Airstrip Thinning

Environmental Assessment and Finding of No Significant Impact

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T. 4 S., R. 5 E., Sec. 7, 18 W. M.

Responsible Agency:	USDI - Bureau of Land Management
Responsible Official:	Cindy Enstrom, Field Manager Cascades Resource Area 1717 Fabry Road SE Salem, OR 97306 (503) 315-5969
For further information, contact:	Keith Walton, EA Editor Cascades Resource Area 1717 Fabry Road SE Salem, OR 97306 (503) 375-5676

BLM
Salem District

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BLM/OR/WA/AE-10/076+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 290 acres of 64-90 year old forest stands. The project is located on BLM lands in T. 4 S., R. 5 E. sections 7 and 18; W.M. in Clackamas County, Oregon. The Airstrip Thinning Environmental Assessment (EA) (# DOI-BLM-OR-S040-2009-0004-EA) documents the environmental analysis of the proposed commercial thinning activity.

The EA is attached to and incorporated by reference in this Finding of No Significant Impact determination. The EA and FONSI will be made available for public review from June 1, 2011 to July 1, 2011 (EA section 5.2).

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 280 of these acres are in the Matrix/GFMA land use allocation (LUA), and 10 acres are in the Riparian Reserve LUA as described in the RMP.

Draft Finding of No Significant Impact[1]

Based upon review of the Airstrip Thinning EA and supporting documents, I have determined that the proposed project 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 project have been analyzed within the context of the project area boundaries, and the following 6th field watersheds: Middle Clackamas River (Helion Creek) and North Fork Clackamas River (Fall Creek). This project would affect approximately 0.9 percent of the 32,334 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:

[1] This section of the Airstrip 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.

Project design features described in EA section 2.2.4 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/EIS.

Vegetation: The proposed project would not contribute to the need to list any BLM Special Status Species because no suitable habitat for any species known or likely to be present would be lost or altered to a degree that would negatively impact existing populations (EA sections 2.2.4 #48, 49; 3.3.1.1). Increases in the number of invasive/non-native plants are expected to be slight because BLM observation of the response of these species to similar actions in the area gives evidence that these species are not strong competitors with native species and that there would not be adverse direct or cumulative impacts. The risk of spread would be further reduced by washing equipment and seeding disturbed soil with native species (EA sections 2.2.4 #45, 46; 3.3.1.1).

Hydrology; Fisheries and Aquatic Habitat (EA sections 3.3.2-3.3.3): Road construction would not cause sediment delivery to streams because it would occur on gentle slopes with stable, vegetated surfaces. Full Riparian Reserve retention (440 ft. each side for fish-bearing streams, 220 ft. all other streams) in section 7 and stream protection zones (100 feet) in section 18 would maintain current stream temperatures by retaining the current vegetation in the primary shade zone and prevent sediment from logging units reaching streams (EA section 3.3.2). Timber haul and road maintenance project design features would prevent sedimentation delivery to streams in quantities that would exceed Oregon DEQ and Clean Water Act standards. The proposed project would abide by and meet State of Oregon water quality standards. Fisheries and aquatic habitat would not be negatively impacted because water quality and flows would be maintained (EA section 3.3.3).

Soils (EA section 3.3.4): 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. Soils would remain stable and mycorrhizae populations would be retained, as confirmed by experience with similar projects.

Wildlife (EA section 3.3.5): The project would not contribute to the need to list any BLM Special Status species because: All special status bird species identified in the general vicinity of the project area are nesting far enough away to not be directly affected by the project. Suitable habitat for all BLM Special Status species known or likely to be present would be retained within the project area and vicinity.

Of the 791 acres of BLM managed land in the two affected 6th field watersheds: habitat in 63 percent (501 acres) would be unaltered by the proposal; 31 percent (245 acres) of treated stands would maintain northern spotted owl (NSO) dispersal habitat, which correlates to maintaining habitat for other species as well; and less than one percent (45 acres) of NSO suitable habitat would be downgraded to dispersal habitat but retain the capability to again become suitable habitat within 10-30 years.

Approximately 90 percent of large diameter (15 inches and larger) snags and Coarse Woody Debris (CWD, minimum 20 inches diameter large end and 20 feet long) within project units would be retained intact as habitat for dead wood dependent species. Thinning would not reduce the persistence or species richness of the Migratory and Resident Bird community.

Within the 791 acres of BLM land in the project vicinity approximately 96 percent of large snags would be retained intact (100 percent retained on 501 acres (63% of the area) plus 90 percent retained on 290 treated acres (37% of the area)). No species would be extirpated in stands as a result of thinning, only individuals would be directly impacted within the project area. See *Intensity* item # 9, for effects to NSO.

Stands comprising 245 of the 290 acres proposed for thinning are not presently functioning as late-successional old growth habitat. The stand in unit 7A (45 acres) is functioning as mature forest habitat, but not as old-growth habitat. All old growth trees and approximately 90 percent of existing snags, large diameter green trees (>36 inches diameter) and coarse woody debris (CWD) would be retained. Falling of two old-growth snags in unit 7B would change this snag habitat to CWD and would not be "significant" because it is within the effects analyzed in the FEIS.

Air Quality and Fire Hazard/Risk (EA section 3.3.6): 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 1 day, 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".

Carbon Storage, Carbon Emissions and Climate Change (EA section 3.3.7): The incremental increase in carbon emissions as greenhouse gasses that could be attributable to the proposed project is of such small magnitude that it is unlikely to be detectable at regional, continental or global scales or to affect the results of any models now being used to predict climate change.

Recreation, Rural Interface, Wild and Scenic Rivers, and Visual Resources (EA section 3.3.8): Recreation opportunities in the vicinity of the project area would continue with the following changes:

- Access to the USFS Ladee Flat OHV Use Area would experience delays of up to an hour to pass logging and pile burning operations when they are active on Road 4-5E-18. This would delay, but not close, access on weekdays for a few days to a few weeks during a single summer within the contract period.
- Public use of the project area for dispersed recreation such as paintball games and hiking would be restricted for weeks to months during thinning and pile burning operations. Similar areas with similar opportunities would continue to be available on nearby public lands. Increases in log truck traffic near residences along the haul route would be short term (weeks to months) and is a common occurrence in the area.

  By following Visual Resource Management (VRM) Class 2 standards, the project would not compromise the potential classification of the North Fork Clackamas River "Scenic" classification. The Outstandingly Remarkable Value of "Fisheries" would be protected by the full "No Treatment" Riparian Reserves. The project would comply with Visual Resource

  Management guidelines because the project would maintain a forested setting and changes to the landscape character would be low.

Some disturbance to vegetation would be observable after thinning activities and would be expected to develop an undisturbed appearance within five years.

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: following legal requirements for traffic control on Road 4-5E-18 through the contract area during operations, and restricting public access to all other parts of the project area during operations would protect the public from injury from project operations. The project would not create hazards lasting beyond project operations.(EA Table 5 and section 3.3.10)

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, wilderness, or ecologically critical areas because these resources are not located within the project area (EA Sections 3.3.8; 3.3.9). For Wile and Scenic Rivers, see item 1. above.

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 effects associated as a result of the project do not have not uncertain, unique or unknown risks because the BLM has experience implementing similar actions in similar areas without these risks and project design features would minimize the risks associated with the project (EA section 2.3.4). 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 project 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 documented in the RMP EIS. 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 there is a potential for cumulative effects on water quality and fisheries, and on carbon storage.

These effects are not expected to be significant for the following reasons:

- *Water Quality/Fisheries:* The proposed project would be expected to temporarily increase stream sediment and turbidity as a result of culvert placement, new construction, road renovation, and road use but would be unlikely to exceed the State of Oregon water quality standards (EA Sections 3.3.2 -3.3.4). Any sediment increase resulting from thinning would be too small to be discernable relative to background sediment yields, would not be expected to exceed ODEQ water quality standards, would dissipate within 800 meters downstream, and would decrease quickly over time, returning to current levels within three to five years as vegetation increases (Dissmeyer, 2000).
- The limited magnitude (less than 0.3 percent of the typical forested watershed sediment supply of 1.752 tons/acre) and duration (primarily major storm events during the first year following disturbance) of this effect would likely be insignificant for water quality on the watershed scale. Cumulatively, the proposed project 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 3.3.2.2)
- *Carbon storage and carbon emissions* (EA section 3.3.7): The incremental increase in atmospheric carbon and greenhouse gasses and the decrease in carbon storage attributed to the proposed project would not be detectable with current technology and would not affect the results of any models now being used to predict climate change.

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 sites potentially affected by the project have been identified as potentially eligible for such listing. "The Incline" is the only known cultural feature which could be considered for eligibility and it is outside of the project area and would not be impacted by the project (EA sections 3.2; 3.3.9; 3.3.10.). See #3, above.

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 (NSO) (EA Section 3.3.5): The project would not affect known spotted owls because it is not within the provincial home range radius of any known spotted owl sites, Late Successional Reserve or Critical Habitat for the northern spotted owl. The project maintains dispersal habitat in 245 treated acres and downgrades 45 acres of suitable habitat to dispersal habitat. 501 acres of dispersal and suitable habitat in the 791 acre block of BLM land in sections 7 and 18 would not be affected by the project. Habitat conditions are expected to improve as thinned stands mature over the next 20 years and the 45 acres of downgraded habitat would again become suitable habitat within 10-30 years as residual trees increase in size and structural complexity increases in the stands.

The project would not affect spotted owls because it is highly unlikely that there are any resident spotted owls in the vicinity of the Airstrip units, and incidental take would not occur.

The project area is within 1.2 miles of two "Predicted Owl Sites", but there have been no responses in two years of owl surveys and habitat analysis shows that there is not enough suitable nesting, foraging and roosting habitat to maintain resident NSO.

The project is not likely to jeopardize the continued existence of the NSO, is not likely to adversely modify NSO critical habitat, and is not likely to diminish the effectiveness of the conservation program established under the NWFP to protect the NSO and its habitat on federal lands within its range (BO, pp. 97-98). ESA Consultation is described in EA section 5.1.1.

ESA Fish – UWR Chinook salmon, UWR steelhead trout, LCR coho salmon, and LCR steelhead trout (EA Section 3.3.3): The project would not impact listed fish or their habitat because:

- Undisturbed Riparian Reserves in section 7 and undisturbed buffers at least 100 feet wide on 1st and 2nd order streams in section 18 would prevent impacts to water quality, channels, flows and large woody debris (LWD) in listed fish habitat;
- No sediment from the temporary road crossing in section 18 would reach listed fish habitat >0.5 miles downstream;
- Stream crossings on the haul route are on paved roads so no sediment would move to streams as a result of log hauling; and
- New road construction would be located in stable locations and would not contribute to degradation of aquatic habitat.
- Consultation with the National Marine Fisheries Service (NMFS) is not required because the project would have no effect on listed fish species or their habitat. ESA Consultation rationale is further 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 1.3, 3.3.10)

Approved by: Cindy Enstrom
Cindy Enstrom, Cascades Resource Area Field Manager

5-31-2011
Date

AIRSTRIP THINNING ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

This 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. Section 1 of this EA provides a context for what will be analyzed in the EA, describes the kinds of actions we will be considering, defines the project area, describes what the proposed action needs to accomplish, and identifies the criteria that we 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 290 acres within 64-90 year old forest stands. Connected actions include road work to access thinning units, landing construction, and fuels treatments. (EA Sections 2.0 and 3.0).

1.1.1 Project Area[2] Location and Vicinity

The proposed project area lies within the Clackamas River watershed approximately 6 miles southeast of the City of Estacada in Clackamas County, Oregon. BLM-administered land is intermixed with privately-owned land and US Forest Service land. The project is located within Township 4 South, Range 5 East, Sections 7 and 18, Willamette Meridian. See Vicinity Map.

1.2 Purpose of and Need for Action

1.2.1 Need for the Action

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 Resource Management Plan (RMP). These stands are overstocked, or will soon grow into an overstocked condition. Overstocked stands 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 trees die. This typically results in lower timber productivity and delays development of complex stand structure for habitat.

Lands within the Matrix/GFMA LUA are designated for the sustained production of timber. Overstocked stands within this LUA have declining growth rates which results in reduced volume yield and value over the planned timber rotation.

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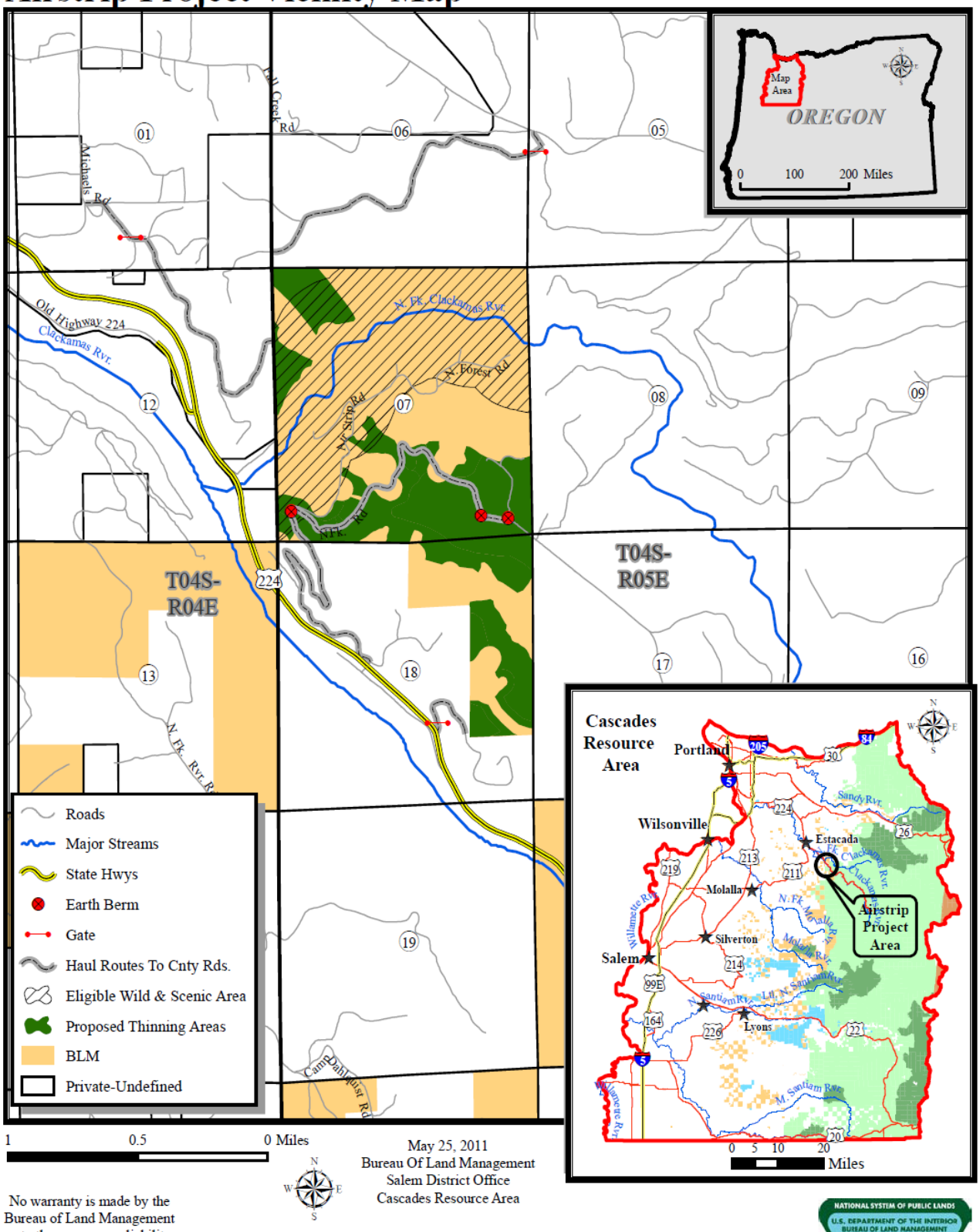
[2] Project Area is defined as that area that is directly affected by project operations (e.g. thinning units, area cleared for landings, roads and rights-of-way). The area around the Project Area, especially BLM managed lands in the same contiguous block of ownership, is referred to as the project area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

Airstrip Project Vicinity Map



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.

The proposed forest management activities are needed in these stands to reverse these trends so the stands will persist and contribute to future forest production and other goals of the RMP (EA section 1.2.2 and RMP pp. 46-48.

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 conifer stands identified for treatment in this LUA are overstocked, resulting in simple stand structure and declining growth rates that result in delayed development of large diameter snags and other habitat characteristics associated with late-successional forests.

1.2.2 Purpose (Objectives) of the Project

The 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 (EA Section 1.3). The proposed project area is within the Matrix/GFMA and Riparian Reserve land use allocations (LUA) (RMP p. 5, EA section 1.3). The following RMP and Northwest Forest Plan (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) by applying commercial thinning treatments.
2. Supply as sustainable source of forest commodities from the Matrix/GFMA LUA to provide jobs and contribute to community stability (RMP pp. 1, 46-48). Select logging systems based on the suitability and economic efficiency of each system for the successful implementation of the silvicultural prescription, for protection of soil and water quality, and for meeting other land use objectives (RMP p. 47) by developing timber sales that can be successfully offered to the market place.
3. Provide for important ecological function such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees to provide habitat for a variety of organisms associated with both late-successional and younger forest (RMP p. 20).

Within the Riparian Reserve LUA

4. Maintain water quality standards (RMP p. 2) and improve stream conditions by:
    - Maintaining effective shade for streams pursuant to BLM's TMDL agreement with the State of Oregon (EA sections 2.2.1, 3.3.2).
    - Designing new roads and using existing roads to avoid increasing the quantity of water and sediment transported to streams (EA sections 2.2.3, 2.2.4, 3.3.2).

