conforms to the:

1. *Salem District Record of Decision and Resource Management Plan*, May 1995 (RMP): The RMP has been reviewed and it has been determined that the proposed thinning activities conform to the land use plan terms and conditions. Implementing the RMP is the reason for doing these activities (*RMP p.1-3*).
2. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl*, April 1994 (the Northwest Forest Plan, or NWFP);
3. *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, January 2001. (2001 ROD), as modified by the 2011 Survey and Manage Settlement Agreement (July 2011).

The analysis in the Take 3 Thinning EA is site-specific, and supplements and tiers to analyses found in the *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement*, September 1994 (RMP/FEIS). The RMP/FEIS includes the analysis from the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl*, February 1993 (NWFP/FSEIS). The RMP/FEIS is amended by the *Final Supplemental Environmental Impact Statement for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, November 2000.

Watershed Analysis: Information for the Eagle Creek Watershed Analysis (1995) has been incorporated into the development of the proposed thinning activities and into the description of the Take 3 EA's affected environment and the environmental effects and is incorporated by reference. The Eagle Creek Watershed Analysis covers the project area.

The above documents are available for review in the Salem District Office. Additional information about the proposed activities is available in the *Take 3 Thinning EA* Analysis File (TK3AF), also available at the Salem District Office.

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. Rey, et al.*, No. 08-1067 (W.D. Wash.) (Coughenour, J.), granting Plaintiffs' motion for partial summary judgment and finding a variety of 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 (IM-OR-2011-063, July 2011).

Previously in 2006, the District Court (Judge Pechman) had invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. On October 10, 2006, following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain activities from the Survey and Manage standard (Pechman exemptions), including thinning projects in stands less than 80 years old (Exemption A). As part of the 2011 Settlement Agreement, the 2006 Pechman Exemptions remain in force.

1.2.1 Land Use Plan Update

A final judgment was issued on 5/16/2012 concerning the Pacific Rivers Council V. Shepard litigation. The court vacated the Western Oregon Plan Revision (WOPR) Record of Decision, returning the management of the federal lands to the Northwest Forest plan, i.e. 1995 Resource Management Plans that were in place prior to December 30, 2008, as modified (i.e. Salem District RMP). The Northwest Forest Plan was incorporated into the 1995 Salem District RMP.

1.2.2 Relevant Statutes/Authorities

This section is a summary of the relevant statutes/authorities that apply to this project.

- **Archaeological Resources Protection Act (ARPA) 1979** – Protects archeological resources and sites on federally-administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.
- **Clean Air Act (CAA) 1990** – Provides the principal framework for national, state, and local efforts to protect air quality.
- **Clean Water Act (CWA) 1987** – Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.
- **Endangered Species Act (ESA) 1973** – Directs Federal agencies to ensure their actions do not jeopardize, or contribute to the need to list threatened and endangered species.
- **Federal Land Policy and Management Act (FLPMA) 1976** – Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.
- **Healthy Forests Initiative (HFI) 2002** – Focuses on reducing the risk of catastrophic fire by thinning dense undergrowth and brush in priority locations that are identified on a collaborative basis with selected Federal, state, tribal, and local officials and communities. The initiative also provides for more timely responses to disease and insect infestations.
- **Migratory Bird Treaty Act of 1918** - Provides for protection of migratory birds.
- **National Environmental Policy Act (NEPA) 1969** – Requires the preparation of environmental impact statements for Federal projects which may have a significant effect on the environment.

- **Oregon and California Act (O&C) 1937** – Requires the BLM to manage O&C lands for permanent forest production, in accord with sustained-yield principles. Management of O&C lands must also protect watersheds, regulate stream flow, provide for recreational facilities, and contribute to the economic stability of local communities and industries.

EA Section 3.3.9 addresses additional authorities and management direction.

1.3 Scoping and Identification of Relevant Issues

1.3.1 Scoping

Internal scoping was conducted through the project planning process by the assigned Interdisciplinary Team (IDT) of BLM resource specialists. This process includes record searches, on-site field visits to the project area, professional observation and judgment, literature review and a series of IDT discussions throughout the planning process. During project planning the IDT considered elements of the environment that are particular to this project as well as elements of the environment that are common to all similar timber management projects.

Public scoping for this project was conducted by means of a scoping letter sent out to approximately 90 federal, state and municipal government agencies, nearby landowners, tribal authorities, and interested parties on the Cascades Resource Area mailing list on June 3, 2011. Eight (8) comments letters were received during the scoping period. The scoping and EA comment letters are available for review at the Salem District BLM Office.

1.3.2 Relevant Issues

The 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 considered to be relevant if they determine the appropriate range of alternatives to analyze, whether the proposed action should be modified or determine the significance of the project's effects on elements of the environment. Analysis of these issues provides a basis for comparing the environmental effects of proposed action(s) 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 (PDF), and analyzed the environmental effects.

1.3.2.1 Issue 1: The Effects of Management Actions on Fisheries, and Aquatic and Riparian Habitats

Site specific concerns for this project include: 1/ The development of complex stand structures in the Riparian Reserve. 2/ Sediment from roads, road decommissioning, and harvest activities and their effect on aquatic and riparian habitat. 3/ The effects of hauling on roads that cross North Fork Eagle Creek where listed fish are present. 4/ Potential increase in road densities in a Key Watershed. 5/ The effects of harvest activities on listed fish species. The elements of this issue are addressed in the following sections of this EA: 3.3.1, 3.3.2, 3.3.3, 3.3.5.

1.3.2.2 Issue 2: The Effects of Management Actions on Vegetation and Forest Stand Characteristics

Elements of the issue identified in scoping: Determining appropriate thinning stands including: Stand age, species composition and stand density, stands that were previously thinned or dropped from previous sales. Thinning prescriptions and stand development trajectories including: structural complexity, species, and invasive/non-native species populations. Management of identified populations of flora (plants, bryophytes, fungi) species with special status (Threatened and Endangered (T/E), Survey and Manage, sensitive, etc.). The elements of this issue are addressed in the following sections of this EA: 3.3.1, 3.3.5.

1.3.2.3 Issue 3: The Effects of Management Actions on Wildlife and Habitats

Elements of the issue identified in scoping: The effects of harvest activities on terrestrial animals with special status (T/E, Survey and Manage, sensitive, etc.) and their habitats; provisions of snag, coarse woody debris, remnant old-growth tree and large tree habitats. The elements of this issue are addressed in the following sections of this EA: 3.3.1, 3.3.5.

1.3.2.4 Issue 4: The Effects of Management Actions on Recreation and Off-Highway Vehicle (OHV) use

Site specific concerns for this project include: 1/ Effects of harvest activities on the Viewshed from the Salmon-Huckleberry Wilderness area. 2/ OHV use and access into the Salmon-Huckleberry Wilderness area from BLM land. 3/ OHV use in areas after thinning activities and in BLM plantations in section 13. 4/ Public access to recreation trails in the Salmon-Huckleberry Wilderness from BLM lands. 5/ Effects of harvest activities on areas inventoried for and identified to contain "wilderness characteristics" section 13. The elements of this issue are addressed in the following sections of this EA: 3.3.4, 3.3.7.

1.3.2.5 Issue 5: The Effects of Management Actions on meeting ACS objectives

Elements of the issue identified in scoping: Compliance with ACS objectives in the Riparian Reserve; retention and long range development of complex stand structure in the Riparian Reserve. Protection of water quality and potential direct, indirect and cumulative effects to water quality, water quantity (peak flows), and stream channels. The elements of this issue are addressed in the following sections of this EA: 3.3.1, 3.3.2, 3.3.3, 3.3.5.

1.3.3 Issues Considered, Not Analyzed in Detail

Some of the issues identified in scoping are outside of the scope of the Take 3 Thinning project or are not consistent with the Need for Action or the Purpose of the Project (*EA 1.1.1, 1.1.2*). The following summarizes these issues and the reasons they were not analyzed in detail. The team reviewed and assessed these issues and determined that further information is not necessary for the decision maker to make an informed decision.

1. **Economic Viability of Management Actions:** The BLM did not analyze the economic viability of the sale because the project was designed to be economically viable in order to meet the purpose and need of the project, specifically EA project objectives 1 and 2 (*EA section 1.1.2*).

2. **Carbon Storage / Emissions:** The BLM did not analyze carbon storage or emissions specifically for this project because the BLM has sufficient information from analysis of four previous commercial thinning projects in the Cascades Resource Area for the Decision Maker to make an informed decision between alternatives.

   Therefore, analyzing quantitative carbon storage and emissions for this project would not provide any additional information needed for a reasoned choice among alternatives for this project.

   The following is a summary of information from those four analyses[3]:

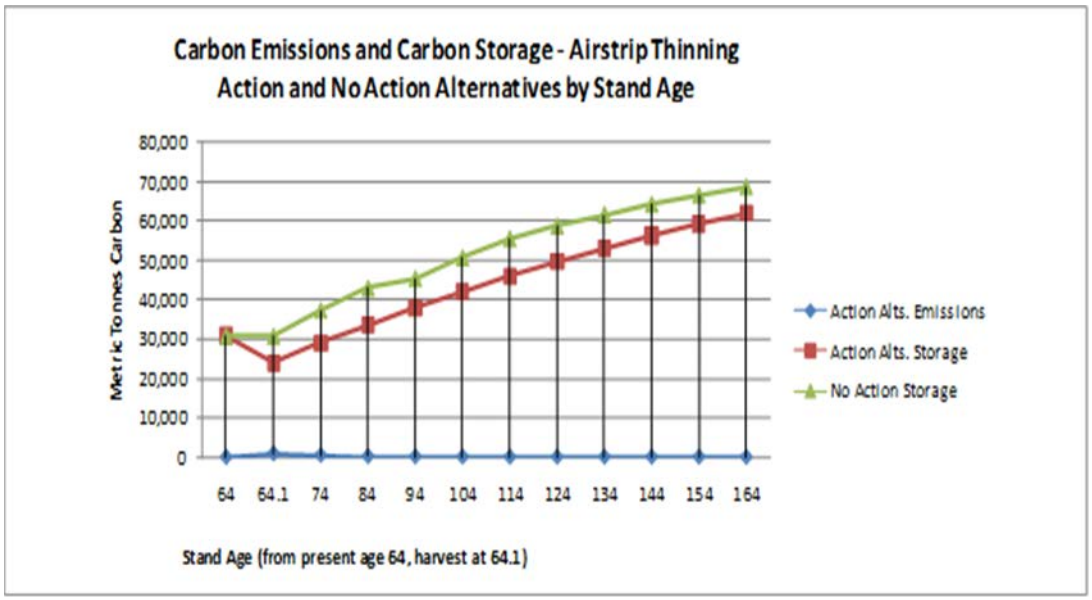
   - Range analyzed for treated acres in the projects: 290 to 1,724 acres.
   - Range analyzed for carbon in harvested wood: 7,000 to 107,000 tonnes.
   - Range analyzed for total carbon emissions in the 30 year period following harvest: 1,850 - 17,080 tonnes.
   - Range of carbon storage in untreated project area at 30 years: 45,420 – 450,270 tonnes.
   - Range of carbon storage in treated project area plus carbon in landfills and wood products at 30 years: 42,150 – 342,200 tonnes.

   The analysis of each of these projects shows that:

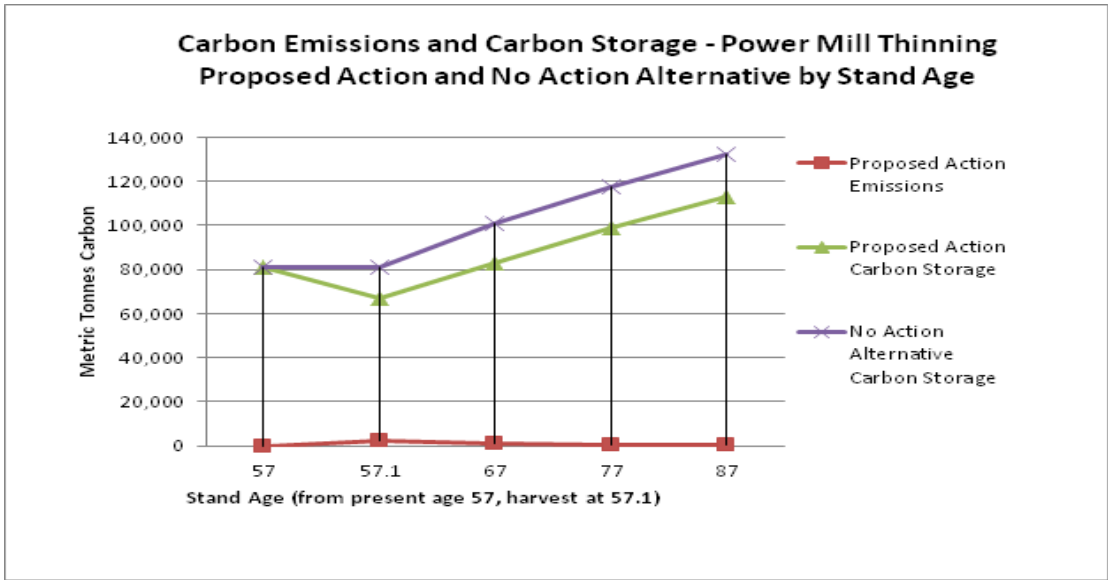
   - The carbon emissions attributable to the projects, both individually and cumulatively, are of such small magnitude that it is unlikely to be detectable at any scale (global, continental or regional) and thus would not affect the results of any models now being used to predict climate change.
   - Total carbon storage for the no action alternative of each project is higher than the total carbon storage for all action alternatives throughout the 30 year analysis period. Figure 6 of the Power Mill EA and Figure 12 of the Airstrip EA are incorporated here by reference. They show the relationship between carbon storage in the proposed action and no action alternative as well as carbon emissions during the analysis period. The other sales analyzed (Gordon Creek and Highland Fling thinning projects show a similar pattern.

[3] For each project, carbon analysis was based on more area than was actually treated and more wood volume than was actually harvested. Harvested wood volume is reported here as tonnes (or gigatonnes, equal to one billion tonnes) of carbon. Carbon emitted is the sum of carbon in harvested wood that would be released in the 30 year analysis period, plus the carbon in diesel fuel used for harvest operations and carbon released by burning piles of logging slash and debris.

- The Take 3 Thinning project falls within the range covered by the projects analyzed in all particulars and is expected to have similar results.



Airstrip Thinning, EA Figure 12, p. 86



Power Mill Thinning EA, Figure 6, p. 95

3. **Defer of harvest in the NW section 13 and NE corner section 11:** The land proposed for thinning in the NW corner of section 13 and NE corner of section 11 are allocated as both Matrix and Riparian Reserve. Deferring harvest in Matrix would be inconsistent with RMP guidance for this land use (*RMP pp. 1, 46-48*) and the purpose and need of this project. Lands proposed for thinning in the Riparian Reserves were identified as appropriate for treatment to meet ACS and RMP objectives. (*RMP pp. 9-15, D-6, NWFP p. B-31).*

4. **Volume of timber proposed for removal exceeds the Eagle Creek Watershed Analysis recommendation:** The Eagle Creek Watershed Analysis (WA) (1995), which was prepared by the USFS, was intended to provide a large scale analysis (over 50,000 acres) of the probable sale quantity for all federal lands within the watershed. The numbers shown in the calculation in the WA were based on the assumption there would be an average of 46 thousand board feet (MBF) of merchantable material per acre available for harvest. More accurate measurements collected by the USFS revealed there was actually 120 to 150 MBF of merchantable material per acre present. The purpose of the probable sale quantity analysis was to compare the harvest level estimates in the Northwest Forest Plan (NWFP) to the combined harvest estimates for all the watershed analyses in the entire Mt. Hood National Forest. It was never the intent of the analysis to set an upper harvest limit for the watershed. This issue was reviewed and addressed in the Rusty Saw Timber Sale Project. (*See BLM Decision Record for the Rusty Saw Timber Sale (OR080-T01-504, EA No.OR-080-99-08), BLM Response to Protest for the Rusty Saw Timber Sale, BLM Response to Appeal for the Rusty Saw Timber Sale*).

5. **An opinion that a separate monitoring plan should be implemented for this project:** The BLM implements all monitoring requirements listed in the PRMP FEIS (1994). Monitoring of any operations are done by the contract sale administrator to ensure compliance with contract requirements and BMP's. No further analysis on a separate monitoring plan will be analyzed in this EA.

2.0 ALTERNATIVES

2.1 Alternative Development

Pursuant to Section 102 (2) (E) of the National Environmental Policy Act (NEPA) 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." There were no unresolved conflicts concerning alternative uses of available resources, therefore, this EA will analyze the effects of the "Proposed Action" and "No Action Alternative" (which provides the baseline to evaluate effects).

2.1.1 Planning and Implementation Process

In planning the Take 3 Thinning project proposal, the IDT developed criteria to implement the Management Actions/Direction in the RMP (*pp. 20-22, 46-48*) in selecting stands to be treated, type of silvicultural treatments, boundary locations, logging systems, fuel treatments, and road system design and use.

The IDT also developed a set of project design features (PDF) that would guide implementation of the project. These would be applied to all selected actions as appropriate. The BLM will consider and evaluate comments received in response to public review of this EA and make any necessary changes to the analysis or action to be implemented.

The BLM would implement the selected actions and PDF's analyzed in this EA in project layout (physical delineation of treatment boundaries and road locations) and timber sale contract provisions. The timber sale contract would be written and administered by the BLM and require the timber sale operator to accomplish the requirements of the contract in a manner that is consistent with the actions and PDF's analyzed in this EA. Administration of contract provisions would be done by trained and authorized BLM employees.

2.2 Proposed Action

2.2.1 Proposed Treatments

Table 1: Proposed Harvest Method by Land Use Allocation (LUA)

EA Unit No. T3S, R5E	Average Stand Ages*	EA Unit Acres	Thinning Acres by Yarding System and LUA				Untreated Area (Within the Contiguous Block of BLM Land)	
			Ground Based Yarding		Skyline Yarding			
			Riparian Reserve	Matrix / GFMA	Riparian Reserve	Matrix / GFMA	Riparian Reserve	Matrix
11A	65-96	156	1	133	5	17	186	382
11D	65-96	9	3	6	0	0		
11G	66	12	5	2	2	3		
13A	62-67	35	13	19	2	1		
13B	62	70	1	35	6	28		
13C	60	8	0	8	0	0		
13D	30-60	52	0	52	0	0		
Total Thinning Ac.		342	23	255	15	49		
Total Thinning Acres by Yarding Type: Ground Based = 278 acres Skyline = 64 acres								
Total Acres Treated by Land Use Allocation: Matrix/GFMA= 304 acres Riparian Reserve= 38 acres								
*Average Stand Ages based on birthdate (Silviculture Prescription page 3-8) **SEE TABLE 7** for breakdown of acres in each age class for units.								

Thinning - Matrix LUA

The BLM proposes to commercially thin approximately 342 acres of overstocked 30 to 96 year old forest stands within the General Forest Management Area (GFMA) portion of the Matrix and in Riparian Reserve Land Use Allocation (LUA) (*EA Table 1*). Approximately 70 acres were initially thinned as part of the "Rusty Saw Reoffer" timber sale from the late 1990's and are proposed for a second-entry thinning under the Take 3 project. Current stand densities based on stand exam data collected in 2010 and 2011 indicate a second-entry treatment in the thinned acres would meet the purpose and need of this project.

The proposed commercial thinning would reduce stand density by implementing a "thin from below" prescription in all units. The prescription generally designates trees to be retained based on a combination of tree size, crown position, spacing, species mix, vigor and potential future log quality. All large trees (36 inches in diameter or larger) would be reserved from cutting and protected from damage as much as feasible.

Specifically, the prescription proposes to:

- Reduce trees per acre (TPA) densities from ~100-240 currently, down to ~60-125 trees per acre and current relative densities (RD) of 49-72 down to ~36-47 (RD) post treatment;
- Retain the largest, healthiest and best formed dominant and co-dominant trees;
- Retain any trees with a diameter of 36 inches or greater;
- Reserve marked wildlife trees and any topped trees that were intended for future snags as much as feasible;
- Maintain a mix of tree species, including hardwoods that are currently present in the stand;
- Retain at least 90% of large (over 15 inches diameter) snags and protect them from damage during timber harvest activities;
- Retain at least 90% of large (over 20 inches diameter) down logs from damage during timber harvest activities;
- Maintain an average canopy closure of 40 percent over the project area;
- Intentionally leave some deformed, forked topped or broken top trees for future cavity nesters; and
- Implement three, 1 acre low density (12-14 green trees per acre) thinning areas – two in unit 11A and one in 13D for a total of up to 3 acres of low density thinning areas. Pile and burn slash in these areas for recruitment of grasses, forbs, deciduous shrub, understory vegetation and ground cover. This treatment will provide early seral components in these stands, as well as foraging opportunities for big game, migratory birds, and other early seral associated species.

Riparian Reserve LUA

The BLM proposes to enhance riparian reserve characteristics by thinning 38 acres (*EA Table 1*) of 62-68 year old conifer stands (*see Table 7*) to accelerate development of a large tree component, appropriate snag distribution and density management. Approximately 1 acre of the 38 proposed for treatment was initially thinned as part of the "Rusty Saw Reoffer" timber sale. The prescription in the proposed riparian reserve acres includes the criteria outlined above for the Matrix proposed treatments, along with the following additions where appropriate:

- Maintain small clumps (2-3 trees together) of dominant and co-dominant trees over 28 inches DBH.
- Provide 25-75 percent variability in leave tree spacing.

The thinning prescription will also retain a canopy closure of at least 50 percent in the secondary shade zone.

Stream protection zones (SPZ) on all perennial and intermittent streams will be maintained. No harvest or direct disturbance would take place within the SPZ, which in this project area have a minimum width of 100 feet each side of perennial streams and 50 feet each side on intermittent streams.

2.2.1.1 Logging Systems

The BLM designed the Take 3 Thinning project for implementation using basic logging systems (ground-based and skyline) to accomplish the proposed thinning project. For all logging systems, the BLM requires the logging operators to propose a logging operations plan that best uses their particular combination of equipment and operating techniques to accomplish the project within the requirements of the contract and following all project design features described in sections 2.2.3 Table 4 of this EA.

Authorized BLM personnel review the proposed plan and examine the locations of skid trails, landings, yarding corridors and trees to be used for attaching cables, as well as the equipment proposed for use prior to approving the plan. The approved plan then becomes an enforceable part of the contract which is administered by trained and authorized BLM personnel.

- Approximately 278 acres (81 percent) of the thinned area would be harvested using conventional ground-based logging equipment such as: track mounted harvesters that cut and process trees into logs; track mounted loaders that pick logs up and place them closer to a skid trail or landing (called “shovel swing”); skidders that drag logs to a landing; or forwarders that carry logs to a landing like an off-road log truck.
- Approximately 64 acres (19 percent) of the thinned area would be harvested using a skyline yarding system or using low-impact ground-based machinery designed for use on slopes up to 45 percent.

2.2.2 Connected Actions (Road Work, Culverts and Fuels Treatments)

Table 2: Road work, culverts and fuels treatments

Action	Associated Unit	Amount	Description/Notes
Roads		**Miles**	
Permanent road construction	13A,B	0.15	Road to be rocked, gated (see figure 3). Includes clearing vegetation in the road right-of-way using ground based logging equipment. Clearing would average less than 30 feet wide.
Temporary road construction	11A,D 13B	1.1	Road not to be rocked, natural surface only. Includes clearing vegetation in the road right-of-way using ground based logging equipment. Includes temporary road construction on private land. Clearing would average less than 30 feet wide. To be decommissioned. (see below, or EA 2.2.2.1)
Maintenance	All	7.92	Existing useable road, including haul, maintenance operations and added rock.
Renovation, stabilize	11A,D,G	1.55	Existing subgrade, not maintained to current safety standard. Road brought up to original design standard. To be water barred where appropriate after operations and remain open to vehicle traffic.
Decommission (includes temporary roads)	11A,D 13B	1.52	Road subgrade would be water barred where appropriate, existing culverts removed; road bed ripped in places where appropriate, seeded and closed to vehicle traffic.
Close, Stabilize	None	0.26	Road subgrade would be water barred where appropriate, seeded and closed to vehicle traffic.
Culverts and Stream Crossings		**Count**	
Install or replace culvert, cross drain, no stream. (Number of culverts.)	13A,B,D	3	Cross drain culverts. Installed during the dry season. No culverts replaced on live stream crossings.
Fuel Treatments		**Acres**	
Burn landing piles	All	5	Burn the landing piles. Up to 3 acres total of machine pile/burn in the low density thinning areas.
Machine pile and burn.	11A 13D	3	

2.2.2.1 Road Work

Roads would be renovated or constructed as shown in Tables 2 and 3 to provide access for safe and efficient logging and hauling.

- Maintenance would bring existing roads up to safe timber haul standards by adding rock, blading and shaping the road, cleaning ditches and culverts, and cutting roadside brush.
- Roads 3-5E-11.1 and the 3-5E-11.3 road at the junctions of the 3-5E-4.0 road are currently blocked with earth and debris barricades from the previous “Rusty Saw” commercial thinning (EA# OR080-TS01-504). These barricades would be removed for access to Take 3 Thinning units. These roads would be renovated, and then water-barred and sloped to drain after thinning operations are complete.

- 0.15 miles of new road would be a permanent addition to the road network in section 13 in order to improve access between BLM managed lands in section 11 and 13. 0.47 miles of existing road would be decommissioned and removed from the road network in section 13 (*see EA 2.2.2 (below), Figure 3*) so there would be a net decrease of 0.32 mile of road in the watershed.
- All other new roads would be temporary and decommissioned when thinning operations are complete (*see EA 2.2.2. (below), Figures 2 and 3*).

Road Closure, Decommissioning

Close/Stabilize

- Road 3-5E-13.4 would be blocked with large boulders and/or earth and debris barricades at the junction of 13.4 and 13.0 road in the SE ¼ of Section 13 to prevent unauthorized OHV access in BLM conifer plantations (*see EA Figure 3*). Water bars would be installed to drain water flowing along the road bed onto stable vegetated slopes. The subgrade would remain intact so the road could be renovated for future use. Road closure and stabilization of the 3-5E-13.4 road is analyzed in this EA, and will be implemented separately from the proposed Take 3 thinning.

Decommission

Temporary roads:

- All temporary roads would be decommissioned. Decommissioning of temporary roads on BLM land would include the following:
  - Earth and debris barricades would be placed at main road junctions to prevent vehicle access;
  - Any temporary culverts would be removed;
  - Waterbars would be constructed where appropriate along the road bed to re-establish natural drainage patterns and re-direct water flow off the main road bed and onto stable vegetated slopes;
  - The roads would be ripped as needed to provide surface roughness and, seeded with native species to vegetate disturbed soil, or covered with logging slash and debris to provide additional stability and blocked to prevent vehicle use.

- The 0.05 mile of new natural surface road on private land (accessing unit 11D) will receive decommissioning treatments similar to those listed above, which are required and specified by the private land owner. The treatments will be detailed in a license agreement as part of the timber sale. This road is located on a flat bench on stable ground and behind a private gate.

3-5E-13.0 road:

- Road 13.0 from the junction of 13.4 to the USFS boundary would be decommissioned (*see EA Figure 3*). Decommissioning of 0.47 miles of road 13.0 is analyzed in this EA and would be implemented separate from the proposed Take 3 thinning. Decommissioning of the 13.0 road would include the following:
  - Earth and debris barricade and large boulders would be placed at the main road junction to prevent unauthorized OHV access into the Salmon Huckleberry Wilderness, while maintaining hiker and equestrian access to trailheads in the Wilderness area;
  - Where appropriate, some of the existing road surface would be pulled back from the downslope edge of the road to a stable location, retaining at least ½ of the existing road surface for equestrian or foot traffic;
  - Waterbars would be constructed where appropriate along the road bed to reestablish natural drainage patterns and re-direct water flow off the main road bed and onto stable vegetated slopes;
  - Exposed and disturbed soil would be seeded with native grass species.

Gates

One gate would be installed in section 13 on road 3-5-13.3 near the junction with 3-5-E-13.1 in the SW¼ of the section to prevent unauthorized access to adjacent private timber land (*see EA Figure 3*).