5. Develop large conifers, future large coarse woody deb4ris (CWD), large snag habitat, in-stream large wood, long-term structural and spatial diversity, and other elements of late-successional forest habitat by applying commercial thinning treatments within the Riparian Reserve LUA concurrent with treatments in the adjacent Matrix/GFMA LUA (RMP pp. 9-15, D-6; NWFP p. B-31, C-32). The NWFP/ROD (p. B-31) states that "active silvicultural programs will be necessary to restore large conifers in Riparian Reserves".

6. Provide habitat for special status, SEIS special attention and other terrestrial species (RMP p. 9). The NWFP/ROD (p. C-32) and the RMP (p.11) direct the BLM to apply silvicultural practices for 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 3.4 describes the project's compliance with the Aquatic Conservation Strategy, including the nine ACS objectives.

Within Both Matrix/GFMA and Riparian Reserve LUA

7. Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act and Bureau special status species policies (RMP p. 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;
   - Performing road maintenance to prevent road deterioration or failure and to prevent road generated sedimentation that exceeds ODEQ standards

9. Increase protection for the public, facilities and resources from large, intense wildfires in the project area (RMP, pp. 39, 43) by:
   - Limiting potential human sources of wildfire ignition;
   - Providing access for fire suppression resources; and
   - Maintaining a healthy forest that is resistant to wildfire.

Wild and Scenic Rivers

10. Provide interim protective management for outstandingly remarkable values identified on BLM-administered lands along river segments that have been determined eligible, but not studied for inclusion as components of the National Wild and Scenic Rivers System Manage the natural integrity of river-related values to maintain or enhance the highest tentative classification determined for rivers...studied for suitability. (RMP p. 37)

1.2.3 Decisions to be Made

The decision maker will decide whether to implement the proposed project, what additional project design features would be incorporated into the project; and which alternative best meets the purpose of and need for the project.

For this project, the only difference between the two action alternatives analyzed is the proposed new road location in part of unit 7B, specifically whether to renovate part of the old airstrip for use as a temporary road or to use an alternate road location that would avoid use of the airstrip.

1.2.4 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. Provide for economically efficient short-term and long-term management of public lands in the project area (objectives 2 and 8);
3. Provide for safe, economically efficient and environmentally sound access for logging operations, fire suppression and administration on public lands (objectives 2, 4 and 8);
4. Provide for increased survival and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris (objectives 1, 2, 3, 5, 6 and 7);
5. Provide habitat for special status, SEIS special attention and other terrestrial species associated with a variety of seral stages and forest stand characteristics in the vicinity of the project area (objectives 3, 5, 6 and 7);
6. Provide for aquatic habitat and water quality/quantity by designing new roads and using all roads to avoid increasing the quantity of water and sediment delivered to streams (objectives 4 and 8);
7. Promote the development of healthy late-successional characteristics in the Riparian Reserve LUA (objective 5);
8. Minimize the potential for human sources of wildfire ignition and prevent large scale, intense wildfires in the project area (objective 9); and
9. Maintains the potential classification and Outstandingly Remarkable Values for potential Wild and Scenic River designation of the North Fork Clackamas River (objective 10).

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

The following documents direct and provide the legal framework for management of BLM lands within the Salem District and for this project:

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).

The area proposed for treatment falls within the following Land Use Allocations (LUA) as defined in the Salem District RMP and Northwest Forest Plan (NWFP): **1/** Matrix/GFMA LUA: For this project, all Matrix/GFMA land is within the General Forest Management Area (GFMA), so the terms "Matrix" and "GFMA" are generally used together in this document and may be used interchangeably. See EA section 1.2.2 for management objectives associated with this land use allocations. **2/** Riparian Reserves (Riparian Reserve LUA): See EA section 1.2.2 for management objectives associated with this land use allocation. The Riparian Reserve LUA includes the stream and the area extending one site-potential tree height (slope distance) from the edges of the stream channel (each side) for non-fish bearing streams and two site-potential tree heights for fish bearing streams. See EA section 2.2.1 for additional information on determining and describing Riparian Reserve widths.

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.

The analysis in the Airstrip 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 1994 (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.

Information from the North Fork Clackamas Watershed Analysis, 1996 (NFCRWA) and Lower Clackamas River Watershed Analysis, 1996 (LCRWA) have been incorporated into the development of the proposed thinning activities, and into the description of the affected environment and environmental effects (EA section 3.0) and are hereby incorporated by reference.

The above documents are available for review in the Salem District Office. Additional information about the proposed activities is available in the Airstrip Thinning EA Analysis File, also available for review 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 *BLM and USFS 2007 Record of Decision eliminating the Survey and Manage Mitigation Measure*. 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).

Following the Court's December 17, 2009 ruling, the Pechman exemptions are still in place. Judge Coughenour deferred issuing a remedy in his December 17, 2009 order until further proceedings, and did not enjoin the BLM from proceeding with projects. Nevertheless, I have reviewed the Airstrip thinning project in consideration of both the December 17, 2009 and October 11, 2006 order. I have determined that the Airstrip project complies with both the December 17, 2009 and October 11, 2006 orders for the following reasons:

- The proposed project contains no regeneration harvest;
- Units 7B and 18A and B meet Exemption A of the Pechman Exemptions (October 11, 2006 Order) because these units entail thinning in stands less than 80 years old;
- Botany: All botanical surveys conducted on the proposed project, as well as all proposed timber sale projects within the Cascades Resource Area are conducted to the same standards as was required under Survey & Manage (2001 ROD). (EA 3.3.1).
- Wildlife: Unit 7A, which contains a 90+ year old component, meets the December 17, 2009 order because this unit was surveyed to the standards outlined in the 2001 Survey and Manage Record of Decision (2001 ROD without Annual Species Reviews) and the latest survey protocols.

1.3.1 Relevant Statutes/Authorities

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

- **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 streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries.
- **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.
- **National Environmental Policy Act (NEPA) 1969** – Requires the preparation of EAs or EISs on federal actions. These documents describe the environmental effects of these actions and determine whether the actions have a significant effect on the human environment.
- **Endangered Species Act (ESA) 1973** – Directs Federal agencies to ensure their actions do not jeopardize threatened and endangered species.
- **Clean Air Act (CAA) 1990** – Provides the principal framework for national, state, and local efforts to protect air quality.
- **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 Water Act (CWA) 1987** – Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.
- **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 -** Establishment of a Federal prohibition, unless permitted by regulations, to take any migratory bird included in the terms of this Convention.
- **Bald and Golden Eagle Protection Act (Eagle Act) of 1940 -** Prohibits the taking of bald or golden eagles without a permit issued by the Secretary of the Interior, Additional authorities and management direction are described in EA section 3.3.10 Table 19.
- **Wild and Scenic Rivers Act, as amended (16 USC 1271) [40 CFR 1508.27(b)(3)] -** Establishes authority and criteria for designating river segments as Wild and Scenic.

1.4 Scoping and Identification of Relevant Issues

1.4.1 Scoping

The Interdisciplinary Team (IDT) of BLM resource specialists conducted internal scoping through the project planning process which includes record searches, on-site field examinations of the project area by IDT members, professional observation and judgment, literature review and IDT discussion. In the project planning process 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 180 federal, state and municipal government agencies, nearby landowners, tribal authorities, and interested parties on the Cascades Resource Area mailing list on December 21, 2009. Approximately fifteen (15) comments letters were received during the scoping period. The scoping and EA comment letters/emails/postcards are available for review at the Salem District BLM Office.

Units 18A and B were previously included in scoping for the Highland Fling Thinning project. When the Airstrip Thinning project was identified in the BLM planning process, the BLM decided to analyze these two units in Airstrip rather than Highland Fling because of their location.

1.4.2 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, determine whether the proposed action should be modified, and 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 action alternative(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.

Issue 1: The Effects of Management Actions on Vegetation and Forest Stand Characteristics

Elements of the issue identified in scoping: Accurate stand descriptions and stand development trajectories as a basis for comparison of alternatives, including:

Stand age, species composition, stand density, ages and locations of large trees in stands, and snags/coarse woody debris; management action/treatment alternatives including: harvest method (thinning, regeneration or no treatment), thinning prescriptions, and management of large trees and old growth trees; understory descriptions and 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 (T/E, Survey and Manage, sensitive, etc.). The elements of this issue are addressed in the following sections of this EA: 1.2.1; 1.2.2; 1.2.4; 2.2.1; 2.2.2; 2.2.4; 2.3; 3.1; 3.2; 3.3.1; 3.3.5; 3.3.10; 3.3.11 and 3.3.12.

Issue 2: The Effects of Management Actions on Hydrology

Elements of the issue identified in scoping: Protection of water quality including sediment from roads, sediment from forest management activities, sediment from landslides, sediment caused by unauthorized OHV use, water temperature, and municipal drinking water supplies; 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: 1.2.2; 1.2.4; 1.3; 2.2; 2.2.1; 2.2.3; 2.2.4; 2.3; 3.1; 3.3.2; ..3.10; 3.3.10; 3.3.11 and 3.3.12.

Issue 3: The Effects of Management Actions on Fisheries, and Aquatic and Riparian Habitats

Elements of the issue identified in scoping: Protection of ESA listed and resident fish and aquatic habitat; compliance with ACS Objectives in the Riparian Reserve; stability of steep slopes above streams; and retention and long range development of complex stand structure in the Riparian Reserve. Site specific concerns for this project also include: 1/ the effects of road building within riparian reserves connecting units 18A and B; 2/ the effects of skyline logging and road building on old growth hardwoods and decadent features within Riparian areas of unit 7b. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.4; 1.3; 2.2; 2.2.1; 2.2.3; 2.2.4; 2.3; 3.1; 3.3.2; 3.3.3; 3.3.10; 3.3.11; 3.3.12 and 5.1.2.

Issue 4: The Effects of Management Actions on Soils

Elements of the issue identified in scoping: The effects of soil compaction, disturbance and erosion caused by logging, fuel reduction operations, and road construction on site productivity; productivity loss and erosion caused by unauthorized OHV use after thinning. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.3; 1.2.4; 2.1; 2.2; 2.2.2; 2.2.3; 2.2.3.1; 2.4; 3.3.1; 3.3.2; 3.3.3; 3.3.4; 3.3.10 and 3.3.12.

Issue 5: The Effects of Management Actions on Wildlife and Habitats

Elements of the issue identified in scoping: Protection of terrestrial animals with special status (T/E, Survey and Manage, sensitive, etc.) and their habitats; provision of snag, coarse woody debris, remnant old-growth tree and large tree habitats; and development of structural complexity and late-successional forest characteristics. Inclusion of unspecified "restoration projects" was recommended. The elements of this issue are addressed in the following sections of this EA: 1.2.1; 1.2.2; 1.2.4; 1.3.1; 2.2; 2.2.1; 2.2.2; 2.2.4; 2.4; 3.1.1; 3.3.1; 3.3.5; 3.3.10; 3.3.11; 3.3.12 and 5.1.1.

Issue 6: The Effects of Management Actions on Air Quality, Fire Hazard and Fire Suppression Capabilities

Elements of the issue identified in scoping: Effects of timber harvest on potential wildfire ignition, intensity and resistance to control; effects of management actions on access for fire suppression resources; and effects of fuel reduction (pile burning) on air quality. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.4; 1.3.1; 2.2.3; 2.2.4; 3.1.1; 3.2; 3.3; 3.3.6; 3.3.10 and 3.3.12.

Issue 7: The Effects of Management Actions on Carbon Storage, Carbon Emissions and Climate Change

Elements of the issue identified in scoping: Effects of timber harvest on carbon storage and atmospheric carbon dioxide (CO2) at various scales; and effects of climate change on fire danger and vegetation in the project area. The elements of this issue are addressed in the following sections of this EA: 1.4.3; 2.4; 3.1.1; 3.3.7; 3.3.10 and 3.3.12.

Issue 8: The Effects of Management Actions on Public Safety, Recreation and OHV Use

Elements of the issue identified in scoping: Providing for public safety related to: recreational traffic and logging related traffic on Highway 224 and BLM Road 5-4E-18; logging activities for residents and users of the Silver Fox RV Park in SW¼NE¼ Sec. 18; and OHV use and the nearby USFS Ladee Flats OHV Use Area. Protection of soil, water and wildlife resources that are potentially affected by OHV use. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.4; 2.2.4; 3..1; 3.2; 3.3.6; 3.3.8; 3.3.10 and 3.3.12.

Issue 9: The Effects of Management Actions on Cultural and Historical Resources

Elements of the issue identified in scoping: Management of possible remnants of an historic logging camp and railroad incline. The elements of this issue are addressed in the following sections of this EA: 1.3.1; 3.2; 3.3.9; 3.3.10; and 5.1.3.

Issue 10: The Effects of Management Actions on the Wild and Scenic River Candidate Status of the North Fork Clackamas River

Elements of the issue identified in scoping: Protection of visual resources and fisheries consistent with the Wild and Scenic River Candidate status of the North Fork Clackamas River under the National Land Conservation System (NLCS). The elements of this issue are addressed in the following sections of this EA: 1.2.4; 1.3.1; 2.2.4; 3.3.8; 3.3.10 and 3.3.12.

Issue 11: The Economic Viability of Management Actions

Elements of the issue identified in scoping: Effects of logging systems, harvest design, project design features and operating seasons on logging costs and the potential for successfully offering the timber sale to the market place; and qualitative cost/benefit ratio of economic factors and environmental effects in a down timber market. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.4; 1.4.3; 2.2; 2.2.1; 2.2.2; 2.2.3; 2.2.4; 2.4 and 3.3.12.

Issue 12: The Effects of Management Actions on the Transportation Network

Elements of the issue identified in scoping: (Note, these elements of the issue overlap with previous issues and are identified separately because they were mentioned separately in comments in ways that often crossed multiple disciplines.)

Effects of road density and use, affecting hydrology (Issue 2) and wildlife (Issue 4); effects of road construction, maintenance, closure and decommissioning on logging methods and costs (Issue 9); access for fire suppression (Issue 10), and public access (Issue 5); and access over private roads for public examination of proposed units. The elements of this issue are addressed in the following sections of this EA: 1.2.2; 1.2.4; 2.2; 2.2.3; 2.2.4; 2.4 and 3.3.12.

1.4.3 Issues Considered, Not Analyzed in Detail

Some of the issues identified in scoping are outside of the scope of the Airstrip Thinning project or are not consistent with the Need for Action or the Purpose of the Project (EA sections 1.2.1 and 1.2.2). These issues were not analyzed in detail. Table 1 summarizes these issues and the reasons they were not analyzed in detail.

Table 1: Issues Considered, Not Analyzed in Detail

Issue Description	Reasons the Issues Were Not Analyzed in Detail
An opinion that the primary management objective for Matrix/GFMA lands should be habitat and variable density thinning should be used to improve habitat.	The Salem District RMP defines the objectives for the Matrix/GFMA LUA. Changing RMP level guidance, including objectives, is outside of the scope of this EA.
An opinion that no-treatment buffers within the Riparian Reserve LUA should be small and more harvest should be done in the Riparian Reserve to improve the economic viability of the timber sale.	The Salem District RMP defines the objectives for the Riparian Reserve LUA. Changing RMP level guidance, including objectives, is outside of the scope of this EA.
An opinion that all naturally regenerated stands be passively managed for habitat.	The Salem District RMP defines the objectives for the LUAs and identifies Special Areas to maintain or protect important values (RMP p. 33). The RMP does not define different objectives for managed and unmanaged stands within a LUA. Changing RMP level guidance, including objectives, is outside of the scope of this EA.
An opinion that income derived from this timber sale be used to implement unspecified restoration projects.	The Augmentation of Appropriations rules (BLM Manual H-5420-1, Appendix 1 (II.A.), Rel. 5-247, 02/08/2000) prohibit the BLM from using timber sale receipts for projects not directly related to timber sale operations. Changing of legal authorities is outside of the scope of this EA.
An opinion that the BLM should develop an alternative to defer harvest and manage BLM lands for carbon sequestration and storage.	The Salem District RMP defines the objectives for the LUAs. Changing RMP level guidance, including objectives, is outside of the scope of this EA. Also, the No Action alternative is an analyzed alternative that defers harvest.
Effects of the Project on Climate Change	The BLM incorporates by reference the Climate Change sections of the PRMP FEIS (1994) and the FSEIS (2008). Both of these analyses conclude that all timber management alternatives for BLM managed lands in Western Oregon in their entirety would not have a discernable effect on global carbon sequestration or atmospheric carbon dioxide levels. The RMP is within the range of the alternatives analyzed in both documents.

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."

For this project the IDT identified the question of whether to use part of the old airstrip for a haul road as an "unresolved conflict". The old airstrip was 40 feet wide and approximately 3/8 mile long. Over the last two decades the airstrip has been decommissioned by planting vegetation and creating physical barriers to prevent use by OHV and unsafe shooting. The IDT could not resolve this conflict in the planning process so they developed two action alternatives for this project.

Alternative 1 would route new road construction around the airstrip to connect the new road on the southern slope break in unit 7B with existing road 4-5E-18.0.

Alternative 2 would renovate part of the original width for nearly the full length of the airstrip to connect the new road on the southern slope break in unit 7B with existing road 4-5E-18.0.

All other aspects of the Airstrip Thinning project proposal are identical for the two Action Alternatives. This EA will analyze the effects of Alternative 1 (bypass the airstrip), Alternative 2 (use the airstrip) and the No Action Alternative (which also provides the baseline to evaluate the effects of the action alternatives).