Table 3: Road Work Detail, Miles

Road ID	BLM Land						Private Land		Associated Unit
	Temporary New Construction Natural Surface	Permanent New Construction Rocked	Renovation	Maint-enance	Decommission	Stabilize, close	Maint-enance	Temporary Construction	
3-5E-4				0.78			1.82		11A,D
3-5E-11				0.49			1.66		11A
3-5E-11.1			0.76						11G
3-5E-11.2			0.31						11A
3-5E-11.3			0.48						11A
3-5E-15							1.47		All 11
3-5E-16							1.08		All 11
3-5E-13				0.27	0.47				All 13
3-5E-13.1				0.99					13B,D
3-5E-13.3				1.13					13A,C
3-5E-13.4						0.26			none
3-5E-13.5				0.05					13B
P1	0.18				0.18			0.05	11D
P2	0.20				0.20				11A
P3	0.02				0.02				11A
P4		0.15							13A,B
P5	0.50				0.50				13B
P6	0.15				0.15				13B
TOTALS	**1.05**	**0.15**	**1.55**	**3.71**	**1.52**	**0.26**	**4.21**	**0.05**	

2.2.2.2 Fuels Treatments

Of the 342 acres proposed for treatment, approximately 8 acres of the treatment area are proposed for fuel hazard reduction treatment in conjunction with the thinning sale. The fuels treatments include burning landing piles, and machine piling and burning in the low density thinning areas *(Table 2).*

Figure 2: Proposed Action Map Section 11

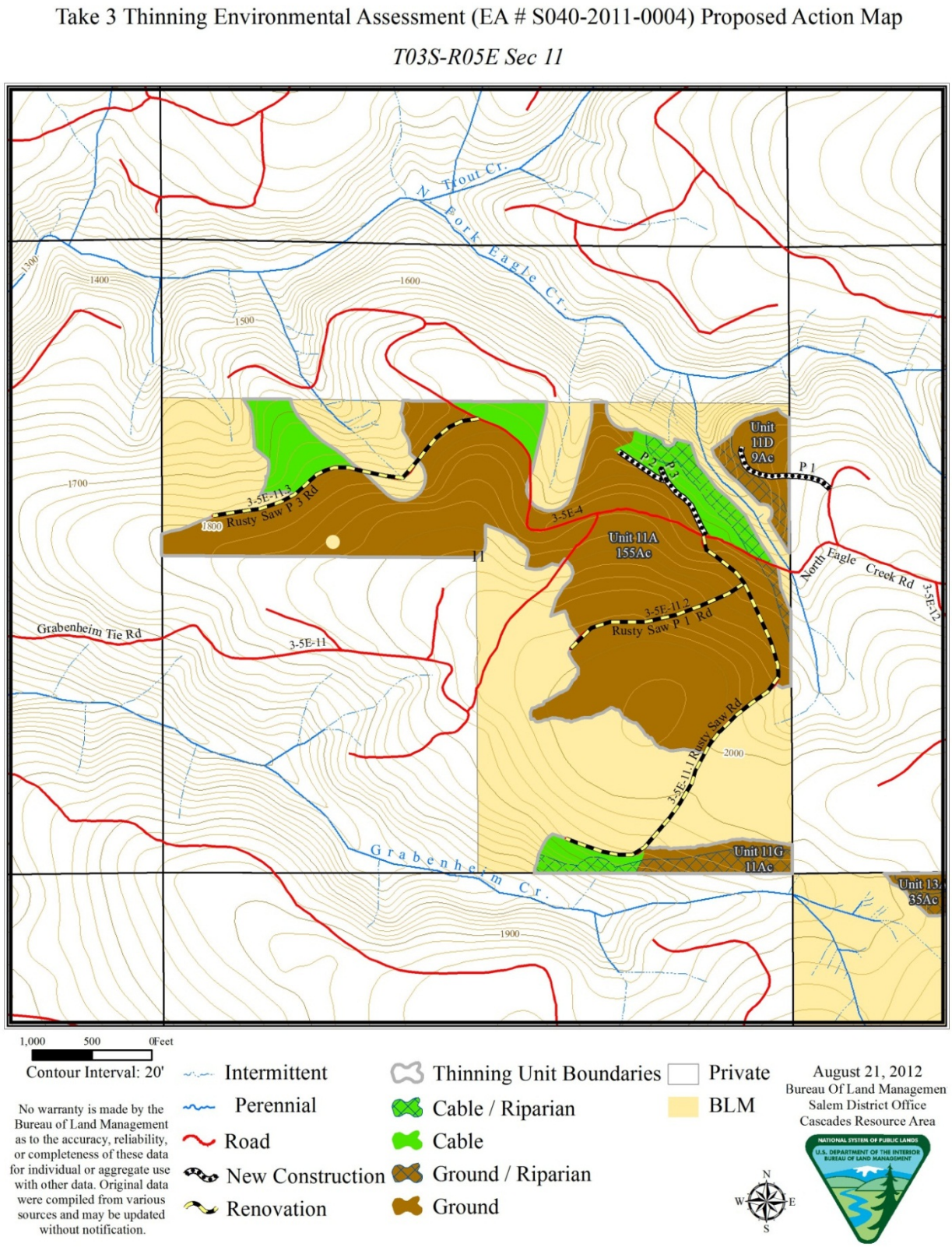
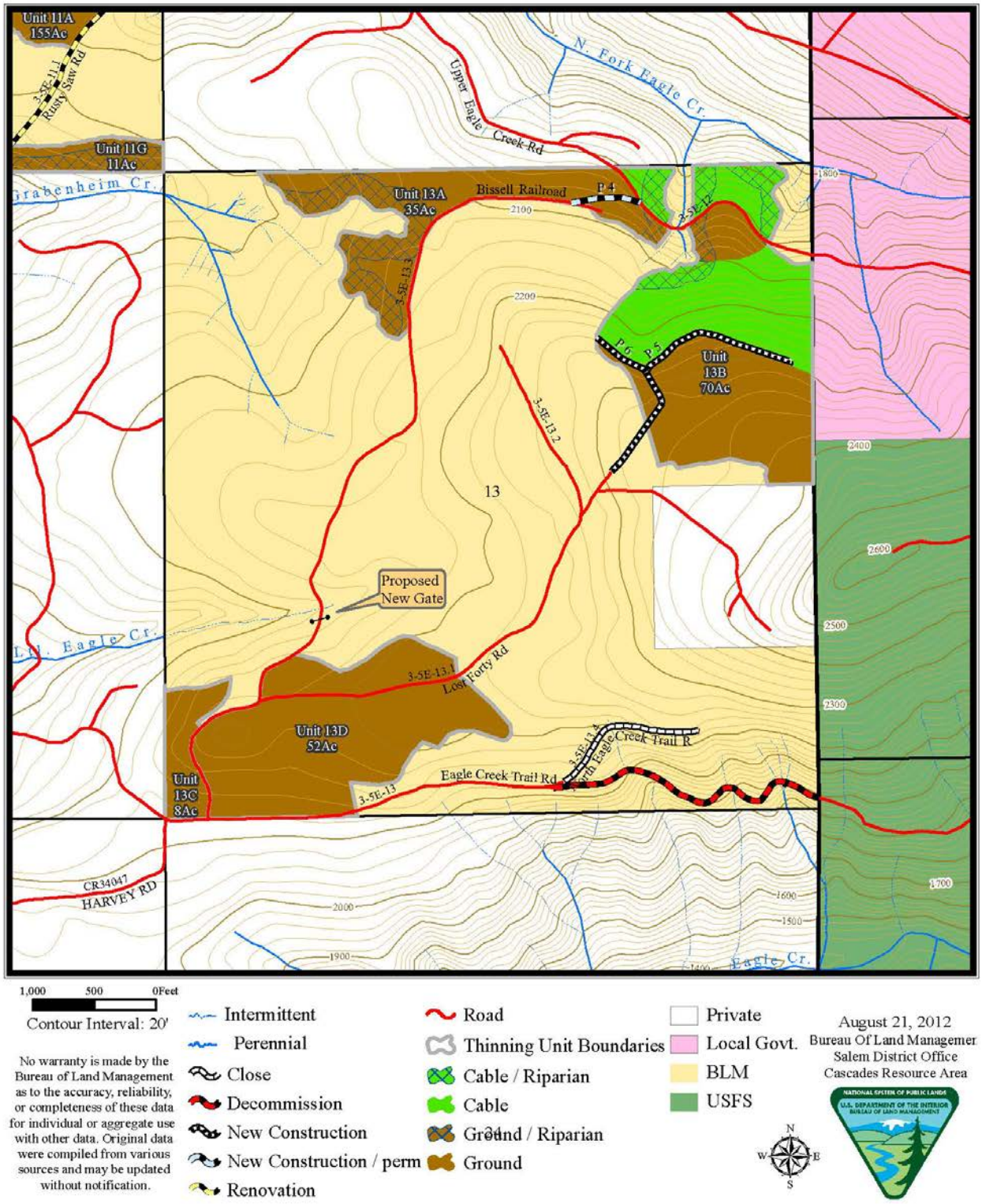


Figure 3: Proposed Action Map Section 13

Take 3 Thinning Environmental Assessment (EA # S040-2011-0004) Proposed Action Map

T03S-R05E Sec 13



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

2.2.3 Project Design Features

This section summarizes the project design features (PDF) that would serve to minimize the project's potential effects on the affected resources described in EA section 3.3, and ensure consistency with the effects analyzed in the RMP/FEIS. Project design features described in this section would be implemented in the proposed action unless otherwise specified. Many project design features contribute to achieving multiple objectives.

These design features are based on the management guidance, design features and best management practices (BMP) described in the RMP/FEIS (Chapter 2; Appendices G, K and S); and RMP (pp. 20-50; Appendices C and D).

Based on the combined experience, professional judgment, familiarity with published research, and field analysis of this project area, the BLM interdisciplinary team of resource specialists (IDT) then refined them into the proposed project actions and project design features (PDF) described in this EA.

The BLM would incorporate the following project design features (PDF) into the selected action and project layout, contract requirements, and contract administration to ensure that the project is implemented as analyzed in this EA. The Contract Administrator enforces compliance with the contract and would suspend operations if the operator fails to follow the guidelines described in the timber sale contract. The BLM timber sale contract holds the purchaser and operator financially liable and requires bonding in an amount sufficient for the BLM to complete restoration work if the operator fails to perform the preventive and restorative requirements of the contract.

The ID team designed the following PDFs to:

- Protect special status species (Vegetation); soil productivity (Soil); water quality and quantity (Water); fisheries, ESA listed fish and aquatic habitat (Fish); stand structure, habitat and wildlife species (Wildlife); air quality (Fire/Air); public safety, rural interface and recreation (Public); cultural resources (Cultural).
- Prevent or reduce: spread of invasive/non-native plant species populations (Invasive), fire hazards and risks (Fire/Air)
- Achieve: desired forest stand composition (Vegetation); economic efficiency (Economic), fuel reduction (Fire/Air)

Table 4: Project Design Features and Benefitting Resources

Applicable benefitting Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
In All Logging Operations:										
1. Limit the area compacted by logging operations (skidding, yarding and landings) to less than ten (10 percent) percent of the harvest area in each unit, outside of road rights-of-way.	♦	♦	♦	♦	♦	♦		♦		♦
2. Locate skid trails and skyline corridors to avoid concentrating runoff water flows that could cause rill or gully erosion with potential to displace soil more than a few feet.	♦	♦	♦	♦						
3. Lift the leading end of all logs off of the ground during yarding (one-end suspension) to prevent the blunt ends of logs from displacing soil in order to prevent creating a channel for erosion. Applies to both skidding and skyline yarding.	♦	♦	♦	♦						
4. Limit the size and number of landings to the minimum needed for safe and efficient operations. Size varies with terrain, area served, equipment size and log size and usually averages approximately 0.1 acre located on and adjacent to roads.	♦	♦	♦		♦	♦	♦			♦
5. Retain organic material including duff, litter and logging slash on the forest floor in average amounts not less than are present in the stand prior to management operations to provide soil stability and nutrient cycling.	♦	♦	♦	♦	♦	♦	♦			
6. Implement erosion control measures where BLM management operations have exposed or disturbed soil to prevent rill or gully erosion that would displace soil more than a short distance (several feet). Typical measures include: shaping to modify drainage (water bars, sloping, etc.); tilling; placing logging slash and debris on exposed soil; and seeding with native species.	♦	♦	♦	♦	♦	♦				
7. Prevent unauthorized off-highway motor vehicle (OHV) use through security measures during operations and physically blocking access and/or making potential routes impassible after operations. Road and skid trail closure methods would be designed to avoid causing erosion, to avoid damaging retained trees and to allow closed roads to be opened if needed for firefighting.	♦	♦	♦	♦	♦	♦	♦	♦		
8. If any trees or snags in the SPZ, or any snags throughout the thinning area must be felled for safe logging operations, leave them on site to create CWD habitat.	♦		♦	♦	♦					♦
9. Install traffic control/protection measures such as signing to reduce potential for conflicts between harvest activities and recreation users.								♦		
10. Restrict hauling of logs to times, weather conditions, road surface conditions and soil conditions when sediment would not be transported to streams.		♦	♦	♦						♦
In Ground-based Logging Operations: RMP/FEIS (pp. 2-34 through 2-37; 4-11 through 4-13; G-2)										
11. Allow skidding (dragging logs behind a skidder) and other ground based logging operations only when the site specific combination of soil conditions, rainfall and operating methods would not result in soil compaction, displacement and erosion impacts exceeding those analyzed in the RMP/FEIS.	♦	♦	♦	♦		♦				♦
12. Re-use existing skid trails whenever feasible for logging operations according to the approved logging plan.	♦	♦	♦	♦	♦	♦				♦
13. Locate new skid trails generally on slopes not greater than 35 percent to avoid gouging, soil displacement, and erosion with effects exceeding those analyzed in the RMP/FEIS.	♦	♦	♦	♦		♦				♦

Applicable benefitting Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
14. Generally limit uphill skidding to slopes where skidders would not break traction to avoid soil displacement.[4]	♦	♦	♦	♦						♦
15. Allow use of mechanized falling/processing and log handling machinery on slopes up to 45 percent where the machinery design and operating techniques would prevent gouging, soil compaction and displacement, and erosion with effects exceeding those analyzed in the RMP/FEIS (pp. 4-11 through 4-13).	♦	♦	♦	♦						♦
In Skyline Yarding Operations: RMP/FEIS (pp. 2-34 through 2-37; 4-11 through 4-13; G-1,2)										
16. For lateral yarding operations where it is not feasible to achieve one-end suspension (cable angles may not create enough lift to achieve one-end suspension until logs get close to the skyline), fall trees to orient logs so that they cause the least soil disturbance and damage to retained trees during lateral yarding.	♦	♦	♦	♦	♦					♦
In Other Operations: RMP/FEIS (pp. 2-34 -- 2-37; 4-8 -- 4-13; G-1,2)										
17. Locate and construct piles of logging slash and debris to provide for safety during logging and burning operations.								♦		♦
18. Construct and cover slash and debris piles so that they will burn efficiently during the wet season, protect retained trees, reduce heat damage to soils, and prevent burning forest fuels outside of the piles.	♦	♦			♦	♦	♦	♦		♦
19. Conduct burning operations after a consistent pattern of fall rains begin and the soil and adjacent fuels are wet (typically November).	♦	♦			♦	♦	♦	♦		♦
20. Conduct all burning operations (landing debris and fuel reduction treatment piles) in compliance with the Oregon Smoke Management Plan to maintain air quality and visibility in a manner consistent with the Clean Air Act.							♦			
21. Restrict or suspend ground disturbing activities immediately if prehistoric cultural resources are encountered during project implementation and develop appropriate management practices to protect the site/cultural values.									♦	
Road Construction, Renovation, Decommission, Maintenance, Stabilization and Closure: RMP/FEIS (pp. 2-22,68,69; 2-75,76; 4-11 -- 4-19; G-2 -- G-7)										
22. Locate, design and construct roads wherever feasible to drain surface water to adjacent slopes where it would infiltrate into the soil and groundwater.		♦	♦	♦						
23. Locate, design and construct roads in upland areas on stable ground with side slopes generally less than 30 percent that do not require extensive cut-and-fill construction methods, in order to avoid increasing mass failure (landslide) potential and to avoid intercepting groundwater.		♦	♦	♦						♦
24. Install sediment traps and/or filters as needed in ditches that drain to stream crossings to prevent sediment transport that would cause a visible increase in turbidity from entering streams. Common methods include: maintain vegetation in the ditch; create small settling basins; or install artificial filters such as straw bales or wattles.			♦	♦						♦

[4] Traction is a highly variable combination of the power required to skid logs, equipment characteristics, operating techniques and soil strength. The potential to break traction increases as slope steepness increases. BLM field experience confirms that 20 percent slope generally provides for adequate traction when skidding uphill while steeper slopes require additional site-specific evaluation.

Applicable benefitting Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
25. BLM personnel would visually monitor turbidity at stream crossings on the haul route during the course of normal contract administration to ensure compliance with Oregon Department of Environmental Quality (ODEQ) water quality standards of less than ten percent increase in turbidity.			♦	♦						♦
26. If water clarity is visibly altered beyond the mixing zone (about 100 meters downstream), the BLM would suspend hauling and other operations immediately and implement site specific measures to reduce fine sediment runoff into the stream. Allow operations to resume when able to comply with State of Oregon turbidity standards.			♦	♦						♦
27. Decommission road 3-5E-13.0 from the 13.4 and 13.0 junction while maintaining non-motorized recreation access as specified in the description of road work in EA section 2.2.2 during the appropriate season (see table 5).	♦	♦	♦	♦	♦		♦	♦		♦
28. Decommission newly constructed roads (except P_4) as specified in the description of road work in EA section 2.2.2. during the appropriate season (see Table 5) after fuels treatments (EA section 2.2.2.) are completed.	♦	♦	♦	♦	♦	♦	♦	♦		♦
29. Use water bars or other surface shaping to drain runoff water to vegetated slopes; surface tilling; seeding with native species; sediment traps to stabilize roads: and/or other techniques to promote infiltration, to prevent erosion and sediment transport to streams that would visibly increase turbidity, and to prevent increases in peak flows.	♦	♦	♦	♦	♦	♦	♦	♦		♦
30. Subgrades of decommissioned temporary roads would be left intact where appropriate so that the road can be renovated for future use or fire control with minimal disturbance and expense.	♦						♦	♦		♦
31. When natural surface roads would be kept intact over winter for use on this project the next year, stabilize the road to prevent erosion and sediment transport to streams. Methods may include: matting, mulching, constructing water bars or other surface shaping to drain runoff water to vegetated slopes, seeding, sediment traps and blocking the entrance to prevent unauthorized motor vehicle use.		♦	♦	♦				♦		♦
32. Restrict road construction, renovation and decommissioning and operations to times, weather conditions and soil conditions when sediment would not be transported to streams.		♦	♦	♦						♦
33. Seed and mulch exposed soil as needed with native species seed approved by the BLM and sterile mulch (free of non-native seed).	♦	♦	♦	♦	♦	♦				
Stand Structure, Wildlife Habitat and other Vegetation: RMP/FEIS (pp. 2-17,22,26,32--3337--38,59--62;80--92; 4-11 through 4-13; G-1,2; K-1--3)										
34. Retain all conifer trees larger than 36 inches diameter (DBH[5]). Any of these trees felled to facilitate safe and efficient logging operations would be left on site as CWD. Leave as close to the cut site as possible.	♦				♦					♦
35. Retain conifer trees smaller than 7 inches DBH where feasible with safe and efficient logging operations. Any of these trees felled or knocked over to facilitate safe and efficient logging operations would be left on site as woody debris. Leave as close to the cut site as possible.	♦				♦					♦

[5] DBH = Diameter Breast Height, diameter of a tree 4.5 feet above ground level on the uphill side of the tree. Unless otherwise specified, this is measured as the circumference outside bark (inches) divided by π (Pi, ≅ 3.14).

Applicable benefitting Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
36. Retain hardwoods larger than 7 inches DBH where feasible with safe and efficient logging operations. Any of these trees felled to facilitate safe and efficient logging operations would be left on site as CWD. Leave as close to the cut site as possible	♦				♦					♦
37. Retain created snags and topped trees marked with orange painted bands in unit11A as much as is feasible with safe and efficient logging operations. Any of these trees felled to facilitate safe and efficient operations would be left on site as CWD. Leave as close to the cut site as possible.	♦				♦		♦			♦
38. Design roads and logging systems to retain ninety (90) percent of snags larger than 15 inches diameter and taller than 15 feet intact and standing. Snags felled or knocked over during operations would be left on site as CWD.					♦		♦			♦
39. Design skid trail location and operating techniques to retain existing Coarse Woody Debris (CWD) meeting RMP standards and to protect its physical integrity. (RMP p. 21) Where a skid trail must cross existing CWD to facilitate safe and efficient logging operations: cut, move and replace a section rather than moving or breaking the entire piece of CWD.		♦			♦					♦
40. Retain some (number varies according to local abundance) trees that have desirable characteristics for wildlife habitat (e.g.: large hardwoods, minor species, multiple or broken tops, large limbs, dead areas being used by cavity excavators, deep crevices and cavities).	♦				♦					
41. Avoid damaging[6] more than two retained trees per acre. Potential techniques include: seasonal restrictions on falling and yarding during the spring growing season; falling and yarding techniques; or rub trees and protective bumpers in locations where logs "turn a corner" during logging.	♦				♦					♦
42. Clean all ground-disturbing logging and road construction equipment to be free of off-site soil, plant parts and seed prior to entering the project area to prevent introducing invasive and non-native plants into the project area.						♦				
43. For locations within the project area that may have existing populations of high priority weed species[7] similarly clean equipment prior to leaving the project area or at an approved industrial wash facility to prevent transporting soil, seed and plant parts from the project area to another area.						♦				
44. Restrict or suspend operations, or modify project boundaries at any time if plant or animal populations that require protection are found during ongoing surveys or are found incidental to operations or other activity in the project area.	♦				♦					

Some of the Project Design Features would be accomplished by restricting operations during certain seasons or conditions. "Restricted" typically means that the specified operations are not allowed unless the BLM determines that conditions or approved operating procedures are in place to prevent impacts that exceed the effects analyzed as a whole in the Salem District RMP or site specifically in this EA. Table 5 shows the anticipated seasonal restrictions for the project.

[6] The standard for "damage" is bark damage on more than 50 percent of the tree's circumference.

[7] Weed species that are not yet widespread in this region and which have the potential to spread to new areas. (e,g, if known sites of BLM Manual 9015 Class A and B or ODA List T and A species are detected in the proposed harvest area or on lands immediately adjacent to the proposed harvest area).

Table 5: Summary of Seasonal Restrictions and Operational Periods

Seasonal Restriction	Reason	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Falling and yarding	Bark slippage												
Hauling	Water quality and sedimentation												
Skidding operations	Soil compaction												
Road Construction / Decommissioning	Soil damage/erosion control												
Logging operations	Fire season, ODF regulated use												
KEY	Operations generally allowed.	Operations restricted, modified or allowed depending on conditions.						Operations generally restricted					

2.3 No Action Alternative

The No Action alternative serves as a baseline, against which the effects of the proposed project can be compared, i.e. the existing conditions in the project area and the continuing trends in those areas if the BLM does not implement the proposed action. Consideration of this alternative also answers the question: "What would it mean for the objectives to not be achieved?"

Under the No Action alternative the following activities would not take place in the project area at this time: silviculture treatments; timber harvest; road construction, renovation, maintenance, decommission or closure; and fuel reduction projects. Only normal administrative activities and other uses (e.g. road use, programmed road maintenance, harvest of special forest products on public land, recreation access) would continue on BLM 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.

2.4 Alternatives Considered But Not Analyzed In Detail

Treatment of other forest stands within the Riparian Reserve LUA

The interdisciplinary team (IDT) evaluated all Riparian Reserve stands adjacent to proposed harvest units to determine whether treatment would contribute to attaining ACS objectives for terrestrial wildlife. Consistent with the NWFP and RMP, two general criteria were used in this screening process: 1) If the stand has a simple structure that would benefit from thinning to accelerate development of elements of complex structure for habitat enhancement; and 2) If the stand can be treated in conjunction with the adjacent Matrix/GFMA unit using only existing roads and roads that would be constructed to manage Matrix/GFMA land (no road construction for the sole purpose of treating Riparian Reserve stands). Riparian treatment in unit 13C and portions of the riparian in 11A, and 13B were considered, but review of the area determined thinning was not needed to achieve ACS objectives.

Treatment of other forest stands in GFMA:

Approximately 10 acres of GFMA was considered for harvest treatment in unit 11A and eliminated from the proposal due to lower stand densities. These acres were not thinned under the Rusty Saw reoffer timber sale. It was determined treating these acres would not meet the purpose and need of this project.

Transportation Systems, Haul Route

An alternative route to access units 13A and B from the 3-5E-12.0 road was not analyzed in detail because the BLM did not currently have rights to use or haul on the 12.0 road. The cost associated with acquiring rights would be higher than the cost associated with building approximately 800 feet of road from the 3-5-13.3 road to the BLM owned portion of the 3-5E-12.0 road. *(see EA 2.2.2.)*

Subgrade removal on the decommissioned portion of 13.0 road

Removal of the subgrade along the section of 13.0 road proposed for decommissioning was considered, but due to the high percentage of bedrock and the need to maintain access for hikers and equestrians to the Salmon Huckleberry Wilderness Area it was deemed unnecessary.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Analysis Assumptions and Methodology

3.1.1 Analysis Assumptions

- Timber management activities would occur on BLM-administered lands allocated to planned, sustainable harvest. The Salem RMP/FEIS analyzed for both the short-term (10 years) and long-term (decades) impacts of implementing this type of timber management action. Under the RMP, this applies to Matrix/GFMA lands in the proposed project area.
- Timber management activities would re-use, where feasible, the transportation system of existing skid trails, landings and truck roads proposed for this project.
- The Riparian Reserve LUA on BLM-administered lands would be managed for protection of watershed values such as water quality and aquatic habitat and for fish and terrestrial wildlife habitat on both a local and landscape level.
- Most private industrial forest lands in these watersheds will be intensively managed with regeneration harvests scheduled on commercial economic rotations occurring at 50-60 year intervals (RMP/FEIS 1994, p. 4-3). BLM observations of recent trends in industrial forest management indicate that this interval may be reduced to 30-40 years for some landowners.

3.1.2 Methodology

The forest condition information was compiled from a variety of resources:

- The RMP/FEIS provided general resource information for the Salem District planning area as of September 1994.
- Research publications provided information specific to forest vegetation and the impacts of managing or not managing forest stands (Silvicultural Report pp. 8-10, Wildlife Report pp. 2-3).
- GIS data, aerial photographs and satellite imagery, BLM's Forest Operations Inventory (FOI) records, resource specific field surveys (see the following EA sections for specific surveys conducted) and field reconnaissance by BLM resource specialists were used to describe vegetation, habitat and plant and animal species present on BLM lands.

3.2 General Setting/Affected Environment

Historical Influences on Forest Development in the Area Watersheds

Sources of Information: *BLM Archival Records – Metzger's Atlas, aerial photos, timber sale files, Rusty Saw Environmental Assessment and EA file; GIS database; Reforestation records; Eagle Creek Watershed Analysis, USFS1995, Silvicultural Prescription 2012.*

Physical and Historical Setting

The Take 3 thinning project is located approximately 15 miles east of Estacada, Oregon. Some of the proposed treatment areas are just south of the North Fork Eagle creek, with BLM ownership in section 13 directly west of County and USFS lands. Roads leading into BLM managed land in section 11 are gated, however roads into Section 13 are unrestricted allowing access into the Salmon-Huckleberry Wilderness trail system, specifically Douglas and Eagle Creek trails.

All lands adjacent to BLM ownership in sections 11 and 13 with the exception of the east boundary of section 13 are private industrial forest lands with recent clear cuts, young plantations, and second-growth conifer stands. East of section 13 is USFS land with second-growth and early mature timber, the Salmon-Huckleberry Wilderness and Clackamas County young plantations.

Section 11

The Take 3 Thinning project proposes to thin approximately 177 acres in section 11. BLM currently manages approximately 320 acres in this section, with North Fork Eagle creek coming within several hundred feet of the northeast corner of BLM land.

Unit 11A encompasses 156 acres of the 177 proposed for thinning in section 11. Most of 11A is considered flat ground, with some north, northwest and northeast slopes leading toward the North Fork Eagle Creek. Unit 11D is a small unit of dense hemlock along the east property

line of BLM ownership and follows a perennial stream that flows north into North Fork Eagle Creek. A young conifer plantation (less than 10 years) exists on adjacent private forest land along the east property line. Unit 11G is a strip of previously unthinned hemlock and Douglas-fir that follows the south property line of BLM ownership in section 11. A recent clear-cut follows the south property line and along a majority of the proposed 11G thinning unit.

The original old-growth stands in this section were logged under 3 separate contracts from 1936 to 1948. There were several follow-up salvage sales in the early 1950's that removed any remaining merchantable timber.

There is evidence that fire from slash burning covered most of the area following the logging, and that several of the younger stands currently proposed for thinning are a result of natural seeding following the original logging and burning. The older stands (over 80 years) were too young at the time of original logging and have survived to the present.

Most of the area was offered for sale in 1980 as the "Rusty Saw" thinning. The purchaser built the roads but did not log the sale. The government subsequently bought the sale back as part of the larger region wide buyout package to revive the depressed economy at the time. The 1998 "See Saw Salvage" sale removed about 5.9 thousand board feet per acre on 10 acres along the roads 3-5-11.1 and 11.2 and removed the log decks from the earlier road construction.

The more recent "Rusty Saw Reoffer" sale (1999, approximately 133 acres) included most of the original Rusty Saw thinning area, with several acres not thinned due to survey and manage species protection measures at the time. Approximately 5 acres of no-treatment "islands" exist in unit 11A and are proposed for treatment, with one of these islands remaining untreated to protect a S&M botanical species (*see EA 3.3.1, and EA Figure 3*). Approximately 70 acres of the Rusty Saw Reoffer thinning is proposed for 2nd entry thinning under Take 3. Approximately 20 acres of Unit 11A was proposed in the Rusty Saw Reoffer thinning and dropped due to moderate to low stand densities at the time. Current stand densities based on stand exam data collected in 2010 indicate thinning in the proposed treatment areas would meet the purpose and need of this project *(see Table 7; EA 3.3.1*).

Section 13

The Take 3 thinning project proposes to thin approximately 165 acres in section 13. The BLM currently manages approximately 600 acres in this section with the Mt Hood National Forest, the Salmon-Huckleberry Wilderness and county lands just east of BLM ownership in sections 18 and 19. The remaining land in and around section 13 is private industrial forest land consisting of recent clear-cuts, second-growth conifer stands and young conifer plantations.

Unit 13A consists of western hemlock and Douglas-fir and follows the north property line, south of the 13.3 road. The ground is flat, with a recent clear-cut in section 12 along the north boundary. A large wet area follows the west boundary of the unit. Unit 13B is dense

hemlock with a moderate infestation of dwarf mistletoe, and is located in the northeast quarter of section 13. It has steeper north slopes leading to a road, and continuing to North Fork Eagle Creek. The North Fork Eagle Creek flows through the northwest corner of section 13 for approximately 200 feet.