2.1.1 Planning and Implementation Process

In planning the Airstrip Thinning project proposal, the IDT developed criteria to implement the Management Actions/Direction in the RMP (pp. 20-22, 46-48) for 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. The actions described in EA Section 2.2 and analyzed in EA Section 3, and the PDF described in EA Section 2.2.4, taken together, form the best management practices (BMP) for the Airstrip Thinning project and are based on site specific application of the principles contained in chapter 2 and Appendices G and K of the RMP/FEIS, and pp. 20-50 and Appendices C and D of the RMP.

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 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 analyzed in this EA. Administration of contract provisions would be done by trained and authorized BLM employees.

2.2 Action Alternatives

Table 2 shows an overview of the proposed Action Alternatives. Alternative 2 is highlighted blue in the table. The only differences between the alternatives are in road construction and road renovation in unit 7B, and associated ground-based and skyline landings. Maps 2 and 3 in EA section 7.0.

Table 2: Action Alternatives Summary of Proposed and Connected Actions

EA Unit No. T4S, R5E	Stand Age	EA Unit Acres	Thinning Acres by Yarding System and LUA				Untreated Area (Within the Contiguous Block of BLM Land)		Road Construction (Const.) & Road Renovation				Landings	
			Ground Based Yarding		Skyline Yarding				Road Miles					
									BLM		Private & USFS			
			RR	Matrix / GFMA	RR	Matrix / GFMA	RR	Matrix	New Const.	Reno-vation	New Const.	Maint-enance	Ground - Based	Skyline
7A	90/60	45	0	1	0	44	390	110	0.4	0	0.1	1.7	0	4
7B - Alt. 1	64	190	0	115	0	75			1.1	0.7	0	2.4	14	30
7B- Alt. 2	64	190	0	115	0	75			0.9	1.0	0	2.4	11	30
18A	68	40	5	30	0	5			0.7	0	0+	0.3	3	3
18B	68	15	5	10	0	0								
Total Thinning Ac.		290	10	156	0	124								
Total Road, Rights-of-Way and Landings						Alternative 1			2.2	0.7	0.2	4.4	17	37
						Alternative 2			2.0	1.0	0.2	4.4	14	37
Total Thinning Acres by Yarding Type: Ground Based = 166 acres Skyline = 124 acres														
Total Acres Treated by Land Use Allocation: Matrix/GFMA = 280 acres Riparian Reserve = 10 acres														

Notes: RR= Riparian Reserve land use allocation (LUA), Acres - Thinning unit acres are map estimates only and are rounded to multiples of five acres. New construction includes clearing vegetation within the road Right-of-Way (R-o-W) clearing averages less than 30 feet wide. Road R-o-W would be cleared using ground based logging equipment.
Roads - Miles rounded to 0.1. "0+" indicates less than 0.05 mile. Clearing allowance for renovated roads is not needed for this project because only brush and sapling or smaller size trees are growing within the existing R-o-W.

2.2.1 Proposed Silvicultural Treatments

Silvicultural treatments are common to both Action Alternatives.

In the Matrix/GFMA LUA

The BLM proposes to commercially thin approximately 290 acres of 64-90 year old forest stands within the General Forest Management (GFMA) portion of the Matrix/GFMA Land Use Allocation (LUA). Specifically, the prescription proposes to:

- Retain trees that are generally larger than the average diameter for the stand, emphasizing the largest, healthiest and best formed dominant and co-dominant trees;
- Thin from below removing primarily suppressed and intermediate trees, and co-dominant trees directly competing with the trees selected for retention to make light, water and nutrients available for healthy growth of those trees to be retained;
- Remove some dominant and co-dominant trees to achieve desired stocking levels and to facilitate safe and economical logging.

- Maintain spacing to provide adequate growing room for retained trees based on target stocking (number of trees per acre to be retained in each stand);
- Thin to a relative density of 35-40 on all units to accelerate growth on retained trees and maintain an average canopy cover of retained dominant and co-dominant trees of at least 40 percent (typically ranging from 55 to 70) following thinning;
- Maintain sufficient growing stock to insure the site is fully utilized and total net yield throughout the rotation is not substantially reduced.
- Retain a mix of the species that are currently present in the stand, including hardwood trees.
- Retain most large (>15 inches diameter) snags and protect them from damage during timber harvest activities;
- Retain all, and protect most large (>20 inches diameter) down logs from damage during timber harvest activities;
- Maintain spotted owl dispersal habitat (minimum 40 percent canopy cover) after timber harvest; and
- Retain all Old-Growth trees.

In the Riparian Reserve LUA

Riparian Reserve LUA width is determined by site potential tree height in each stand: two tree heights (slope distance) each side of fish bearing streams and a single tree height (slope distance) each side of non-fish bearing streams. In the Airstrip Thinning project area site potential tree heights are 220 feet for units 7 A and B, and 240 feet for units 18 A and B. In this document distances from streams which are based on Riparian Reserve widths are generally referred to as "more than 200 [or 400] feet".

The BLM evaluated all Riparian Reserve areas that are adjacent to the proposed Matrix/GFMA units and identified ten acres of Riparian Reserve between units 18A and B where active restoration would benefit ACS objectives. No stands in section 7 (units 7A and B) need treatment to achieve ACS objectives.

Therefore, the BLM proposes to implement a Density Management Thinning in 10 acres of 64-68 year old forest stands within the Riparian Reserve LUA in Units 18A, and 18B. Approximately 390 acres of the Riparian Reserve LUA within the project vicinity in sections 7 and 18 would not be treated, allowing these areas to develop naturally. For the 10 acres of Density Management Thinning in the Riparian Reserve, a Stream Protection Zone (SPZ) at least 100 feet wide on each side of the stream would be designated where there would be no treatments except the temporary road described in EA section 2.2.3.

2.2.2 Logging Systems

Logging systems are common to both action alternatives.

The BLM designed the project to use readily available ground based and skyline logging systems to accomplish the proposed thinning project using the Best Management Practices (BMP) identified by the IDT for this project. The elements of this logging plan include:

- Approximately 55 % of the project 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.
- In ground based logging, 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, including stipulations to implement the proposed project described in EA Sections 2.2.1-2.2.2, connected actions described in EA Section 2.2.3, and project design features described in Section 2.2.4. Authorized BLM personnel review the written plan and examine skid trail and landing locations 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 45 percent of the project area would be harvested using a skyline yarding system[3] or using low-impact ground-based machinery designed for use on slopes up to 45 percent. The process for developing, approving and administering a logging plan for skyline yarding and ground-based operations on slopes up to 45 percent is similar to the process for planning conventional ground-based logging as described above. The logging plan designates the location of landings, yarding corridors, trees to be used for attaching cables and the equipment proposed for use.

2.2.3 Connected Actions

Table 3: Connected Actions

Action	Location	Amount	Description/Notes
Roads: Alternative 1			
New Construction, temporary, BLM	7B	1.1 miles	Road may be rocked or natural surface (dirt). To be stabilized and closed.
New Construction, temporary dirt, BLM	7A; 18A,B	1.1 miles	Road not to be rocked, natural surface only. To be stabilized and closed.
New Construction, Private Land	7A,B; 18A,B	0.2 mile	Road may be rocked or natural surface (dirt). To be stabilized and closed.
Renovation, BLM	7B	0.7 mile	Existing subgrade, not maintained to current safety standard. Road brought up to original design standard.
Renovation, Private Land	7A, 18	2.1 miles	
Maintenance on Haul Route	All		Existing useable road, maintenance operations and added rock. Haul route.

[3] In skyline yarding operations, a cable is suspended above the ground (a line in the sky) which holds a carriage that uses another cable to pull logs sideways across the slope to the skyline (lateral yarding). A yarder (machinery with a tower, cables and winches) located on the landing then pulls the carriage up the skyline and pulls (yards) logs up to the landing. The leading end of the log is typically lifted off the ground while being moved (one end suspension). In some situations the entire log is lifted off the ground while being moved toward the landing (full suspension).

Action	Location	Amount	Description/Notes
Roads: Alternative 2			
New Construction, temporary, BLM	7B	0.9 mile	Road may be rocked or natural surface (dirt). To be stabilized and closed.
New Construction, temporary dirt, BLM	7A; 18A,B	1.1 miles	Road not to be rocked, natural surface only. To be stabilized and closed.
New Construction, Private Land	7A,B; 18A,B	0.2 mile	Road may be rocked or natural surface (dirt). To be stabilized and closed.
Renovation, BLM	7B	1.0 miles	Existing subgrade, not maintained to current safety standard. Road brought up to original design standard.
Renovation, Private Land	7A, 18	2.1 miles	
Maintenance on Haul Route	All		Existing useable road, maintenance operations and added rock. Haul route.
Culverts and Stream Crossings			
Install and remove temporary culvert, perennial stream. (Number of culverts.)	18 A&B	1	Install, use and remove culvert during the same summer (in-water work period).
Install & remove temporary culvert, cross drain, no stream. (Number of culverts.)	7A	1	
Fuel Treatment			
Burn landing piles.	All		
Machine pile and burn.	7B		

2.2.3.1 Road Work

Roads would be renovated or constructed as shown in Table 4 to provide access for safe and efficient logging and hauling logs.

- Renovation 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.
- All new roads would be temporary. Temporary roads would be stabilized to prevent erosion by shaping the road surface to drain water onto stable vegetated slopes, ripped as needed to provide surface roughness and provide a seedbed, seeded with native species to vegetate disturbed soil, covered with logging slash and debris to provide additional stability and prevent vehicle use, and blocked to prevent vehicle use. The subgrade would be left intact so that the road could be renovated for future use.
- New roads designated as natural surface in Table 4 would only be used as natural surface roads.
- New roads designated as natural or rocked in Table 4 may be rocked to extend the operating season to increase economic efficiency.
- All new roads and some renovated roads on BLM would be closed and stabilized after operations are completed (see project design features, EA 2.2.4). Some new and renovated roads on private land may be closed and stabilized as directed by the landowners.

- The stream crossing on the new road in section 18 ("New 6" in Table 4) would be removed after logging operations in unit 18A are complete. The stream channel would be restored to match the natural channel dimensions upstream of the crossing and wood would be replaced in the channel. BLM Engineering staff would implement site appropriate BMPs including work methods, materials and work season to prevent sediment transport more than a few hundred feet downstream.

Table 4: Road Work Detail, Miles (Alternative 2 is highlighted in blue)

Unit		Road ID	BLM Land			Private Land	
			New Temporary Construction Natural Surface	New Temporary Construction Natural or Rocked	Road Renovation	New construction	Renovation
7A North		4-5E-05.0					1.41
		New 1	0.11			0.08	
7A South		4-4E-12.0					0.32
		New 2	0.26			0.04	
Unit 7A subtotal			0.37	0	0	0.12	1.73
7B, Alt.1	Same as Alt. 2	4-5E-7.0			0.23		
		Unnumbered			0.09		
		New 3		0.13			
		4-5E-7.1			0.26		
		4-5E-7.2			0.10		
		New 4		0.14			
		New 5		0.84			
Unit 7B, Alt. 1 subtotal			0	1.11	0.68	0	0
7B, Alt.2	Same as Alt 1	4-5E-7.0			0.23		
		Unnumbered			0.09		
		New 3		0.13			
		4-5E-7.1			0.26		
		4-5E-7.2			0.10		
		New 4		0.14			
		Airstrip			0.28		
		New 5		0.66			
Unit 7B, Alt. 2 subtotal			0	0.93	0.96	0	0
18A & B		4-5E-18.1					0.32
		New 6	0.70			0.03	
18 A& B subtotal			0.70	0	0	0.03	0.32
Alternative 1 (bypass airstrip) Total			**1.07**	**1.11**	**0.68**	**0.15**	**2.05**
Alternative 2 (use airstrip) Total			**1.07**	**0.93**	**0.96**	**0.15**	**2.05**

2.2.3.2 Fuels Treatments

To reduce hazardous concentrations of fuels the BLM would burn piles at logging landings. To reduce the potential for human caused ignition of wildfire the BLM would remove or pile and burn slash on up to 20 acres within 100 feet of road 4-5E-18.

2.2.3.3 Special Forest Products (SFP)

The BLM would sell permits for collecting Special Forest Products from the harvest units if there is a demand for the products, and collection would not interfere with proposed project operations or have effects beyond those analyzed in this EA. Special Forest Products are useable materials other than timber that may be harvested from the forest and can include: edible mushrooms, firewood, posts and poles, and native plants for transplant. (RMP p. 49)

2.2.4 Project Design Features

This section summarizes the project design features that would keep the project's effects on the affected resources described in EA sections 3.1-3.3 within the effects analyzed in the RMP/FEIS. Project design features described in this section would be implemented in all action alternatives 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 its 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 selected action and design features into the project layout, contract requirements, and contract administration to ensure that the project is implemented as analyzed in this EA. The Contracting Officer enforces compliance with the contract and would suspend operations if the operator fails to perform the required preventive and restorative practices analyzed in this EA. 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 following project design features would:

- 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 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 (Invasives), fire hazards and risks (Fire/Air)
- Achieve: desired forest stand composition (Vegetation); economic efficiency (Economic), fuel reduction (Fire/Air)

Table 5: Project Design Features and Benefitting Resources

Applicable 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: RMP/FEIS (pp. 2-34 -- 2-37; 4-11 -- 4-13; G-1,2)										
1. Limit the area compacted by logging operations (skidding, yarding and landings) to less than ten (10%) 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 must be felled for safe logging operations, leave them on site to create CWD habitat.	♦		♦	♦	♦					♦
In Ground-based Logging Operations: RMP/FEIS (pp. 2-34 through 2-37; 4-11 through 4-13; G-2)										
9. 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.	♦	♦	♦	♦		♦				♦
10. Re-use existing skid trails whenever feasible for logging operations according to the approved logging plan.	♦	♦	♦	♦	♦	♦				♦
11. 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.	♦	♦	♦	♦		♦				♦
12. Generally limit uphill skidding to slopes where skidders would not break traction to avoid soil displacement.[4]	♦	♦	♦	♦						♦

[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 Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
13. 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)										
14. 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)										
15. Locate and construct piles of logging slash and debris to provide for safety during logging and burning operations.								♦		♦
16. 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.	♦	♦			♦	♦	♦	♦		♦
17. Conduct burning operations after a consistent pattern of fall rains begin and the soil and adjacent fuels are wet (typically November).	♦	♦			♦	♦	♦	♦		♦
18. 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.							♦			
19. Within 100 feet each side of road 4-5E-18 (North Fork Road), either remove slash (pull back beyond that distance) or machine pile logging slash and debris to reduce fuel hazard and the potential for human caused ignition.	♦	♦			♦	♦	♦	♦		♦
20. Use signs, temporary barriers and flaggers as required by Oregon Occupational Safety and Health Administration (OR OSHA), Oregon Department of Transportation (ODOT) and BLM policy and practice to provide for public safety during logging, hauling and fuel treatment operations.							♦	♦		
21. Locate unit boundaries and roads to avoid impacts to known cultural resources, including the site of the Porter-Carstens incline.									♦	
22. 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, Maintenance, Stabilization and Closure: RMP/FEIS (pp. 2-22,68,69; 2-75,76; 4-11 -- 4-19; G-2 -- G-7)										
23. Locate, design and construct roads wherever feasible to drain surface water to adjacent slopes where it would infiltrate into the soil and groundwater.		♦	♦	♦						
24. 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.		♦	♦	♦						♦
25. 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.			♦	♦						♦
26. 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.			♦	♦						♦

Applicable Resources / Objectives → Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
27. 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.			♦	♦						♦
28. Dewater streams during culvert installation/removal operations in flowing streams by pumping or piping water around the construction site.		♦	♦	♦						
29. Close and stabilize all new and renovated roads and some existing roads after use to reduce changes to natural drainage patterns, prevent erosion, and prevent unauthorized use by motor vehicles (including OHV).	♦	♦	♦	♦	♦	♦	♦	♦		♦
30. 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.	♦	♦	♦	♦	♦	♦	♦	♦		♦
31. Subgrades of closed and stabilized roads would be left intact so that the road can be renovated for future use or fire control with minimal disturbance and expense.	♦						♦	♦		♦
32. 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.		♦	♦	♦				♦		♦
33. Restrict road construction, renovation and stabilizing operations to times, weather conditions and soil conditions when sediment would not be transported to streams.		♦	♦	♦						♦
34. Seed and mulch exposed soil as needed with native species seed approved by the BLM and sterile mulch (free of non-native seed).	♦	♦	♦	♦	♦	♦				
35. Design and construct roads and landings to avoid creating opportunities for unauthorized shooting ranges that could endanger public safety.	♦				♦			♦		
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)										
36. Retain old growth trees[5] and protect them from logging damage that would potentially affect the health or function of the trees. Individually designate old growth trees that are inside unit boundaries for retention.	♦				♦					♦
37. Retain all conifer trees larger than 36 inches diameter (DBH[6]). Any of theses 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.	♦				♦					♦
38. Retain all hardwood trees larger than 18 inches diameter and protect them from structural damage as feasible with safe and efficient logging operations. Any of theses 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.	♦				♦					♦
39. Retain minor conifer species and hardwoods between 8 and 18 inches DBH where feasible with safe and efficient logging operations.	♦				♦					♦

[5] Trees older than 200 years – RMP/FEIS, Table 3-16, p. 3-28 and glossary.

[6] 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, $\cong$ 3.14).