Unit 13C is a small unit in the SW corner of the section. A strip of hardwoods, mainly red alder exist between units 13C and 13D along road 13.1 and 13.3. The unit follows the west property line and a similar second-growth conifer stand on private timber land.

The BLM ownership in section 13 has been actively managed since the 1930's. The original old-growth logging occurred between 1931 and 1939 and in some places in the mid-late 1950's. The more recent timber harvest activities occurred in the late 1970s, and early 1980s. Piling and burning slash, planting, fertilizing, brushing and pre-commercial thinning activities after clear-cut harvest occurred throughout the mid-late 1980s and early 1990's. Firewood cutting continues to occur along BLM roads.

The "Upper Eagle Creek" timber sale (1976) was a clear-cut harvest of approximately 55 acres, with 8 acres of thinning. Between 1976 and 1991 the sale was burned, planted, aerial sprayed with herbicides, pre-commercial thinned to a 12' spacing, and fertilized. A majority of this sale area is now proposed for commercial thinning as unit 13D (*see EA Figure 3*).

The "Bissell Thinning" was implemented in 1980-1981, and included commercial thinning 243 acres of 40-50 year old Douglas-fir and western hemlock, as well as clear-cut harvest of 82 acres. A majority of the acres proposed for thinning in Take 3 surround the old "Bissell Thinning" primarily units 13A and 13B.

Existing Watershed Condition

The project area is located in the Eagle Creek 5th field watershed.

Table 6: Land Ownership/Management from the 1995 Eagle Creek Watershed Analysis

Watershed	BLM	USFS	State/ County	US Fish and Wildlife	Private	Total Acres*
Eagle Creek	4004	17,272	181	119	35,934	57,510

* Sum of published Watershed Analyses acres

Scope of the Project Proposal

The proposed action would thin:

- 342 acres of the 4004 BLM acres, or 9 percent of BLM lands in the watershed. Less than 1 percent of BLM lands in the project vicinity would be included in Rights-of-Way for roads to be constructed.
- Within the 342 acres proposed for thinning, 89 percent of the proposed thinning acres are in GFMA, 11 percent in Riparian Reserve.
- 304 acres within the Matrix/GFMA LUA, or 44 percent of the 696 acres of Matrix/GFMA LUA within sections 11 and 13.

- 38 acres within the Riparian Reserve LUA or 17 percent of the 224 acres of Riparian Reserve LUA within sections 11 and 13.

Cumulative Actions

- Past Actions within the 5th field watershed containing the project area since the Northwest Forest Plan (1995) –
  - Private clear-cuts adjacent to north, south and east sides of section 11 and north, south and west sides of section13.
  - BLM Timber Sales:
    - Delph Creek Density Management Project (T3S,R5E,Section35):
      - 2001 (EA No. OR080-97-21): Approximately 400 acres commercially thinned, approximately 1.19 miles of temporary road construction with 2.35 miles of road decommissioned (includes new temporary roads).
      - 2010 2nd entry (EA No. DOI-BLM-OR-S040-2009-0001-EA): Approximately 204 acres commercially thinned, 1.5 miles of existing road renovated, no new road construction or decommissioning.
    - Rusty Saw Commercial Thinning (T3S, R5E, Section 11): 1999 (EA No OR-080-99-08). Approximately 133 acres commercially thinned.
  - USFS Timber Sales:
    - Eagle, Beagle, Talon and Claw timber sales (1996-2002) Eagle FEIS (1996): Approximately 270 acres of commercial thinning.
    - Wildcat Thinning Categorical Exclusion (2005); commercial thinning of approximately 70 acres of 45-65 year old conifer stands.
  - Clackamas County Timber Sales: Approximately 550 acres of regeneration harvest over a 10 year period, including along the east property line of section 13.
  - USFS road decommissioning projects within the watershed: According to the *Roads Analysis Mt. Hood National Forest* (2003) since the Northwest Forest Plan until 2003, 2.0 miles of road were decommissioned on Forest Service land within the Eagle Creek Watershed.
- Present Actions –
  - USFS road decommissioning projects within the watershed: Under the *Zigzag Road Decommissioning for Habitat Restoration, Increment 2 Environmental Assessment* (2010) approximately 1.05 miles of road are scheduled for decommissioning within the watershed.

- Foreseeable Future Actions –
  - USFS road decommissioning projects within the watershed: Under the *Zigzag Road Decommissioning for Habitat Restoration, Increment 2 Environmental Assessment* (2010) approximately 0.51 miles of road are scheduled in approximately 3-5 years for decommissioning within the watershed.
  - BLM timber sales: None are planned in this watershed. USFS timber sales: None are currently planned in this watershed.
  - Clackamas County timber sales: Approximately 133 acres scheduled for regeneration harvest in 2012.
  - Private: Stands that are at least 40 years old are expected to be assessed for timber harvest. BLM has observed no indicators of imminent harvest operations.

3.3 Resource Specific Affected Environment and Environmental Effects

This section of the EA describes the current condition and trend of the affected resources and the environmental effects of the alternatives on those resources. The interdisciplinary team of resource specialists (IDT) reviewed the elements of the human environment, required by law, regulation, Executive Order and policy, to determine if they would be affected by the proposed project (BLM Handbook H-1790-1: p. 137), [40 CFR 1508.27(b)(3)], [40 CFR 1508.27(b)(8)] (EA section 3.3.10), as well as the issues raised in scoping (*EA 1.5.2*).

The resources potentially affected by the proposed thinning activities are described in the following sections: Vegetation and Forest Stand Characteristics; Hydrology; Fisheries and Aquatic Habitat; Soils; Wildlife; Air Quality and Fire Hazard/Risk; Recreation, Visual Resources and Rural Interface; and Cultural Resources.

3.3.1 Vegetation and Forest Stand Characteristics

Incorporated by Reference: *Take 3 Silvicultural Prescription-Commercial Thinning, Schlottmann et. al 2011; Wildlife Report Take 3 Project, Murphy 2011*

***Assumptions*:**

- As relative density (RD)[8] increases above 50, competition for light, nutrients and water begins to reduce growth rates and increase stresses on individual trees and on the stand as a whole.
- Forest stands with relative densities above 65 have lower tree vigor, higher mortality of suppressed trees, and higher susceptibility to insects, disease, and more severe fire behavior than stands with lower densities (Perry 1994; Hann and Wang 1990; Curtis 1982). These conditions reduce stand resiliency and resistance to environmental stresses.

[8] Relative density (RD) is a measure of crowding in a stand of trees, expressed as a percentage of density (based on number and size of trees) relative to a theoretical maximum density. Curtis Relative Density (RD) is calculated by dividing the basal area per acre by the square root of the quadratic mean diameter. Other common ways of communicating density in a forest stand include trees/acre, basal area/acre, average spacing and crown or canopy closure.

Methodology:

- For stand structure information, Stand Exams were conducted in 2006-2010 and additional stand information was gathered by BLM personnel, including additional core samples for tree age and evaluating characteristics of large diameter trees (over 36 inches DBH). BLM's Resource Area Silviculturalist did field reconnaissance of all proposed thinning units.
- The plot data was analyzed by the Resource Area Silviculturist using BLM's EcoSurvey Program and the ORGANON growth mode (Hann et al 2006). The BLM analyzed and incorporated data into the description of existing vegetation and forest stand characteristics and for developing the prescriptions that would be implemented under the proposed project (EA Table 7, Silvicultural Report pp. 8-10). Stand ages were calculated by these programs using weighted averages of sample tree ring counts (cores) to determine a stand "birthdate".
- Threatened/Endangered/Special Status/Special Attention Botanical Species: The BLM botanist for Cascades Resource Area conducted two types of surveys within the project area and vicinities; Known Site Surveys (Data Search) and Field Surveys (Botanical Inventory). The Botanist conducted comprehensive botanical inventories of the project area in April, May, June and November 2011.

Affected Environment

Stand Structure and Development

Matrix/GFMA LUA

The RD throughout the project area ranges from 49-77 and stocking typically ranges from 101-241 trees per acre (TPA). These densities and stocking levels are associated with overstocked stands where competition for site resources (water, nutrients and light) results in moderately to severely reduced growth rates and stand vigor with increased susceptibility to damage from insects, disease, fire and wind throw.

Proposed Thinning Unit Characteristics

Unit 11A: Has characteristics of late mid to early mature seral stage and encompasses 7 separate and distinct stands (*see EA 3.2 physical and historical settings, see Table 7*). The average ages of these stands range from 65 to 89, with one acre averaging 96 years. This thinning unit is dominated by Douglas-fir in some areas with an understory of western hemlock and western red-cedar, while dense western hemlock is dominant in the eastern and southern portions of the unit. Some dwarf mistletoe is present in the western hemlock. The understory shrub layers include vine maple, sword fern, salal and ocean spray. In the western section of the unit there is a component of large[9] Douglas-fir, over 36" DBH. There are some areas where *Phellinus* pockets have created canopy openings and snags. One stand type in the unit has a component of larger western red cedar (1-3 per acre), primarily concentrated in the riparian.

[9] Large trees (greater than 36" DBH) that were cored for age were less than 200 years, anywhere from 72-140 years, and are not considered Old-growth (see table 10).

Approximately 70 acres of 11A were commercially thinned in the late 1990's as part of the "Rusty Saw Reoffer" timber sale. An additional 20 acres of Unit 11A was initially proposed in the Rusty Saw Reoffer thinning and dropped due to moderate to low stand densities at the time. Current stand densities based on stand exam data collected in 2010 and 2011 indicate an initial entry in these acres and a second-entry treatment in the thinned acres would meet the purpose and need of this project *(see Table 7).*

Unit 11D: Approximately 7 acres of this unit are composed of a dense hemlock stand with little or no understory development with an average age of 65 years. This area was logged in the late 1930's; early 1940's and naturally regenerated. Approximately 2 acres of proposed treatment has an average age of 96 years and is composed of Douglas-fir, western hemlock and western red-cedar. There are many trees that have blown over from recent wind events along the east property line.

Unit 11G: This is a mixed stand of Douglas-fir and western hemlock with an average age of 66 years. Some snags and down logs are present (*see Table 7*). The understory is primarily vine maple and dwarf Oregon grape. There are very few understory trees present and no canopy gaps. This unit was logged in the late 1930's; early 1940's and naturally regenerated.

Unit 13A: This unit encompasses two distinct stands, one averages 62 years dominated by western hemlock and the other 67 years of age dominated by Douglas-fir.
The Douglas-fir stand consists of mostly well spaced trees that are growing well. There is a substantial amount of down wood and some snags and the understory shrub layer is primarily vine maple, dwarf Oregon grape, sword fern and oxalis. The first logging occurred between 1931 and 1939. There is evidence of slash burning following the logging and the current stands are a result of natural seeding.

The other portion of this unit is a very dense stand of mostly western hemlock averaging 62 years of age. The understory vegetation of mostly vine maple, oxalis and sword fern is very sparse. There is little or no vertical or horizontal structure evident.

Unit 13B: This is a very dense stand of mostly western hemlock with an average age of 62 years. There are numerous old mounds from wind thrown trees and trees now occupy the tops of these mounds. They are beginning to become unstable and many are starting to fall over. The logging history of this unit is the same as 13A. The understory vegetation of mostly vine maple, oxalis and sword fern is very sparse. There is little or no vertical or horizontal structure evident. The south portion of this unit has a heavy infestation of dwarf mistletoe.

Unit 13C: This is a variable mixed stand of Douglas-fir and western hemlock.. There are inclusions of the large trees over 36 inches DBH and pockets of dense hemlock in this unit. The understory vegetation includes sword fern, vine maple and oxalis. The original logging occurred here in 1955 and 1956. There is evidence of slash burning following the logging and the current stand is a result of natural seeding. There are heavy pockets of dwarf mistletoe on the western hemlock.

Unit 13D: Approximately 48 acres of this unit consist of a Douglas-fir plantation that was created following logging in the 1970's. The plantation is mostly pure Douglas-fir with an average age of 30 years, with minor amounts of western hemlock, western red-cedar with an understory of vine maple, sword fern and ocean spray. The plantation has been heavily managed with actions including; aerial spray with herbicides in 1980, pre-commercial thinning in 1990 and fertilization in 1991.

Approximately 4 acres is the same timber type as 13C, with a mixed Douglas-fir and western hemlock stand of 60 years on average. Large diameter Douglas-firs (over 36 inches DBH) exist on the southern edge of this unit along road 3-5E-13.0.

Riparian Reserve LUA

The Riparian Reserve LUA stands proposed for thinning are similar to and contiguous with the Matrix stands proposed for thinning. When BLM lands in the Take 3 Thinning project area were logged and reforested, there was no distinction made between forest stands in what is now classified as Riparian Reserve and those in Matrix LUAs. Stands in the Riparian Reserve LUA that are naturally developing structural complexity were dropped from consideration for thinning.

Units included in the proposed action are those stands lacking vertical canopy structure in terms of tree regeneration or tall shrubs. Within these stands, there are other areas where understory trees and/or shrubs are present, but their growth is hindered by the shade of the overstory canopy.

The wetland area along the west boundary of unit 13A has riparian vegetation and larger deciduous trees including black cottonwood and red alder. Other tree and shrub species include western red-cedar, oceanspray, salmonberry and salal. There are two small wetland areas in the NE corner of Unit 13B and between 13B and 13A with similar riparian vegetation as 13A, including red alder, and western red-cedar. Some blow down along the east edge of Unit 13A is evident with some hemlock and Douglas-fir trees on the BLM land having fallen into the wetland along the east property line below road 3-5E-12.0.

Forest stands that are associated with ecological riparian zones where the water table largely defines site conditions typically develop more species and structural diversity. This can include hardwood trees, brush species and western red-cedar which provide greater variety than is found in the adjacent uniform conifer stands. These wet areas are not proposed for treatment. In the Riparian Reserve outside of these wet areas the stands are similar in age and structure to the adjacent Douglas-fir and western hemlock stands in the Matrix.

Table 7: Stand Characteristics

T-R-Sec Unit	Proposed thin acres (ac) total	Stand Age *	Birth date	Proposed thin Riparian Reserve (ac)	Seral Stage	CWD** (feet/ac)	Snags/ ac >15" Dia. & >15'Tall	Current Condition			Average (Avg.) Diameter (Dia.)Year 20 No Thin	After Proposed Treatment			
						Hard/ Soft	Hard/Soft	Trees per Acre	Avg. Dia. (Inches)	Curtis RD		Trees per Acre	Avg. Dia. Year 1	Avg. Dia. Year 20	Curtis RD Yr. 1
T3S, R5E, 11A	81	68[1]	1944	1	Late Mid/ Early Mature	146'/880'	0/1	143	17	53	19.6	82	19.2	22.5	37
	11	65	1947	5				241	14.4	72	16.3	107	16.6	19.2	40
	19	65	1947	0				117	21.6	64	25.0	61	24.7	28.3	41
	27	81	1931	0				101	21.6	55	24.4	69	22.5	25.8	40
	17	89	1923	0				144	19.6	68	22.3	69	23.3	26.6	42
	1	96	1916	0				151	19.2	70	20.9	91	20.9	23.1	47
T3S, R5E, 11D	2	96	1916	0	Early Mature	0/673'	0	151	19.2	70	20.9	91	20.9	23.1	47
	7	65	1947	3	Late Mid			241	14.4	72	16.3	107	16.6	19.2	40
T3S, R5E, 11G	12	66	1946	7	Late Mid	114/1,151	0/1	222	15.9	77	18.3	100	18.5	21.8	43
T3S, R5E, 13A	17	67	1945	13	Mid/Late Mid	0/288	0/0.3	150	18.1	63	21.1	80	20.7	24.7	41
	18	62	1950	2				207	14.8	65	17.4	125	16.6	19.1	41
T3S, R5E 13B	70	62	1950	7	Mid	0/906	0	207	14.8	65	17.4	125	16.6	19.1	41
T3S, R5E, 13C	8	60	1952	0	Mid	0/69	3.3/0	189	15.3	58	18.0	119	16.1	19.6	42
T3S, R5E, 13D	48	30	1983	0	Early Mid	0/495	0	194	12.9	49	18.9	136	13.8	20.6	36
	4	60	1952	0				189	15.3	58	18.0	119	16.1	19.6	42

*Average stand age as of July 2012. Calculated from Stand "birthdate" (Silvicultural Report pp. 3-8) [1]Average weighted stand data from two stands were combined when density, DBH, TPA, age (within 5 years) and post treatment results were similar.
** Linear feet per acre. RMP management direction for CWD is minimum 20 inches diameter large end and at least 20 feet long.
Seral Stage Age Classes (years) based on Stand Exam data: Early Seral = 0-30; Early Mid Seral = 30-40;
Mid Seral = 40 – 60; Late Mid Seral = 60 -80; Early Mature Seral = 80 - 120; Mature = 120 - 200; Old Growth =200+; (See RMP/FEIS glossary, p. 6-13)

Threatened/Endangered/Special Status/Special Attention/ Survey & Manage Plant Species

No T&E vascular plants or suitable habitat was found during field surveys and there are no known sites within the proposed harvest area(s) as determined by a known site data search.

Survey and Manage

Within the former Rusty Saw Timber Sale in section 11 (*see EA 3.2*) several Survey and Manage (S&M) fungi species were identified within the proposed sale boundaries; only a few species known to exist in the area remain listed as S&M, as directed in the 2011 settlement agreement. Four species/known sites are within the proposed Take 3 Thinning timber sale unit boundaries. The fungi *Phaeocollybia Kauffmanii* is within an 81 year old stand. *Phaeocollybia olivacea*, *Phaeocollybia scatesia*, and *Phaeocollybia attenuate* fungi are within 65 year old stands.

Phaeocollybia olivacea, *Phaeocollybia scatesiae* and *Phaeocollybia attenuate* known sites are within a timber stand that are currently less than 80 years and these sites are exempt from S&M protection requirements as directed in the 2011 settlement agreement. Because the known site for *Phaeocollybia Kauffmanii* is within timber that is currently 81 years of age, this site will retain its original 50' radius buffer to protect this known population.

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

During field surveys the following invasive/non-native species were found to occur adjacent to the proposed harvest areas within road corridors and regen-harvest units; tansy ragwort (*Senecio jacobaea*), Canadian thistle (*Cirsium arvense*), bull thistle (*Cirsium vulagre*), St. John's wort (*Hypericum perforatum*), English holly (*Ilex aquifolium*), scotch broom (*Cytisusscoparius*) and American/Himalayan blackberry (*Rubus discolor (armeniacus*).

Environmental Effects

3.3.1.1 Proposed Action

Matrix/GFMA LUA

Stand Structure and Development

Observed Characteristics and Direct Effects Immediately after Thinning to 10 Years

The stands should appear healthy with uniform spacing and tree size. Tree crowns would be more widely spaced than prior to treatment, allowing more light to reach the forest floor. The low density thinning areas would create openings that encourage the growth of native mid-seral shrub species and understory conifer and deciduous trees.

The average diameter of the forest stand would be larger than prior to thinning because "thinning from below" primarily removes the smaller and less healthy trees from the stand and any large conifers 36 in diameter or greater would be retained. There would be some visible damage to retained trees, but contract requirements and administration would prevent more than two trees per acre being damaged for more than half the circumference as defined in the project design features.

Skyline corridors would create linear gaps in the canopy as trees within a 12 feet wide corridor are felled and as cables and the carriage break limbs from trees adjacent to the corridor. Soil in road rights-of-way, at landings and in skid trails and yarding corridors would be disturbed, and some of that soil (less than ten percent of the area) would be compacted by logging operations. Logging slash and debris, consisting primarily of limbs and broken boles generally less than six inches diameter would cover much of the ground surface. The width (12 feet) of skid trails and skyline corridors is less than the average spacing of retained trees (21-25 feet), so the overall stocking density of the stand would be within the levels analyzed in this EA.

Observed Characteristics and Trends in the Long Term (10-30 Years)

Tree crowns would continue to grow as limbs grow longer and lower limbs continue to grow instead of dying and self-pruning. As crown closure increases (limbs grow and fill in the open space in the tree canopy) the amount of light reaching the forest floor would slowly diminish. Understory brush and conifer seedlings, and ground cover species would grow rapidly in response to increased light reaching the forest floor then begin to decline in vigor in the second decade as crown closure increases.

Most areas of damaged bark and cambium on retained trees would heal while some of the trees with more than 50 percent of the circumference damaged would be expected to develop decay pockets or die and become snags. Some individual tree and small group windthrow would be expected.

Disturbed soil would become fully revegetated with herbaceous species (especially the native species used for seeding) within two years and woody species would be expected to become established on some of the disturbed soils over a five year period. Logging slash would lose its needles within one year and decay over a three to seven year period to become a mat of duff and litter.

Indirect Effects

Diameter growth rates on retained trees would increase because of decreased competition for site resources (light, water, nutrients) resulting in larger trees available for future harvest or other management options (*See Table 7*). Crown ratios would increase because lower limbs would not self-prune for a decade or more, resulting in healthier trees with larger crowns and larger limbs compared to trees in an overstocked stand. Stand structure would become more complex as understory and ground cover develops, compared to an overstocked stand with limited light reaching the forest floor.

Tree mortality, windthrow and decay that began as a result of injury to some trees would add snags and CWD elements of structural complexity to the stands. The BLM expects wind throw may continue after treatment, especially in proposed thinning areas that are adjacent to private plantations. Growth models predict that Culmination of Mean Annual Increment (CMAI) would occur within 25 to 35 years of thinning and the need for additional treatment would be evaluated.

Threatened, Endangered, Special Status and Survey and Manage Plant Species, Invasive/Non-Native Plant Species

Threatened or Endangered (T/E) Plant Species or Habitat

There are no known T/E species or habitat within the proposed harvest areas.

Invasive, Nonnative Species

In timber harvest areas adjacent to the proposed project area(s), there was no evidence to indicate that adverse impacts from invasive/non-native species would occurred as a result of the proposed project. With project design features in place, it is not anticipated that the proposed project would contribute measurably to the cumulative effects of invasive/non-native species in Oregon.

A Noxious Weed Risk Assessment (BLM Manual 9015) of the proposed project area was conducted and the area was found to have a risk assessment rating of moderate. A moderate rating indicates the proposed project should proceed as planned with project design features in place to control the spread of the existing invasive/non-native species populations and prevent the introduction of new invasive/non-native plant species

Special Status or Survey and Manage Species / Habitat

Due to the nature of the proposed project and the habitat modification that would occur (i.e. thinning) potential adverse impact to suitable habitat or any undiscovered SSS or S&M species is not anticipated. Suitable habitat would remain in reserve areas adjacent to the proposed harvest areas. Some indirect impact (i.e. increased sunlight, etc.) to reserve areas may occur; no adverse impact to the habitat is anticipated.

Riparian Reserve LUA

Stand Structure and Development

The logging methods are essentially the same in the Riparian Reserves as they are in the adjacent Matrix portions of the treatment area. The prescription implemented in the uplands would also be implemented in the Riparian Reserve along with the following additions where appropriate:

- Maintain small clumps (2-3 trees together) of dominant and co-dominant trees over 28 inches DBH

- Provide 25-75 percent variability in leave tree spacing

Any trees to be found 36 inches or larger DBH will be retained throughout the riparian reserve. The 25-75 percent variation in spacing would effectively create small clumps and gaps in the riparian reserve. Enough light would reach the forest floor to allow establishment of native ground cover species, and brush understory with some conifer tree regeneration within three to five years.

The small clumps and gaps created by spacing variation would also introduce variation in the density, distribution and species mix of ground cover plants and brush and conifer understory. The proposed action would retain hardwood trees and conifer species having low local abundance. These trees would have less competition for site resources and should have higher survival and growth rates.

Skyline corridors would create linear openings in the canopy oriented up and down slopes (rather than across slopes). These openings would not change the character of the stand at ground level because the width of the corridor (12 feet) is less than the average leave tree spacing (average 21-25 feet, ± 25 percent). The skyline cable and carriage would break limbs to create an opening in the canopy, which would allow additional light to reach the forest floor for understory growth. As limbs grow together in the canopy, this gap should close over the next 20 years.

Skid trails would not create linear canopy gaps since the 12 foot width is also less than the average leave tree spacing and there are no cables in the canopy to break limbs. The compacted trail would be visible on the ground and take one to two decades longer to grow ground cover and understory than the 90 percent of the ground based yarding area in the Riparian Reserve that is not compacted by skid trails.

Observed Characteristics and Trends in the Long Term

In the next 20 years, growth on the retained trees should continue at a steady rate, which would be greater than the growth rate if the area remained unthinned. The crowns would expand and fill the spaces created by the thinning and the site should be fully occupied so that growth is slowing down by the end of the second decade after thinning. The understory vegetation in the thinned area should be well established and vigorous by year five, but start to become less vigorous after about 15 years as the site resources become concentrated in the trees and less light reaches the forest floor.

Indirect Effects

As site resources are concentrated on fewer trees, the growth rates of the retained trees increases and the trees are more vigorous and healthy compared to what they would be in a crowded stand. With faster growth rates, it is reasonable to assume that more trees would get larger faster. The faster growth rates after thinning would provide trees of suitable size for snags (15+ inches diameter) and CWD (20+ inches diameter) sooner than would be available without thinning. Thus, accelerated growth would help meet IDT goals for

Riparian Reserve in the Take 3 Thinning project area to develop and maintain later seral forest stand characteristics. Desirable stand characteristics include larger trees for a large green tree component and recruitment of large standing dead and down coarse woody debris in future stand.

Retaining minor conifer species and hardwoods and the development of understory vegetation would also help meet IDT objectives for multi-layered stands with well developed understories, and multiple species that include hardwoods and other minor species. The proposed action would reserve any large diameter trees (36 inches DBH or larger).

Since Riparian Reserve stands tend to be more on stream canyon slopes rather than on exposed upland ridges, they tend to be more sheltered from high winds than Matrix stands on exposed ridges. The BLM expects, based on experience with similar projects, even less windthrow in Riparian Reserves than in Matrix stands. Individual wind thrown trees and small wind thrown patches of trees contribute to structural complexity as natural openings with "debris pile" habitat that develops into a brush patch and eventually, again, conifers.

Trees damaged by logging would either survive and perhaps develop decay pockets that could be used by cavity excavating/nesting wildlife species, or die and become snags or woody debris.

Within Both LUAs

Variable Density and Horizontal Complexity

Immediately after thinning the Take 3 Thinning project area would have a higher degree of complexity on a landscape level than it currently has due to the 25 percent spacing variation (and up to 75 percent in places in the Riparian Reserves) within thinned stands that vary between the untreated areas adjacent to the thinned stands.

The untreated areas include areas of hardwoods and brush, mixed conifers and hardwoods, and high-density conifer stands. As each of these stands continue to mature and be influenced by natural forces over the next 20 years and beyond, the different niche habitats provided by each stand type should continue to develop increasing complexity and diversity.

3.3.1.2 Cumulative Effects

- No cumulative effects are expected with regard to stand structure and development because the proposed thinning would maintain a forested setting in the same age class as before thinning.
- No cumulative effects to Threatened, Endangered (T/E) and Special Status Species (SSS) are expected because no suitable habitat to support T/E species was identified within the proposed project boundaries and no SSS were found.

- Suitable habitat for SSS would remain in the proposed thinning area because thinning would not remove such habitat, and suitable habitat for SSS would remain undisturbed adjacent to the proposed thinning areas. The proposed project would not contribute to the need to list any SSS as Threatened or Endangered.
- In addition, no cumulative effects are expected with regard to invasive /non-native plants because the project would not contribute to the spread of invasive species populations or to the introduction of new species with the implementation of project design features and because little or no difference in the composition or numbers of invasive/non-native species populations have been observed in similar projects on BLM lands in the vicinity.

Threatened/Endangered/Special Status/Special Attention/ Survey & Manage Plant Species

No suitable habitat to support any T&E species was identified within or adjacent to the proposed project area. Although suitable habitat to support some SSS and S&M species was identified within the proposed project areas, no SSS or new S&M sites were found. All known S&M site requiring protection would remain buffered, therefore no adverse effects are anticipated.

Due to the nature of the proposed project (i.e. thinning of the existing forest) and the habitat modification that would occur, some suitable habitat that might support SSS and S&M species within the proposed project areas would be modified but not lost. Suitable habitat would remain in reserve areas adjacent to the proposed harvest areas and although indirect impact (i.e. increased sunlight, temperature increase, etc.) to reserve areas may occur, no adverse impact to that habitat is anticipated.

Based on the nature of the proposed project and the habitat that exist within the proposed harvest areas, this project would not contribute to the need to list as T&E any SSS or S&M species suspected to occur in the vicinity of the proposed harvest areas.

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

Due to project design features it is not anticipated that all areas of disturbed ground that are a result of the proposed project would become established with invasive/non-native species. If species establishment does occur, it is anticipated to be short lived (i.e. less than 10 yrs.). As evidenced on both public and private lands adjacent to the proposed project areas, no dramatic population increase in invasive/non-native species would occur if the proposed project proceeds as planned. Similar projects in the vicinity of the proposed project had little to no difference in their invasive/non-native species population composition or numbers, and these projects were completed without the project design features of this proposal.

3.3.1.3 No Action Alternative

Stand Structure and Development (all land use allocations)

The stands would continue to grow but at a reduced rate. Crowns would close and there would be more suppression mortality resulting in more snags and down wood, especially in the smaller (less than 15 inches DBH) size classes. Understory vegetation would be reduced in quantity and diversity because of the ever-reduced light reaching the forest floor. In the Matrix LUA, at rotation age there would be smaller trees of lower quality to harvest and total net yield would be reduced below the potential for the site.