Project Design Features (RMP/FEIS references for key points)	Vegetation	Soil	Water	Fish	Wildlife	Invasives	Fire / Air	Public	Cultural	Economic
40. Retain created snags and topped trees marked with orange painted "W" in unit 7B as much as is feasible with safe and efficient logging operations. Any of theses trees felled to facilitate safe and efficient operations would be left on site as CWD. Leave as close to the cut site as possible.	♦				♦		♦			♦
41. 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 (IDT BMP based on Wildlife Report). Snags felled or knocked over during operations would be left on site as CWD.					♦		♦			♦
42. 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.		♦			♦					♦
43. 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).	♦				♦					
44. Avoid damaging[7] 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.	♦				♦					♦
45. 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.						♦				
46. For locations within the project area that have existing populations of high priority weed species[8] 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.						♦				
47. Restrict habitat modifying operations (falling, yarding and road construction) within the disturbance range (0.25 to 0.5 miles) of known northern spotted owl (NSO) sites during the nesting season unless appropriate NSO surveys indicate that there are no nesting spotted owls within the disturbance range.					♦					♦
48. Locate unit boundaries and mark trees for retention to protect known populations of *Cimicifuga elata*.	♦									
49. 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 are accomplished by restricting operations during certain seasons or conditions which are often correlated closely with seasons. "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 in this EA. Table 6 shows the anticipated seasonal restrictions for the project.

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

[8] 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 6: Summary of Seasonal Restrictions and Operational Periods

Seasonal Restriction	Reason	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Most logging, road work and fuels treatments	Raptor breeding and nesting season												
Falling and yarding	Bark slippage												
Hauling	Water quality and sedimentation												
Skidding operations	Soil compaction												
Road Construction / Decommissioning	Soil damage/erosion control												
In-water work: stream culvert maintenance.	Protect fish and aquatic habitat												
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 describes the 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 conditions if the BLM does not implement the proposed project. Consideration of this alternative also answers the question: "What would it mean for the objectives to not be achieved?" The "No Action alternative" means that no timber management actions, fuel reduction treatments, or connected actions would occur.

If this alternative were to be selected, the following activities would not take place in the project area at this time: silviculture treatments; timber harvest; road construction, renovation, improvement 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) would continue on BLM within the project area. On private and USFS 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 IDT evaluated all Riparian Reserve stands adjacent to proposed harvest units to determine whether treatment would contribute to attaining ACS objectives for habitat. 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 Reserve stands that did not meet both of the above conditions or were not technically feasible to thin were dropped from further consideration for treatment.

Canopy Gaps in the Matrix/GFMA LUA

One-acre canopy gaps on Ladee Flat in unit 7B were considered to increase structural complexity and vegetative forage. Twelve trees per acre would be retained in these gaps to provide for legacy trees and potential snags or CWD. Logging slash remaining in the gaps would be hand-piled. Some of the piles would be burned to reduce fuel loading and some would be left unburned to provide habitat for some birds and small mammals. The IDT did not analyze this alternative in detail because these gaps are not consistent with the timber production silvicultural objectives for this stand.

Reserve the Stands in the Project Area for Carbon Storage

This alternative was not analyzed in detail for the following reasons. This Alternative:

- Does not respond to the purpose for the project (EA section 1.2);
- Is not in conformance with the RMP which sets the basic policy objectives for the management of the project area, in which Matrix/GFMA lands are managed primarily for timber production, and Riparian Reserves are managed to help develop late successional habitat conditions in line with the Aquatic Conservation Strategy. The RMP does not include a Land Use Allocation that reserves lands or stands for carbon storage;
- Is substantially similar in design to the "No Action alternative" which is analyzed in the EA.

Transportation Systems

An alternative route to access units 18A and B from the west was not analyzed in detail because the route would be through a privately managed RV park. Log hauling through the RV park would be a hazard to public safety and would damage private roads.

Temporary Bridge in Section 18

Installing a bridge instead of a culvert temporary stream crossing for the new temporary road in section 18 was not analyzed in detail because:

- initial assessment by BLM engineering staff as discussed by the IDT revealed that costs of a bridge would be much higher than for a culvert;
- the earthwork required would also generate approximately as much sediment as a temporary culvert; and
- earthwork required may also impact the channel as much or more than a temporary culvert would.

Regeneration Harvest of Unit 7A

The scoping letter for the Airstrip Project included a proposal for regeneration harvest of unit 7A. Initial data from BLM Forest Operations Inventory (FOI) records indicated that the stand age, based on the overstory of large diameter trees, was consistent with RMP Management Direction for regeneration harvest.

Scoping is done very early in the planning process so that all public input received can be fully considered by the IDT during project development, often before site specific Stand Exam data is available for analysis.

When this data was analyzed it became apparent that the stand did not meet criteria for regeneration harvest. Analysis also shows that the second story of 60 year old Douglas-fir is overstocked and thinning is recommended to meet timber management objectives for the Matrix/GFMA Land Use Allocation.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

Sources Incorporated by Reference: North Fork Clackamas River Watershed Analysis (NFCRWA), USFS/BLM, 1996; Lower Clackamas River Watershed Analysis (LCRWA), USFS/BLM, 1996.

3.1 Analysis Assumptions and Methodology

3.1.1 Analysis Assumptions

General

- Timber management activities will occur on BLM-administered lands allocated to planned, sustainable harvest. The type, quantity, and impacts of allocating these lands for the type and quantity of these timber management activities were analyzed in the Salem RMP/FEIS for both the short-term (10 years) and long-term (decades). Under the RMP, this applies to Matrix/GFMA lands in the proposed project area.
- Future timber management activities on those BLM-administered lands will re-use the transportation system of skid trails, landings and truck roads proposed for this project.
- The Riparian Reserve LUA on BLM-administered lands will be managed for protection of watershed values such as water quality and aquatic habitat and for terrestrial wildlife habitat on both a local and landscape level.
- If the proposed project is implemented, no further silvicultural treatments would be done for approximately the next 20 years in these stands, both Matrix/GFMA and Riparian Reserve.
- 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.

Vegetation/Silviculture

- As relative density (RD)[9] 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.

[9] 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.

- 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.
- Potential warming and drying trends predicted by some global climate change models within the next 20 years would not change these management recommendations because BLM's experience with similar projects has demonstrated that the same principles and effects apply to similar forest stands in warmer and drier areas further south and at lower elevations within the *Tsuga heterophylla* (western hemlock) forest zone classification. Warming and drying could theoretically increase stresses in overcrowded stands, but the BLM cannot reliably quantify this effect with current modeling tools and believes that the range of forest conditions and effects would continue to be within the ranges analyzed.

Soils

- Harvest operations would be done only on lands classified by the BLM as Suitable[10] 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).

Air Quality and Fire Hazard / Risk

- Overall potential increase in wildfire season duration and severity due to potential climate change during the project period (three to five years) would not be likely to exceed the range of conditions used to model fire potential for this time period. Predictions of climate change reviewed in a wide range of literature are generally within two degrees F. warming and unquantified degree of "drier" within the next decade or so. This degree of variation in the project area would be within the historical range of conditions that the BLM has observed for the area for the last several decades.

Recreation / Visuals / Rural Interface

- Access to the project area will continue to be a combination of uncontrolled access from public roads and controlled by private gates and road owner policy.

3.1.2 Methodology

General

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

[10] 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.

- The RMP/FEIS provided general resource information for the Salem District planning area as of September 1994.
- Research publications provided further information specific to forest vegetation and the impacts of managing or not managing forest stands (Silvicultural Report pp. 6-7, 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.

Vegetation

- For stand structure information, Stand Exams were conducted in 2006-2008 and additional stand information was gathered by BLM personnel.
- The BLM analyzed and incorporated data from the ORGANON Program (Hann, et al 2006) 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 9, Silvicultural Report pp. 6-7).
- 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).

Hydrology

- 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).

Fisheries and Aquatic Habitat

- BLM Fisheries Biologists conducted surveys of the project area streams during the 2009 and 2010 field seasons.

Soils

- Soil maps and descriptions of project soil characteristics used for the project area are available at the Natural Resource Conservation Service 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 and field-verified 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, including digging small pits, to evaluate site specific conditions.

Wildlife

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

- For Special Status/species of concern: They 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 2009 and 2010 field seasons and examined habitats in and adjacent to proposed Airstrip Thinning project units. From the Cascades Resource Area list, the wildlife biologists compiled a list of Special Status/species of concern documented or suspected to occur in the Airstrip 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. 47-56)
- For amphibians: Wildlife biologists conducted surveys for amphibians concurrent with mollusk surveys in 2010. Additional surveys may be conducted in the future.
- For northern spotted owl (NSO): The project area was surveyed in 2009 and 2010 by BLM contractors and there were no northern spotted owl responses. The closest known spotted owl site is located approximately 1.5 miles away. Additional surveys for northern spotted owls may be conducted to determine presence in the future.
- Red Tree Voles. Surveys were conducted in the summer of 2010 in unit 7A. The entire unit was surveyed from the ground and the trees that could not be inspected from the ground were climbed. 17 trees were climbed and inspected for any evidence of red tree voles. No red tree vole nests or evidence of the presence were found.
- Mollusks. Surveys were conducted during the spring and fall of 2010 in unit 7A. one Survey and Manage mollusk species was found to be present, Oregon megomphix, (*Megomphix hemphilli).*
- 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.

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; GIS data base; Reforestation records; Masters Thesis, Paullin, Pamela K. 2007; North Fork Clackamas River Watershed Analysis, USFS, 1996; Lower Clackamas River Watershed Analysis, USFS 1996; Silvicultural Prescription 2010*

Physical Setting

The Airstrip Thinning project is located approximately 7 miles southeast of Estacada, Oregon near the confluence of the North Fork Clackamas River with the Clackamas River at the North Fork Reservoir. The project is named after an abandoned dirt airstrip on the plateau between the North Fork and mainstem Clackamas Rivers. The five thousand acre plateau has been known as Ladee Flat (variants include: Ladee, LaDee or La Dee, and Flat or Flats) since it was logged by the Ladee Logging Company in the 1920s.

Unit 7A in the northwest quarter of section 7 is on a south and southeast facing slope with several benches. The lower edge of the unit is above the steep slopes and cliffs of the north side of the North Fork gorge. This is a two story stand that is shown on the 1914 Historic Forest Map (Oregon Department of Forestry cited by Paullin 2007, p.26, fig. 2.3) as a "non-timbered area". There is no evidence of past logging or other forest management and the stand appears to have developed as a result of multiple forest fires in the late 1800s and early 1900s that eliminated essentially all vestiges of the older forest and prepared seed beds for two major age classes of trees (60 and 90 years) with individual trees ranging in age up to 169 years.

The forest stand is accessible from the bottom by foot from the trail along the North Fork Clackamas then cross-country (3/4 mile total) and the closest road access to the top of the unit is privately owned with locked gates.

Unit 7B encompasses the west end of Ladee Flat plateau which extends another three miles east of the project area. The northern and western edges of the unit extend down the upper and middle portions of the moderately steep (40-70 percent) slopes of the south side of the North Fork gorge. The southern edge of the unit extends down parts of the upper slope of the mainstem Clackamas River gorge. The forests in this unit became established primarily in the mid 1940s after logging in the 1920s and fires in 1929 and 1939. This forest stand is adjacent to USFS Road 4610 (BLM Road Number 4-5E-18.0) which is open for public use. The dirt airstrip (the namesake for the Airstrip Thinning project) has been revegetated with grasses, brush and planted trees and the surface has been roughened. Trenches prevent OHV access into this stand.

Units 18A and B are in section 18 on older landslide debris at the toe of the escarpment that forms the north side of the Clackamas gorge below Ladee Flat. The small area (roughly 150 acres) of gentle to moderately sloped ground below the escarpment also contains a private RV park, a sewage treatment facility and a rocked staging area for road and facilities maintenance. The forest in these stands became established primarily in the mid 1930s, apparently after logging in the 1920s and the Ladee Flat Fire in 1929. These units are accessible by foot (1/4 mile to BLM) on a private road behind a locked gate.

Lands adjacent to section 7 on the east, north, west and the western half of the south line are private industrial forest lands with numerous recent clearcuts and young plantations. Section 18 is contiguous with the east half of the south side of section 7.

USFS manages section 17 immediately east of section 18. The remainder of the land adjacent to BLM in section 18 is private land managed for timber, recreation and a storage area for maintenance supplies such as logs, rock and culverts.

Historical Setting and Current Use

The older Douglas-fir forests in the Clackamas River watersheds that were present when settlers arrived in the area are believed to have established after the widespread stand-replacement fires in the region from about 1400-1650. Fire use by Native Americans was typically low intensity underburning in the fall to enhance forage for big game species and preferred plants like huckleberries.

After about 1850 most fires were caused by settlers (burning to clear fields and home sites) and commercial users (logging, railroads, etc.). When those fires escaped it was often the summer or east wind conditions in the fall, so they were larger, more intense fires covering larger areas with mixed areas of underburn and stand replacement fire. Many forest stands in the North Fork Clackamas originated after the 1868 fire season and fires are also recorded in the area in 1883, 1902 (Hillockburn), 1929 (Ladee Flat), and 1939 (Boyer Creek). (Paullin 2007, p. 25, citing: Weisberg and Swanson 2001; Burtchard and Keeler 1991; Merle Siedel, personal communication 2003)

The Cascades Forest Reserve was created in 1893 which included some of the land that became the Mt. Hood National Forest in 1924. The Chamberlin-Ferris Act (1916) transferred the revested O&C Railroad lands to federal ownership. Early management direction was to sell the timber as quickly as possible.

By 1921 the Union Lumber Company had purchased enough timber patents in the (not yet named) Ladee Flat plateau to began construction of railroad tracks up to the North Fork Clackamas River to log the area.

It was not feasible to construct a standard railroad grade to the plateau, so Union constructed the Porter-Carstens incline(named after the engineers for the project) and the Ladee Logging Company set up logging Camp No. 1 at the top of the incline and began logging in 1923. Ladee Logging constructed a network of logging railroad lines and an additional logging camp on the plateau. Snags were actively felled for safety, fuel wood and fire control. Active logging effectively ended with the Ladee Flat Fire in 1929 and the remaining salvage logging and decommissioning the tracks, camps and incline was completed in 1930.

The first major public access was provided when the Civilian Conservation Corps (CCC) built a truck road in 1934. In 1946 a private party constructed a dirt airstrip, 2300 feet long and 40 feet wide, on BLM land in section 7 using the Ladee Logging Co. main railroad grade. Apparently the airstrip was only lightly used and not well maintained until it was officially abandoned in the late 1960s. Several sections of land in the Ladee Flat area were transferred from the BLM to the Mt. Hood National Forest as recorded in Metsker's Atlas in 1956. During the late 1980s and 1990s the BLM revegetated the airstrip with native grasses and planted trees and blocked OHV access with trenches. A 1982 commercial thinning timber sale that overlaps the Airstrip Thinning project in section 7 was also named Airstrip Thinning. USFS also has multiple active timber sales in the general area.

The Clackamas River became a popular recreation area for people in the Portland are as access was developed to support hydroelectric facilities and logging. Recreational use of Ladee Flat, both legitimate and destructive, has influenced management plans for the area in the last two decades. The activities that have most heavily influenced management decisions are unmanaged shooting ranges, off-highway vehicle (OHV) use, dumping, firewood theft and dispersed camping.

The Ladee Flat area has been closed to all shooting on USFS and BLM land since 1992 (USFS 1996, p. 2-59) and USFS has developed an authorized OHV use area and has increased administrative and law enforcement presence in the area.

The North Fork Clackamas River is designated by the National Landscape Conservation System (NLCS) as a candidate for Wild and Scenic River status which restricts certain management activities within 1/4 mile of the river channel. Units 7A and 7B both include land in this corridor.

Existing Watershed Condition

The project area is located in two 6th field watersheds: Middle Clackamas River (also mapped as Helion Creek - Clackamas River) and North Fork Clackamas River (also mapped as Fall Creek) with a combined area of 32,252 acres (50sq-mi). All proposed units ultimately drain to the same fourth field watershed, the Clackamas River, cataloging unit (#17090011).

Ownership and management in the combined watersheds is 5 percent BLM, 70 percent USFS, and 25 percent State and private. State and private land use is 22 percent forestland, 78 percent agricultural and residential.

Table 7: Land Ownership/Management in Project Area Watersheds

6th Watershed	BLM	USFS	State	Private		Total Acres*
				Forest	Residential/Other	
Middle Clackamas	947	8,879	86	1,101	700	11,713
North Fork Clack.	604	13,749	1	5,195	1,076	20,625
Total	1,551	22,628	87	6,296	1,776	32,338

*GIS Data Base acres. Sum of published Watershed Analyses acres = 32,252.

The City of Estacada utilizes the Clackamas River as a source for drinking water and the project area is within the drinking water source area. Portland General Electric (PGE) operates several hydroelectric projects on the Clackamas river including the North Fork dam and reservoir immediately downstream of the project area. There are no key watersheds in the project area. The North Fork Clackamas is eligible for designation by Congress as a Wild and Scenic River.

Scope of the Project Proposal

BLM lands are scattered in the project vicinity, so a logical scope for the project overview is all acres in the BLM ownership blocks that contain one or more project units. GIS records list a total of 791 acres of BLM managed land in sections 7 and 18. Of these 791 acres, approximately 49 percent (391 acres) are mapped as Matrix/GFMA and 51 percent (400 acres) are Riparian Reserve.

The action alternatives would thin:

- 290 acres of the 791 BLM acres, or 36 percent of BLM lands in blocks affected by the project. Less than 1 percent of BLM lands in the project vicinity would be included in Rights-of-Way for roads to be constructed (Alt. 1 = 10 acres; Alt. 2 = 9 acres).
- Within the 290 acres proposed for thinning, 97 percent of the proposed thinning acres are in GFMA, 3 percent in Riparian Reserve.
- 280 acres within the Matrix/GFMA LUA, or 72 % of the 391 acres of Matrix/GFMA LUA within sections 7 and 18
- 10 acres within the Riparian Reserve LUA or 3 % of the 400 acres of Riparian Reserve LUA within sections 7 and 18.

Table 8: BLM Acres by LUA, Treatment and Logging System

	Total	Total Thinning			Matrix/GFMA Thin			Riparian Reserve Thin		
		GB	Sky	Total	GB	Sky	Total	GB	Sky	Total
Acres BLM Lands	791	166	124	290	156	124	280	10	0	10
Percent of 791 Acres BLM Land	100	21	15	36	20	15	35	1	0	1
Percent of 290 Thinned Acres		57	46	100	24	43	97	3	0	3
Logging System Percent of Each Land Use Allocation		57	43	100	56	44	100	100	0	100

Cumulative Actions

- Past Actions within the 6th field watersheds containing the project area-
  - Private clearcuts adjacent to the north and west sides of unit 7A, east of unit 7B, south of the west end of unit 7B, and south and west of units 18A and B.
- Present Actions – USFS timber sales in the two watersheds total 2,557 acres, all are commercial thinning.
  - USFS sales include: "1929", 388 acres; Cold, 331 acres; Moore, 357 acres; Bugeye, 301 acres; Crow, 258 acres; Boya, 324 acres; Raven, 94 acres; Shay, 134 acres; and Dry, 370 acres. (USFS, personal communication from J. Roden, on file)
  - USFS Ladee Flats OHV Area.
  - No other BLM or apparent private actions are ongoing.
- Foreseeable Future Actions -
  - BLM timber sales: None planned in these watersheds. USFS timber sales: Included in and not distinguished from the list of sales in Present Actions, above.
  - 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 because most private land near the project area has been recently harvested or is in young (<20 years) plantations.

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 section 1.4.2).

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; Carbon Storage and Carbon Emissions; Recreation, Visual Resources and Rural Interface; and Cultural Resources.

3.3.1 Vegetation and Forest Stand Characteristics

Sources Incorporated by Reference: BLM 2010, Airstrip Thinning Silvicultural Prescription - Including: Stand Exam Data, EcoSurvey analysis of stand exam data, ORGANON modeling reports and Marking Guides.

Resource Specific Methodology: BLM's Resource Area Silviculturist did field reconnaissance of all units. Detailed stand data was developed by taking plots throughout the proposed units according to accepted statistical sampling techniques. The plot data was analyzed by the Resource Area Silviculturist using BLM's EcoSurvey Program and the ORGANON growth model. Stand ages were calculated by these programs using weighted averages of sample tree ring counts (cores) to determine a stand "birthdate". BLM's Resource Area Botanist reviewed BLM data for habitat requirements and known sites of Threatened and Endangered (T&E) species, Special Status Species (SSS) and Invasive/Non-native Plant Species prior to conducting field surveys. The Botanist conducted comprehensive botanical inventories of the project area in April, May, June and November 2009.

Affected Environment

Stand Structure and Development

Matrix/GFMA LUA

Unit 7A[11] is a distinct two storied (two layered) stand. The second (lower) story of mostly 60 year-old Douglas-fir with minor amounts of big leaf maple and red alder is the prevalent layer of the stand. The overstory of 90 year-old Douglas-fir (ages of ring-count sample trees larger than 36 inches diameter ranged from 87 to 169) consists of scattered individuals and small clumps. Some individual old-growth (>200 years) may be present in and adjacent to the stand, none were encountered on stand exam plots. The occasional tree regeneration is Douglas-fir and the understory consists mostly of salal, vine maple and sword fern. The stand is generally healthy and growing well and no evidence of disease was found. There are very few large hard snags or hard coarse woody debris (CWD), further indicating that fire was a recurrent event that prevented stands from becoming established.

[11] Unit 7A was originally mapped as a single unit with a wet area in the middle. During field examinations it was determined that the wet area is part of a discontinuous stream, splitting the unit into two parts. Since stand exams were complete and both smaller units are part of the same stand, the two parts are presented as subunits with the same number.

These stand ages and the relatively low incidence of older snags and CWD are consistent with the recorded fire history described in section 3.2. Some (<10) of the large diameter trees near the north boundary of the unit were notched as skyline cable anchors, partially girdling these trees near ground level.

Figure 1: Unit 7A (File photo by C. Murphy, 2010, section 7, T4S. R5E)

Figure 2: Unit 7A (File photo by K. Walton 2010, section 7, T4S. R5E)

Figures 1 and 2: Airstrip Thinning 7A showing large diameter overstory trees and small diameter understory stand.

Figure 3: Typical Old-growth Douglas-fir rings (File photo by K. Walton, 2011, Salem District sample)

Figure 4: Douglas-fir, 44 inches DBH from Airstrip 7A, wedge and 2 cores (File photo by K. Walton, 2011, section 7, T4S. R5E)

Figure 5: Close-up of same wedge and cores showing growth rings in cores taken at 4.5 ft., north & south sides. (File photo by K. Walton 2011, section 7, T4S. R5E)

In Figures 4 and 5, the rapid growth shown by width of annual growth rings shows how trees ranging from 87-169 years have attained the large diameter often associated with old-growth. Compare to growth rates in the outer rings of a 56 inch diameter, 494 year old old-growth DF on display at Salem BLM (Fig. 3). (Figures 3,4 & 5 - K Walton 2011)

Unit 7B is in a uniform 64 year-old Douglas-fir stand with minor amounts of big leaf maple and red alder. There are some scattered residual old-growth trees near the south unit boundary in section 18. Most of the unit and some of the adjacent stand was commercially thinned in 1982. Portions not previously thinned include part of the area around the airstrip that was less dense thirty years ago, and below the slope break in the southern part of the unit. The understory consists of mostly vine maple, sword fern and salal.

The stand is generally healthy and growing well and no evidence of disease was found. Old-growth stumps are evident in the stand but there are very few snags or CWD, which is consistent with the recorded logging and fire history described in section 3.2.

Figure 6: Airstrip 7B, northwest (File photo by D. Schlottmann 2011, section 7, T4S. R5E)

Figure 7: Airstrip 7B, southeast. Retain orange marked trees. (File photo by D. Schlottmann 2011, section 7, T4S. R5E)

Units 18A and B are in a uniform 68 year-old Douglas-fir stand with minor amounts of big leaf maple present and red alder outside of the proposed unit boundaries in the wet riparian areas.

There are some scattered residual old-growth Douglas-fir, primarily near the eastern boundary of 18A. The understory consists mostly of vine maple, salal and sword fern. The stand is generally healthy and growing well. One large pocket of *Phellinus* root rot that created a brushy opening was found near the north boundary of 18A. Evidence of old-growth stumps, snags and CWD were found throughout the stand which indicates that the logging and fire history were similar to that described in section 3.2 for unit 7B, but no records of a timber sale or specific fire history for this location were found.

Table 9: Stand Characteristics

T-R-Sec Unit	Stand Age*	Seral Stage	CWD** (Linear feet/acre)	Snags/acre >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
5S -4E 7A	90/60	Late Mid/ Mature	0/240+	0+/0+	172	15.8	59	22.1	91	18.6	23.5	40
5S -4E 7B	64	Late Mid	0+/<200	1.1/0+	166	16.2	59	19.8	96	17.8	21.7	39
5S -4E 18A&B	68	Late Mid	50/240+	0+/1.4	175	15.7	59	19.3	102	17.2	21.1	40

*As of Stand Exams in 2008. Stand ages are statistically calculated from ages of sample trees that were cored for ring count. ** RMP requirements for CWD are minimum 20 inches diameter large end and at least 20 feet long.

Riparian Reserve LUA

The Riparian Reserve LUA stands proposed for thinning are contiguous with the Matrix/GFMA stands proposed for thinning and have similar development histories.

When BLM lands in units 7B and 18A and B of the Airstrip Thinning project area were logged and reforested, and when parts of 7B were commercially thinned in 1982, there was no distinction made between forest stands in what is now classified as Riparian Reserve and those in Matrix/GFMA LUAs.

The streams tributary to the North Fork are generally on steep slopes of the canyon and are often incised within the major slope to create multiple aspects (direction the slope faces) and changing moisture levels throughout the Riparian Reserve. This leads to structural and spatial complexity in both overstory and understory vegetation rather than a uniform stand extending well into the Riparian Reserve that is often encountered in managed stands.

The stream that separates the subunits of 7A traverses a bench and forms a wet area with more big leaf maple, red alder, vine maple and ground cover than is found in the adjacent Matrix/GFMA unit. This more complex structure continues through most of the width of the Riparian Reserve south of the stream. On the north side of the stream, the stand composition changes abruptly at the toe of the slope so that most of the Riparian Reserve there is identical to the adjacent two-storied Matrix/GFMA stand. No Riparian Reserve stands on the south side of unit 7B, tributary to the mainstem Clackamas River, were included in the project proposal.

The stream between units 18A and B and the first order tributaries that extend into 18A have gentle stream adjacent slopes and associated wetlands, with three separate wetlands larger than one acre.

The wetlands have riparian vegetation and large deciduous trees including Oregon ash, black cottonwood, big leaf maple and red alder. Forest stands that are associated with ecological riparian zones where the water table largely defines site conditions are naturally developing structural complexity are not proposed for treatment; therefore they are not “in the project area”. In the Riparian Reserve outside of the wet areas the stands are similar in age and structure to the adjacent uniform Douglas-fir stands in the Matrix.

The BLM wildlife specialists for the Airstrip Thinning project evaluated Riparian Reserve LUA stands in the project area and determined that selected portions of the stands associated with units 18 A and B are 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 severely hindered by the shade of the dense overstory canopy. The wildlife biologists and silviculturists determined that in these selected stands thinning would accelerate key elements of habitat development.

Threatened or Endangered /Special Status Plant Species

No Threatened & Endangered vascular plant species or habitat was found during field surveys and there are no known sites within the proposed harvest areas as determined by a known site data search. *Cimicifuga elata* (tall bugbane) a Special Status, Bureau Sensitive vascular plant species (SSS) was identified during a known site data search and an additional site was identified within the proposed project area during field surveys. No additional SSS were identified within or adjacent to the proposed project area.

Invasive / Non-native Plant Species

BLM field surveys found the following BLM Manual 9015 Class C and/or Oregon Department of Agriculture (ODA) List B invasive/non-native species to occur within the project area: tansy ragwort (*Senecio jacobaea*), Canadian thistle (*Cirsium arvense*), bull thistle (*Cirsium vulagre*), St. John's wort (*Hypericum perforatum*), herb Roberts (*Geranium robertianum*), American blackberry (Himalayan) *Rubus discolor* (*armeniacus*), Scotch broom (*Cytisus scoparius*) and English ivy (*Hedera helix*). English ivy was found in unit 7A in an undisturbed area with moderate to low light condition. The remaining invasive/non-native species were all found in disturbed areas with high light such as road corridors and none were found within the proposed harvest units except in the airstrip itself.

Environmental Effects

3.3.1.1 Action Alternatives

Effects of the two Action Alternatives on vegetation are the same except as specifically identified below.

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 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. 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. Some felled trees larger than 20 inches diameter would remain on site as CWD.

Skyline corridors would create linear gaps in the canopy as cables and the carriage break limbs. 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 ft.) of skid trails and skyline corridors is less than the average spacing of retained trees (21-25 ft.), 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.

Figure 8: Example of a 60-70 year old Douglas-fir canopy approximately 5 years after thinning, note tree crown spacing and developing understory. (File photo by K. Walton 2006, section 12, T1S, R5E.)

Figure 9: Example of a 60-70 year old Douglas-fir stand approximately five years after thinning, note understory development and snag. (File photo by K. Walton 2006 section 12, T1S, R5E.)

Other Effects

Constructing new road on BLM land would clear forest vegetation and create linear openings as follows:

- Alternative 1: 2.2 miles of new road would create approximately 6 acres of openings.
- Alternative 2: 2.0 miles of new road would create approximately 5 acres of openings.

These openings would have little effect on overall tree spacing and stocking because the average 22-30 feet wide clearing is similar to the spacing anticipated in the proposed thinning prescription of retaining 91-102 trees per acre (21-22 feet average with 25 percent variation = 26-28 feet maximum spacing). BLM experience with similar projects has shown that herbaceous ground cover vegetation would become established, typically within 1-3 years after operations, followed by woody understory species over the next two decades.

Renovating part of the old airstrip surface as a haul road (Alternative 2 only) would clear established herbaceous vegetation and small trees from approximately 1 acre of the old airstrip.

None of the vegetation in the airstrip would be cleared in Alternative 1. Herbaceous ground cover vegetation would be expected to become reestablished within 1-3 years after operations.

Renovating approximately one mile of existing roads on BLM (Alternative 1 = 0.7 mile; Alternative 2 = 1.0 mile including the airstrip) would clear existing ground cover, brush and tree regeneration from up to 5 acres of unmaintained road Rights-of-Way. Ground cover vegetation would become reestablished as described above.

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 9). 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, CWD and "cull tree" elements of structural complexity to the stands. Growth models predict that Culmination of Mean Annual Increment (CMAI) would occur within 25 to 30 years of thinning and the need for additional treatment would be evaluated.

Threatened, Endangered, Special Status and Survey and Manage Plant Species

There would not be any direct impacts to known populations of *Cimcifuga elata* because unit boundary layout would protect the plants from disturbance by logging operations. Populations of this species may expand after logging because the species responds favorably to disturbance by spreading into areas of disturbed soil and increased light. There may be some shift in annual productivity for some fungi species that may occur that may be positive or negative for individual populations under differing weather patterns. Since populations of fungi change over time regardless of whether timber stands are managed, the nature of change attributable to the proposed thinning is unknown.

Invasive/Non-native Plant Species

A slight increase in the populations of invasive/non-native plant species present in the project area would be likely to occur. Observation of the response of these species to similar actions in the area gives evidence that these species are not strong competitors with native species and that there would not be adverse direct or cumulative impacts. Project design features such as washing equipment and seeding disturbed soil with native species further reduces the risk of spread.

Within the Riparian Reserve LUA

Stand Structure and Development

Observed Characteristics and Trends in the Long Term:

Stand growth and development in the thinned portion of the Riparian Reserve (all in section 18) would be as described above for thinned stands in the Matrix LUA.

Indirect Effects:

Due to the increased growth rates resulting from thinning, trees would reach the size suitable for high value snag habitat (15 inches diameter and larger) and CWD (20 inches diameter and larger) sooner than would be expected if the stands were not thinned.

Long Term Management Objectives

Riparian objectives include recruiting large snags and coarse woody debris. The trees retained when thinning would continue to grow and develop large diameters over time.

These trees would generally be healthy for the next several decades, with some natural mortality and windthrow. If there is not enough natural mortality and windthrow to meet snag and CWD objectives, it may be necessary after two or three decades to create more snags from these larger healthy trees or fall some of them to create more CWD. Under current management plans, these treatments would be done in 20-30 years along with the next management entry into the adjacent Matrix/GFMA stands. At that time the treatments and stand development between the two land use allocations would diverge (different treatment prescriptions). Riparian Reserve stands would be managed to enhance late successional characteristics and/or develop uneven aged stand structure while Matrix/GFMA stands would be managed primarily for timber production.

Variable Density and Horizontal Complexity

A forest landscape with varying densities would be developed in stands of a few acres to two hundred acres on BLM managed lands in the watershed. Immediately after thinning the Airstrip Thinning project area would have a higher degree of spatial complexity on a landscape level than it currently has because only some of the dense, young conifer stands in the watershed would be thinned, resulting in a greater variety of stand densities across the landscape. As all of these stands develop over the next few decades, the variation between stands will be more distinct, further enhancing stand density variations and horizontal complexity in the watershed.

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 classes 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 except for *Cimicifuga elata* which would remain stable or expand slightly as a result of the proposed project. Suitable habitat for SSS will remain in the proposed thinning area because thinning will not remove such habitat, and suitable habitat for SSS will remain undisturbed adjacent to the proposed thinning areas. The proposed project will 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. When similar projects have been implemented on BLM lands in the vicinity there has been little or no difference in the composition or numbers of invasive/non-native species populations.

3.3.1.2 No Action Alternative

Stand Structure and Development (all land use allocations)

The forest stands would continue to grow, but at a reduced rate. Crowns would close together and there would be more suppression mortality (smaller trees would be shaded and die) resulting in more snags and down wood. Because the smaller trees in the stands are generally the ones that die from suppression mortality, the snags and down wood created would generally be smaller than average stand diameter. In the Matrix/GFMA LUA, at rotation age there would be smaller diameter trees to harvest and total net yield could be reduced below the potential for the site.

Crown closure would further reduce the amount of light reaching the forest floor so understory vegetation would be reduced in quantity, size and diversity compared to current levels. Shading and self pruning of the lower limbs would result in more clean bole (no live limbs), reduced crown ratios (height of the live crown relative to total tree height) and less potential for large diameter limbs to develop.

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

Cimicifuga elata plants in unmanaged forests tend to be the smallest and least reproductive of all management histories (Kaye 2000) so existing populations would likely remain stable or decline if the surrounding stand is not treated. No other T&E or SSS species have been identified in the project area, so no effects are anticipated.

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 for the Proposed Airstrip Thinning Project, (Hawe, 2009) (Hydro Report), WEPP (Water Erosion Prediction Project) Report for Airstrip Thinning (Hawe, 2008) (WEPP Report).*

Additional Sources and Methodology: *BLM GIS data base review, ODEQ Source Water Assessment, OWEB, Oregon Administrative Rules (OAR) section 340 from State of Oregon websites, Water Rights Information System (WRIS) of the Oregon Department of Water Resources,* field reconnaissance to update stream mapping, field reconnaissance by Hydrologist to assess stream characteristics and condition.

Affected Environment

Project Area Setting

The project area is situated on forested slopes between 800 and 1800 feet elevation and adjacent to the North Fork Reservoir on the Clackamas River southeast of Estacada, Oregon.

Slopes vary from flat plateau to moderately steep (7B) to moderate slopes with benches (7A) to gentle slopes (18AB).