Within the Riparian Reserve LUA there would be slower development of the 15+ inch DBH trees desirable for future snag and 20+ inch diameter trees desirable for future coarse woody debris recruitment. Fewer of them would reach these sizes within the next 20 years.

The dense stands would not increase in vigor and may decline in vigor, making them more susceptible to disease, insects, windthrow and fire. This condition would not meet O&C Act, or RMP objectives (including ACS objectives) and would not fulfill the Purpose and Need for this project. The live crown ratio (live crown height/total height of the tree, expressed as percent) would continue to decline as lower limbs die from shading.

The unfavorable height-to-diameter ratios (tall trees that are too slender to be strong) that develop in high-density stands would continue to develop, decreasing the general health and vigor of those stands and potentially increasing the risk of extensive windthrow.

Threatened/Endangered/Special Status/Special Attention/ Survey & Manage Plant Species

No T&E or SSS species have been identified in the project area, so no effects are anticipated. Without new disturbance, no effects are anticipated to existing populations of S&M fungi species.

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

Without new disturbance, existing populations of invasive/non-native plants would likely decline due to competition with native species. Natural disturbances that disturb soil may result in new or expanded populations of these plants that would then decline because of competition with native species.

3.3.2 Hydrology

Sources Incorporated by Reference: Hydrology/Channels/Water Quality Specialist Report: Take3 Project *(Hawe, 2011) (Hydro Report)*

Methodology: The Water Erosion Prediction Project (WEPP) soil erosion model was used to predict potential changes in erosion and sediment yield from actions proposed in this EA. Documentation of the WEPP model is available at the following web site: http://fsweb.moscow.rmrs.fs.fed.us/fswepp (Hydrology Report pp. 25-27).

Affected Environment

Project Area Precipitation and Basin Hydrology (ACS Objective 6)

The project area is located in the Oregon Western Cascades range at elevations between 1,700-2,500 feet[10]. All of the project units are in the transient snow zone (TSZ), an elevation zone subject to rain-on-snow events (ROS) that have the potential to increase peak flows during winter or spring storms. This zone varies with temperature during winter storms but is assumed to lie between 1,500 - 3,000 feet in elevation. The project area receives approximately 74-86 inches of rain annually and has a mean 2-year precipitation event of 4.0 inches in a 24-hour period (estimated at: http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm).

The project area drains to two separate 6th field watersheds with approximately 35,000 acres (55 miles[10]) in combined drainage area. All are tributary to the Eagle Creek fifth field and the fourth field Clackamas River #17090011. The Clackamas is utilized as a drinking water source for the City of Clackamas, whose water intake is several miles downstream from the project area, and thus the project lies within the municipal watershed. Eagle Creek is identified as a Tier 2 key watershed in the Northwest Forest Plan.

Channel and Wetland Morphology (ACS Objective 3)

Project area stream channels- intermittent streams

The project area is situated in the Western Cascades physical province and streams reflect the geologic origin of the area[11]. Most of the terrain around the treatment units is volcanic in origin and composed of basaltic and andesitic rocks of Miocene age (Walker, 1991). Stream channels immediately adjacent to, or in some cases within, the proposed treatment units are a mix of first order headwater channels with intermittent flow that converge in 2nd and 3rd order perennial channels tributary to the Eagle Creek main channel (*see Figure 5*).

[10] Unless otherwise indicated, geographic information is an estimate derived from the BLM's GIS database.

[11] For a more detailed description of stream channel formation and geomorphology the reader is referred to *Geomorphology of Steepland Headwaters: The Transition From Hillslopes to Channels* (Benda *et al*., 2005).

Stream channels in the project area were field reviewed by the area hydrologist in 2010 - 2011. The small headwater tributary channels formed in the deep soils of the benches and ridges in the project area flow intermittently on the surface before disappearing underground, only to pop out again down-slope. It's likely that ground water and intricate patterns of subsurface flow, as opposed to surface run-off, is the primary system of water delivery to these channels. Most are moderate gradient (4-10 percent) with small substrates reflecting the adjacent soils.

Utilizing the Montgomery-Buffington typology (Montgomery & Buffington, 1997), these channels would be classified as colluvial: "small, headwater streams at the tips of a channel network that flow over a colluvial valley fill and exhibit weak or ephemeral fluvial transport." Most have too low of a gradient to be subject to debris torrents or land sliding.

The BLM Hydrologist used criteria provided in the BLM publication Riparian Area Management. A User Guide to Assessing Proper Functional Condition and the Supporting Science for Lotic Areas (U.S.D.I., 1998);[12] and compared conditions here to similar channels in the Western Cascades to assess project area channel conditions. Project area channel reaches observed on BLM are currently in proper functioning condition (PFC) because there is adequate vegetation, landform, or large woody debris present to: dissipate stream energy, filter sediment, aid ground-water recharge, aid floodplain development, stabilize stream banks and maintain channel characteristics. A determination of "proper functioning condition" means that the channel elements and physical processes are in working order relative to an area's capability and potential. It does not mean that the channel is functioning at full biological potential or that nothing could be improved by human intervention (i.e., placing additional wood structure, repairing infrastructure, thinning adjacent forest, etc.).

Some of the small tributaries in the project area are much steeper and potentially unstable due to channel incision into the resistant volcanic rocks. These channels are often steep A3/4a+ channel types (Rosgen classification): steep channels incised into resistant bedrock and subject to debris flows. They have steep side slopes that are prone to land sliding and, because it is difficult for conifer in these locations to establish, they tend to be dominated by deciduous species such as red alder and salmon berry. Due to the relatively frequent disturbance regime in these channels, the surrounding stands are often open (i.e., not fully stocked) and "brushy" with large quantities of downed wood.

Perennial Stream Channels

The small headwater tributaries adjacent to the proposed treatment units eventually reach larger perennial channels that flow to the main Eagle Creek channel. These larger 3rd order streams have entrenched into the relatively resistant bedrock forming constrained valleys with moderately steep adjacent slopes (average 50-60 percent). There is a low to moderate supply of gravel and cobble sized material actively transported in these Rosgen "B3" channels (Rosgen, 1996). Utilizing the Montgomery-Buffington typology (Montgomery & Buffington,

[12] See page 5, paragraph 1 for the definition of proper functioning condition.

1997), these perennial streams would be classified as step-pool channels: "Step-pool morphology generally is associated with steep gradients, small width to depth ratios, and pronounced confinement by valley walls."

Some of these channels are shaded by dense stands of second growth conifer, often dominated by hemlock. Wood and shade are in abundant supply, banks are stable and channel morphology is controlled by bedrock features with a cobble-boulder bed. These channel types are highly resilient and unlikely to be altered substantially by disturbance. Utilizing the same proper functioning condition criteria described previously, and comparing conditions here to similar channels in Western Cascades, all of the perennial channels on BLM viewed in the field by the BLM Hydrologist are currently in "proper functioning condition."

Existing roads and stream channels

Where roads cross streams, channel morphology (the shape, size and slope of a channel) is generally altered in a predictable manner and this will affect channel equilibrium (the relationship between the channel's morphology and its ability to transport materials and water)[13]. Within the area occupied by the road prism (this volume varies with the length, width and depth of the road prism), vegetation and organic materials are removed, the channel surface, banks and bed are compacted (bulk density, or the weight by volume, of the soil is increased by as much as 30 percent relative to undisturbed soil), the original channel is buried by road fill, and the channel morphology is reduced to the dimensions of the culvert.

In most locations culvert dimensions (shape, area and slope) are adequate to allow for the transport of most or all of the water, sediment and organic materials from upstream and the stream is said to be "at grade" and channel morphology upstream of the road fill is not affected. However, in other cases, the reduced area imposed by culverts and/or collapsed road beds have restricted the passage of water, sediment and organic materials from upstream resulting in the deposition of sediment above the crossing and the stream is said to be "aggraded". Alterations of channel morphology at road crossings also may result in increased land-sliding and road failure as has occurred along road 3-5E-13 in the SE corner of section 13; this section of road is proposed for decommissioning.

Project Area Wetlands

There are no wetlands in the project area identified on National Wetlands Inventory maps. The BLM GIS Water Bodies theme (for smaller wetlands, ponds and lakes), which has more detailed mapping of wet areas within the project and the BLM GIS Timber Production Capability Classification (TPCC) theme, which has a category for sites with high water tables (symbol- FW, or fragile water), identified wetlands in the project area. These inventories are based primarily on review of aerial photographs with field verification and thus small (less than 1 acre) areas with high water tables, ponds and/or wetlands may not have been identified, particularly when situated under forest canopy. During field review of the project area

[13] See: http://www.krisweb.com/hydrol/channel.htm for a discussion of factors in channel equilibrium.

locations with high water tables, ponds and/or wetlands were identified and excluded from the treatment area. Where appropriate, either the TPCC, hydrology, or lakes GIS themes were updated to accurately reflect these features.

Project Area Hydrology (ACS Objective 6)

There are no current stream flow gauging stations on Eagle Creek or its tributaries. The nearest station is several miles downstream of the project area on the Clackamas River near Oregon City (http://www.nwrfc.noaa.gov/verification/verify_table.cgi?id=COCO3). Eagle Creek is free-flowing and although the streams directly draining the project area have not been gauged, stream-flow is assumed to be typical of smaller Western Cascades streams where most runoff occurs during winter storm events[14].

Base Flow

Base-flow or low-flow occurs during late summer and early fall when mean stream discharge drops below 20 percent of the mean winter flow. Many small headwater channels (referred to as "intermittent" in this analysis) dry up completely during this period.

Peak Flow

Peak flows occur following a rapid and substantial depletion of the snow-pack during prolonged rain-on-snow periods (ROS) in the transient snow zone (TSZ) estimated to lie between 1,500 feet and 3,000 feet elevation. The two largest peak flow events in recent history took place in December of 1964 and in February of 1996. Both events are estimated to be at or above a 100 year flood return interval and both were in response to substantial snow pack melt-off. The State of Oregon has estimated peak flows for most watersheds in Western Oregon, including project area watersheds. These estimates may be viewed at the following web site http://map.wrd.state.or.us/apps/wr/wr_mapping/. Project area stream flow (including peak flow) was analyzed for the Take 3 project. (Hydro Report pp. 7-10)

Potential for Peak Flow Augmentation Due to Forest Harvest: Current Condition

The BLM Hydrologist conducted a preliminary analysis for the risk of increases in peak flow as a result of forest harvest using the Oregon Watershed Assessment Manual watershed analysis methods for forest hydrology (OWEB, 1997 located at http://www.oweb.state.or.us/publications/wa_manual99.shtml).

[3] For a more detailed description of watershed hydrology in forested regions of the Pacific Northwest the reader is referred to *Physical Hydrology and the Effects of Forest Harvesting in the Pacific Northwest: A Review* (Moore *et al.*, 2005).

Figure 4: Figure 3 of OWEB (1997) - Graph for determining risk of peak flow augmentation[15].

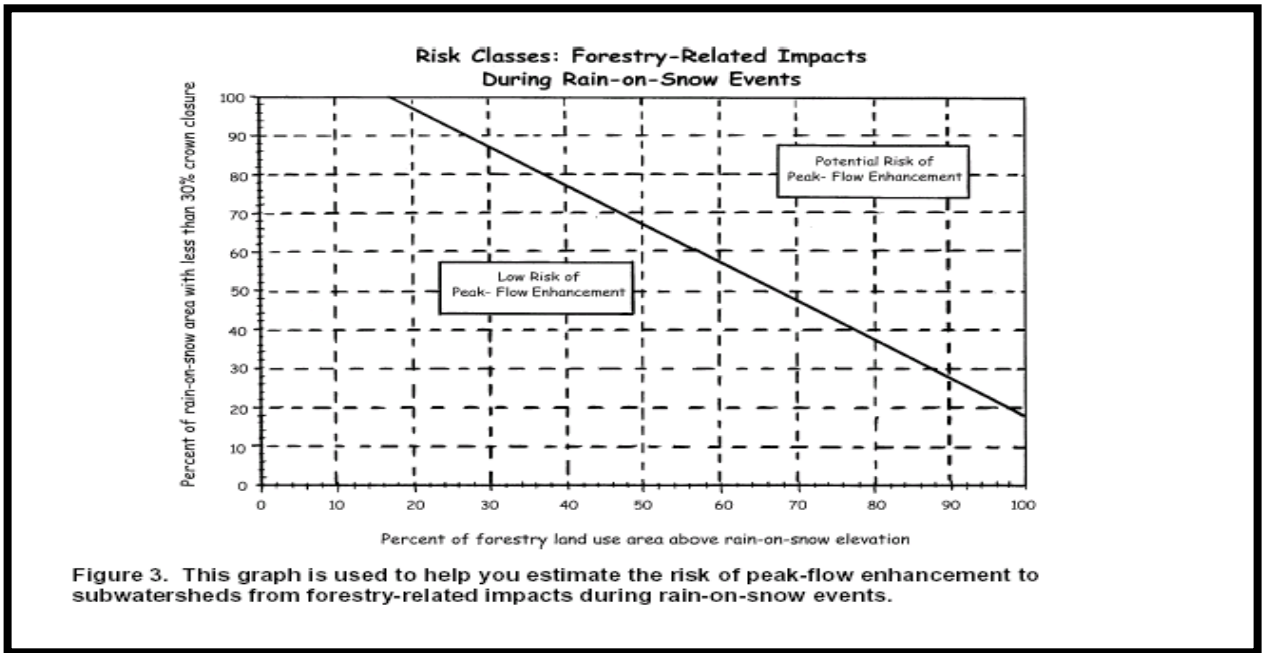


Table 8 displays statistics for the two Eagle Creek sixth field watershed used for determining the current risk of peak flow augmentation in project watersheds. The proportion of North and Upper Eagle Creek sixth field watersheds in ROS ranges from 37-49 percent. The risk of peak flow enhancement will vary with the proportion of this area that has been recently harvested (see Figure 4). The proportion of the ROS area with current crown closure less than 35 percent was 7-35 percent indicating that there is currently a *low risk for peak-flow enhancement* due to forest openings in the project area.

Table 8: Risk of Peak flow Enhancement by Sixth Field Watershed in Eagle Creek

Roads and Peak Flow/Water Quality

6th Field Subwatershed Name	*Watershed Area (acres)*	*Percent of Watershed in ROS Areas (Horizontal axis in Figure 1)*	*Percent of ROS area with <35 percent Current Crown Closure (Vertical axis in Figure 1)*	*Peak-Flow Enhancement Risk*
North Eagle Creek 6th	17,338	49 percent (8556 acres)	35 percent (3000 acres)	Low
Upper Eagle Creek 6th	17,842	37 percent (6,558 acres)	7 percent (440 acres)	Low

Based on the analysis of road proximity to streams documented in the Hydrology Report (pp. 9-10), channel network expansion values from roads in the project area 6th field watersheds are approximately 7 percent.

[15] OWEB, 1997 located at http://www.oweb.state.or.us/publications/wa_manual99.shtml

The Wemple study implies that drainage density increases due to road stream intersections of approximately 20 percent or greater have the capacity to alter both the timing and quantity of peak flows (Wemple et al, 2003). Based on this, Eagle Creek watershed is currently at low risk for augmentation of peak flows due to the road network in the watershed.

Project Area Ground Water

The Water Resources Department (OWRD), together with the Oregon Department of Environmental Quality (DEQ), is responsible for the regulation and protection of ground water quality and quantity. DEQ has reported that nitrate is the most commonly detected contaminate of ground water in the State of Oregon followed by pesticides, volatile organic compounds, and bacteria (see http://www.deq.state.or.us/wq/groundwa/wqgw.htm). The DEQ has not identified any groundwater pollution problems in Eagle Creek.

Water Quality and Beneficial Uses (ACS Objectives 4, 5)

Designated Beneficial Uses

The State of Oregon designates the beneficial uses for which all waters of the state are utilized. Water quality standards are ultimately meant to protect these uses. The City of Clackamas withdraws water from the Clackamas River several miles downstream from Eagle Creek and the proposed project. Additional beneficial uses include: Industrial Water Supply, Wildlife & Hunting, Fishing, Boating, Anadromous Fish Passage, Water Contact Recreation, and Aesthetic.

Municipal Water Providers and Source Water Assessments

The ODEQ has completed a Source Water Assessment (SWA) for the Clackamas municipal watershed (assessment #4100817 at http://www.deq.state.or.us/wq/dwp/swrpts.asp). The SWA identifies "potential contaminant sources" within "sensitive areas," defined as areas with high runoff potential, high soil erosion potential or any area within 1,000 feet of creeks that are upstream of the water intake. Portions of proposed units are within 1,000 feet of tributary channels of the Clackamas River. The SWA identified potential impacts from forestry activities: "cutting and yarding of trees may contribute to increased erosion, resulting in turbidity and chemical changes in drinking water supply". The SWA did not indicate a specific concern with public lands in the proposed treatment units.

Willamette Basin TMDL: Effective Shade and Stream Temperature

The Clackamas River downstream of RM 23 was included on the 2002 303(d) List for temperature standard violations, specifically the 64 degrees Fahrenheit, numeric criteria that applied at the time of the listing.

The Oregon Department of Environmental Quality subsequently published a Total Maximum Daily Load Assessment (TMDL) in 2006 for the Willamette Basin which included the Clackamas

(http://www.deq.state.or.us/wq/TMDLs/docs/willamettebasin/willamette/chpt6clackamas.pdf) and its tributaries. In essence, the TMDL targets the recovery or maintenance of effective shade (as measured by a solar pathfinder or similar instrument) along all perennial streams in the basin including perennial channels in the project area.

According to the TMDL, effective shade is a surrogate measure for the heat load a stream receives when it is exposed to direct sunlight and thus, maintaining or recovering site potential levels of effective shade should result in reductions in stream temperatures to levels that achieve state standards. In the project area, the site potential for effective shade is estimated by use of effective shade curves and averages approximately 95 percent depending on stream channel orientation with a "near stream disturbance zone" up to 85 feet (see Figure 3.44. in the TMDL: Effective Shade Curve – Western Hemlock Potential Vegetation Zone).

As one of the designated management agencies, BLM was required to submit for approval a Water Quality Restoration Plan (WQRP) that describes agency plans for monitoring and recovery of water quality on public lands managed by the BLM in the Clackamas sub-basin. Salem BLM published the Clackamas WQRP[16] in April of 2008. The WQRP utilized the RAPID model to describe shade conditions on the main channel of Eagle creek and its tributaries in Section 11 and 13.

Shade along all tributary channels in the project area was categorized as 85-100 percent (i.e., full effective shade). Based on the RAPID model results together with field verification surveys conducted in 2011, the BLM Hydrologist concluded that effective shade is near to full potential along all of the perennial streams on public lands in the project area with effective shade averaging 95 percent along stream reaches viewed in the field. These data support the conclusion that the existing riparian vegetation in the project area is adequate to maintain streams in the temperature range required by the ODEQ under the Clean Water Act because the shade produced *on BLM managed land* does not allow sufficient light to penetrate to the water surface to add to the existing heat load.

Turbidity[17]

No site specific data for stream turbidity in the project area was located for this assessment. During winter field reviews of project streams by the area hydrologist, water clarity was excellent and turbidity was visually estimated at below 5 NTUs (i.e., no cloudiness visible). Therefore, it is reasonable to conclude that stream clarity in project area streams is generally high, meets the State of Oregon's water quality standards and protects the designated beneficial uses.

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[16] *WILLAMETTE BASIN WATER QUALITY RESTORATION PLAN*. Bureau of Land Management; Salem District & Eugene District. APRIL 16, 2008. Document Control Number: BLM/OR/WA/AE-08/045+1792

[17] Turbidity is a measurement of water clarity and is not convertible into a volume measurement of sediment yield unless correlated to suspended sediment data. For a description of sediment supply and transport processes in forested watersheds and the effects of forest management on these processes the reader is referred to *Suspended Sediment Dynamics in Small Forest Streams of the Pacific Northwest* (Takashi *et al*, 2005).

Environmental Effects

3.3.2.1 Proposed Action– Direct and Indirect Effects

Channel and Wetland Morphology (ACS Objective 3)

Direct and Indirect Effects - Channel and Wetland Morphology

No new road construction would cross stream channels or wetlands therefore there would be no direct alteration of the physical features of project area stream channels or wetlands: stream banks, channel beds and wetlands are protected with no entry buffers from direct physical alteration or disturbance by harvesting equipment.

In addition, the proposed would not affect stream flow in a detectable manner (see the following discussion under watershed hydrology) and therefore no indirect effects to stream channels as a result of flow alteration or timing would occur. As a result, the proposed action would not produce any detectable effects to channel morphology, such as increases in bank erosion, channel incision, loss of floodplain connectivity or alteration of local wetland hydrology that could result from augmented peak flows or altered watershed hydrology. With the exception of the normal cycle of road renovation and maintenance, actions are kept a minimum of 100 feet from perennial stream channels and 50 feet from intermittent channels.

No new road construction crossing stream channels or wetlands is proposed. In addition, no repair or replacement of stream crossing culverts is proposed. Effects from maintenance of road surfaces would be limited to the site of disturbance, and unlikely to result in any alterations to channels or floodplains downstream or elsewhere in the watershed.

Project Area Hydrology (ACS Objective 6)

Water Yield, Base Flow, Fog-Drip, and Peak Flow

Implementation of the Proposed Action would likely result in some incremental increase in annual water yield correlated to the partial removal of the conifer over-story however, “the increase in fall and winter discharge from forest activities is likely to have little biological or physical significance” (US EPA. 1991). It is unlikely the Proposed Action would have a detectable effect on fog drip or a detectable effect on the base flow in project area streams because no studies have documented reductions in fog drip where less than 20 percent of the forest canopy is in an open condition, as in this case.

Most of the proposed treatment units lay in a zone subject to transient snow accumulations (TSZ) in the winter. It can be assumed that the reduction in stand density would result in some increase in snow accumulation on the ground in these areas because there would be less

canopy interception and sublimation[18]. The State of Oregon method for determining risk of peak flow augmentation does not consider forest with a canopy cover greater than 30 percent to be a contributing factor in rain-on-snow (ROS) events. Consequently, since all of the units to be treated would have a final canopy cover of greater than 50 percent in the riparian and 40 percent in the uplands, it is expected that any increase in snow accumulation and melt-off during ROS events would remain undetectable.

This proposal would not increase permanent road mileage in the Eagle Creek fifth field watershed, so it would maintain the current condition and trends relative to hydrology and stream flow that are attributable to roads. Therefore, the risk of hydrologic change that would be caused by the road system is low (see discussion in Affected Environment). Additionally, existing roads were inventoried by area specialists and their recommendations for improvement and repair of road surfaces would be implemented under the Proposed Action. These actions would divert intercepted rainfall on these roads to vegetated soil surfaces where it can re-infiltrate before reaching streams.

Proposed new road construction is located on slopes generally under 30 percent, and would not require extensive full bench or cut and fill construction. Roads constructed on these surfaces result in little or no sub-surface disturbance. These roads would have no effect on sub-surface or groundwater flow and thus have no effect on the timing or volume of stream flow in the watershed (Wemple et al, 2003). With the exception of the new road construction in section 13 of 0.15 miles (*see EA 2.2.2*); all of the new road construction surfaces would be temporary, further reducing potential for any hydrologic effects.

Since no additional stream crossings are proposed, there would be no additional routes for water intercepted by road surfaces to reach streams. Intercepted rainfall on these roads would be drained to the adjacent undisturbed forest floor where, because of the high permeability of forest soils, it quickly infiltrates into the ground. Under these circumstances, road construction has a low risk of altering watershed hydrology or peak flows because intercepted water does not reach stream channels any faster than precipitation which falls on the forest floor.

Ground Water

The Proposed Action is unlikely to affect the flow, quantity or quality of watershed groundwater because the action is unlikely to alter in a measurable manner patterns of surface flow and runoff, so there is little capacity to affect groundwater patterns which are intimately linked to the surface.

The proposed project would have no potential effect on ground water quality because no BLM action on this project would affect nitrate, pesticide, and volatile organic compounds or bacteria levels analyzed by DEQ.

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[18] Montesi et al, 2004. As much as 30 percent of the snow-pack may return to the atmosphere in the sublimation process alone.

The proposed project would not affect ground water quantity because it would not affect the total infiltration capability of the project area, nor would it displace infiltration in any area by more than a few feet (half the width of skid trails, roads or landings).

Water Quality (ACS Objectives 4 and 5)

Summer Stream Temperature Maximums in Perennial Streams

Summer temperature maximums in perennial streams adjacent to the proposed thinning areas would not increase because vegetation providing shade would not be cut or removed in the stream protection zone (SPZ). The average canopy closure in the secondary shade zone that contributes to effective shade would be maintained above 50 percent which would not allow enough light to strike the water surface to increase the heat load. These measures are described in the Northwest Forest Plan Temperature TMDL Implementation Strategies (USFS and BLM, 2004). By implementing them, the proposal would maintain stream temperatures in their current range, and protect current beneficial uses.

Dissolved Oxygen, pH and Conductivity

The Proposed Action would have no measurable effect on dissolved oxygen (DO) levels in project area streams because the project would not measurably change the factors that contribute to reduced DO. The Proposed Action would not place large amounts of fine organic material in the stream, would not alter re-aeration, and would not result in any measurable increase in stream temperature or sedimentation. Available data indicates that most forest management activities have little effect on pH or conductivity (US EPA, 1991).

Turbidity

In most cases, management practices with the potential to accelerate erosion fall into three categories: road construction/maintenance and hauling, timber harvest or "yarding," and site preparation for reforestation (particularly prescribed burning).

All proposed treatment units are outside of any areas that are identified as unstable or prone to mass wasting in the TPCC and/or identified in the field. Areas with potential for slope instability and mass wasting were identified and verified by BLM personnel during work for the project proposal. Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high as defined by the TPCC.

Continuous forest cover and its root structure would be maintained. Therefore, increases in sediment delivery to streams due to mass wasting induced by loss of root strength and increases in soil pore pressure would not occur.

Due to the high infiltration capacity of native soils, heavy vegetative growth, and deep soil-duff layer the Proposed Action is unlikely to increase surface erosion. The Proposed Action would not lead to a measurable long-term alteration in sediment delivered to streams, stream

turbidity, stream substrate composition, or sediment transport regime because BMPs and project design features would eliminate and/or limit acceleration of sediment delivery to streams in the project area.

New roads would not be connected to the stream system and therefore no pathway would exist for delivery of any sediment to streams generated by their construction or use. All new road construction would occur on stable slopes (i.e., surfaces that are not contributing to land sliding or mass wasting) emanating from the existing road network and therefore road related landslides in these locations are a low risk. All road construction would utilize the BMPs required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce non-point source pollution to the maximum extent practicable[19].

Road renovation, maintenance and improvements of existing roads (i.e., added rock and blading of road surfaces), may increase turbidity (i.e., a visible reduction in water clarity) relative to background or upstream water clarity during this activity. Turbidity may also increase slightly in the first winter following the project if storm events wash some of the fines off disturbed surfaces and deliver them to the stream. Road renovation work would occur during the driest period of the year, the "in-water work period," to avoid increasing turbidity of local streams during periods of higher flow.

Any increased turbidity would be unlikely to be visible or detectable beyond 800 meters below the site of the disturbance (Foltz and Yanosek, 2005), would not likely exceed the standards set by the State of Oregon and, since the projects are greater than 800 meters (approximately 0.5 mile) upstream of the main Eagle Creek channels, it is highly unlikely increased turbidity would reach the rivers Therefore, water quality standards would be maintained and beneficial uses protected on streams adjacent to treated forest.

Sediment Regime (ACS Objective 5)

Tree harvest, including ground based logging, would not increase sediment supply to streams because of factors discussed previously, including: forest cover would be retained with at least 40 percent canopy closure, water would normally infiltrate rather than runoff and erode soil, untreated SPZ would further filter any runoff or subsurface flow during high rainfall events, and design features would prevent concentrating runoff from roads and areas compacted by logging operations.

Skyline yarding would not increase sediment supply to streams because of the above factors and because the Water Erosion Prediction Project (WEPP) modeling demonstrates that thinning and skyline yarding done with the proposed project design features would result in surface erosion sediment yields that would not be detectable relative to background sediment transport in the main channels of the project area watersheds. Research in the Pacific Northwest has demonstrated over time that WEPP over-estimates sediment yields (Geren, 2006).

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[19] See http://www.epa.gov/owow/nps/forestrymgmt/ for a review of applicable BMPs.

The BLM Hydrologist for the Cascades Resource Area has conducted field reviews of skyline logging on similar sites in the Cascades Resource during multi-day rain storms and found no evidence of overland flow or sediment transport where WEPP had predicted sediment transport under similar conditions (Hydro Report pp. 23-25, Hawe, 2011).

This proposal would not increase bank erosion or channel cutting by altering channel roughness, redirecting flows or altering bank-stabilizing vegetation because project design features, including the SPZ around all streams, would eliminate most disturbance of stream-side vegetation and protect stream banks, wetlands and channel beds from direct physical alteration or disturbance by harvesting equipment.

Pile burning would not have any influence over water quality, stream channels or watershed hydrology and any effects to soils and hydrology would be short term and limited to the immediate site. Piles to be burned would be located on level ground outside of riparian areas so there is no delivery mechanism by which ash or soil from the pile locations could reach stream channels. Other fuel treatment methods (e.g. lop and scatter, mastication) do not create ash or erosion, so none could be introduced into streams.

3.3.2.2 Cumulative Effects

Channel and Wetland Morphology (ACS Objective 3)

No cumulative effects to channel and wetland morphology are expected for the following reasons:

No new road construction would cross stream channels or wetlands therefore there would be no direct alteration of the physical features of project area stream channels or wetlands: stream banks, channel beds and wetlands are protected with no entry buffers from direct physical alteration or disturbance by harvesting equipment. In addition, no repair or replacement of stream crossing culverts is proposed.

As a result, the proposed action would not produce any detectable effects to channel morphology within the project area or else where within the watershed. Effects from maintenance of road surfaces would be limited to the site of disturbance, and unlikely to result in any alterations to channels or floodplains downstream or elsewhere in the watershed.

Water Quality (ACS Objectives 4)

Overall, this proposal would not have any measurable direct or indirect effect on stream temperatures, pH, or dissolved oxygen. Current conditions and trends in water quality would be maintained under the Proposed Action. Therefore, the proposal has little potential for contributing to any cumulative effects to these water quality attributes in these watersheds.

The risk of short term (during the action and the first winter following) increases in stream turbidity as a result of road repair and hauling may contribute to increased turbidity levels

directly below road/stream intersections (i.e., direct effect). These would be maintained below the limits required by the Oregon State DEQ. Cumulatively the limited magnitude (not visible more than 800 meters downstream of the crossing) and duration (primarily in the first winter following road repairs) of this effect would be non-detectable on the scale of the seventh field watershed and would not contribute cumulatively to turbidity levels in the watershed.

Sediment Regime (ACS Objectives 5)

Average annual suspended sediment yield in managed forest watersheds such as Eagle Creek has been estimated at 1.752 t ac^{-} (see discussion above). Assuming this "average yield" total sediment yield would be approximately 100,847 tons/year in the Eagle Creek fifth field watershed (approximately 57,561 acres). It is assumed that quantities of sediment reported in the scientific literature represent a meaningful "average" in the Eagle Creek fifth field watershed in order to provide a basis for estimating cumulative effects.

The WEPP estimated an average sediment yield of 0.52 ton per $ac^{-1}$for the proposed treatment in unit 11A, results in a total sediment yield for the proposed project (cable yarding of 64 acres) of 62 tons per year. Accounting for the 50 percent estimated precision of the WEPP model, 31-122 tons per year could be contributed to the watershed from this action. This represents 0.03 – 0.06 percent of mean annual yield at the fifth field watershed scale. Given the inherent variability and error in sediment yield measurements[20], a less than 1 percent increase is not detectable with current technology designed for field use. Typically, sediment yields from forest harvest decrease exponentially over time (Dissmeyer, 2000).

The quantity of surface erosion with delivery of sediment during large storm events would likely drop back to current levels (0.32 t ac^{-1}) within three to five years as the remaining forest canopy and root systems occupy the space left by the removed trees (i.e., competition). Therefore, the incremental increase in sediment yield that could be attributable to the Proposed Action is of such a small magnitude and duration that it would not be detectable and would not contribute to cumulative effects within the watershed.

Watershed Hydrology (ACS Objectives 6)

Since the analysis found no measurable direct or indirect effects to peak flow due to the proposed action it would not contribute to any potential cumulative effects to peak flows in Eagle Creek. In addition, current condition of the watersheds in the project area indicates low risk for augmentation of peak flows due to forest openings.

This proposal would result in no net increase in forest openings in ROS areas with average crown closure less than 35 percent and would be unlikely to contribute cumulatively to the augmentation of peak flows even if they were occurring in these watersheds as a result of past forest harvest. Proposed road use and construction is unlikely to alter surface or subsurface

[20] Accurate estimates of sediment yield are difficult to measure and may vary by two or more orders of magnitude (Gregory L. Morris, Jiahua Fan, 1998).

hydrology or to contribute cumulatively to any change from current conditions in the watershed.

As there would be no measurable direct or indirect effect to the watershed's ground water, the proposed action carries no risk for contributing cumulatively to effects either in the uplands or in lower valley positions.

Connected Actions

Road Closure/Decommission 13.0 and 13.4 Roads

The proposal would restore more natural hydrologic patterns along 0.47 miles of the road surface and adjacent slopes by reducing compacted surface area, removing/stabilizing failing road fill and routing surface flow to stable surfaces or original channels. Sediment delivery off the road surfaces into headwater streams would be reduced. Native riparian vegetation would be promoted which would further stabilize surfaces and reduce erosion. This action is consistent with the Key Watershed provision of no net increase in road mileage.

Although soil surfaces and adjacent vegetation would be disturbed, runoff and sedimentation would be reduced over the long term by rehabilitation of soil structure and surface drainage. Over the short term (less than 1 year) some additional turbidity may result at sites which intersect stream channels and running water. Turbidity is not likely to be visible more than 1,000 feet downstream from activity.

3.3.2.3 No Action Alternative

The No Action alternative would result in the continuation of current conditions and trends at this site as described in the Affected Environment, above. Any existing effects in the watershed would continue to occur from the development and use of private and other agency lands (primarily agriculture, timber harvesting and road building).

3.3.3 Fisheries and Aquatic Habitat

Sources Incorporated by Reference*:* Hydrology/Channels/Water Quality Specialist Report: Take_3 Project *(Hawe, 2011) Fisheries report: Take 3 project (Zoellick, 2011)*

Methodology*:* BLM Fisheries Biologists conducted surveys of the project area streams during the 2010 and 2011 field seasons.

Affected Environment

Fish Presence in the Project Area

Coastal cutthroat trout (*Oncorhynchus clarki clarki*; Behnke 1992) are common in North Eagle, Grabenheim, and Little Eagle creeks, but do not occupy any other of the 1st and 2nd order tributaries in or adjacent to the proposed project units. These streams are too small or steep to

support fish populations. Rainbow trout (*O. mykiss*) were formerly stocked in lower North Fork Eagle Creek downstream of the project area (USFS and BLM 1995). Other resident fish that may inhabit the lower reaches of North Fork Eagle Creek include longnose dace (*Rhinichthys cataractae*), northern pikeminnow (*Ptychocheilus oregonensis*), redside shiner (*Richardsonius balteatus*), largescale sucker (*Catostomus macrocheilus*), mountain sucker (*Catostomus platyrhynchus*), western brook lamprey (*Lampreta richardsoni*), prickly sculpin (*Cottus asper*), and reticulate sculpin (*Cottus perplexus*; USFS and BLM 1995).

Threatened and Endangered Species

Lower Columbia River (LCR) winter run steelhead trout (*O. mykiss*), LCR coho salmon (*O. kisutch*), and LCR spring Chinook salmon (*O. tshawytscha*) are listed as 'threatened' under the Endangered Species Act of 1973 (ESA). Salmon and steelhead populations in the Lower Columbia River Evolutionary Significant Unit (ESU) are substantially reproductively isolated from other populations and are an important component in the evolutionary legacy of those species (NOAA 2005). Coho salmon, spring Chinook salmon, and winter steelhead inhabit North Fork Eagle Creek, which is a tributary to Eagle Creek in the Clackamas River sub basin of the Lower Columbia River ESU.

Coho salmon and winter steelhead are distributed in the North Fork Eagle Creek from the confluence with Eagle Creek upstream to one-half mile past the eastern boundary of Section 13 (T.3S, R.5E; Streamnet 2006). Units 11A, 11D, 13A, and 13B are located adjacent to North Fork Eagle Creek with unit boundaries 130 to 440 feet from salmon and steelhead habitat (Table 9). Coho salmon and winter steelhead habitat is present in Little Eagle Creek about 1.1 miles downstream of Unit 13C. Spring Chinook salmon inhabit lower North Fork Eagle Creek, more than 5 miles downstream of proposed project units (Table 9).

Table 9: Distances to Fish Habitat

Unit Number	Distance to resident cutthroat trout habitat (feet)	ESA Listed Fish Species		
		Distance to steelhead trout habitat (miles)	Distance to coho salmon habitat (miles)	Distance to Chinook salmon habitat (miles)
11A	400' to N.F. Eagle Cr	0.0	0.0	5.9
11D	420' to N.F. Eagle Cr	0.0	0.0	6.0
11G	150' to Grabenheim Cr	2.0	2.0	5.0
13A	400' to N.F. Eagle Cr	0.0	0.0	7.3
13B	130' to N.F. Eagle Cr	0.0	0.0	7.3
13C	440' to Little Eagle Cr	1.4	1.4	5.6

Upstream limits of anadromous fish distribution were obtained from Streamnet (2006) or Oregon Department of Fish and Wildlife (ODFW) data, if ODFW data indicated fish were distributed further upstream than delineated by Streamnet. Stream distances were measured using ArcGIS software.

Aquatic Habitats

Stream channels in the project area are stable (generally gravel dominated; BLM Fish Inventories 2011) and well-shaded (over 85 to 100 percent effective shading; Hydrology Specialist Report 2011). Stream banks are stable (over 90 percent of banks vegetated with riparian and streamside vegetation; BLM Fish Inventories 2011). North Fork Eagle Creek in the project area flows through private lands in a moderately confined valley with low gradients of 2 to 4 percent with narrow floodplains (Rosgen B-channel type; Rosgen 1994). The small tributary streams in and adjacent to units 11A, 11D, 13A and 13B drop steeply to the main stem of North Fork Eagle Creek with gradients of 10-20 percent.

Most aquatic habitat in the North Fork Eagle Creek basin is located on private lands; only 14% of 16 miles of North Fork Eagle and Little Eagle Creeks are on BLM managed lands (USFS and BLM 1994). Aquatic habitat complexity in North Fork Eagle and Little Eagle creeks is low (USFS and BLM 1995). Large woody debris (LW) levels are low resulting in loss of secondary channels and pool habitat, and consequently poor condition winter habitat. Stream sediment levels are thought to be elevated as a result of past timber harvest and road construction activities in the basin. Riparian areas are generally dominated by hardwoods, with scattered conifer trees present, due to timber harvest in the 1960s and 1970s. Past timber harvest decreased stream shading, and reduced LW recruitment potential. About 50 percent of North Fork Eagle Creek has low to medium potential for LW recruitment because of the young age of riparian tree stands (USFS and BLM 1995).

Environmental Effects

3.3.3.1 Proposed Action

Fish and Aquatic Habitat (ACS Objectives 2, 3, 8)

Stream Channels

Proposed tree thinning would not impact channel conditions and fish habitat due to Stream Protection Zones (SPZs) which serve as no-disturbance buffers ranging from 130 to 440 feet on North Fork Eagle Creek, Grabenheim, and Little Eagle creeks, and a minimum 50 feet on intermittent and 100 feet on perennial 1st and 2nd order tributaries to North Fork Eagle Creek. These SPZ widths are adequate to intercept and infiltrate water carrying sediment preventing its delivery to streams and aquatic habitats (Olson and Rugger 2007, Rashin et al. 2006, CH2MHILL et al. 1999).

Stream Shading and Temperature

Perennial streams supporting fish populations would have minimum 130 feet wide (up to 440 feet wide) SPZ, and perennial 1st and 2nd order tributaries to North Fork Eagle Creek would have minimum 100 feet wide SPZ. Thus, with no disturbance to the primary shade zone (within 70 to 85 feet of channels), and retaining greater than 50 percent canopy closure in the

secondary shade zone, no change in solar radiation input and stream temperature would occur (Groom et al. 2011, USDA and USDI 2004). Trees would be thinned in Riparian Reserve LUA within 50 feet of intermittent tributary streams to North Fork Eagle Creek. These streams would not have surface flows during the summer, thus summer stream temperatures would not be altered.

Large Wood (LW)

Most major streams would have 400 feet SPZ, but Riparian Reserves on Grabenheim Creek in Unit 11G, and on North Fork Eagle Creek in Unit 13B would be thinned to within 130 to 150 feet of the stream channel. Average height of trees in unit 13B is 110 feet, and trees range up to 125 feet in height. Thus, even if the tallest trees were thinned from the portion of unit 13B that is closest to North Fork Eagle Creek (130 feet away), large wood levels would not be impacted because the trees are not tall enough to reach the stream channel. Thus, thinning in Riparian Reserves more than 130 feet from the stream channel would not affect large wood levels in North Fork Eagle, Little Eagle, and Grabenheim Creeks. Stream flows in tributary streams are too small to move large wood to North Fork Eagle Creek. Therefore, thinning within 50 to 100 feet of these tributary channels, would not impact LW levels in North Fork Eagle Creek.

Sediment and Roads

About 0.15 mile of permanent new road would be constructed, and about 1.1 mile of temporary new road would be constructed. New roads would not increase the size of the stream network (Wemple et al. 1996) and are located >200 feet from the nearest stream channel, and 400 feet from North Fork Eagle Creek. Road surfaces of new roads would be constructed to drain surface water to adjacent gentle vegetated slopes where it would infiltrate into the soil and groundwater. Thus, sediment produced by the road would not reach stream channels and would not impact aquatic habitats or fish populations.

New roads would be closed and decommissioned after the project, with the exception of about 0.15 mile of new road in unit 13A. This permanent road mileage would be offset by other road mileage decommissioned elsewhere in the watershed by the USFS, and by the decommissioning a portion of road 3-5E-13 (*See EA 2.2.2*).

About 0.47 mile of road 3-5E-13 in the southern portion of section 13 would be decommissioned. This road crosses 3 intermittent drainages about 0.3 to 0.4 miles upstream of Eagle Creek and about 4 miles upstream of listed fish habitat (LFH). Sediment delivery to Eagle Creek tributaries would be reduced over the long term by decommissioning this road. Three cross-drain culverts would be replaced, with no culverts replaced on streams throughout the proposed sale area.

Threatened/Endangered Species

Proposed tree thinning would not impact listed fish habitat due to SPZ of 130 to 400 feet on North Fork Eagle Creek, and 50 feet on intermittent and 100 feet on perennial 1st and 2nd

order tributary streams. These SPZ widths are adequate to intercept and infiltrate water carrying sediment preventing its delivery to streams and aquatic habitats (Olson and Rugger 2007, Rashin et al. 2006, CH2MHILL et al. 1999). No disturbance to primary shade zones (within 70 to 85 feet of the channel), and retaining over 50 percent canopy closure in the secondary shade zone, would result in no change in stream temperatures of North Fork Eagle Creek and intermittent and perennial headwater tributaries (BLM TMDL Implementation Strategy; Groom et al. 2011).

Potential LW source areas to North Fork Eagle Creek would not be impacted because of the 130 to 400 feet wide (one to two times wider than the current tree height) stream protection zones. Thinning within 50 to 100 feet of headwater tributaries would not affect LW supplies in North Fork Eagle Creek as tributary flows are too small to deliver LW to the stream from the areas being thinned. LW in North Fork Eagle creek would remain at low to moderate levels over the short term because of the young age of riparian trees on private lands along the stream.

1.25 miles of road construction would not increase the size of the stream network (Wemple et al. 1996) because all new roads are greater than 200 feet from stream channels, and constructed road surfaces would be designed to drain surface water to adjacent gentle slopes where it would infiltrate into the soil and groundwater. Thus, little sediment would be produced by the new roads and would not reach stream channels and impact LFH.

Steelhead trout and salmon habitat in North Fork Eagle Creek and Little Eagle Creek would not be impacted by log hauling, because hauling would be limited to the dry season.

Haul Route, Section 11

Hauling would be limited to the dry season (*see PDF #10, 24-26, EA 2.2.3*); therefore habitat would not be impacted by log hauling.

The haul route from Section 11 crosses salmon and steelhead habitat in Little Eagle Creek on a gravel road. Sediment from the road surface was observed in the roadside ditch on 17 October 2011 at the approach to the stream crossing, but was not reaching the stream channel. (This stream crossing would contribute sediment to the stream if it were used by log trucks in the wet season.)

Similarly, an alternate haul route that crosses North Fork Eagle Creek on a private road would not contribute sediment to the stream because it would not be used to haul logs during the wet season. (The road slopes toward the stream crossing, gravel is lacking on the road surface, and soil is present on the bridge decking (Photo 2) so it would contribute sediment to the stream if it were to be used for wet season haul.) Logs were hauled on this alternate route for a previous BLM Timber Sale (Rusty Saw Reoffer, 1999) because of the shorter distance to a paved county road, and thus it is reasonable to expect that the purchaser of the Take 3 Thinning timber sale may also use this alternate haul route.

Haul Route, Section 13

The haul route from section 13 would not impact salmon and steelhead habitat as the haul route does not cross any streams except on the paved road portion of the route (County Road No. 34047). Because the haul route is paved where there are stream crossings, no sediment would move to streams as the result of log hauling, regardless of winter or summer haul.

3.3.3.2 Cumulative Effects

The proposed action would have no direct impacts to channel morphology (channel shape and form) of streams on the project areas and hence no cumulative effects to channel morphology. With no direct or cumulative impacts to channel morphology, instream fish habitat (ie. pool habitat, instream cover, stream depth, etc.) would not be affected.

Cumulatively, the limited magnitude and duration of sediment effects from roads in the project area would be unlikely to affect spawning and rearing success of fish populations in the short term. Reducing sediment delivery to Eagle Creek tributaries by decommissioning 0.47 mile of road 3-5E-13 combined with actions by USFS to reduce road densities in the Eagle Creek basin (USFS and BLM 1995) would cumulatively reduce sediment levels and thus improve spawning and rearing success over the long term.

No direct or cumulative impacts to peak flows are expected (See Take 3 Hydrology Specialist Report).

3.3.3.3 No Action Alternative

Populations of aquatic species would undergo natural increases and declines related to changes in stream temperature, sediment delivery events, and peak winter flows. Under the No Action alternative, canopy closure in primary and secondary shade zones along stream channels would remain similar to current levels, except for changes to tree canopy and consequently stream shade levels resulting from snow or ice break, wind storms, and wildfire. Stream temperatures would follow changes in stream shading (Johnson 2004). Dense stands of riparian trees would self-thin over time, contributing LW to stream channels, and windthrow from storms would also contribute large wood to streams. Natural sediment inputs to streams would vary as sediment contributing events (flooding) occur within RR.

Threatened and Endangered Species

This alternative would have “no effect” on LCR steelhead trout, LCR spring Chinook salmon, and LCR coho salmon because no actions would be taken that would affect salmon and steelhead habitat. The project area is adjacent to coho salmon and steelhead habitat in the North Fork Eagle Creek, and is located about 5 miles upstream of Chinook salmon habitat in lower North Fork Eagle Creek.

3.3.4 Soils

Source Incorporated by Reference: *Soils Specialist Report for the Proposed Take 3 Thinning Project, 2011 (Soils Report)Schlottmann, D and A. Tanner., 2011. Take 3 Thinning and Silvicultural Prescriptions (Silviculture Report),*

Assumptions:

- Harvest operations would occur only on lands classified by the BLM as Suitable[21] for timber production (including Suitable Fragile).
- Impacts and potential reductions in growth and yield, are within the standards analyzed in the RMP/FEIS (less than one percent) when no more than ten percent of the ground surface is compacted (soils are generally considered compacted if there is more than ten percent increase in density) by logging operations (RMP/FEIS G-2).

Methodology:

- Soil maps and descriptions of project soil characteristics used for the project area are available at the Natural Resource Conservation Service (NRCS) web site: http://www.or.nrcs.usda.gov/pnw_soil/or_data.html.
- Site specific conditions on BLM lands in the project area were mapped, field-verified, and recorded in the Timber Production Capability Classification (TPCC) database (USDI BLM 1987).
- BLM Resource Specialists for soil and hydrology visited the project area multiple times, performing both formal surveys and informal reconnaissance to evaluate site specific conditions.

Affected Environment

All of the soils in the areas proposed for thinning are suited for growing Douglas-fir and western hemlock. Typical soils in these project areas formed in colluvium (i.e., material rolling downhill) from tuffaceous, basalt, and andesite rock and volcanic ash. Soils in the project area range from gravelly to cobbly loams with similar physical and chemical characteristics. In general, these soils have few limiting factors for commercial forestry, are deep, well drained and a low erodibility index (e.g., are not prone to erosion). Soil maps and descriptions of project soil characteristics are available by county at the NRCS web site: http://www.or.nrcs.usda.gov/pnw_soil/or_data.html.

All three soils in the project area (Aschoff cobbly loam, Zygore and Wilhoit gravelly loams) are deep (over 60 inches to bedrock), well drained soils in mountainous uplands. Permeability in these soils ranges from 0.6 to 2 inches per hour, bulk density from 0.85 to 0.95 and pH is slightly acid. There are no wetland soils mapped in the project area.

Soil mapping in *forested regions* of Western Oregon was typically done on a large scale with minimal site verification. Site specific conditions on BLM lands in the project area are mapped

[21] All lands on BLM are classified as, *Suitable* for timber production, *Suitable [but] Fragile* for a variety of reasons (e.g., nutrient status, compacted surfaces, slope gradient, etc.) or *Non-suitable*. BLM practice is to locate proposed timber harvest unit boundaries to avoid areas that are Non-suitable.

and field-verified in the Timber Production Capability Classification (TPCC) database[22]. TPCC mapping and classification is more precise than county soil maps and is focused on forest productivity. From the TPCC preface: "The purpose of the TPCC is to interpret soil and land characteristics to assist in timber management planning and in the application of practices which will maintain or enhance production over a long period of time".

All lands on BLM are classified either as *Suitable* for timber production, *Suitable but Fragile* for a variety of reasons (e.g., nutrient status, compacted surfaces, slope gradient, etc.) or *Non-suitable.* All of the proposed treatments are within areas classified as Suitable or Suitable but Fragile. Areas that are *Non-suitable* are excluded from treatment in the proposal. There are 28 acres of lands in section 13 classified as non-suitable due to a high water table and are adjacent to streams and wetlands and within stream protection zones (SPZ)..

There are 4.2 acres considered non-suitable due to low soil moisture in the SE corner of section 13. These are typically shallow, rocky soils on steep slopes which have low water holding capacity and are prone to surface erosion. These soils are not part of the proposal but are partially traversed by road 3-5E-13 (proposed for decommissioning).

Disturbed Surfaces- Compaction and Roads

The TPCC did not identify compaction as a problem in the project area. Furthermore, based on field review by area specialists, soil surfaces generally appear to be in a non-compacted state and are covered with a deep layer of surface "duff" (i.e., partially decomposed organic material, mostly needles, bark and wood, that protects the mineral soil surface).

There are approximately 43 miles of roads in the Eagle Creek fifth field watershed occupying approximately 0.2 percent of the surface area (assumes an average 22 foot wide "footprint" on the soil surface). However, based on field observation by resource specialists on the IDT, the condition of these road surfaces varies widely from paved highways to barely discernible natural surface "roads" that were utilized at one point in time to haul cut trees to market.

On BLM lands, a few moderately compacted soils (i.e., bulk density of the soil has been increased by over 10 to 20 percent relative to un-compacted soils) and some highly compacted soils (i.e., bulk density of the soil has been increased by 20 to 50 percent) have visibly persisted in some of the skid trails. Moderately compacted soils are primarily located along skid trails (i.e., sites where trees were dragged along the ground) and are generally less than 10 feet in width and discontinuous since large portions of former skid trails have been obscured by the growth of trees and development of the duff layer.

Based on the proceeding observations, a conservative estimate is that approximately 4 percent of the soils in the project area are slightly to moderately compacted and 1.5 percent highly compacted.

[22] Power, W.E., Tausch, W.A.. 1987. *Timber Production Capability Classification. TPCC Technical Guide*. U.S.D.I. BLM Salem District. OR.

Environmental Effects

3.3.4.1 Proposed Action

Sufficient vegetation and root structure to maintain soil stability and mycorrhizae populations would be present after thinning because a minimum average of 60 to 125 trees per acre and some other existing vegetation would be retained. Also, there is no evidence that past logging operations in the area have affected mycorrhizae populations.

Direct Effects on Soil Compaction and Disturbance/Displacement

Where standard falling and skidding practices are used, total surface disturbance and soil compaction would be approximately six to eight percent (21 to 28 acres) of the project area, in skid trails and landings, based on BLM field observations in similar projects.

Much of the soil that would be impacted by logging operations is in old skid trails that have already been compacted by previous logging operations. Other harvest techniques (cut-to-length, shovel swing) that may be used in part or all of the project area generally cause a lesser degree of disturbance and compaction. In skyline yarding areas, the disturbed and compacted are would range from three to seven percent (11 to 25 ac.) in landings and skyline corridors.

Road Work

Constructing up to 1.25 miles of roads would displace topsoil and compact subsoil on approximately 3.3 acres. The roads to be constructed would be on moderate topography (grades of approximately 3 to 10 percent), so the total width of the clearing would be expected to be around 22 feet. This narrow clearing would have a minimal effect on overall tree spacing and stocking because average leave tree spacing is expected to be around 23 feet (*Schlottman et. al 2011*).

In addition to new road constructed on previously undisturbed surfaces, up to 1.55 miles of road renovation would occur under this proposal. Since the proportion of these existing roads that is disturbed varies across the project area we make the assumption that this renovation would be the equivalent of new disturbance to approximately 50 percent of the affected area.

Pile Burning

Soil damage from pile burning would not measurably decrease site productivity because the affected areas are small (greater than 20 feet diameter) widely dispersed, and burned when soil moisture is high. The largest of these piles are generally at landings on ground already impacted by road and landing construction. Soil displacement from burned areas would be limited to a few feet because adjacent vegetation would prevent further movement of any soil eroded from burned spots.

Indirect Effects on Site Productivity due to Soil Compaction and Disturbance

No measurable reduction in overall growth and yield in the thinned area would be expected because decades of BLM experience with similar projects has demonstrated that growth accelerates after thinning. Acres of forest land converted to roads would no longer be productive.

Surface Erosion Potential: Water Erosion Prediction Project (WEPP)

Surface erosion due to the project (direct effect) would be unlikely to have any long-term deleterious effect on site productivity (indirect effect) because erosion potential would be very low and within the typical renewal rates for topsoil (0.12 to 0.8 tons per acre per year, Pimental, 1987) within three to five years after harvest (Dissmeyer, 2000; Soils Report p. 9).

"Background" surface erosion estimated by the WEPP model for this area is 0.38 ton $acres^{-1}$ or approximately 46 tons per year over the total 74 acres of proposed cable yarding. The cable yarding proposal increases surface erosion estimated by the WEPP model for this area to 0.55 t ac^{-1} or approximately 41 tons per year over the total 64 acres of proposed cable yarding.

To put these sediment yields into a visual context; the average annual surface erosion rate would increase from about 1.5 wheelbarrow to 2.2 wheelbarrows full of soil[23] for each acre treated (an acre is about the size of a football field).

Degradation of soil by erosion is of concern because soil formation is slow. Typical renewal rates for topsoil range from 0.12 to 0.8 tons per acre per year. (Pimentel, 1987). Reducing stand density by approximately half is estimated to increase surface erosion but rates would still remain within rates of renewal. These erosion rates could have an effect on soil productivity if maintained over the course of time. Typically sediment yields from forest harvest decrease over time as a negative exponential (Dissmeyer, 2000). The quantity of surface erosion during large storm events would likely drop back to current levels (0.38 tons per acre per year) within three to five years as the remaining forest stand fills out. By way of comparison, in the United States surface erosion on croplands (44.5 tons per acre per year) averages more than 80 times the top rate estimated for this action (Pimentel, 1987). Therefore, the rate of surface soil erosion under this proposal is unlikely to have any long term deleterious effect on soil productivity.

Stabilizing Roads and Skid Trails

Soil damage would be limited to the immediate effects described above because: blocking the roads and skid trails would prevent continued vehicle use; shaping (e.g. water bars), seeding

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[23]. One wheelbarrow is assumed to carry approximately 5 ft^3 of soil which weighs approximately 500 lbs. Since 0.38 tons = 760 lbs., it is equal to 1.5 wheelbarrow of soil.

and scattering woody debris on disturbed ground; and natural re-vegetation within the next three to five years would prevent erosion and soil movement off-site.

3.3.4.2 Cumulative Effects

The combined effect of the proposed action (density management, road work, fuels treatments, skid trail construction, and CWD creation), would increase the overall amount of compacted/disturbed surfaces in the Eagle Creek watershed. Constructing up to 1.25 miles of roads would displace topsoil and compact subsoil on approximately 3.3 acres, however, most of these surfaces would not be retained over the long term (i.e., equivalent decommissioning is proposed) so that at the conclusion of the project the quantity of compacted road surfaces would begin to decrease over time and within a decade would likely approach current levels.

There is an overall maximum increase of 38 acres in compaction/disturbance of soils under the proposed action, approximately 0.1% of the watershed. The extent of compacted/disturbed soil surfaces in the watershed as a whole was not estimated and a "cumulative" total has not been determined. At the conclusion of the project the quantity of compacted/disturbed soils would begin to decrease over time from the maximum and is highly likely to approach current levels within a decade as soil surfaces recover.

The limited magnitude (0.1% of the total watershed) and duration (from the first year following disturbance with a decline toward existing levels within the first decade) of the cumulative increase in compacted/disturbed soil surfaces would likely be insignificant on the watershed scale.

There is a small risk for a cumulative reduction in overall site productivity from top soil displacement, as the proposed activities have the potential to remove and/or displace soil nutrients. However, the limited magnitude and duration of the effect (for an example, the quantity of surface erosion during large storm events), would likely drop back to current levels of 0.38 t/ac/yr within three to five years as the remaining forest stand fills out and would likely be insignificant on both the local and watershed scale.

3.3.4.3 No Action Alternative

If the project were not implemented, the existing soil compaction from past logging and construction activities would continue to recover slowly over time. Only natural mechanisms of compaction and topsoil displacement would occur except from unpredictable unauthorized uses (such as OHV). Unauthorized uses would be addressed as they occur.