The project area is located in two 6th field watersheds: North Fork Clackamas River (also identified as Fall Creek in some documents) and Middle Clackamas (also identified as Helion Creek in some documents). All streams in the project area are first and second order, many perennial, draining directly to the North Fork Clackamas River or the North Fork Reservoir on the mainstem Clackamas River. Approximately 25 percent of the project area is in the transient snow zone (TSZ) (1500 - 3000 feet elevation) where rain-on-snow events have the potential to increase peak flows. Average annual precipitation is 65 inches.

Three special uses or designations have been identified: The City of Estacada draws its municipal water supply from the Clackamas River downstream of the project area. The North Fork Clackamas River is eligible for designation by Congress as a Wild and Scenic River.

The North Fork Dam and Reservoir are part of a series of hydroelectric projects on the Clackamas River operated by PGE. There are no key watersheds in the project area.

Channel and Wetland Morphology (ACS Objective 3)

There are no streams above the escarpment on Ladee Flat in the project area. All of the streams described below are currently in *proper functioning condition* because there is adequate vegetation, and rock or large woody debris to maintain channel characteristics, filter sediment and aid ground-water recharge.

Intermittent and Perennial Headwater Stream Channels

There are several first order intermittent streams tributary to the North Fork adjacent to project units. One of these is a discontinuous stream that forms the wet area between the subunits of unit 7A. Many of the headwater streams that form on the steep slopes (60-80 percent) below the escarpment of Ladee Flat originate as springs emerging from the basalt/andesite cliffs that are scattered throughout the area.

Perennial Stream Channels

In section 18 springs emerge from the base of the escarpment and form low gradient stable channels that flow through wetlands between and adjacent to the two thinning units. This type of channel (Rosgen category C4) (Rosgen 1996) easily adjusts to changes in flow, sediment supply or vegetation, but this channel has stream flows less than 1 cubic foot per second (cfs) much of the time and the channel is not subject to high energy flows that would be likely to cause such changes. Vegetation is well established, which increases the stability of the channel and banks.

Three larger perennial channels adjacent to the project units in section 7 have developed into constrained, step-pool or cascading channels on 20-50 percent slopes. Stream adjacent slopes were observed to be moderate grade (40-50 percent) and stable with no indications of slope instability, landsliding, or surface erosion. These streams are tributary to the North Fork Clackamas and the reservoir. These streams are well shaded, have ample supplies of large and small wood, and have large supplies of cobble and gravel actively transported by the streams.

The confluence of the North Fork and mainstem Clackamas is within the pool of the reservoir and the slackwater extends upstream on the North Fork into BLM lands in section 7.

The North Fork channel is constrained by steep canyon walls incised into the local basalt/andesite and the channel exhibits pool-riffle sequences alternating with reaches of boulder strewn cascades and waterfalls. Very little large wood was observed in the river channel, but there are ample supplies of large cobble and boulders which provide enough roughness to maintain channel function and stability.

Roads and Stream Channels in the Project Area

There is currently only one place on BLM land in the project area where an open road crosses a stream. This intermittent stream flows through a culvert near the 2-mile post on the paved main haul road from unit 7B, road 4-5E-18, which has commonly been used for log hauling for the last two to three decades. The culvert is in a steep, unstable setting of the escarpment adjacent to the "incline" location (see sections 3.2 (setting) and 3.3.9 (cultural)). There were indications of active slumping above the road in the stream channel during the winter of 2009 and nearby sections of the road have failed and been rebuilt in recent decades.

USFS monitors their roads for condition and potential failure. BLM engineering staff have observed that the road is apparently sound and the Forest Service has not notified the BLM of any predicted road failure that would either affect or be affected by log hauling. For a description of the stream proposed for a temporary crossing in section 18, see "Perennial Stream Channels" above.

Project Area Wetlands

There is a small (<1 acre) wetland associated with a discontinuous intermittent stream separating the two parts of unit 7A. A series of wetlands is associated with the streams around units 18A and B at the base of the escarpment in section 18. Field reconnaissance has shown that many areas identified in BLM's GIS data as wetlands are not wet, even though not occupied by conifer.

Project Area Hydrology (ACS Objective 6)

Base Flow

The Clackamas and North Fork Clackamas Rivers are similar to other Western Cascades streams where highest discharge takes place during winter storm events. However, stream flow directly below the Airstrip Thinning project area is interrupted and controlled by PGE's North Fork dam and reservoir. There are several other hydroelectric projects on the Clackamas River both up and downstream from the project area.

Peak Flow

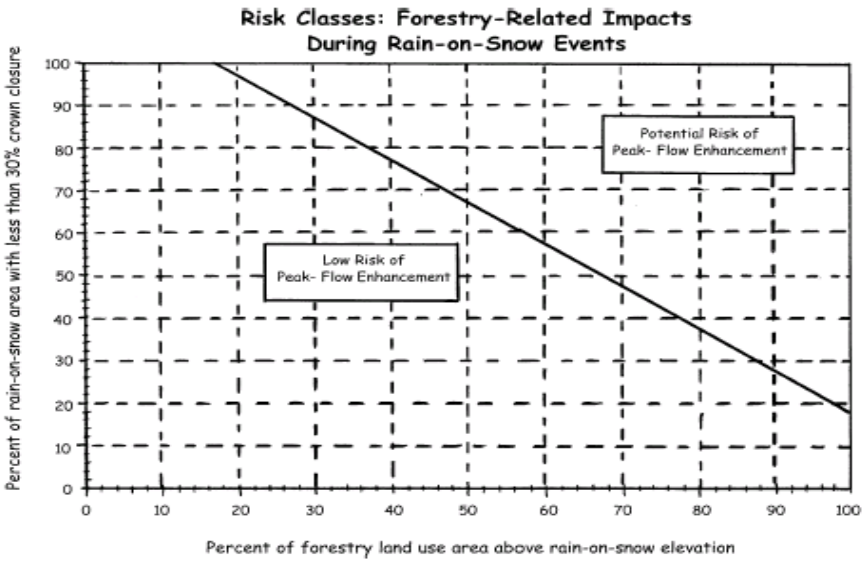
Peak flow refers to the instantaneous maximum discharge associated with individual storm or snowmelt events (USEPA, 1991). In the western Cascades, peak flows are often associated with rapid and substantial depletion of the snow pack during prolonged rain-on-snow (ROS) periods. In forested settings however, peak flow effects on channel morphology are generally not a concern in bedrock and high gradient stream channels such as most of those found in the Airstrip Thinning project area and only a minor concern in step-pool reaches (Grant, 2008). High gradient, mountain streams are often heavily armored with resistant beds and banks so the probability of major changes in channel morphology is low.

Potential for Peak Flow Augmentation Due to Forest Harvest

Analysis indicates that there is a low risk that peak flows have been increased as a result of openings in the forest canopy in the Airstrip project watersheds. This analysis was conducted using the Oregon Watershed Assessment Manual watershed analysis methods for forest hydrology (OWEB, 1997) which assumes that augmentation of peak flows in forested watersheds is generated by areas with crown closure ≤35 percent in ROS areas. The BLM Hydrologist estimated these areas from 2009 satellite imagery and topographic maps.

Seventh field watersheds shown in Table 10 were used for analysis in the Airstrip Thinning project area because the smaller area would show the potential for effects more clearly than a larger sixth field watershed shown in Table 7. This methodology and set of assumptions tends to err on the *side of over-predicting the risk* of peak flow augmentation.

Figure 10[12]: Graph For Determining Risk Of Peak Flow Augmentation[13]



This graph shows estimated risk of peak-flow enhancement to subwatersheds from forestry-related impacts during rain-on-snow events.

Table 10: Risk of Peak Flow Enhancement by 7th Field Watershed for the Airstrip Thinning Project

7th Field Subwatershed Name	Watershed Area (acres)	Percent of Watershed Area above rain-on-snow elevation (within ROS areas) (Horizontal Axis In Figure 5)	Percent of ROS area with <35% Current Crown Closure (Vertical Axis In Figure 5)	Peak-Flow Enhancement Risk
Fall Creek (North Fork Clackamas)	6900	5448 acres or 79 Percent of the 6900 acres	690 acres or 13 Percent of the 5448 acres	Low
Reservoir (Middle Clackamas)	3600	689 acres or 19 Percent of the 3600 acres	32 acres or 5 Percent of the 689 acres)	Low

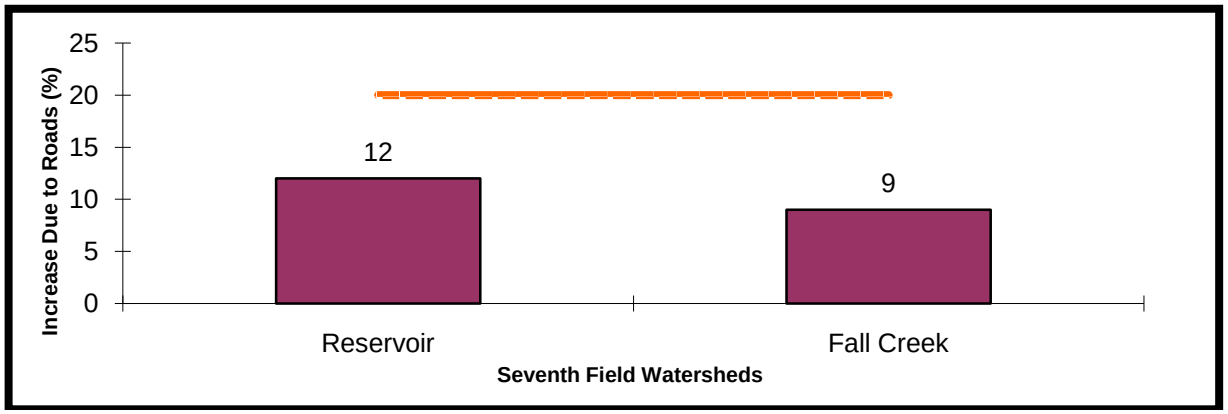
[12] Figure 3 from the Hydrology Report or OWEB, 1997?

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

Roads and Peak Flow/Water Quality:

Analysis of road proximity to streams in the Airstrip seventh field watersheds are not currently at risk for augmentation of peak flows due to the road network in the watershed. When road ditches drain water directly into streams they act as an "extension" of the stream network and can have a measurable effect on stream flow (Wemple et al, 2003). The Wemple study concludes that approximately 20 percent stream length increases due to roads have the capacity to alter the timing and quantity of peak flows (orange line in Figure 11, below). Using methodology developed by Wemple et al (1996) and GIS data for road/stream intersections in the area, the BLM Hydrologist estimated the increase in stream length to be 9 percent in Fall Creek and 12 percent in the Reservoir seventh field watersheds, below the 20 percent described above. Highway 224 parallels the Clackamas River through the entire length of the Reservoir seventh field watershed.

Figure 11: Estimated stream channel network extension at road-stream intersections for Airstrip Thinning project watersheds.



Project Area Ground Water

The Oregon Water Resources Department (WRD) and Oregon Department of Environmental Quality (DEQ) have not identified any groundwater pollution problems within project watersheds. The Oregon WRD website identifies one ground water well for domestic water use is located on private land in section 18.

Soils in the project area have relatively high rates of water movement as indicated by infiltration rates between 0.25-2 inches per hour, so most under natural conditions precipitation either drains through the soil profile or is evapotranspired. Natural conditions are typically altered by roads, landings and compaction from logging operations which can intercept subsurface flows and reroute them to surface streams or change infiltration rates. It is reasonable to assume that low risk of changing peak flows by rerouting groundwater is directly related to low risk of altering groundwater in the project area watersheds because the water would continue to follow the same underground routes.

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

Oregon Department of Environmental Quality (DEQ):

The Environmental Protection Agency (EPA), under the authority of the Clean Water Act, has delegated protection of all waters in the State of Oregon to the Oregon DEQ. The following water quality parameters are analyzed because they could potentially be affected by the proposal: stream temperature, dissolved oxygen (DO), pH and turbidity. Other parameters are not highly sensitive to timber harvest and road construction (USEPA 1991) and were not analyzed. DEQ water quality standards are published in the Oregon Administrative Rules (OAR) section 340.

Designated Beneficial Uses:

The following Beneficial Uses have been identified that could potentially be affected by the project. Salmon rearing, resident fish and aquatic life (see EA 3.3.3), "core cold water habitat" in the Fall Creek watershed, and the City of Estacada municipal drinking water intake >1 mile downstream. DEQ has completed a Source Water Assessment (SWA) for the Estacada municipal watershed which identifies some general "potential contaminant sources" associated with timber harvest, but did not indicate a specific concern with public lands in the project area.

Willamette Basin TMDL: Effective Shade and Stream Temperature

The existing riparian vegetation in the project area is adequate to maintain streams in the temperature range required by DEQ because the shade provided on BLM managed land does not allow sufficient light to penetrate to the water surface to add to the existing heat load. "Total Maximum Daily Load" (TMDL) targets recovery or maintenance of effective shade along all perennial streams. Effective shade is a surrogate measure for the head load a stream receives when it is exposed to direct sunlight which warms the water. More effective shade allows less sunlight to reach and warm the water so that the stream is more likely to stay cool enough to meet state water quality standards for temperature. For tributary channels in the project area the estimated potential for effective shade was categorized in the 85-100 percent range (average 95 percent) which is considered to be full effective shade. The main North Fork channel in section 7 has variable shade ranging from completely open where flooded by the reservoir pool to fully shaded.

Dissolved Oxygen, pH, and Nitrates:

Dissolved oxygen in the North Fork Clackamas was measured in May (10.1 mg/L) and July (9.1 mg/L), below the DEQ standard of 11 mg/L for 30 days during spawning periods for winter steelhead and resident trout.

Reported values for pH (7.2-7.4) at the North Fork Clackamas were within DEQ standards.

Nitrate concentrations in the North Fork Clackamas and Fall Creek were 81 and 110 µg/L in July, exceeding the 5 µg/L reference condition suggested by the US EPA for streams in the Cascade Range Ecoregion.

Nitrogen from tributaries have combined with phosphorus in the main Clackamas channel (and reservoir) to nourish algal blooms in the reservoir and other segments of the river. It appears that industrial timber management practices upstream of the project area may be contributing to high nitrogen levels in these streams.

Sediment Supply, Transport and Turbidity[14]

The United States Geologic Survey (USGS) has conducted water quality studies on the Clackamas River. Water Resources Investigations Report 02-4189 (2003) cited occasional high turbidity levels in the Clackamas River, but did not cite the North Fork Clackamas as a substantial turbidity source. Average annual sediment yield for small forested watersheds in the Pacific Northwest range from 0.02-19.43 tons/acre, with a mean of 1.75 tons/acre/year (Patric, et al, 1984). The BLM Hydrologist accepts this average as a reasonable estimate of background sediment yield for the North Fork Clackamas River 6th field watershed.

Total sediment yield is a 30 year average of all sediment sources, including landslides (mass wasting). The WEPP model estimates the background level of surface erosion to be 0.067 tons/acre/year in the 50 acre skyline yarding area used for modeling.

Environmental Effects

3.3.2.1 Action Alternatives 1 and 2 – Direct and Indirect Effects

No differences in effects to Hydrology have been identified between Action Alternatives.

Channel and Wetland Morphology (ACS Objective 3)

In general, the proposed project would result in no direct alteration of the physical features of the project area stream channels or wetlands because, except for the proposed stream crossing in section 18 (see below), the unit design and project design features would prevent direct disturbances to these features.

The stream crossing in section 18 between units 18A and B would disturb the bed surface and banks of the channel. Existing materials, mostly gravel to sand size material, would be excavated and removed when installing the temporary culvert with approximately 150 cubic yards of fill. Removal and restoration of the temporary culvert and fill would result in channel dimensions (width, bank angle, cross sectional area and grade) that match the channel upstream of the crossing. The restored channel shape and wood placement would allow water and sediment to pass without causing the channel to either aggrade or degrade, except for some adjustments to grade or width of the channel which may occur as the channel reaches equilibrium with flow and sediment transport during the first year. These adjustments would be unlikely to extend more than 100 feet up or downstream from the site of disturbance.

Project Area Hydrology (ACS Objective 6)

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

The project would likely result in some (not measurable) incremental increase in annual water yield correlated to the removal of some of the forest vegetation (Bosch et al, 1982; Troendle et al, 2006). Other than augmentation of peak and/or base flows the "increase in fall and winter discharge from forest activities is likely to have little biological or physical significance" (USEPA, 1991).

[14] Turbidity is a measurement of water clarity and is not directly convertible into a volume measurement of sediment.

The BLM Hydrologist has determined that it is unlikely that the proposed action would have any detectable effect on the contribution of fog drip to base flows because a literature review shows the following: There are no known studies documenting reductions in fog drip where >50 percent of the canopy is retained and only a small portion of the watershed is treated. The research showing an observed reduction in low flows associated with reduction in fog drip was specific to Fox Creek in the Bull Run Watershed and resulted from extensive clearcutting where 25 percent of the watershed was cut in one decade.

It is unlikely that the proposed thinning would have any effect on peak flows from thinning in either of the watersheds in the project area because the proposed thinning would not increase openings (<35 percent canopy) within the TSZ that have the potential to augment peak flows. Without an increase in openings within the TSZ, the rate of snow melt does not increase enough to cause hydrologic change in this region. (Berris, 1984; Troendle et al, 2006; Grant et al, 2008)

It is unlikely (low risk) that watershed hydrology or peak flows would be altered by the road system because: 1/ Current conditions would be maintained on existing roads; 2/ Since all proposed new road construction would be on slopes generally less than 30 percent that would not require extensive cut or fill construction so there would be little or no subsurface disturbance and no effect on subsurface or ground water flow;

3/ There are no new permanent stream crossings so there would be no additional routes for water intercepted by road surfaces to reach streams (see figure 11, above); and 4/ Approximately five acres of soil compacted by road construction would alter permeability for the life of the road, but precipitation would be routed to undisturbed soil where it would infiltrate into the ground and not reach stream channels any faster than if it had fallen on the undisturbed forest floor.