3.3.5 Wildlife

Sources Incorporated By Reference: Schlottmann, D and A. Tanner., 2011. Take 3 Thinning and Silvicultural Prescriptions (Silviculture Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.;

USDA, Forest Service; USDI. 1995. Eagle Creek Watershed Analysis (ECWA 1995);

USDI, Bureau of Land Management; Fish and Wildlife Service; USDA Forest Service. April 2012. Biological Assessment of Not Likely to Adversely Affect Projects with the Potential to Modify the Habitat of Northern Spotted Owls, Willamette Planning Province – FY2013 (BA 2013);

USDI Fish and Wildlife Service. June 2012. Letter of Concurrence and Conference Concurrence Regarding the Effects of Habitat Modification Activities within the Willamette Province, FY2013, Proposed by the Eugene District, Bureau of Land Management; Salem District, Bureau of Land Management; Mt. Hood National Forest; Willamette National Forest; Columbia River Gorge National Scenic Area on the Northern Spotted Owl and its Critical Habitat; FWS Reference #01EOFW00-2012-I-0105 (LOC 2013).

Methodology: Cascades Resource Area Wildlife Biologists assessed potential effects to terrestrial species by using the following methodologies:

- For Special Status/species of concern: Wildlife biologists compiled a list of species in the Cascades Resource Area using BLM wildlife databases, BLM Special Status Species lists (BLM IM OR-2008-038), Oregon Natural Heritage Information Center lists (ONHIC 2007), various wildlife field guides, literature, and texts.
- BLM wildlife biologists visited the project area during the 2010, 2011 and 2012 field seasons and examined habitats in and adjacent to proposed Take 3 Thinning project units. From the Cascades Resource Area list and field surveys the wildlife biologists compiled a list of Special Status Species of concern documented or suspected to occur in the Take 3 Thinning project area based the proposal's geographic location, elevation, and knowledge of habitats present gained through air photo interpretation, stand exam data, GIS information, and field reconnaissance. For each of those species they determined habitat associations and the presence or absence of suitable habitat.
- For migratory and resident birds: The biologists developed a list of migratory and resident birds and addressed them according to new interim guidance in Instruction Memorandum BLM-IM-WO-2008-50 (Wildlife report pp. 43-47)
- For amphibians: Wildlife biologists conducted surveys for amphibians concurrent with mollusk surveys in 2010 and 2012.
- For northern spotted owl (NSO): The project area was surveyed 6 times for the northern spotted owl in the spring and early summer of 2011 and 2012 by BLM contractors and there were no northern spotted owl responses. Additional surveys for northern spotted owls may be conducted to determine presence in the future.
- Red Tree Voles. Surveys were conducted in the spring of 2010 and 2012 in portions of units 11A, 11D, 13C and 13D. These areas were surveyed from the ground, and the trees that could not be inspected from the ground were climbed. No red tree vole nests or evidence of their presence were found.
- Mollusks. Surveys were conducted in 2011 and 2012 in stands where the average age exceeded 80 years. No Survey and Manage mollusk species were found. Additional surveys may be conducted for mollusks in the future.

- Cascades Resource Area wildlife biologists assessed the suitability for treatment of Riparian Reserve stands adjacent to proposed Matrix/GFMA thinning units by:
    - Conducting visual "walk through" examinations of those Riparian Reserve stands to assess stand complexity and other habitat characteristics based on their training and professional experience.
    - Consulting stand exam data.
    - Consulting with the Cascades Resource Area logging systems specialist to determine if treatment is feasible using existing roads or roads to be constructed for managing Matrix/GFMA land.

Affected Environment

Descriptions of stand conditions as they relate to wildlife habitat are based on stand exam data, aerial photo interpretation and field review by BLM resource specialists in wildlife biology (wildlife biologist) and silviculture (silviculturist).

General Stand Condition

Descriptions of stand conditions as they relate to wildlife habitat are based on stand exam data, aerial photo interpretation and field review by BLM resource specialists in wildlife biology (wildlife biologist) and silviculture (silviculturist). Stand characteristics by proposed thinning unit are described in EA 3.3.1.

There are two distinct stand types for wildlife habitat in Take 3; structurally simple mid-seral stands and more diverse early mature seral stage stands (*as defined in Table 7*). There is approximately 45 acres classified as early mature (*see Table 7*) in 11A, and about 2 acres in 11D. The rest of the sale can be placed into the mid-seral and structurally simple stands. Most stands proposed for thinning in the Take 3 area originated between the early 1900s to the late 1970s after the mature/old growth forest was logged. Little evidence of the previous stands is now visible, except for some scattered large CWD that was left on the ground after logging. Canopy closures range from 49-90 percent, and understory shrub development has generally been retarded and ground cover is sparse in some areas (less than 10 percent).

Approximately 70 acres of 11A was commercially thinned in the late 1990's as part of the "Rusty Saw Reoffer" timber sale. Approximately 88 acres of unthinned conifer stands that were posted out of the Rusty Saw Reoffer sale are proposed for initial thinning (*See EA 3.2 3.3.1*).

Variation in forest stand conditions within stands and at the landscape level have been identified as a key factor in providing habitat for a diversity of forest organisms (Hayes et.al. 1997; Muir et.al., 2002). Certain structural and compositional aspects that have been found to be important contributors to habitat diversity and species richness include dead wood in the form of snags and down logs, remnant live trees, and vertical and horizontal variation in tree and understory canopies. Also, hardwood trees and shrubs in particular have been found to be important contributors to forest biodiversity, providing habitat substrate, food sources, foraging substrate, and nesting opportunities. All of these features are generally lacking in the managed stands proposed for thinning.

Snags, Coarse Woody Debris (CWD) and Special Habitats

Snags, course woody debris (CWD) and special habitats provide important ecological function such as adding in dispersal and carryover of wildlife species (RMP, p. 20). BLM identified the dead wood and special habitats in the proposed units. Dead wood composes both standing (snags) and the fallen logs (course woody debris). Special habitats consist of wet and dry meadows, talus, cliffs & rock outcrops. The presence of snags, special habitats, and the amount of CWD present are based on stand exam data, aerial photos, and field review by specialists has been summarized in Table 10 and 12.

Table 10: Summary of special habitats, remnants, and coarse woody debris (CWD) present by project Unit

Name/Unit	Location	Seral Stage	Remnant Old Growth	Special Habitats*	CWD***	
					Hard (Class 1-2)	Soft (Class 3-5)
11 A	3S-5E-11	Late Mid/Early Mature	No	No	146’	880’
11 D	3S-5E-11	Late Mid/Early Mature	No	No	0	673’
11 G	3S-5E-11	Late Mid	No	No	114’	1,151’
13 A	3S-5E-13	Mid/ Late Mid	No	Yes#	0	288’
13 B	3S-5E-13	Mid	No	No	0	906’
13 C	3S-5E-13	Mid	No	No	0	69’
13 D	3S-5E-13	Early mid	No	No	0	495’

Seral Stage Age Classes (years) based on Stand Exam data: Early Seral = 0-30; Early Mid Seral = 30-40; Mid Seral = 40 – 60; Late Mid Seral = 60 -80; Early Mature Seral = 80 - 120; Mature = 120 - 200; Old Growth =200+; (See RMP/FEIS glossary, p. 6-13)

**Special habitats within the units include: wet and dry meadows, talus, cliffs & rock outcrops.*

****Linear feet/acre Meeting RMP direction of at least 20” diameter & >20’ long, hard (decay classes 1-2) and soft (decay classes 3-5) logs.*

#Presence of adjacent special habitat, wetland, pond protected with no treatment buffer.

CWD in the project area provides for ecological function. To see that the needs of the species are met and ecological processes are achieved the BLM has management direction in the Matrix to leave at least 20” in diameter at the large end, 20 feet in length, and in decay classes 1 and 2, (RMP, p. 21). See table 10 for the amount of CWD in the proposed units meeting this direction.

With the exception of the hard CWD listed in Table 10, hard CWD (class 1 and 2) in the project area is smaller diameter material. This material isn’t adequate to meet all the needs of dead wood associated species and doesn’t meet management direction for CWD. The hard logs in smaller size classes are mostly the result of recent self-thinning in crowded overstocked stands. These small logs are much less useful to forest floor-associated animal species for cover because they have less volume, and persist for shorter time spans (usually less than two decades) than the larger material, thus they are less useful for wildlife.

Soft CWD (classes 3 to 5) are usually remnants of old-growth “cull” trees that were not removed after harvest, and are often in larger diameter classes. These logs provide valuable habitat for a whole host of CWD associated wildlife species (O’Niell et.al. 2001), and they

persist for many decades before passing through advanced decay classes to become unrecognizable as down logs.

Snags are an ecologically valuable structural component of the project area. Table 11 summarizes the number of snags necessary for five cavity-excavating woodpecker species to maintain 40 percent of potential population levels (Neitro et. al, 1985). These numbers for snags are used as management direction for retention in the Matrix (RMP p. 21). Table 12 summarizes the snags currently present in the project area. A diameter of 15 plus inches was used because most wildlife species that utilize snags are associated with snags greater than 14.2 inches (Rose et.al., 2001).

Table 11: Snags and Cavity nesting birds

Diameter class (inches dbh)	Snag Decay Stage		Total by diameter class (per 100 acres)
	Hard (Class 2-3)	Soft (Class 4-5)	
11+		Downy woodpecker (6)	6
15+	Red-breasted sapsucker (18)	Hairy woodpecker (77)	95
17+		Northern flicker (19)	19
25+	Pileated woodpecker (2)		2
Total – all diameter and decay classes per 100 acres			**122**

Table 12: Summary of Snags Currently Available By Project Unit

Snags at least 15' tall/ 100 acres						
Section (all units)	**Hard snags 15-25"**	**Soft snags 15-25"**	**Hard snags 25"+**	**Soft snags 25"+**	**Total hard snags 15"+**	**Total soft snags 15"+**
Take 3 Project Area						
3S-5E-11-A	0+	0+	0+	100	0+	100
3S-5E-11-D	0+	0+	0+	0+	0+	0+
3S-5E-11-G	0	0	0	100	0	100
3S-5E-13-A	0+	0+	0+	30	0+	30
3S-5E-13-B	0	0	0	0	0	0
3S-5E-13-C	0	0	330	0	330	0
3S-5E-13-D	0	0	0	0	0	0

The presence of snags and standing dead material is based on stand exam data and field review by specialists. Stand exam data is based on a statistical sample from plots. Low numbers of snags may be present, but the sampling may not have picked up any on the plots. The use of 0 plus in the table denotes when there are trace numbers of snags present that may not have shown up on the plots.

The hairy woodpecker, red-breasted sapsucker and pileated woodpecker are species associated with conifer stands in the western Cascade Mountains, and are present in the Take 3 Project Area. Northern Flicker and Downy woodpecker are not typically associated with closed-canopy conifer-dominated stands in the western Cascades, though both species are found in or around the project area.

For the five woodpecker species found in the project area, the snag habitat does not meet the management direction of 40 percent of maximum population densities. Most of the snags and CWD material that are present are small (less than 15 inch diameter) and/or highly decayed. Trees that could have developed into large snags and down logs were removed by past timber management treatments. The stands throughout the project areas are in a condition in which there currently is a snag deficit.

In 2006 BLM created snags in parts of Unit 11 A to accelerate the development of complex crowns, lateral limbs and increase the number of dead and broken top trees in the stand. The snag creation consisted of topping, and base girdling. The snag creation project treated 250 trees in Section 11 between 16 and 24 inches in diameter (DBH). The area was treated to create approximately 2 dead/deformed trees per acre. The Take 3 proposed action would protect these snags, as described in the Project Design Features (*EA section 2.2.3, PDF # 37*).

Residual Old Growth: There are no known residual old-growth trees present in the proposed Take 3 units. There is a large (greater than 36 inches DBH) tree component in portions of Units 11A, 11D, 13C and 13D (*see EA 3.3.1*).

Special Habitats: There are wet areas with seasonal ponds adjacent to unit 3S-5E-13A. These features will be posted outside of the unit boundaries.

Federally Listed Species: Northern Spotted Owls (NSO)

The closest known spotted owl site is the Eagle Creek site, which is located outside of the provincial home range radius (1.2 miles). The site is located in the Salmon-Huckleberry Wilderness area managed by the Mt. Hood National Forest. The Take 3 vicinity was surveyed for spotted owls during 2011 and 2012. There were no spotted owl responses and none were found. There were barred owl responses in the vicinity of the Take 3 proposal.

The proposed units provide 342 acres of dispersal habitat in the Eagle Creek Watershed. None of the proposed units are located within the provincial home range radius (1.2 miles) of a known spotted owl site. None of the units are located in Critical Habitat and or unmapped Late Successional Reserves (LSRs) which are 100 acre core areas of known spotted owls as of January 1994.

Special Status, Survey and Manage, and other Species of Concern

Table 6 of the Wildlife Report lists BLM Special Status/Species of Concern which are documented or suspected to occur in the Take 3 Project Area based on field inventories of the habitats present and a review of the existing literature. Vegetation surveys (stand exam data) indicate that most of the stands proposed for thinning are lacking in habitat elements that support diverse populations of wildlife species, especially CWD, snags, deciduous understory and ground cover vegetation, or deep accumulation of leaf litter. Habitat, range data, and previous surveys for mollusks and amphibians conducted over 9000 acres on the Cascades

Resource Area since 1991 indicate that no Bureau Sensitive mollusk species are likely to be present in the proposed thinning units.

Bureau Sensitive- Johnson's Hairstreak

Johnson's hairstreak (Callophrys johnsoni) is a small butterfly which is found in older coniferous forests that contain mistletoes (Arceuthobium species), primarily of western hemlock and true firs. It is a forest canopy species, which may account for the rarity of sightings throughout its range. Late successional and old-growth forests are important to the survival of Johnson's hairstreak. It has been called the only old-growth obligate butterfly (Pyle 2002). There are younger forests that contain dwarf mistletoe may have the potential to support populations of the Johnson's hairstreak (Hoffman and Lauvray 2005). There are no old-growth stands in the proposed Take 3 units, there are early mature stands proposed for thinning, and western hemlock dwarf mistletoe is present in the Take 3 area in 11 A and 13 B and 13C.

Most of the Johnson's hairstreak records in Oregon are from elevations over 2,000 feet. BLM lands in Take 3 vary in elevation from about 1,800 to 2,200 feet, with most of section 13 above 2,000 feet, and most of section 11 is at or below 2,000 feet. The current range distribution indicates that it could be present. No formal surveys have been done in this area for this species. This habitat is marginal due to young age of the stand, and is at the lowest end of the elevation range in which the species is normally found. There are no recorded sites in the project area.

Bats

There is one Bureau Sensitive bat species suspected to occur in Take 3 Area, the fringed bat. Four bat species of concern are suspected to occur in the Take 3 Area (silver-haired bat, long-eared myotis, long-legged myotis, and Yuma myotis). These species are associated with caves and mines, bridges, buildings, cliff habitat, or decadent live trees and large snags with sloughing bark.

Decadent live trees and large snags, particularly ones with bark attached that extend above the tree canopy, are used variously as solitary roosts, maternity roosts, and hibernacula by these species, and other bat species associated with Douglas-fir forests (Christy and West 1993, Weller and Zabel 2001, Waldien et.al. 2000). Although roost sites are poorly characterized in Pacific Northwest forests, existing information indicates that old-growth forests provide higher quality roost sites than younger forests and that many species prefer older forests (Thomas and West 1991, Perkins and Cross 1988). Old-growth and tall snags with sloughing bark are rare in the project area (*Tables 10 and 12*), and these species are likely to be present in low numbers. Bats are also associated with buildings, bridges, mines, cliff crevices and caves. None of these features are present in the Take 3 Project Area.

Former Bureau Sensitive - Oregon Slender Salamander

Oregon slender salamander is no longer a Bureau Sensitive species (BLM IM OR-2012-018) and is on List 4 according to the Oregon Biodiversity Information Center C (ORBIC 2010). It is expected to occur in portions of the project areas where CWD of adequate size (RMP management direction greater than 20 inches in diameter at the large end, greater than 20 feet in length) occurs. Oregon slender salamander has been found throughout the Cascades Resource Area in stands across the full range of seral stages. Its distribution on BLM lands within the Cascades Resource Area appears to be limited by dry conditions at low elevations along the Willamette Valley floor, and by cold conditions at higher elevations (Dowlan, unpublished 2006). Oregon slender salamander was found to be present in section 11, and suspect to be present in section 13.

Survey and Manage – Red Tree Vole

Red tree vole is an arboreal vole associated with conifer forests west of the Cascades summit, below about 3,500 to 4,500 feet in elevation. The project area is within the "Northern Mesic Zone" of the range for the species, and red tree voles could occur. Currently only portions 11A and 11D meet the stand-level criteria as described in the Red Tree Vole Protocol (Biswell et al 2002). Most of unit 11 A and portions of 11 D were surveyed for red tree voles during 1999 Rusty Saw Timber Sale. No red tree voles were confirmed to be present during the previous survey effort. In 2010 and 2012 the BLM surveyed portions of 11A, 11D, 13C and 13D. No red tree voles were found.

Migratory and Resident Bird Species

The BLM evaluated and considered management objectives and recommendations for migratory birds resulting from comprehensive planning efforts (IB No. 2010-110).

The comprehensive planning effort that addresses the Western Oregon Cascades region is the Partners in Flight (PIF) conservation plan; Conservation Strategy for Landbirds in Coniferous Forest of Western Oregon and Washington (Altman 2008) (Appendix A). This plan outlines the focal species associated with various stand types and associated habitat attributes are shown in Appendix C. Breeding bird surveys and observations from the project area have found twenty-two species, of which nine are priority bird species of conservation concern as identified by the conservation strategy.

The proposed units are low in landbird species richness. Species richness is the number of species present in the project area. Bird species richness at the stand level has been correlated in some recent studies with habitat patchiness, densities of snags, and density by size-class of conifers (Hagar, McComb, and Emmingham 1996, Hansen et al. 2003). Even-aged conifer stands provide habitat for a relatively high abundance of a few bird species, many of which feed on insects gleaned from conifer foliage. The proposed units are in mid seral stands that are structurally simple and characterized by an even-aged, single-layered, closed-canopy with poor understory development. The most common species include chestnut-backed chickadee, Pacific-slope flycatcher, hermit warbler, golden-crowned kinglet, varied thrush, winter wren,

red-breasted nuthatch, and Swainson's thrush, however, these species are also common or more abundant in mature conifer stands as well (Hansen et.al., 1995).

Poor understory development in the proposed units effects bird populations. The light-limited understory of unthinned stands does not provide for a diverse community of shrub and ground cover plant species that are important in providing insect and plant food resources for bird species which rely on living deciduous trees, shrubs, and leaf litter (Hagar 2004). Abundance of arthropod prey species has been correlated with understory and midstory vegetation, particularly tall shrubs and hardwoods. These habitat elements are lacking or poorly-developed in the stands proposed for thinning.

Big Game

Big game species that are found in the project areas include Roosevelt elk (*Cervus elaphus roosevelti*) and black-tailed deer (*Odocoileus hemionus*). The project areas are in mid seral stands which provide hiding and low quality thermal cover. Early seral communities and mid seral stands are abundant on adjacent private lands surrounding the project areas. The project area is not in critical winter or summer range (RMP p.26).

Environmental Effects

3.3.5.1 Proposed Action

General Stand Condition

The proposed treatment will have both short (less than 5 years) and long term (more than 5 years) effects on the two distinct stand types represented. Because the silvicultural prescription is designed to thin from below concentrating on suppressed and intermediate trees, some of the conifer understory over 7 inches dbh would be harvested (Schlottmann et.al.). All conifers fewer than 7 inches in diameter would be retained. A large component (295 acres) of the proposed sale is composed of structurally simple mid-seral stands. Thinning these stands will create a short term reduction in canopy cover, understories and ground vegetation. The long term effect of thinning would be to increase tree sizes, spacing, understory development and structural complexity, and thus improve habitat quality for many mid - late successional wildlife species.

The effects of thinning 47 acres of early mature seral stage stands would be similar to that of the mid-seral stands. In the mature stage there is a shift from competitive to non-competitive mortality causes of mortality, which represents a stand-level change from uniform to spatially-aggregated patterns of mortality (Franklin, et al 2002). In the short term, canopy cover, understories and ground vegetation would be reduced. In the long term, the large tree component (greater than 36 inches DBH) would be reserved, and the variability in tree sizes and spacing would be reduced. Stand conditions and structural complexity would improve in the long term as residual trees increase in diameter, understories develop and canopies close.

Research that has occurred since the 1980s has determined that it is possible to develop desired structural and compositional diversity in young managed stands through specific actions (Bailey and Tappeiner 1997, Chan et.al.2006). Thinning forest stands produces what has been described as "cascading ecological effects" (Hayes, Weikel and Huso, 2003) that result from reduced competition between overstory trees and increased availability of solar radiation to the forest floor. Growth, size, branch diameter, and crown ratio of the remaining trees is increased, and development of understory and ground cover vegetation is stimulated. These changes effectively increase structural complexity and alter habitat quality. The increase in structural diversity would improve habitat for many species by providing more opportunities for foraging, nesting/breeding, resting, hiding and escape cover/habitat for a variety of species in the forest environment, including invertebrates, songbirds, and small mammal species. These changes are considered to be beneficial since there is an abundance of simplified mid seral stands in the Eagle Creek Watershed (ECWA Chp. 3, pp.27).

Proposed road construction and renovation, skid trails and skyline corridors under the proposed action would create narrow linear openings through the vegetation, disturbing, reducing or removing ground vegetation and creating breaks in the canopy, which allow more light to reach the forest floor. The effects on wildlife habitat would be a short term (less than 5 years) disturbance and reduction in ground vegetation and canopy closure that would increase access to the stand by certain wildlife species, specifically larger mammals such as big game, coyotes, and avian predators. In the long term (more than 5 years) ground vegetation would become re-established due to increased light to the forest floor and the breaks in the canopy would close.

The proposed action includes three one acre low density thinning patches. These openings would increase understory layering, structural diversity and ground cover, adding complexity to the forest stands. Species which are expected to benefit from low density thinning patches are ruffed grouse, Wilson's warbler, warbling vireo, song sparrow and big game species.

Riparian Reserves and associated Wildlife Species

Thinning is expected to improve habitat conditions in the Riparian Reserves for wildlife by accelerating development of late seral forest stand characteristics. Desirable late seral forest stand characteristics include larger trees for a large green tree component and recruitment of large standing dead and down CWD in future stands, multi-layered stands with well developed understories, and multiple species that include hardwoods and other minor species.

At the landscape level, connectivity is expected to improve as late successional conditions develop in the Riparian Reserves. Species which would benefit from the development of late successional conditions in the Riparian Reserves include many species of mollusks, amphibians, bats, the red tree vole, blue grouse, red-breasted sapsucker, pileated woodpecker, Cooper's hawk, Pacific-slope flycatcher, Swanson's thrush, black-throated gray warbler, and black-headed grosbeak, olive-sided flycatcher, brown creeper, and hermit warbler.

Snags and Coarse Woody Debris (CWD)

Thinning these stands would reduce the number of small diameter (less than 15 inches DBH) snags over the next 20 to 40 years because thinning from below removes the smaller suppressed and intermediate trees that would be most likely to die from suppression mortality and become snags within that time period. Also, more of the existing smaller diameter/taller snags (greater than 12 inches diameter and greater than 25 feet tall), would be felled for safety reasons, or fall incidental to thinning operations. These smaller snags are less important for wildlife species than the larger material over 15 inches (Rose et. al., 2001). The benefit of smaller snags to wildlife is limited. In unmanaged forests the presence of cavity nesting birds has been linked to the presence of snags, particularly greater than 50 cm (19.26") (Carey et al. 1991, Huff and Raley 1991). Snag associated species such as chestnut backed chickadees, red breasted nuthatches, brown creepers and hairy woodpeckers have shown selectivity to foraging habitats based on deciduous trees, large diameter conifers, and large diameter heavy decayed snags and logs (Weikel, 1999).Within thinning units, approximately 90 plus percent of existing snags over 15 inches diameter would remain standing after treatment. This would effectively reserve the best existing habitat features for primary excavators (woodpeckers), and secondary cavity users, such as songbirds, bats and small mammals. The remaining 10 percent or less of these large snags may need to be felled to maintain safe project operations.

All felled snags would remain on-site as CWD, providing important habitat for dead-wood associated species, including the Oregon slender salamander. After operations are complete, all dead wood would remain on-site, either in the form of standing snags or as down logs. The existing topped trees in unit 11A would be reserved from harvest.

Most units throughout the project areas are expected to remain in a snag deficit condition for two to five decades, until live trees become large enough (at least 20 inches diameter) to provide for recruitment of large snags and CWD which would meet RMP management direction. Approximately 60 to 135 green trees per acre would be retained for green trees, and recruitment of snags and CWD in the future stands (RMP p. 25). As a result of thinning, growth of residual live trees would be accelerated, so that larger trees would be available sooner for recruitment than without thinning to contribute additional large snags and CWD in the future stand. As a result of previous snag creation along with increased growth rates of retained trees, the RMP guidelines for snags (40 percent maximum population densities) and CWD (240 plus linear feet per acre of material in decay classes 1 or 2, at least 20 inches in diameter at the large end, and 20 feet in length), could be met in two to five decades.

Large diameter CWD in more advanced decay conditions would persist and contribute to forest floor wildlife habitat conditions for many decades before passing through decay class five to become unrecognizable as down logs.

Small dead wood would still be present and available in adjacent untreated areas. There would be untreated areas to provide small dead wood from suppression mortality, and improved growth rates of residual trees in thinned areas to provide for future recruitment of larger diameter dead wood.

It is anticipated that less than ten percent of existing CWD would be directly impacted by logging. Less than ten percent of the thinning area would be directly impacted by skidding/yarding, which is the operation with the highest potential impact to existing CWD. BLM oversight of skyline corridor and skid trail locations would ensure that they were located to avoid impact to high value CWD whenever feasible.

Federally Listed Species

Threatened - Northern Spotted Owl

None of the proposed units are located within the provincial home range radius (1.2 miles) of a known spotted owl site. None of the proposed units are located in LSR or Critical Habitat for the Northern spotted owl.

The project area has 342 acres of dispersal habitat for Northern spotted owl (*Table 13*). The short term effect of thinning will be alteration of dispersal habitat. Forest stands can be altered in a manner that is not necessarily expected to change the habitat function for spotted owls (Forsman et al. 1984, USFWS 2007c). Current habitat conditions for the spotted owl would be maintained after treatment. "Maintain" habitat means light to moderate thinning in which forest stand characteristics are altered but the components of spotted owl habitat are maintained such that spotted owl life history requirements are supported. As a result, the functionality of the habitat used by spotted owls remains intact post treatment.

The habitat functionality of the dispersal habitat will be maintained in the project area. For spotted owl dispersal habitat a canopy cover of over 40 percent along with other habitat elements (e.g. including snags, down wood, tree-height class-diversity, and older hardwoods) will be maintained post treatment to adequately provide for spotted owl dispersal.

Such treatments can have long-term benefits to spotted owls by encouraging late-successional characteristics to occur more rapidly (BA p.14; LOC p.18). Thinning would accelerate the development of suitable habitat characteristics, especially in Riparian Reserves. As thinned stands mature, habitat conditions are expected to improve.

Canopy closures would increase and the stands that are dispersal currently would attain suitable habitat conditions within 10 to 40 years. These stands would develop foraging and nesting structure and residual trees will increase in size and be available for recruitment of snags, culls and CWD for prey species and nesting opportunities for spotted owls.

Disturbance associated with thinning (logging, road-building, etc.,) may have temporary effects on the presence or movement of spotted owls. However, thinning would maintain dispersal habitat, therefore maintaining the ability of the habitat to accommodate movement of birds after thinning is completed. Based on the lack of suitable habitat in the vicinity, the proposal's location on the landscape, and past survey results, the presence of spotted owls in the Take 3 area is unlikely.

Table 13: Spotted Owl Habitat Modification and Effect Determination

Proposed Treatment[1]	Acres	Land Use Allocation[2]	Pre/Post Treatment Habitat Type[3]	Habitat Modification[4]	Effect[5]
Moderate Thin	342 ac	GFMA/RR	Dispersal to Dispersal	Maintain	NLAA

Notes and definitions for Table 4 (BA 2008, pp. 3, 4-5; LOC 2008, pp. 10-11).

1 Treatment Type:

Light to moderate thinning in dispersal habitat can be for forest health or to improve the structural characteristics of a stand or to provide commodity. Such treatments may be described as commercial thinning, density management, selective cut, partial cut, or mortality (standing) salvage. Such thinnings maintain a minimum of 40 percent average canopy cover. Light to moderate thinnings can have long-term benefits to spotted owls by encouraging late-successional characteristics to occur more rapidly.

2 Land Use Allocations: **GFMA**=General Forest Management Area Matrix; **RR**=Riparian Reserve.

3 Habitat Types:

Dispersal habitat consists of conifer and mixed mature conifer-hardwood habitats with a canopy cover greater than or equal to 40 percent and conifer trees greater than or equal to 11 inches average diameter at breast height (DBH). Generally, spotted owls use dispersal habitat to move between blocks of suitable habitat, roost, forage and survive until they can establish a nest territory. Juvenile owls also use dispersal habitat to move from natal areas. Dispersal habitat lacks the optimal structural characteristics needed for nesting.

4 Habitat Modifications:

Maintain habitat means to alter forest stand characteristics but maintain the components of spotted owl habitat within the stand such that spotted owl life history requirements are supported (i.e. the functionality of the habitat used by spotted owls remains intact post treatment). For spotted owl dispersal-only habitat a canopy cover of >40 percent along with other habitat elements (e.g. including snags, down wood, tree-height class-diversity, and older hardwoods) will be maintained post treatment to adequately provide for spotted owl dispersal.

5 Effect: **NE**=No effect; **NLAA**=May affect, but not likely to adversely affect; **LAA**=May affect and likely to adversely affect.

Special Status, Survey and Manage, and other Species of Concern

Bureau Sensitive – Johnson's Hairstreak

No old-growth habitat is proposed for thinning, however, there are early mature stands proposed for thinning. The primary habitat component for Johnson's Hairstreak, western hemlock dwarf mistletoe, is present in the Take 3 area. The proposed project would reduce the amount of hemlock dwarf mistletoe in the stand. The reduction in mistletoe may have effects on Johnson's hairstreak, but the impacts would be limited to individual trees in marginal habitat mostly right at or below 2,000 feet. Hemlock dwarf mistletoe is known to be very persistent and virtually impossible to eliminate without aggressive clear-cutting (Hawksworth, Wiens 1996), and would persist after treatment. The reduction in available habitat would be short term.

Bats

Old-growth forests provide higher quality roost sites than younger forests and many species prefer older forests (Thomas and West 1991, Perkins and Cross 1988). No older forests are proposed for thinning. Bat species which use snags would be affected due to a loss of 10 percent or less of the standing dead material within the thinning units. Within thinning units, approximately 90 plus percent of existing snags over 15 inches diameter would remain standing after treatment. The remaining 10 percent or less of these large snags may need to be felled to maintain safe project operations. Bat activity appears to be higher in thinned versus unthinned stands. Structural changes in stands caused by thinning may benefit bats by creating habitat structure in young stands that bats are able to use more effectively (Humes, Hayes, Collopy 1999).

Bat species are also associated with buildings, bridges, mines, cliff crevices and caves. None of these features are present in the Take 3 Project Area.

Former Bureau Sensitive – Oregon Slender Salamander

The proposed thinning should have minimal effects to Oregon slender salamanders or their habitat. Oregon slender salamander's primary habitat is CWD and less than 10 percent could be manipulated to facilitate ground based logging. This material would be cut or moved out of the way. There would be a short term disturbance to this habitat, but it will remain present in the stand after treatment. Post-thinning treatment surveys in the Keel Mountain Density Management Study Area indicate that Oregon slender salamanders are not significantly affected by thinning (Rundio and Olson 2007). Oregon slender salamanders would be expected to persist at sites within stands where CWD of adequate size (RMP Management direction greater than 20 inch diameter at the large end and greater than 20 feet in length) currently exists. The CWD currently on-site prior to thinning would continue to provide refuge for terrestrial salamanders many years after treatment.

Survey and Manage – Red Tree Vole

The effects to red tree vole are expected to be minimal due to the lack of old-growth/late successional habitat. Portions of Units 11A, 11D, 13C, and 13D were surveyed and could be marginal habitat at best. No red tree voles were detected during two survey efforts in the area.

No habitat is being removed as a result of this proposal. In the short-term, undetected nests could be destroyed or disturbed during thinning. Thinning can temporarily inhibit dispersal and make habitat less suitable because of wider spacing between crowns (Hayes et. al. 1997). After thinning is completed, stands would acquire older forest characteristics sooner than without thinning. Habitat conditions for red tree voles would gradually become more suitable after thinning as the stands continue to mature and develop older forest characteristics.

Migratory and Resident Birds

Unintentional take of nests, eggs, nestlings and nesting failure would be likely if harvest operations occur during active nesting periods. However, the impacts would be short term, involving loss of nests and unintentional take during one nesting season, and would not reduce the persistence of any bird species in the watershed or populations at the regional scale. In the western Oregon Cascades there is temporal variability of breeding bird species and individuals of the same species in forested habitats. For example some owls and woodpeckers begin breeding in February or March while some flycatchers do not finish breeding until August. The majority of birds in the Pacific Northwest complete their breeding cycle within the April 15 to July 31 time period (Altman, Hagar 2007).

Some individual birds may be displaced during harvest operations in the project area due to disturbance. Adjacent untreated areas and areas where active operations are not occurring would provide refuge and nesting habitat, which would minimize short term disturbance.

Changes in habitat structure are expected to have immediate effects on bird communities in thinned stands. Thinning densely-stocked conifer stands would be expected to immediately enhance habitat suitability for species which prefer a less dense conifer canopy, and reduce habitat suitability for species that prefer continuous conifer canopies. Reducing the canopy closure and opening up stands is expected to have short term negative effects on the brown creeper, golden-crowned kinglet, hermit warbler, Pacific-slope flycatcher and varied thrush however, these species are also common or more abundant in mature conifer stands as well (Hansen et.al., 1995). The thinning would have no effects or even positive long term effects on this same set of species as understories develop and habitat quality improves.

Overall bird species richness (a combination of species diversity and abundance) would be expected to gradually increase for up to 20 years as hardwood components of stand structure develop, plant species composition becomes more complex, and hardwood shrub layers, epiphyte cover, and snag density become more prominent within the stands. The future development of hardwood/deciduous tree/bush components and canopy layers would favor species such as the band-tailed pigeon, ruffed grouse, red-breasted sapsucker, Wilson's warbler, Hutton's Vireo and black-throated gray warbler. The low density thinning patches would encourage the development of hardwood/deciduous tree/shrub components and canopy layers more rapidly, and would further benefit this same set of species.

Big Game

Big game species would be temporarily disturbed during the implementation of the proposed action. Logging equipment noise and human presence may cause animals to avoid or disperse from the project areas temporarily. Thermal and hiding cover would be maintained after harvest. Thermal and hiding cover quality would decrease in the short-term as a result of thinning, opening new roads, renovating roads and road improvements (Cole, et al. 1997, Trombulak and Frissell 1999, USDA (PNW) 2006). Vegetative forage such as saplings, shrubs, grasses and forbs would increase as a result of thinning and road closures after thinning. As a result of increased light, forage quantity would increase and attract early successional species such as elk and deer to the thinned areas. This response of early serial plant species will be evident in the three – one acre low density thinning areas.

In the long term (5 plus years), thermal and hiding cover quality would increase and vegetative forage such as saplings, shrubs, grasses and forbs would gradually decrease as a result of canopy closure decreasing the amount of light reaching the forest floor. Vegetative forage would persist longer in the low density thinning areas.

3.3.5.2 Cumulative Effects

Snags and CWD

Thinning would reduce the number of small diameter (less than 15 inches DBH) snags in treated areas. Small dead wood would still be present and available in adjacent untreated areas. Design features would retain existing CWD and snags 15 plus inches diameter. It is

expected that 90 plus percent of these snags would remain standing after treatment. Some snags, especially smaller diameter/taller snags (less than 12 inches diameter and greater than 25 feet tall), would be felled for safety reasons, or fall incidental to thinning operations. Any snag that falls for any reason as a result of thinning operations would remain on-site to become CWD, providing important habitat for a different, but also, key group of dead-wood associated species (Aubry 2000, Bowman et.al. 2000, Butts and McComb 2000), including the Oregon slender salamander.

Beneficial long term, cumulative effects to larger CWD, snag habitat and associated species may occur as a result of implementing the projects, since larger trees would be available sooner than without thinning to contribute additional large snags and CWD recruitment in future stands.

Federally Listed Species

Threatened - Northern Spotted Owl

The scale for cumulative effects for the northern spotted owl is the provincial home range of known spotted owl sites, 1.2 miles for the Cascades of Western Oregon (BA, p. 3; LOC, p. 12), and the location of the project in relationship to adjacent known spotted owl sites and Late Successional Reserves (LSRs). The scale was chosen because the Northwest Forest Plan (NWFP) goal for conservation and recovery for spotted owls is to maintain suitable owl habitat within LSRs and the provincial home range of known owl sites; and maintain dispersal habitat between LSRs and known owl sites.

Cumulative effects to spotted owls and their habitat were analyzed thoroughly at multiple scales in the BA, including the current Environmental Baseline (2013 BA pp.18-27), and Cumulative Habitat Effects Summary (2013 BA p. 53). Unit Specific Data, including the environmental baseline and effects of proposed projects that are likely to adversely affect spotted owls, are summarized by Administrative Units in the Willamette Province (2013 BA pp. 57-113), including the Cascades Resource Area where the Take 3 Project is located (2013 BA pp. 65-76).

The LOC issued by the USFWS concurred with the analysis in the BA that the combined effects to spotted owl habitat and populations of all of the actions proposed in the Willamette Province (including the Take 3 Project) are not likely to adversely affect spotted owls or spotted owl critical habitat (2013 LOC pp. 40-41).

The proposed project would not contribute to cumulative effects to spotted owls because the proposed action would maintain dispersal habitat within and between known owl sites. In the long term the silvicultural prescription should promote multi-aged and multi-storied stands may increase the quality of spotted owl habitat over time (LOC p. 23).

Other BLM Special Status Species and Survey and Manage

The proposed action would not contribute to cumulative effects to the Oregon slender salamander and other CWD associated species. Suitable habitat conditions would be

maintained in the short term in the project areas, providing refugia for low-mobility amphibians and invertebrates. In the long term, larger trees would be available sooner than without thinning to contribute additional large CWD in future stands. Implementation of the project would not eliminate connectivity between proposed units or adjacent untreated stands under BLM management.

Cumulative impacts to red tree voles are expected to be minimal due to the lack of old-growth/late successional habitat over 80 years of age. The units have been surveyed for two sales and no red tree voles have been found in this area.

Thinning in the project areas, either individually or collectively, would not be expected to contribute to the need to list any Bureau Sensitive species under the Endangered Species Act (BLM 6840) because habitat for the species that is known to occur in the project areas would be not be eliminated, habitat connectivity would not be changed, any habitat alteration would have only short-term negative effects, and long-term effects would be beneficial.

Migratory and Resident Birds

The proposed action would not reduce the persistence of any bird species in the watershed or populations at the regional scale. Habitat changes resulting from the proposed action would not eliminate any forest cover type, change any habitat or patch size, and therefore would not contribute to fragmentation of bird habitat. Thinning would not contribute to a fundamental change in the species composition of existing bird communities within the watershed. Therefore, no adverse cumulative effects would occur to migratory birds.

Big Game

No adverse cumulative effects to big game species populations are expected. The proposed action would not fundamentally change or eliminate any forest cover type or change any habitat patch size. Therefore, thermal and hiding cover present before treatment would be maintained after harvest.

3.3.5.3 No Action Alternative

Habitat Structure, Snags and Coarse Woody Debris

The majority of the stands in the project area have low vigor and small crowns would grow more slowly compared to thinned stands. Self thinning would occur, but diameter growth would not accelerate as fast as in thinned stands.

Snags and CWD created by self thinning mortality would not be large enough to meet RMP standards until later in the life of the stand (approximately 20 to 60 years) when suppressed co-dominates achieve these diameters before dying. Understory and ground cover development would take longer than if these stands were thinned. Without management intervention, stands would take longer to develop late successional habitat conditions and remain less diverse for a longer period of time.

In the early mature stands (47 acres) canopy cover, developing understories and ground vegetation would remain unimpacted. Variability in tree sizes and spacing would be maintained and structural complexity would be maintained and improve with time.

Federally Listed Species

Threatened - Northern Spotted Owl

There would be no immediate change in spotted owl habitat and no effect to spotted owls caused by management action. Habitat conditions would remain as described in the Affected Environment, and would continue to develop slowly over time for reasons stated above. In unthinned areas that are currently dispersal habitat, it would take approximately 20 to 50 years to develop suitable habitat conditions if left untreated.

BLM Special Status Species and Survey and Manage

In the short term, there would be no immediate change in current habitat conditions for Survey and Manage and BLM Special Status Species. In the long term (20 to 60 years):

- Trees will grow more slowly, and material available for CWD recruitment would average smaller in diameter than if thinning were to occur. Development of Oregon slender salamander habitat conditions would likely be delayed without the addition of new large woody material to replace existing well-decayed material that will eventually disappear.
- Since no new disturbance to the conifer canopy would occur, no undetected red tree vole nests would be affected. Optimal red tree vole habitat conditions, presumed to be older forest conditions, would develop more slowly without thinning the early/ mid seral stands.

Migratory and Resident Birds

Habitat conditions would remain as described in the Affected Environment, and would continue to develop slowly over time. Species richness of bird communities would reflect the simple single storied early/mid seral stages for a longer period of time, and overall bird species richness would be less than if these stands were thinned. Bird species richness may not noticeably increase, and legacy features in the future stand would likely be smaller and less persistent, especially those that provide habitat for cavity-nesting species.

Big Game

In the short term (less than 5 years), there would be no disturbance effects due to the proposed action. Thermal and hiding cover quality would remain the same as current conditions. There would be no increase in vegetative forage due to increased light to the forest floor. In the long term (5 plus years), thermal and hiding cover quality would gradually decrease as overstocked stands mature hindering mobility. Forage quantity would continue to decrease over time as less light reaches the forest floor.

3.3.6 Air Quality and Fire Hazard/Risk

Source Incorporated By Reference: *Take 3 Fuels Specialist Report*

Affected Environment

Air Quality

The Take 3 Project area is located approximately 10-12 air miles northeast of the town of Estacada. The Willamette Valley smoke sensitive receptor area (SSRA) is 10 to 12 air miles west of the project area. A quarter mile to the southeast from Unit 13B is the Eagle Creek addition of the Salmon-Huckleberry Wilderness, a Class II area. Unit 13D is four tenths of a mile west of the same wilderness. The Mount Hood Wilderness, a Class I area, is 13 to 14 miles to the east. Identified Class I areas have visibility goals to protect them from haze and provide for protection from increases in air pollution. Burning is regulated to prevent any smoke intrusion into SSRAs and prevent any visibility issues in the wilderness areas.

Fuels

The estimated total dead fuel loading for the proposed thinning areas ranges from less than 5 up to 30 tons per acre. The fuels consist of a combination of closed timber litter – tightly compacted short-needled conifer, not much branch or log fuel, and larger dead fuels as well as littler, some great understory and large downed old-growth hemlock, fir and cedar from the original logging. Slash from previous thinning treatments and wildlife trees that were topped in unit 11A remain on site untreated. These fuel types are all determinants of the potential for spread of a fire and the potential difficulty of suppression.

Wildland / Urban Interface

Wildland/Urban Interface (WUI) is a term used to describe the area where developed lands meet undeveloped lands. The developed lands can be homes, businesses or agricultural lands. The project area has been identified in the Clackamas County Community Wildfire Protection Plan (CCCWP) as a Primary WUI area. This is used as an identifier for large-scale fuels modification work. The project area is not within any at risk communities as identified within the CCCWP.

Environmental Effects

3.3.6.1 Proposed Action

Air Quality

The total amount of slash debris expected to be piled for burning is estimated to be between 600 and 1000 tons. Burning up to 1000 tons of dry, cured, piled fuels under favorable atmospheric conditions would not be expected to result in any long term negative effects to air quality in the airshed.

During burn days there would be some smoke that would be dissipated with favorable wind conditions that must be met under the Oregon Smoke Management Plan. There would be a low risk that smoke would enter the Smoke Sensitive Receptor Area (SSRA) or Estacada. Smoke entering the Class I and II Wilderness Areas would be mitigated by burning on favorable winds and burning outside the visibility protection period (July 1 to September 15).

The burning may change the local air quality for a short duration but transport winds affecting the area would keep the air shed scoured out preventing a buildup of particulate matter and provide atmospheric mixing to prevent any intrusions or visibility. Due to the location of this project and only burning when west winds prevail it is unlikely that inversions would present a problem. Burning of slash would always be coordinated with Oregon Department of Forestry (ODF) and conducted in accordance with the Oregon State Smoke Management Plan.

Fire Hazard/ Risk

Immediately after thinning, fuel loading, risk of a fire start and the resistance to control a fire, would all increase at the sites as a result of the proposed action because fuel loading increases. Slash created from timber harvest would add an estimated 10 to 15 tons per acre of dead fuel to the thinned areas. The fuel arrangement would tend to be continuous with patches of low fuels. The low density thinning areas would have most fine fuels removed.

Risk of a fire start in the untreated slash would be greatest during the first season following cutting, - the period when needles dry out but remain attached. These highly flammable “red needles” generally fall off within one year and risk of a fire start greatly diminishes. Fire risk would diminish as soon as the red needles drop and the area "greens up" with under story vegetation and as the fine twigs and branches in the slash begin to break off and collect on the soil surface. Past experience, in the geographic area of this proposed action, has shown that, in approximately 15 years, untreated slash would generally decompose to the point where it no longer contributes significantly to increased fire risk.

Risk of a fire starting in portions of the units without fuels treatments under this proposed action is expected to be low because of limited access to some units and the fuel free areas next to open roads. The continued existence of a tree canopy to shade the fuels would maintain cooler temperatures and higher humidity on the site reducing the risk of a fire start. Fuel treatments are based on the need to reduce the potential fire behavior from fire starts in the thinned areas to the pre-thinning level or less. Reducing the amount of slash left from the thinning would also result in more efficient and quicker fire suppression, less risk for fire fighters and less resource damage if a fire occurred after any treatment.

3.3.6.2 Cumulative Effects

The cumulative potential for wildfire start and growth would increase in the short term (1 to 3 years) as a result of the proposed action because fuel loading on the ground would increase as a result of harvest. Cumulative potential for wildfire start and growth would decrease in the longer

term (1 to 2 decades) compared to unmanaged stands as the logging slash decays and because the natural heavy fuel loading from suppression mortality (trees dying) would not be present after treatment. Neighboring Forest Service lands have continuous forest cover and the private lands are generally clear-cut or early seral stages with low fire risk.

3.3.6.3 No Action Alternative

Air Quality

Under the no action alternative, there would be no change to the affected environment. There would be no short term impacts to air quality because there would be no burning.

Fire Risk

In the short term there would not be much change for risk of fire. In the long term, suppression mortality and ladder fuels would continue to increase as the stand ages. High public use, current trends in human activity and related potential for fire starts would be expected to remain the same or increase as population and WUI increases. Severity and the potential for a crown fire will be higher for dense stands with accumulating surface fuels in the long term (one to several decades). The major change would be that surface fires would be long duration due more down wood and the potential for a crown fire to occur would increase due to increased ladder fuels and canopy closure. The potential risk can change annually with weather conditions and possibly increase faster in the long term with predicted climate change.

If a wildfire were to occur the effects may include: 1) total tree mortality, 2) elimination of the duff and litter layers, 3) reduction of the downed woody component, especially logs in later stages of decay, 4) increased erosion and sedimentation of water courses, and 5) formation of snags.

3.3.7 Recreation, Visual Resources and Rural Interface

Source Incorporated By Reference: *Take 3 Rec/Rural Interface/Visuals Specialist Report*

Assumptions:

- Access to the project area will continue to be a combination of privately controlled roads, some containing gates, and uncontrolled public road access.
- The BLM will continue to allow for access to the Forest Service's Salmon-Huckleberry Wilderness trailhead from the junction of 3-5E-13.4 and 3-5E-13.0 roads in the SE¼ of Section 13 which provides low elevation access to the wilderness' Eagle Creek and Douglas Tie trails.

Affected Environment

Recreation

The project areas are within a forest setting accessed by gravel roads. Evidence of man-made modifications (roads, timber harvest activities, utilities, buildings, houses) is visible from both

private and public lands within or in the vicinity of the project areas. The project areas have dispersed recreation with no developed or designated recreation sites, trailheads, or trails (motorized or non-motorized) existing on BLM lands. Any trail is unauthorized with no protection from implementation of the proposed activities. Other authorized trails in the area exist on Forest Service lands over ½ mile to the east of the proposed thinning units within the Salmon-Huckleberry Wilderness addition. Dispersed recreation activities that occur in the area include Off-highway vehicle (OHV) riding, equestrian riding, hiking, hunting and associated camping, target shooting, driving for pleasure, and special forest product harvest; other dispersed recreation may occur as well but at a lesser rate.

Motorized and OHV designation in the project area is restricted to existing roads and designated trails. No designated OHV trails are within the project area. Many roads are gated restricting traffic, however roads into the southern units of the timber sale are unrestricted allowing access to the Salmon-Huckleberry Wilderness trail system, specifically Douglas and Eagle Creek trails. Vehicles have access into the wilderness for about 310 feet based on BLM's roads layer. However, at the end of the 3-5E-13 road, one can continue approximately 120 feet more until the Forest Services' roads layer shows the road as closed. The Forest Service is proposing converting the road to a trail permanently. Due to its low elevation access to the wilderness trail system and a high opportunity for equestrians, utilization of this road/trail during winter increases. A user created trailhead is at the junction of the 3-5E-13 and 3-5E-13.4 roads

Rural Interface Areas (RIA)

None of the proposed units are located in proximity to residential dwellings. The proposed project area is not within a rural interface zone as defined in the Salem District Resource Management Plan page 39. Rural interface zones are BLM-administered lands where they intersect a created half-mile buffer around county zoning. The closest rural interface zone buffer is to the northwest of section 11 (just under a twelfth of a mile or 436 feet) and it does not intersect proposed units. However, the BLM must take into account homes located near proposed projects even though a project is outside of a rural interface zone, such as homes along Harvey Road in Township 3 South, Range 5 East section 34. The haul route would pass residential houses and through rural interface zone located in Township 3 South, Range 5 East section 10.

In general, the concerns of property owners near timber harvest and hauling activities tend to be associated with noise, traffic, and dust from logging and hauling activities, effect to scenic, water and wildlife values, increased public access that may lead to problems with fire hazard, garbage, dumping, and vandalism. Roads surrounding these proposed units have historically experienced log truck traffic.

Visual Resource Management (VRM)

Visual Resource Management (VRM) of this area is VRM class 4 based on current project acreage information and ArcGIS data layers for VRM on the Salem District. On VRM 4 lands, the level of change to the characteristic landscape can be high. The objective is to

allow management activities that require major modification of the existing character of the landscape. Activities may dominate the view and may be the focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. Tree planting, creek buffers, and spacing of timber cut units can mitigate management impacts of regeneration projects. No unique or sensitive visual resources were identified in the project vicinity. The view from the 3-5E-13 road into the wilderness is continuous, leading many to believe they have already entered the wilderness, when in fact they have one third mile before entering the wilderness.

Other Resources

There are no designated Wild and Scenic Rivers within the project areas. The newly designated (2009) Forest Service's Eagle Creek Wild and Scenic River is adjacent to BLM property and wilderness line in section 13. The closest thinning area, unit 13D, is approximately 2,400 feet from the wild and scenic river buffer. The outstandingly remarkable values of this designated wild river include fisheries and wildlife values.

Wilderness and Wilderness Characteristics

There is no designated wilderness within the project areas however to the east; Salmon-Huckleberry Wilderness addition, created in 2009, is adjacent to the property boundary in section 13. The closest thinning area, unit 13B, is approximately 1,300 feet to the northwest. Road decommissioning is planned on the 3-5E-13 road which continues into the recently added wilderness at the junction with the 3-5E-13.4 road. (*see recreation section or EA 2.2.2* for more information). Visitors to the Salmon-Huckleberry Wilderness utilize a user created trailhead for parking near the junction of the 3-5E-13.4 and 3-5E-13 roads.

An evaluation of wilderness characteristics in 2006 found lands with wilderness characteristics within Township 3 South, Range 5 East, Section 13, which is adjacent to the larger Salmon-Huckleberry Additions. Under Section 201 of the Federal Land Policy and Management Act, the BLM has authority to inventory for and maintain current inventory of resources, including wilderness characteristics, and to consider such information during the land use planning process. Interim management would maintain and protect these lands possessing wilderness character.

Environmental Effects

3.3.7.1 Proposed Action

Recreation

Dispersed recreation use within the proposed units would be restricted approximately three to five years during timber harvest and associated management activities. Recreation visitation

should return to prior usage upon completion of activities except the closure of the 3-5E-13 road to vehicle access at the junction with the 3-5E-13.4 road. Other BLM and Forest Service lands nearby will remain available for recreational opportunities. Recreation users in the vicinity would hear the noises of the timber operations and may experience traffic delays of minutes to hours or lack of access for safety reasons. Harvest activities would obliterate any unauthorized trails. There would be no reconstruction of unauthorized trails.

Rural Interface Areas (RIAs)

Rural interface areas are not present within the project area. Residences along the haul route and in close proximity to timber harvest activities may hear equipment harvesting trees, noise from log truck traffic, experience dust from gravel road traffic, and experience delays for safety. Disturbance from this proposed timber harvest would be short-term lasting a few weeks to months. The project would have no effect on rural interface zones other than increased log truck traffic and potential to hear harvest operations.

In general, the concerns of property owners near timber harvest and hauling activities tend to be associated with noise, traffic, and dust from logging and hauling activities, effect to scenic, water and wildlife values, increased public access that may lead to problems with fire hazard, garbage, dumping, and vandalism.

Visual Resources

The project units which are not adjacent to major roads, are in the distance when looking from major public travel routes, and may not be observable since the rolling mountains, remaining trees, and vegetation block the view. Using viewshed analysis, which calculates if a raster cell's visibility from a point on the earth's surface, portions of units 13C and 13D were visible, see table below and map at the end of this report.

Visibility		
	13C	13D
Percent Visible	41 percent	45 percent
Acreage Visible	3.30	20.49

When looking from major public travel routes, units may not be observable since the rolling mountains, remaining trees, and vegetation block the view. For the most part BLM lands are unidentifiable from other lands when looking at the landscape from any vantage point. Traffic speeds reduce the time any unit is visible from a distance while slower forest road speeds allow units to remain in view driving to the Forest Service's Salmon-Huckleberry Wilderness access point. No special visual features or specific concerns were identified in scoping.

The proposed commercial thinning of the harvest units would comply with VRM Class 4 Management Objectives. Commercial thinning of all the units would not significantly alter the visual character of the project area. Some short term disturbance would be observable in the foreground, but a forested setting would be maintained. The disturbance to the stand

would be less observable within five years as vegetation returns to the site and the remaining stand continues to mature.

Visual disturbance of the project area would be associated with modifications to vegetation and other ground disturbing activities from timber harvest and road decommissioning operations. Evidence of harvest activities would fade as understory vegetation returns to a more natural appearance and the remaining stand continues to mature. A forest setting and most of the canopy would remain. Harvest activities would remove a portion of trees from the proposed units leaving undergrowth vegetation crushed. Logging debris and crushed undergrowth vegetation would continue turning brown to red as it dies leaving the view of the units undesirable. Fuel treatments would comply with State of Oregon smoke management regulations thus reducing the affect to visual quality to a few days, however leaving blackened areas where piles were located. Understory vegetation and the remaining trees would rebound, grow, and continue to green up covering logging debris and burn pile scars.

Wilderness and Wilderness Characteristics

Timber harvest activities in proposed units would have no effect to lands identified to contain wilderness characteristics. Decommissioning the 3-5E-13 road may be visible from the lands inventoried to contain wilderness characteristics if visitors happened to be walking in the area. However, decommissioning a road leading into the wilderness would increase overall enjoyment of recreational users to the Salmon-Huckleberry Wilderness.

3.3.7.2 No Action Alternative

With the exception of unexpected changes (i.e. wildfire or disease), the proposed units would continue to provide a forest setting for dispersed recreation opportunities and local residents. A three to five year increase in log truck traffic, noise and other disturbances related to the harvest of the proposed units would not occur. Timber management activities and log truck traffic would continue on both private and public lands in the vicinity. No modifications to the landscape character of the project area would be expected to occur. Modifications to the landscape character in the area around the projects would still be expected, as a result of activities on other lands.

3.3.7.3 Cumulative Effects

Timber harvest would interrupt recreation activities intermittently for approximately three to five years. Recreational visitation should return to prior usage. Additional road closures may occur upon completion of harvest activities. This project would have minimal to no impact on recreational uses due to the fact there are other opportunities available.

Residential development along haul routes routinely receives log truck traffic from timber management activities on private and public lands.

Looking at aerial photos it is evident that timber management, both thinning and regeneration harvest activities has occurred for many years and will continue to occur in the viewshed, except

within the wilderness. Timber management activities are likely to continue on both private and public lands in the vicinity. Timber management activities would continue to result in temporary changes to visual resources while logging debris and crushed undergrowth vegetation dies turning brown to red. If logging debris piles are burned, blackened areas would be visible until vegetation growth covers the scars. Smoke would dissipate. Vegetation would green up and return within five years leaving the units less noticeable from roads adjacent to harvest units.

3.3.8 Cultural Resources

Sources Incorporated By Reference: *Cultural Resource Inventory Report for Take 3 Timber Sale. BLM Archival Records – Metzger's Atlas,*

Affected Environment

See EA section 3.2. There are no significant cultural or historical resources within this project area. There is, however, evidence of past logging and railroads. A portion of the Bear Creek Lumber Company Railroad grade is still visible.

Environmental Effects

3.3.8.1 Proposed Action

No effects to cultural resources would be anticipated as a result of the project. Logging and railroad features have been documented requiring no further attention at this time. Any cultural resources found during operations would be evaluated and mitigation measures would be applied as necessary as directed by the BLM Archaeologist.

3.3.8.2 Cumulative Effects

There would be no direct effects, so there would be no cumulative effects to any known cultural resources.

3.3.8.3 No Action Alternative

There would be no change to cultural resources other than natural deterioration.