Ground Water

Since the project would be unlikely to affect peak or base flow, by extension it would have little capacity to affect groundwater patterns which are intimately linked to surface hydrology.

Water Quality (ACS Objectives 4 and 5)

Summer Stream Temperature Maximums in Perennial Streams

The project would be unlikely to alter the temperature regime in project area streams because all of the primary shade zone vegetation would be retained along all streams except for approximately 100 feet associated with the temporary crossing proposed in section 18.

Dissolved Oxygen, pH and Conductivity

It is unlikely that the project would have any measurable effect on DO levels in project area streams because the proposed action is unlikely to alter stream temperatures or sedimentation, would not introduce large amounts of fine organic material into any stream, and would not alter re-aeration. It is unlikely that the project would have any detectable effect on pH or conductivity because available data indicates that most forest management activities have little effect on these aspects of water quality (USEPA, 1991).

Sediment Supply, Transport and Turbidity

It is unlikely that the project would have a detectable effect on sediment supply, routing or water quality because of the following factors (Takashi et al, 2005; Hassan et al, 2005; Morris and Fan, 1998):

Mass Wasting

Mass wasting is the primary process responsible for the bulk of sediment production and transport in mountainous terrain and sediment transport in headwater basins is dominated by infrequent large-scale erosion events. The proposed project would not be likely to alter these trends and none of the elements of the proposed action have been identified as having potential to cause a landslide.

Surface Erosion, Stream Bank and Channel Erosion

The WEPP model indicates that sediment yield from forest management practices, specifically skyline yarding, could increase sediment yield from 0.067 tons/acre/year (site specific, no landslides) to 0.64 tons/acre/year on those acres. WEPP has been demonstrated to over-estimate actual sediment yields in the Pacific Northwest (Geren, 2006) and BLM field reviews of similar treatment areas (Hawe, 2007) found no evidence of overland flow or sediment transport on skyline yarding corridors where WEPP had predicted sediment transport under similar conditions (>2 inches of rain in three days). (Hydrology Report p. 27).

This increase is approximately one third of the 1.752 tons/acre/year average background sediment yield. Even if all of this sediment were delivered to streams as a result of harvest and yarding (all or most of it would be trapped by the undisturbed vegetation between the yarding area and the stream), an increase of such small magnitude (small proportion of yield/acre, small proportion of watershed acreage) would not be measurable using current technology (Hydrology Report p. 26). Forest management practices would be unlikely to accelerate sediment delivery to streams in the project area beyond background levels because:

- Project design features (EA section2.2.4) serve as best management practices (BMP) for the Airstrip project to prevent increasing overland flow that could carry sediment to streams. Overland flow (water moving over the surface with the energy to erode soil) is rarely observed on forest slopes (Leopold, 1997).
- All stream channels, including intermittent headwater channels that only flow during storm events, are protected with buffers of natural vegetation. This practice has been demonstrated in research projects around the world to be effective for protecting water quality in forestry operations (Norris, 1993).
- Any increase in water yield caused by the project would be unlikely to be measurable, so it would not increase stream bank or channel erosion.

Road Construction, Maintenance and Log Hauling

Turbidity levels at the site of the temporary culvert in section 18 would be unlikely to exceed the State of Oregon water quality standards (≥10 percent increase relative to background levels) beyond the mixing zone downstream (approx. 100 meters) and would decrease and the disturbed surfaces and channel bed stabilize.

A turbidity plume would be visible within the mixing zone during installation and removal of the temporary culvert, which would decrease to near pre-disturbance levels within two hours after in-stream operations cease. In-stream disturbance at this site would probably be completed during a single work day for installation and one for removal, so any increase in turbidity would be unlikely to exceed eight hours. (Hydrology Report, pp. 23-24). No other new roads would be connected to the stream system so no pathway would exist for these new roads to deliver sediment to streams. All new roads would be constructed on gentle, stable slopes so they are unlikely to contribute to causing landslides.

Log hauling would be unlikely to cause increases in turbidity that exceed Oregon's water quality standards or impact beneficial uses because of project design features to prevent transport of road generated sediment to streams.

Installing and removing a culvert associated with a new temporary road crossing on the 1st order tributary in Unit 18A would locally increase turbidity within less than one half mile downstream of the temporary crossing (Foltz and Yanosek 2005) for short durations of several hours each day over a 2-3 day period for culvert installation and removal (Fisheries, EA section 3.3.3).

3.3.2.2 Cumulative Effects

Channel and Wetland Morphology (ACS Objective 3)

With the exception of disturbance at the stream crossing in section 18, the project would not result in any direct effects to channel or wetland morphology and therefore would have no cumulative effect. At the stream crossings, effects would be low magnitude (no more than 100 feet up or downstream of the disturbance site) and short duration (channel adjustments within one year). Since the project would be unlikely to alter channels or floodplains of streams in the watersheds and these stream channels currently have properly functioning dimensions and form, there would be no cumulative effects.

Watershed Hydrology (ACS Objective 6)

The project would carry low risk for contributing to any existing cumulative effects to watershed hydrology because it would not be likely to result in a direct effect to peak or base flow or to the watershed's ground water. Proposed road use and construction is unlikely to alter surface or subsurface hydrology in a manner that would alter stream-flow patterns or timing or contribute cumulatively to any change from current conditions in the watershed.

Water Quality (ACS Objectives 4 and 5)

The proposal has little potential for contributing to any cumulative effects to stream temperatures, pH, or dissolved oxygen in these watersheds because this proposal is unlikely to have any measurable direct or indirect effect on these attributes. Current conditions and trends in water quality would likely be maintained under the proposed action.

Sediment Yield Cumulative Effects

The incremental increase in sediment yield and turbidity that could be attributable to the project would be of such small magnitude and duration that it is unlikely to be detectable at the seventh field (or larger) watershed scale. Modeling of soil erosion and sediment yield due to forest management (using WEPP) in the North Fork Clackamas sixth field watershed estimates that the project could increase sediment yield by 0.1-0.3 percent over the typical sediment yield of 1.752 tons per acre generated by a typical forested watershed of this size (Patric et al, 1984). This level of increase would be undetectable with current technology because accurate estimates of sediment yield are difficult to measure and may vary by two or more orders of magnitude (Morris and Fan, 1998). Sediment yields for forest harvest decrease rapidly over time (Dissmeyer, 2000) so sediment delivery during large storm events would likely return to current levels within three to five years after thinning. Cumulatively the limited magnitude and duration of turbidity due to road construction and maintenance, and hauling would not be detectable on the scale of a seventh field watershed and would be unlikely to have any effect on any designated beneficial uses.

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: *Airstrip Thinning Fisheries Specialist Report, Zoellick, 2008 (Fisheries Report) , BLM Fish Inventories 2009, Hydrology Report, Additional Sources Referenced: Logging Systems Report*

Affected Environment

Fish Presence in the Project Area, Including Threatened and Endangered Species

Coastal cutthroat trout (*Oncorhynchus clarki clarki*; Behnke 1992) are common in the North Fork (NF) Clackamas River, but do not occupy any of the 1st and 2nd order tributaries to the NF Clackamas River in and adjacent to project units 7A and 7B. These streams are too small and or steep to support fish populations. No fish were found in the small 2nd order stream between units 18A and B that drains to the North Fork Reservoir. Pacific lamprey (*Lampetra tridentatus*) and largescale suckers (*Catostomus macrocheilus*) spawn and rear in the North Fork Clackamas River adjacent to the project area.

Other resident fish known to inhabit the NF Clackamas and the North Fork Reservoir include longnose dace (*Rhinichthys cataractae*), resident rainbow trout (*O. mykiss*), and mountain whitefish (*Prosopium williamsoni*; USFS 1996). ODFW stocks the North Fork Reservoir with hatchery-reared rainbow trout to support a popular recreational fishery (USFS, 1996).

Lower Columbia river (LCR) winter run steelhead trout (*Oncorhynchus mykiss*), LCR coho salmon (*O. kisutch*), and LCR spring Chinook salmon (*O. tshawytscha*) are found in the NF Clackamas River and Clackamas River adjacent to the project area.

The three species are distributed in the NF Clackamas from the confluence with the Clackamas River in the North Fork Reservoir to a 50 feet tall barrier falls a mile upstream of the project area at river mile 2.4 near the Bee Creek confluence (USFS, 1996). These three species are listed as "threatened" under the Endangered Species Act of 1973 (ESA) and are the species referred to as "listed fish" in this document. Unit 7A and 7B boundaries are more than 400 feet from listed fish habitat in the NF Clackamas River. Unit 18 A is located 0.4 mile upstream of listed fish habitat in the North Fork Reservoir.

Aquatic Habitat in the Project Area

Adjacent to the project area the Clackamas River and the lower 3/8 mile of the NF Clackamas River are impounded by the North Fork Reservoir. The following paragraphs refer to flowing streams in the project area.

The condition of fish habitat in the lower NF Clackamas is slightly degraded relative to the range of natural variability in conditions of similar-sized streams in the Willamette River basin with minimal impacts from land uses. Large wood debris (LWD) are 10-15 pieces per mile, the low end of the range of natural variability. Small wood is lower than the natural range of variability at about 25 pieces per mile. The number of pools per mile (18.2 per mile) are lower than goals set in the USFS Columbia River Implementation Guide (USFS, 1996).

First and second order tributaries in the project area observed during BLM fish inventories in 2010 were visually estimated to have low to moderate levels of LWD.

Stream channels in the project area are stable (BLM Fish Inventories, 2009; USFS, 1996) and well-shaded with >90 percent effective shade (Hydrology Report). Tributaries to the NF Clackamas drop steeply to the river with gradients of more than10 percent.

The unnamed second order tributary to the Clackamas River, where it flows between units 18A and B, is a low gradient stream with gravel/sand/silt substrates, stable banks and wide floodplains vegetated with wetland and riparian plants.

Special Status Species Presence in the Project Area

No aquatic BLM Sensitive, Bureau Strategic or Former Bureau Assessment Species have been documented in the Airstrip Thinning project area.

Environmental Effects

No differences in effects to Hydrology have been identified between Action Alternatives.

3.3.3.1 Action Alternatives 1 and 2

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

Fish populations, channel conditions, and aquatic habitat would not be impacted by the project because no trees would be thinned in Riparian Reserves (RR) on the NF Clackamas River or its tributaries.

The resulting no-disturbance buffers of at least 400 ft. on NF Clackamas River, and at least 200 ft. wide buffers on intermittent 1st and 2nd order tributary streams would be more than 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).

Similarly, minimum no-disturbance buffers of 200 ft. on one 1st order tributary, and 100 ft. on two perennial 1st and 2nd order tributaries to the Clackamas River in units 18A and 18B would be 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).

Large wood (LW) supplies in NF Clackamas River would not be impacted by the project because the stands close enough to the river for trees to fall into the river (within 1 site potential tree height) would not be thinned. Tributary streams to NF Clackamas and the Clackamas Rivers are too small to move LW to the rivers.

Stream temperature in the NF Clackamas River and its tributaries would not be affected because no trees would be thinned within RR of these streams (all stream shading would be retained). On tributary streams to the Clackamas River in units 18A and 18B, stream temperatures would not be affected because no trees would be thinned within 100-200 ft. wide no-entry buffers on the streams, and at least 50 percent canopy closure would be retained >100-200 ft. from the channel (USDA Forest Service and USDI Bureau of Land Management. 2004. TMDL Implementation Strategy).

Installing and removing a culvert associated with a new temporary road crossing on the 1st order tributary in Unit 18A would locally increase turbidity within less than one half mile downstream of the temporary crossing (Foltz and Yanosek 2005) for short durations of several hours each day over a 2-3 day period for culvert installation and removal (Hydrology, EA section 3.3.2).

Flows in the tributary are perennial, but interrupted in summer. Most of the sediment and turbidity from the culvert installation would be filtered out by the small wetland that the stream flows into 0.1 mile downstream of the temporary road crossing. Because of the filtering capacity of the wetland, aquatic habitat would not be degraded in the long term.

No other new roads would be connected to the stream system so no pathway would exist for these new roads to deliver sediment to streams (Hydrology, EA section 3.3.2).

Special Status Species – Aquatic

The project would not result in adverse effects to BLM Special Status Species, Survey and Manage, or Bureau Assessment Species because no suitable habitat for any species known or likely to be present would be lost or altered to a degree that may impact existing populations. Therefore, the project would not contribute to the need to list any BLM Special Status Species.

Threatened/Endangered Species

The project would not impact listed fish habitat because no trees would be thinned in RR on the NF Clackamas River and its tributaries. Additionally, no-disturbance buffers of 200 ft. on one 1st order tributary, and 100 ft. on two small perennial 1st and 2nd order tributaries to the Clackamas River (North Fork Reservoir) would prevent impacts to water quality, channels, flows, and LWD in listed fish habitat 0.5 mile downstream (see Fish and Aquatic Habitat Section above, and Hydrology, EA section 3.3.2).

No sediment from the temporary road crossing in 18A would reach listed fish habitat in the reservoir because the distance to the reservoir (0.55 mile) is greater than the distance (<0.5 mi, Foltz and Yanosek 2005) that turbidity and sediment would move downstream.

The sediment would be both filtered out by the wetland that the stream enters 0.1 mile downstream of the crossing and retained in the low gradient channel between the wetland and North Fork Reservoir. Steelhead trout and salmon habitat would not be impacted by log hauling from units 7B and 18A and B, because no streams would be crossed except for small 1st and 2nd order tributaries to the Clackamas River crossed by State Highway 224, a paved road.

The haul route from unit 7A would cross tributaries to Delph Creek more than one mile upstream of listed fish habitat (Streamnet 2006) on a paved county road. No sediment would move to streams as a result of log hauling on paved roads.

3.3.3.2 Cumulative Effects

The project would nave no cumulative effects to instream fish habitat because there would be no direct impacts to channel morphology (channel shape and form) in fish-bearing streams. The project would not contribute to cumulative effects to fish habitat, fish populations, or spawning and rearing success of fish populations because it would not cause direct effects to water quality or fish habitat, as described above. No direct or cumulative impacts to fish habitat because of changes to peak or base flows would be expected because no change these flows would be expected (Hydrology Report, EA section 3.3.2).

3.3.3.3 No Action Alternative

No differences between the proposed project and the no action alternative would be expected in effects to fish (including listed fish) populations or habitat.

3.3.4 Soils

Source Incorporated by Reference: *Soils Specialist Report for the Proposed Airstrip Thinning Project, 2010 (Soils Report)*

Affected Environment

All of the soils in the areas proposed for thinning are suited for growing Douglas-fir and western hemlock. The soils found on Ladee Flat (0 to about 15 percent slopes) and the slopes (<60 percent) around the edges of the flat proposed for thinning (unit 7B) are deep, well-drained clay loams. This soil is described as susceptible to compaction, but TPCC (Timber Production Capability Classification data base) and field reconnaissance show relatively little existing compaction except in the airstrip itself and visible old skid trails from both the 1920s and 1980s. The steeper slopes below the project area (not proposed for thinning) are associated with slump-earthflow areas.

The stony loam and cobbly loam soils in unit 7A (and some on the southern fringe of 7B) are shallower, well-drained soils with many rock fragments on moderate slopes with south aspects. These soils may be moisture limited in summer and early fall, which coincides with the fire history and stand development of 7A described in EA section 3.2. No traces of any logging systems impacts are evident in unit 7A.

The silty clay loam in units 18A and B is a deep, well-drained soil formed in the landslide deposits at the foot of the escarpment. The wet areas adjacent to these two units have a poorly-drained silty clay loam wetland soil. Some traces of logging systems are discernable in these units, but little or no compaction remains.

There are approximately 27 miles of roads in the North Fork Clackamas watershed (USFS *North Fork Clackamas Watershed Analysis*) occupying approximately 1.5 percent of the surface area in the watershed. These roads include: the old airstrip, paved highways, maintained logging roads, unmaintained natural surface roads and decommissioned roads. Based on field observations and GIS data base information, the BLM estimates that approximately 4 percent of the soils in the project area are slightly to moderately compacted (10-20 percent increase in bulk density) and 1.5 percent are highly compacted (20-50 percent increase).

Environmental Effects

Effects of the two Action Alternatives on soils are the same except as specifically identified below.

3.3.4.1 Action Alternatives 1 and 2 – Direct and Indirect Effects

Sufficient vegetation and root structure to maintain soil stability and mycorrhizae populations would be present after thinning because a minimum average of 91-102 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 (17-23 ac.) 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 (9-20 ac.) in landings and skyline corridors.

Road Work

Constructing new roads would displace topsoil and compact subsoil on BLM land as follows:

- Alternative 1: 2.2 miles of new road, up to 6 acres of displacement and compaction.
- Alternative 2: 2.0 miles of new road, up to 5 acres of displacement and compaction.

Renovating up to one mile of existing roads (Alt 1 = 0.7 mi; Alt. 2 = 1.0 mi.) would result in less than two acres of new disturbance, assuming that at least 50 percent of the affected ground is already disturbed and compacted by the original road construction.

Pile Burning

Soil damage from pile burning would not measurably decrease site productivity because the affected areas are small (<20 feet diameter) and widely dispersed. 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 (0.12-0.8 tons/acre/year, Pimental, 1987) within three to five years after harvest (Dissmeyer, 2000; Soils Report p. 9).