3.3.9 Review of Elements of the Environment Based On Authorities and Management Direction

Table 14: Elements of the Environment Review based on Authorities and Management Direction

Element of the Environment /Authority	Remarks/Effects
Aquatic Conservation Strategy	EA sections 3.2, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, and 3.3.10 show how the Take 3 Thinning project meets the Aquatic Conservation Strategy.
Air Quality (Clean Air Act as amended (42 USC 7401 et seq.)	This project is in compliance with this direction because air quality impacts would be of short duration (one burn period during implementation of prescribed fire). Addressed in Text (EA Section 3.3.6).
Cultural Resources (National Historic Preservation Act, as amended (16 USC 470) [40 CFR 1508.27(b)(3)], [40 CFR 1508.27(b)(8)]	This project is in compliance with this direction and the project would have no effect on this element because cultural resource inventories of the affected area would precede management actions that include any ground disturbing activities that could potentially damage cultural resources.
Ecologically critical areas [40 CFR 1508.27(b)(3)]	This project would have no effect on this element because there are no ecologically critical areas present within the project area.
Energy Policy (Executive Order 13212)	This project is in compliance with this direction because this project would not interfere with the Energy Policy (Executive Order 13212).
Environmental Justice (E.O. 12898, "Environmental Justice" February 11, 1994)	This project is in compliance with this direction because project would have no effect on low income populations.
Fish Habitat, Essential (Magnuson-Stevens Act) Provision: Essential Fish Habitat (EFH): Final Rule (50 CFR Part 600; 67 FR 2376, January 17, 2002)	This project is in compliance with this direction because the project would have no effect on listed fish species or on essential fish habitat (EA Section 5.1.1, 5.1.2). Effects to this element are addressed in text (EA Sections 3.3.2 and 3.3.3).
Farm Lands, Prime [40 CFR 1508.27(b)(3)]	The project would have no effect on this element because no prime farm lands are present on BLM land within the Cascades RA.
Floodplains (E.O. 11988, as amended, Floodplain Management, 5/24/77)	This project is in compliance with this direction because the proposed treatments would not change or affect floodplain functions.
Hazardous or Solid Wastes (Resource Conservation and Recovery Act of 1976 (43 USC 6901 et seq.) Comprehensive Environmental Repose Compensation, and Liability Act of 1980, as amended (43 USC 9615)	This project would have no effect on this element because no Hazardous or Solid Waste would be stored or disposed of on BLM lands as a result of this project.
Healthy Forests Restoration Act (Healthy Forests Restoration Act of 2003 (P.L. 108-148)	This project is in compliance with this direction because treatments would help maintain forests in a healthy functioning condition with low risk of wildfire (EA Section 3.3.1, 3.3.5).
Migratory Birds (Migratory Bird Act of 1918, as amended (16 USC 703 et seq)	This project is in compliance with this direction because treatments would immediately increase the overall habitat diversity for migratory birds and increase overall bird species richness in the long term (20 years). Addressed in text (EA Section 3.3.5).
Native American Religious Concerns (American Indian Religious Freedom Act of 1978 (42 USC 1996)	This project is in compliance with this direction because no Native American religious concerns were identified during the scoping period (EA section 1.4).

Element of the Environment /Authority	Remarks/Effects
Noxious weed or non-Invasive, Species (Federal Noxious Weed Control Act and Executive Order 13112)	This project is in compliance with this direction because Project Design Features would prevent establishment of new populations of invasive plant species and because vegetation development would result in decline in both number and vigor of invasive plant populations in the project area. Addressed in text (EA Sections 2.2.3 and 3.3.1)
Park lands [40 CFR 1508.27(b)(3)]	The project would have no effect on this element because there are no parks within or immediately adjacent to the project area.
Public Health and Safety [40 CFR 1508.27(b)(2)]	The project would have no effect on this element because the public would be restricted from the project area during operations, the project would not create hazards lasting beyond project operations, and traffic control would be implemented to provide for safe public passage through the project area during active operations. (EA section 2.2.3, #9)
Threatened or Endangered Species (Endangered Species Act of 1983, as amended (16 USC 1531)	This project is in compliance with this direction because there would be no adverse effects on Threatened or Endangered Species (EA Section 3.3.1; 3.3.3; 3.3.5).
Water Quality –Drinking, Ground (Safe Drinking Water Act, as amended (43 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.)	This project is in compliance with this direction because Oregon State water quality standards would be adhered to and the area hydrology would not be changed measurably. Addressed in text (EA Sections 3.3.2)
Wetlands (E.O. 11990 Protection of Wetlands 5/24/77) [40 CFR 1508.27(b)(3)]	This project is in compliance with this direction because wetlands will not be treated. (EA Section 3.3.2)
Wild and Scenic Rivers (Wild and Scenic Rivers Act, as amended (16 USC 1271)) [40 CFR 1508.27(b)(3)]	This project is in compliance with this direction because there are no Wild and Scenic Rivers within or adjacent to the project area. The nearest is the Sandy Wild and Scenic River at over 6 miles to the northeast. (EA Section 3.3.7)
Wilderness (Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.); Wilderness Act of 1964 (16 USC 1131 et seq.)	This project is in compliance with this direction because the proposed action is not within designated wilderness or lands containing wilderness characteristics. (EA Section 3.3.7)

3.3.10 Compliance with the Aquatic Conservation Strategy

Based on the environmental analysis described in the previous sections of the EA, Cascades Resource Area Staff have determined that the project complies with the ACS on the project (site) scale. The project complies with the four components of the Aquatic Conservation Strategy, as follows:

ACS Component 1 - Riparian Reserves: The project would comply with Component 1 by maintaining canopy cover along all streams and wetlands, which protect stream bank stability and water temperature. Road and landing locations have been minimized in Riparian Reserves. Addressed in text (*EA sections 3.3.2-3.3.3*).

ACS Component 2 - Key Watershed: The project would comply with Component 2 because we are not increasing permanent road mileage in the watershed.

ACS Component 3 - Watershed Analysis: The project would comply with Component 3 by incorporating the following recommendations from the Eagle Creek Watershed Analysis: Thinning in this project is designed to develop the large tree component faster, leading to earlier potential for recruiting CWD, LWD, snag and large tree habitat and to develop understory

vegetation. Density management and thinning in 38 acres of Riparian Reserve to develop and maintain late seral stand characteristics, maintaining 50 percent average crown closure. Untreated areas provide additional range of species and density mix.

ACS Component 4 - Watershed Restoration: The project would comply with Component 4 by allowing natural processes to continue in the extensive unthinned areas in Riparian Reserves. Thinning in 38 acres of Riparian Reserve would further enhance terrestrial habitat complexity in the long and short term in the selected area to be thinned. Thinning in all LUAs would be expected to result in long-term restoration of large conifers and the potential for material that would contribute to in-stream habitat complexity in the long-term.

Project Compliance with the Nine ACS Objectives

Cascades Resource Area Staff have reviewed this project against the ACS objectives at the project or site scale with the following results. The No Action alternative does not retard or prevent the attainment of any of the nine ACS objectives because this alternative would maintain current conditions. The proposed project does not retard or prevent the attainment of any of the nine ACS objectives for the following reasons.

1. **ACSO 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.** Addressed in Text (*EA sections 3.3.1, 3.3.5*). 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.

   Proposed Action: The proposed thinning from below in a selected 38 acre area of the Riparian Reserve Land Use Allocation (RR) would result in forest stands that exhibit attributes typically associated with stands of a more advanced age and stand structural development (larger trees, a more developed understory, and an increase in the number, size and quality of snags and down logs) sooner than would result from the No Action alternative. The remaining 186 acres of unthinned Riparian Reserve in the project vicinity would "maintain" as described for the No Action alternative.

2. **ACSO 2: Maintain and restore spatial and temporal connectivity within and between watersheds.** Addressed in Text (*EA 3.3.1 , 3.3.5*). In summary:

   No Action Alternative: The No Action alternative would have little effect on connectivity except in the long term within the affected watersheds, maintaining connectivity throughout the 224 acres of Riparian Reserve in the Take 3 project vicinity.

   Proposed Action: Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development in the 38 acres of Riparian Reserve proposed for thinning. Both terrestrial and aquatic connectivity would be maintained, and improved over the long-term as the Riparian Reserve LUA develops late

successional characteristics and connectivity through forest stands in the Riparian Reserve as they continue to grow and develop structural diversity on a landscape level.

3. **ACSO 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.** Addressed in Text (*EA 3.3.1, 3.3.2 , 3.3.3,*). In summary:

   No Action Alternative: It is assumed that the current condition of physical integrity would be maintained.

   Proposed Action: Physical integrity of channels at existing stream crossings would not likely be altered because no culverts will be replaced at stream crossings. Three cross-drain culverts will be replaced, and due to the stable nature of these locations, little to no additional disturbance to channel morphology would be expected.

4. **ACSO 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.** Addressed in Text (*EA 2.2.3, , 3.3.2, 3.3.3*). In summary:

   No Action Alternative: It is assumed that the current condition of the water quality would be maintained.

   Proposed Action: Stream Protection Zones (SPZs) would be maintained in the 38 treated acres of Riparian Reserve LUA (RR) and no treatment in the remaining 186 acres of RR. The proposed new and renovated roads are on ridge top or upper-slope locations. The proposed project would be unlikely to have any measurable effect on stream temperatures, pH, or dissolved oxygen. Sediment transport and turbidity in the affected watersheds is likely to increase over the short term as a direct result of road repair and construction, hauling and yarding in and around the RRs. Sediment increases would not be visible beyond 800 meters (0.5 mile) downstream from road/stream intersections and would not be expected to affect fish, aquatic species or habitat, or human uses.

   Over the long-term (beyond 3 to 5 years), current conditions and trends in turbidity and sediment yield would likely be maintained under the proposed project.

5. **ACSO 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved.** Addressed in Text (*EA 2.2.3, 3.3.2, and 3.3.3*). In summary:

   No Action Alternative: It is assumed that the current levels of sediment into streams would be maintained.

   Proposed Action: Stream protection Zones (SPZs) and untreated RRs would be maintained (minimum of 100 feet on perennial streams, and 50 feet on intermittent streams). Hauling restrictions and sediment control measures would minimize sediment delivery.

6. **ACSO 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.** Addressed in Text (*EA 2.2.3, 3.3.2, and 3.3.3*). In summary:

   No Action Alternative: No change in in-streams flows would be anticipated because there would be no changes in the forest stands.

   Proposed Action: No measurable change in in-stream flows would be anticipated, shown by a preliminary analysis for the risk of increases in peak flow as a result of forest harvest that the BLM conducted using the Oregon Watershed Assessment Manual watershed analysis methods for forest hydrology (OWEB, 1997).

   Because the proposed project would remove less than 60 percent of the existing forest canopy and only a small fraction of the forest cover (roads and landings) within the treated area, it is unlikely to produce any measurable effect on stream flows.

   The full canopy would be retained intact in 186 of 224 acres of Riparian Reserve. In the 38 treated Riparian Reserve acres, the riparian canopy would remain intact within the primary shade zone and substantial portions of the canopy would be retained in the secondary shade zone, therefore maintaining riparian microclimate conditions and protecting streams from increases in temperature.

7. **ACSO 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.** Addressed in Text *(EA sections 2.2.3, 3,3,10)***.** In summary:

   No Action Alternative: The current condition of flood plains and their ability to sustain inundation and the water table elevations in meadows and wetlands is expected to be maintained since no changes would be made to these features or the surrounding forest.

   Proposed Action: There would be no alteration of any stream channel, wetland or pond morphological feature because no changes would be made to these features or the forest stands in 186 of the 224 acres of Riparian Reserve in the project vicinity. In the 38 acres of treated Riparian Reserve, all operations, equipment and disturbances are kept a minimum of 50 feet from all intermittent streams, 100 feet from perennial stream channels. Thus, the current condition of floodplain inundation and water tables would be maintained.

8. **ACSO 8: Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.** Addressed in Text (*EA sections 2.2.3, 3.3.1, 3.3.2, 3.3.3, 3.3.5*). 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 a longer period of time.

   Proposed Action: The current species composition and structural diversity of plant communities would continue along the current trajectory in 186 of the 224 Riparian

Reserve acres in the project vicinity. Stream Protection Zones would maintain the current species composition and structural diversity of plant communities in riparian areas and wetlands within 50 feet of intermittent streams and wetlands and 100 feet of perennial streams in the 38 treated acres.

9. **ACSO 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.** Addressed in Text (*EA 2.2.3, 3.3.1, 3.3.2, 3.3.3, 3.3.5).* 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.

   Proposed Action: The proposed project would have no adverse effect on riparian dependent species. Although thinning activities may affect some invertebrates within the ten Riparian Reserve treated acres and the 186 acres of adjacent non-thinned areas should provide adequate refugia for the species. In the long term, the treatments would restore elements of structural diversity to treatment areas in the Riparian Reserve LUA. These attributes would help to provide resources currently lacking or of low quality, and over the long-term, would benefit both aquatic and terrestrial species.

3.3.11 Comparison of Alternatives with regard to the Decision Factors

This section compares the alternatives with regard to the decision factors (DF) described in EA section 1.1.4 and the project objectives in EA section 1.1.2.

1. Provide timber resources and revenue to the government from the sale of those resources (objectives 1 and 2);
2. Reduce the costs both short-term and long-term of managing the lands in the project area (Objectives 1 and 2); and
3. Provide safe, cost effective access for logging operations, fuels management and fires suppression (objectives 2 and 8):

   The No Action alternative fails to meet these factors since the timber sale would not take place. The proposed action would contribute to higher timber productivity and value as well as increased stand complexity benefitting fish and wildlife species. The proposed action would use commonly used silvicultural, transportation and logging practices that BLM experience with past timber sales has shown to be cost effective, providing revenue with reasonable logging costs. These desired traits move the proposed forest stands toward a condition that would meet the objectives defined in the Salem District RMP (*EA 1.3.2 and RMP pp. 46-48*).

4. Provide habitat for special status, SEIS special attention and other terrestrial species (Objective 4):

   The No Action alternative would not fully meet other objectives compared to the proposed action because: 1/ The 38 acres of Riparian Reserve proposed for treatment would develop large diameter trees and other late successional characteristics slowly, meeting this part of the objective more slowly than the Proposed Action. 2/ The mid seral stage stands in the

remainder of the proposed project area are currently over-represented in the watershed. (*EA 3.3.1, 3.3.5)*

The proposed action would meet some of the objectives associated with this Decision Factor because: 1/ The Proposed Action would increase habitat diversity on a landscape level in the vicinity of the project area by accelerating growth of trees providing large diameter trees available for recruitment of large diameter snags and CWD for dead wood dependent species in the project area, and by 2/ encouraging development of the understory by allowing more light to the forest floor. The characteristics described for Decision Factor 4 would apply to these stands. (*EA 3.3.1, 3.3.5*)

The proposed action would not fully meet some of the objectives associated with this Decision Factor because: 1/ The proposed action would maintain spotted owl dispersal habitat within the unit boundaries in the short term, recovering as canopy grows to over 60 percent cover. (*EA 3.3.1, 3.3.5*)

5. Reduce competition-related mortality and wildfire risk, and increase tree vigor and growth (objective 1 and 6):

   The No Action alternative would not meet this factor. The proposed action would meet this factor. (*EA 3.3.1, 3.3.6*)

6. Reduce erosion and subsequent sedimentation from roads (objectives 2 and 8):

   The No Action alternative partially meets the objectives associated with this factor because no new roads would be constructed, however the existing road in the SE corner of section 13 would not be decommissioned as proposed under the proposed action, and which would decrease sedimentation into neighboring streams over time. Therefore, erosion and the subsequent sedimentation from this road would not be reduced under the no action alternative.

7. Provide habitat for a variety of organisms associated with both late-successional and younger forest (Objective 3);
8. Provide for the establishment and growth of conifer species while retaining structural and habitat component s, such as large trees, snags, and coarse woody debris (objectives 3, 4, and 6); and
9. Promote the development of healthy late-successional characteristics' in the Riparian Reserve land use allocation (objective 6):

   The No Action alternative would not meet the objectives associated with this these factors because: 1/ Stand tree growth rates would decline if stands are not thinned. 2/ Competition would result in mortality of smaller trees and some co-dominant trees in the stands, resulting in numerous snags and CWD that are too small to meet resource objectives (minimum 15 inches diameter for snags, minimum 20 inches diameter for CWD). 3/ This alternative retains existing elements, but does not enhance conditions to provide these elements for the future stand. 4/ Trees would continue to grow slowly until reaching suitable size for large woody debris, snags and late successional habitat. (*EA 3.3.1, 3.3.5*)

The Proposed Action would meet the objectives associated with these factors because: 1/ Stand health and tree growth rates would be maintained as trees are released from competition. 2/ The alternative retains the elements described under "no action" on untreated areas of the stands in the project area and encourages development of larger diameter trees and more open stand conditions in treated areas. 3/ These conditions add an element of diversity to the landscape on BLM lands which is not provided under the No Action alternative. (*EA 3.3.1, 3.3.5*).

4.0 LIST OF PREPARERS

Table 15: List of Preparers

Resource	Name	Initials	Date
Writer/Editor	Alisa Tanner	AAT	10/22/2012
NEPA Review	Carolyn Sands	***CDS***	9/13/2012
Botany	Terry Fennell	TGF	10/25/2012
Cultural Resources	Heather Ulrich	HAU	10/25/2012
Engineering	Dan Nevin	DN	10/25/2012
Fire/Fuels	Maria Caliva	MAC	10/10/2012
Fisheries	Bruce Zoellick	BWZ	10/16/2012
Hydrology/ Water Quality	Patrick Hawe	WPH	10/25/12
Logging Systems	Dugan Bonney	DPB	10/3/2012
Recreation, Visual Resources Management and Rural Interface	Traci Meredith	TMM	10/1/2012
Silviculture	Dan Schlottmann/Alisa Tanner	AAT	10/22/2012
Soils	Patrick Hawe	WPH	10/25/12
Wildlife	Corbin Murphy/Jim England	JSE	10/10/2012

5.0 CONTACTS AND CONSULTATION

5.1 Consultation

5.1.1 US Fish and Wildlife Service (USFWS)

The Take 3 thinning proposal was submitted for Informal Consultation with U.S. Fish and Wildlife Service (USFWS) as provided in Section 7 of the Endangered Species Act (ESA) of 1973 (16U.S.C. 1536 (a)(2) and (a)(4) as amended) during the FY2013 consultation process. The *Biological Assessment of Not Likely to Adversely Affect Projects with the Potential to Modify the Habitat of Northern Spotted Owls, Willamette Planning Province – FY2013 (BA) was submitted in April 2012.* Using effect determination guidelines, the BA concluded that the Take 3 thinning proposal may affect, but is not likely to adversely affect the northern spotted owl due to modification of dispersal habitat (BA, pp. 28-32, 68); and would have no effect on spotted owl Critical Habitat (BA, p. 43).

The *Letter of Concurrence Regarding the Effects of Habitat Modification Activities within the Willamette Province, FY2013* (LOC) associated with the Take 3 Project was issued in June 2012 (FWS reference #01EOFW00-2012-I-0105). The LOC concurred that the habitat modification activities described in the BA, including the Take 3 Thinning, are not likely to adversely affect

spotted owls and are not likely to adversely affect spotted owl Critical Habitat (LOC, p. 41-42). Furthermore, the proposed action is not likely to diminish the effectiveness of the conservation program established under the NWFP to protect the spotted owl and its habitat on federal lands within its range including designated spotted owl critical habitat (LOC, p. 41).

All applicable General Standards described in the Biological Assessment and Letter of Concurrence will be incorporated into the proposal (BA, pp. 10-12; LOC, pp. 14-15). This may include a seasonal restriction within disruption distance of known spotted owl sites during the critical nesting season, and monitoring/reporting on the implementation of this project to the U.S. Fish and Wildlife Service.

5.1.2 National Marine Fisheries Service (NMFS)

Consultation with the National Marine Fisheries Service (NMFS) on effects of the Take 3 Thinning project on Lower Columbia River (LCR) Chinook salmon, LCR Coho salmon, and LCR winter steelhead trout is not required because the thinning sale would have no effect on these species or on essential fish habitat. Listed fish habitat would not be affected by the thinning project because 1/ No-entry buffer widths of 130 to 400 feet on coho salmon and steelhead trout habitat in North Fork Eagle Creek would prevent impacts to salmon and steelhead habitat, water quality, and large wood (LW) in the stream, and 2/ Chinook salmon habitat in North Fork Eagle Creek is located more than 5 miles downstream of project units.

Large wood (LW) levels in North Fork Eagle Creek would not be affected by tree thinning, both because of the width of the no-entry buffers (greater than the height of trees in RR adjacent to the North Fork Eagle Creek), and small size (capability) of tributary channels to move LW to North Fork Eagle Creek. Minimum no-disturbance buffers would be 50 to 100 feet wide on intermittent and perennial (1st and 2nd order tributaries) streams that drain to North Fork Eagle and Little Eagle creeks. With no disturbance to the primary shade zone of perennial streams (within 70 to 85 feet of channels), and retaining greater than 50 percent canopy closure in the secondary shade zone, no change in solar radiation input and stream temperature would occur (Groom et al. 2011, USDA and USDI 2004).

1.25 miles of road construction would not increase the size of the stream network (Wemple et al. 1996). New roads are more than 200 feet from stream channels, and constructed road surfaces would be designed to drain surface water to adjacent gentle slopes where it would infiltrate into the soil and groundwater. Thus, little sediment will be produced by the new roads and would not reach stream channels and impact LFH.

Steelhead trout and salmon habitat would not be impacted by log hauling as log haul routes from Section 11 that cross Little Eagle Creek or North Fork Eagle Creek would be restricted to dry season haul only. The southern haul route from section 13 would not impact salmon and steelhead habitat as the haul route does not cross any streams except on the paved road portion of the route (County Road No. 34047).

5.1.3 Cultural Resources: Section 106 Consultation with State Historical Preservation Office (SHPO)

Cultural resource surveys were conducted in accordance with the *Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon* throughout the sale area in August, 2010. Additional surveys were conducted in October, 2011. . Remnants of past historic logging activities were recorded and determined to be ineligible for the National Register of Historic Places. No prehistoric cultural resources were discovered. No further consultation is required.

5.2 Public Scoping and EA Public Comment Period

For the results of project scoping, see EA section 1.3.1. The EA and FONSI will be made available for public review from November 7, 2012 to December 7, 2012 and posted at the Salem District website at http://www.blm.gov/or/districts/salem/plans/index.php. The notice for public comment will be published in a legal notice in the Sandy Post newspaper. Written comments should be addressed to John Huston, Field Manager, Cascades Resource Area, 1717 Fabry Road S., Salem, Oregon 97306. Emailed comments may be sent to BLM_OR_SA_Mail@blm.gov. Attention: John Huston.

6.0 LIST OF INTERDISCIPLINARY TEAM REPORTS INCORPORATED BY REFERENCE

The Interdisciplinary team reports can be found in the Take 3 Thinning EA project file and are available for review at the Salem District Office.

Caliva, M. 2012. Take 3 Thinning Project Air Quality and Fire Hazard/Risk Specialist Report (Fuels Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Fennell, T., 2011. Cascades Resource Area Botanical Report Proposed Take 3 Thinning Timber Sale (Botany Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Hawe, W. P., 2011. Hydrology/Channels/Water Quality: Specialist Report for the Take 3 Thinning Project, (Hydro Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Hawe, W. P., 2011. WEPP (Water Erosion Prediction Project) Report for Take 3 Thinning (WEPP Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Hawe, W.P. 2011. 2011 Soils Environmental Assessment for the Proposed Take 3 Thinning Project (Soils Report) Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Meredith, T., 2011. Recreation, Visual and Rural Interface Resources Report. Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Bonney, D, 2011. Take 3 Logging Systems Report (Logging Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Murphy, C., England, J. 2012. Cascades Resource Area Wildlife Report Take 3 Project (Wildlife Report) Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Schlottmann, D., and A. Tanner 2012. Take 3 Thinning and Silvicultural Prescriptions (Silviculture Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR

Ulrich, H. Greatorex, F., and P. Hazen. 2010, 2012 Cultural Resource Inventory Reports, Take 3 Thinning Timber Sale Pre-project Surveys. Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR. (Original report by P. Hazen 2010, updated by Greatorex, 2012.)

Zoellick, B., 2011. Take 3 Thinning Fisheries Specialist Report (Fisheries Report) Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

7.0 GLOSSARY AND ACRONYMS

7.1 Glossary

activity fuel - Debris (wood chips, bark, branches, limbs, logs, or stumps) left on the ground after management actions, such as logging, pruning, thinning, or brush cutting, versus debris left after storms or fires.

age class - A management classification using the age of a stand of trees.

alternative - One or more additional proposed management actions that have been studied and found to meet the goals and objectives of a project's purpose and need and, as a result, is suitable to aid decision-making.

anadromous fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Includes species such as salmon and steelhead. Also see salmonid.

(ACS) Aquatic Conservation Strategy - A Northwest Forest Plan methodology designed to restore and maintain the ecological health of watersheds and aquatic ecosystems, consisting of four components: riparian reserves, key watersheds, watershed analysis, and watershed restoration.

baseline - The starting point for the analysis of environmental consequences, often referred to as the Affected Environment. This starting point may be the condition at a point in time (e.g., when inventory data is collected) or the average of a set of data collected over a specified number of years.

beneficial use - In water use law, such uses include, but are not limited to: instream, out of stream, and ground water uses; domestic, municipal, and industrial water supplies; mining, irrigation, and livestock watering; fish and aquatic life; wildlife watering; fishing and water contact recreation; aesthetics and scenic attraction; hydropower; and commercial navigation.

(BMPs) Best Management Practices - BMPs are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation).

canopy cover - The ground area covered by the crowns of trees or woody vegetation as delimited by the vertical projection of crown perimeter and commonly expressed as a percent of total ground area.

(CWD) coarse woody debris - That portion of trees that has naturally fallen or been cut and left in the forest. Usually refers to pieces at least 20 inches in diameter. There are four classes used to describe coarse woody debris. The classes range from Class I (which has the least decay, intact bark, and a hard log) to Class IV (i.e., the coarse woody debris has decayed to the point of nearly being incorporated into the forest floor).

commercial thinning - Any type of thinning producing merchantable material at least equal to the value of the direct cost of harvesting. See thinning.

crown fire - Fire that moves through the upper part of a tree that has live branches and foliage (i.e. crown) independent of any surface fire. Crown fires can often move faster and ahead of ground fires.

cumulative effect - The impact on the environment that results from incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

diameter at breast height (DBH) - The diameter of the stem of a tree measured at 4.5 feet above the ground level on the uphill side of the stem.

dispersal habitat (spotted owl) - Forest habitat that allows northern spotted owls to move (disperse) across the landscape; typically characterized by forest stands with average tree diameters of greater than 11 inches, and conifer overstory trees having closed canopies (greater than 40 percent canopy closure) with open space beneath the canopy to allow owls to fly.

dropped - dropped from this proposed action. The actions may be considered in the future and would be documented in an environmental analysis with a new decision. Dropping these areas does not constitute a change in land use allocations.

effective shade - The proportion of direct beam solar radiation reaching a stream surface to total daily solar radiation.

environmental effects - The direct, indirect and cumulative effects of a proposed action or alternative on existing conditions in the environment in which the action(s) would occur. Also see baseline.

fine sediment - Fine-grained soil material, less than 2 millimeter in size, normally deposited by water, but in some cases by wind (aeolian) or gravity (dry ravel).

fuel loading - The dry weight of all accumulated live and dead woody and herbaceous material on the forest floor that is available for combustion, and which poses a fire hazard.

green tree - A live tree.

land use allocation - A designation for a use that is allowed, restricted, or prohibited for a particular area of land, such as the matrix, adaptive management, late-successional reserve, or critical habitat land use allocations.

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.

long term - A period of time used as an analytical timeframe; starts more than 10 years after implementation of a project, depending on the resource being analyzed. Also see short term.

mass wasting - The sudden or slow dislodgement and downslope movement of rock, soil, and organic materials.

mature stage - Generally begins as tree growth rates stop increasing (after culmination of mean annual increment), and as tree mortality shifts from density-dependent mortality to density-independent mortality.

merchantable - Trees or stands having the size, quality and condition suitable for marketing under a given economic condition, even if not immediately accessible for logging.

multi-layered canopy - Forest stands with two or more distinct tree layers in the canopy.

old-growth forest - A forest stand usually at least 180-220 years old with moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

overstory - That portion of trees forming the uppermost canopy layer in a forest stand and that consists of more than one distinct layer.

short term - A period of time used as an analytical timeframe and that is within the first 10 years of the implementation of a resource management plan. Also see long term.

silvicultural prescription - A planned series of treatments designed to change current stand structure to one that meets management goals.

snag - Any standing (upright) dead tree.

thinning - A silvicultural treatment made to reduce the density of trees primarily to improve tree/stand growth and vigor, and/or recover potential mortality of trees, generally for commodity use.

timber - Forest crops or stands, or wood that is harvested from forests and is of a character and quality suitable for manufacture into lumber and other wood products rather than for use as fuel.

(USFWS) United States Fish and Wildlife Service - A federal agency under the United States Department of the Interior that is responsible for working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats.

watershed - All of the land and water within the boundaries of a drainage area that are separated by land ridges from other drainage areas. Larger watersheds can contain smaller watersheds that all ultimately flow their surface water to a common point.

wetland - land with presence and duration of water, sufficient to support wetland vegetation.

wildfire - Any nonstructural fire, other than prescribed burns, that occurs on wildland.

(WUI) wildland/urban interface - The area in which structures and other human development meet or intermingle with undeveloped wildland. The term used primarily for wildfire prevention and suppression. Rural/Urban Interface is used primarily for other recreation and forest management activities.

windthrow - A tree or trees uprooted or felled by the wind.

7.2 Additional Acronyms

BLM – Bureau of Land Management

BS – Bureau Sensitive, a category of species under the Oregon/Washington Special Status Species Policy

DBH – diameter at breast height

EA – Environmental Assessment

ESA – Endangered Species Act

FONSI – Finding of No Significant Impact

Matrix/GFMA – General Forest Management Area within the Matrix land use allocation

NEPA – National Environmental Policy Act (1969)

ODEQ – Oregon Department of Environmental Quality

RIA – Rural-Urban Interface (recreation, visual and sociological issues)

RMP/FEIS – Salem District Proposed Resource Management Plan / Final Environmental Impact Statement (1994)

ROW – right-of-way (roads)

RR – Riparian Reserve Land Use Allocation (Riparian Reserves)

SPZ – Stream Protection Zone (no-cut protection zone)

TMDL – total maximum daily load

USDA – United States Department of Agriculture

USDI – United States Department of the Interior

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

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