Only skyline yarding areas (124 acres) would be affected by erosion because the gradient in ground-based logging areas is too low to result in active surface erosion with topsoil loss in this area. WEPP modeling predicts an increase in surface erosion of soil from 0.067 tons/acre/year (134 pounds, to 0.120 tons/acre/year.[15]

For the 120 acres of skyline yarding in the project, the total amounts are 8 tons/year background and 14 tons/year after yarding. Erosion rates typically return to pre-treatment levels within three to five years. Field checks of WEPP estimates show that WEPP consistently overestimates actual erosion.

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

3.3.4.2 Cumulative Effects

Cumulative effects to site productivity and erosion would not be detectable on a local or watershed scale because direct effects would not be measurable in the project area.

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.

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[15] To visualize these amounts: A football field is about one acre. One cubic yard of dry soil (27 cubic feet) weighs a little less than a ton and a half, or approximately 100 pounds per cubic foot. A cubic foot is 7.34 gallons, or about 1½ "five gallon buckets". A heavy-duty homeowner's wheelbarrow holds five cubic feet. So, modeled background erosion of 0.067 tons/acre/year is about two buckets, or 1/4 wheelbarrow spread over a football field size area - approximately 0.0004" or 1/10 the thickness of a sheet of copier paper (0.004"). Modeled erosion the first year after logging would be about twice that.

3.3.5 Wildlife

Sources Incorporated By Reference: *USDI Bureau of Land Management (England, J. and Murphy, C.), Cascade Resource Area EA wildlife Report Airstrip Project, 2010 (Wildlife Report); USDA, Forest Service; USDI Bureau of Land Management. 1996. Lower Clackamas Watershed Analysis (LCWA 1996); USDA, Forest Service. 1996. North Fork Clackamas River Watershed Analysis (NFCWA 1996); USDA, Forest Service; USDI. Bureau of Land Management. August 2010. Biological Assessment of Likely to Adversely Affect (LAA) Projects with the Potential to Modify the Habitat of Northern Spotted Owls Willamette Planning Province - FY 2011-2012 (BA); USDI, U.S. Fish and Wildlife Service. December 2010. Biological Opinion. Regarding the Effects of Habitat Modification Activities within the Willamette Province.*

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

Stand composition and condition are described in EA section 3.3.1. The following descriptions are limited to elements of composition and condition that specifically apply to wildlife resources. Young managed stands with simple structure and limited diversity such as those proposed for thinning in units 7B and 18A&B currently constitute a large portion of the Lower Clackamas River and North Fork Clackamas River Watersheds. Forest management on both public and private lands when these stands were established was intended to maximize timber production and the trajectory originally intended for many of these stands would not develop old forest characteristics (Hunter, 1993).

Variation in forest stand conditions, both within stands and at the landscape level, have been identified as a key factor in providing habitat for a diversity of forest organisms (Hays et. al., 1997; Muir et. al., 2002).

Stand specific conditions (See EA 3.3.1):

Unit 7A: The 90 year old (average age class of this overstory based on stand exam data) Douglas-fir overstory consists of small clumps and scattered individual trees up to 72 inches diameter. The oldest tree found is approximately 169 years old. The second story of Douglas-fir is mostly 60 year old Douglas-fir with scattered bigleaf maple and red alder. The understory consists mostly of salal, vine maple, sword fern and small numbers of Douglas-fir tree regeneration. Snags and down wood are generally lacking and do not meet NWFP minimum standards.

Unit 7B: Most of this 64 year old Douglas-fir plantation was commercially thinned in 1982, resulting in the present uniform stand with an understory of vine maple, sword fern and salal. Canopy closure is typically 65 percent although a portion of the interior of the stand has wide tree spacing with lower closure and more understory. There are some scattered residual old-growth trees near the southern boundary in section 18, but there are very few large snags or CWD. Similar stands currently constitute a large portion of the Lower Clackamas River and North Fork Clackamas River Watersheds.

Units 18A and B: The 68 year-old stand is uniform Douglas-fir with minor amounts of bigleaf maple. There are some scattered residual old-growth trees, mostly along the east boundary.

Understory consists mostly of vine maple, salal and sword fern. There is one large brushy opening in the north end of 18A caused by a *Phellinus* root rot pocket. There are wetlands adjacent to the proposed harvest units, both on BLM and private property, see *Special Habitats* below.

Old-Growth and Large Diameter Trees, Snags, Coarse Woody Debris (CWD) and Special Habitats

The presence of residual old-growth trees, snags, CWD and special habitats present in these stands was determined from stand exam data and is summarized in Table 11 below.

Table 11: Summary of remnant old growth, special habitats, coarse woody debris (CWD) and snags present by project unit.

T-R-Sec Unit	Seral Stage	Remnant Old Growth	Special Habitats *	CWD**/ Acre	Hard Snags / Acre		Soft Snags / Acre		Total Snags / Acre
				Hard / Soft	15-25" ***	25"+	15-25" ***	25"+	
4S-5E-7A	Late Mid / Mature	No+	Adjacent	0 / 240+	0+	0	0+	0	0+
4S-5E-7B	Late Mid	Yes	No	0+ / <200	1.1	0	0	0+	1.1
4S-5E-18A,B	Late Mid	Yes	Adjacent	50 / 240+	0+	0	0+	1.4	1.4

Seral Stage Age Classes (years) based on Stand Exam data: Early Seral = 0-30; Early Mid Seral = 31-40; Mid Seral = 41 – 60; Late Mid Seral = 61 -80; Early Mature Seral = 81 - 120; Mature = 121 - 200; Old Growth =201+ (see RMP/FEIS glossary, p. 6-10, 6-13).

* Special habitats within the units include: wet and dry meadows, talus, cliffs & rock outcrops. Presence of adjacent special habitat, wetland, pond adequately protected with no treatment buffer.

** RMP (p. 21) standard for inclusion = Linear ft/acre ≥20" diameter large end & ≤20' long, hard (decay classes 1-2)/soft (decay classes 3-5) logs.

*** Minimum snag diameter of 15" was selected because most wildlife species that utilize snags are associated with snags larger than 14.2 inches diameter (Rose et. al., 2001). See Table 12 below.

\+ Some of the large trees may be over 200 years old. Sampled trees larger than 36 inches diameter range from 87 to 169 years old.

Table 12: Snags Required to Support Cavity Nesting Bird Populations

Diameter class (inches dbh)	Snag Requirements by Species and Decay Stage		Total by diameter class (per 100 acres)
	Hard 2-3 Species (Snags/100 Acres)	Soft 4-5 Species (Snags/100 Acres)	
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			122

Old-Growth and Large Diameter Trees: There are remnant old-growth trees in units 7B (southeast corner in section 18 at the slope break) and 18A (near the east edge). There is a large tree component in unit 7A, but no old-growth trees (>200 years old) have been identified in stand exams or other site visits (see EA 3.3.1).

Snags: Overall snag habitat in the project area does not currently meet the 40 percent population densities requirement (RMP p. 21) for the five woodpecker species (Table 12, compare to Table 11) (RMP p. 21, 25 as per Neitro et al, 1985).

Most of the snags that are present are small and/or highly decayed so they do not meet the diameter needs for these five species and/or are not expected to persist for very long in these stands. The watershed lacks large snags (NFCWA, pp. 1-5) and there are few large snags in the project area. Snags were removed in the 1920s by logging and firefighting efforts in units 7B and 18A and B and the stand development in 7A has left few large snags. There is an adequate supply of small diameter snags resulting from self-thinning in these dense conifer stands (*ibid).*

In unit 7B, top girdling in part of the previously thinned stand created approximately two dead or deformed trees per acre in 1997. The identifying marks (orange painted "W") are still generally visible.

The hairy woodpecker, red-breasted sapsucker and pileated woodpecker are present in the project area. These species are associated with conifer stands in the western Cascade Mountains. Northern flicker and downy woodpecker are found in or around the project area but are not typically associated with closed-canopy conifer-dominated stands in the western Cascades.

Coarse Woody Debris (CWD): Hard (decay class 1 and 2) CWD is lacking in all of the units. Soft (decay class 3, 4 and 5) CWD is lacking in unit 7B but is abundant in units 7A, and 18A and B, mostly originating with cull logs left by loggers and snags felled by firefighters in the 1920s. Soft CWD provides habitat for numerous wildlife species (O'Niell et.al. 2001) and the soft CWD in the project area is expected to persist in the forest environment for several decades.

Hard (decay class 1 and 2) down wood in all units is almost exclusively small diameter (<20 inches) that does not meet RMP management direction (>20 inches diameter large end and >20 feet long, RMP p. 21). Small diameter, hard down wood provides habitat for a lesser variety of forest floor species, largely because the smaller size provides less cover and they tend to persist for only one or two decades. The smaller diameter down wood usually results from self-thinning of the smaller, suppressed trees in dense forest stands while the larger diameter trees continue to grow.

Special Habitats: Adjacent to units 18A and B there are three wetlands that are over 1 acre in size. There is a south facing talus slope special habitat for mollusk, amphibian and small mammal species adjacent to unit 7A. There are also some small cliff faces (less than 10 meters) that do not have adequate ledges and are too small to provide nesting habitat for birds of prey. The wetlands have large deciduous trees, which include Oregon ash, black cottonwood, big leaf maple, red alder. The wetlands are flat areas with high water table that have riparian vegetation and little or no open water. The large deciduous trees are important to insect gleaning neotropical migratory birds for forage and nesting habitat. The wetlands provide habitat features for mollusks and amphibians.

Federally Listed Species: Northern Spotted Owls (NSO)

The proposed thinning units include 245 acres of dispersal habitat and 45 acres of suitable habitat. No thinning is proposed in any suitable nesting, foraging and roosting habitat inside the provincial home range (1.2 miles radius) of any known spotted owl sites. The nearest known owl site is 1.5 miles from units 18A and B. 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. The project area was surveyed for spotted owls in 2009 and 2010 with no NSO responses.

The lack of suitable habitat and survey results indicate that it is highly unlikely that there are any resident spotted owls in the vicinity of the Airstrip Thinning project. (Wildlife Report, pp. 11-12)

There are two "Predicted Owl Sites" within 1.2 miles of project units. These sites are generated by computer models, no owls have been found in these locations. No owls have been associated with these two sites and neither site has a viable level of suitable habitat to maintain resident spotted owls (USDA and USDI 2008, also referred to as ITS 2008). Thinning is proposed in suitable nesting, foraging and roosting habitat inside the provincial home range of these computer generated spotted owl sites.

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

BLM Wildlife biologists conducted field inventories of habitat, reviewed existing literature to determine range data, and reviewed previous surveys for 39 BLM Special Status Species/Species of Concern.

Vegetation surveys (BLM field examinations and analysis of stand exam data) indicate a lack of habitat elements to support diverse populations of wildlife species in most of the stands proposed for thinning, especially CWD, snags, deciduous understory, ground cover vegetation, and deep accumulation of leaf litter. The following species are documented or suspected to occur in the project area.

Bureau Sensitive – Oregon Slender Salamander

The Oregon slender salamander has been found in units 7A and B, and is assumed to be present in all sections of the project area where large CWD is found.

Bureau Sensitive – Bald Eagle

There is available habitat for bald eagles in the project area but none have been observed. Preferred nesting and perching habitat is large old-growth trees near major bodies of water and rivers.

There are large Douglas-fir trees in all units of the Airstrip Thinning within ½ mile of the North Fork Reservoir and North Fork Clackamas River. Known bald eagle nests are located approximately 10 and 12 miles from the project area. The US Fish and Wildlife Service removed the bald eagle from the endangered species list in June, 2007 and it is now a Bureau Sensitive Species.

Bureau Sensitive – Peregrine Falcon

Peregrine falcons likely forage occasionally in the vicinity of the project area and there is a nest site 1.5 miles from the project area. There are no suitable cliffs for nesting in the project area.

Bureau Sensitive – Bats

Four bat species of concerns are suspected to occur in low numbers in the Airstrip Thinning vicinity. These species are associated with caves, mines, bridges, buildings, cliffs and large decadent trees and snags.

Survey and Manage – Red Tree Vole

Unit 7A has an overstory component that is older than 80 years. It meets the stand level criteria for red tree vole habitat and is within the range of the red tree vole (Huff et. al., 2008). The unit was surveyed for red tree voles[16] and no red tree voles were found.

Survey and Manage – Terrestrial Mollusk Species

Two Survey and Manage mollusk species are known or suspected to be in the project area. Oregon Megomphix was found on 4 survey plots in unit 7A. Malone's jumping slug are suspected to occur in unit 7A but were not found.

Migratory and Resident Bird Species

Approximately 82 bird species have a least a low probability of breeding in the Airstrip Thinning project area. Of these, 36 priority bird species of conservation concern have at least a low probability of breeding there. The structurally simple, even-aged conifer stands with a single-layered, closed canopy and poor understory development characteristic of units 7B and 18A and B are low in land bird species richness. Unit 7A has a two-storied canopy and is expected to have a higher degree of species richness. (Wildlife Report, pp. 14-15)

Big Game

Roosevelt elk and black-tailed deer are found in the project area, which provides hiding cover and some thermal cover. Early seral stage stands, on adjacent and nearby private lands, provide forage. No critical winter or summer range is identified in the RMP (p. 26) for the project area.

Environmental Effects

Effects of the two Action Alternatives on wildlife are the same except as specifically identified below.

3.3.5.1 Action Alternatives 1 and 2

General Habitat

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 "cascading ecological effects" (Hayes, Weikel and Huso, 2003) as competition between overstory trees is reduced and more sunlight reaches the forest floor.

Growth, size, branch diameter and crown ratio of the retained trees increases and understory development and ground cover vegetation are stimulated. The increase in structural diversity would improve wildlife habitat by providing more opportunities for foraging, nesting/breeding, resting, hiding and escape cover/habitat for a variety of animal species in the project area.

[16] Complying with the 2001 ROD without Annual Species Reviews (IM-OR-2010-017, *Interim NEPA Direction for Survey and Manage Species*).

These changes are considered beneficial because there is an abundance of simplified structure habitats in the vicinity of the project area.

Constructed roads, skid trails and skyline corridors would created narrow, linear openings through the vegetation. In the short term (up to five years) these would increase access to the stand by larger animals such as big game, coyotes and avian predators. In the long term, both the understory and canopy of these openings would close and the effects of these openings would end.

Old Growth and Large Diameter Trees, Snags and Coarse Woody Debris (CWD)

Old-Growth and Large Diameter Trees: None of the remnant old growth trees identified in units 7B and 18A and B would be felled or structurally damaged. Some root damage may result from skidding and log hauling near these trees. Up to ten percent of the large diameter (36 inches DBH and larger) Douglas-fir trees in unit 7A would be cut and left onsite as CWD to facilitate road construction and safe and efficient skyline logging operations. It is possible that one or more of those large diameter trees would be old-growth trees which have not yet been identified. Trees larger than 36 inches diameter which are felled for road construction and logging operations would be left on site as CWD. These felled trees would no longer be available for future snag recruitment.

Snags and CWD: Within thinning units approximately 10 percent of snags larger than 15 inches diameter could be cut or knocked over during logging operations, based on up to ten percent of the ground area directly impacted by landings and logging operations. Approximately 90 percent would remain standing after operations, effectively retaining the majority of the best existing habitat features for primary excavators (woodpeckers) and secondary cavity users, including song birds, bats and small mammals.

Within rights-of-way for roads to be constructed, all snags would be felled. This includes two large diameter (approximately 60 inches) Douglas-fir snags in the Right-of-Way in the southern part of unit 7B above the escarpment.

This would result in the loss of some large snag habitat in the project area. Many of the small (<15 inches diameter) snags would be damaged or knocked over during logging operations.

Breakage is expected to be higher in the smaller diameter snags. These small diameter snags would provide short term debris that would decay within a few years to two decades and would tend to have wider variation in moisture content than larger dead wood. All felled snags would be retained on site as CWD, some of which would already be in decay class II or III.

Source material for large diameter snags would be available sooner than in similar unthinned stands because it takes a large diameter live tree as source material to become a large diameter dead tree (snag or CWD). An indirect result of thinning is that retained trees grow faster in diameter than trees of the same age growing in dense stands. Snag creation due to suppression mortality would be lower than for an unthinned stand of the same initial density and age. However, suppressed trees are the smallest trees in the stand, so the snag recruitment forgone as a result of thinning from below would generally be the smaller diameters that are less valuable as habitat (EA 3.3.5). Since no thinning would be done in 64 percent of BLM land in sections 7 and 18, those stands would continue to provide small diameter snags and woody debris in the watershed through suppression mortality.

Coarse Woody Debris (CWD): Up to ten percent of the existing CWD would be directly impacted by logging operations, proportional to up to ten percent of the surface area of the thinning units directly impacted by landings, skid trails and skyline corridors. CWD with enough strength to withstand movement would be minimally moved, or moved and replaced, so that the habitat would not be destroyed. Habitat quality of those pieces of CWD would be degraded by making smaller pieces and disturbing highly decayed parts by moving it. Trees larger than 36 inches diameter felled and left as CWD would become hard, large diameter logs that would persist for many decades and provide habitat for a group of dead wood associated species (including the Oregon slender salamander) as they progress through all five decay classes.

Special Habitats: There would be no effects to the rock outcrops and talus slope below unit 7A because they are outside of unit boundaries and not affected by the proposal. There would be no effects to the wetlands adjacent to units 18A and B because they are outside of the unit boundaries and buffered by a 200+ feet wide protection zone.

The BLM anticipates, based on extensive experience with similar treatments, that thinning would improve habitat conditions for wildlife in the 10 acres of Riparian reserve to be thinned adjacent to units 18 A and B by accelerating tree diameter growth, encouraging larger tree crowns with larger limbs and allowing more light to reach the forest floor to develop vegetative layers in the understory. These are desirable characteristics associated with late seral forest stands.

Federally Listed Species - Northern Spotted Owl

In unit 7A, habitat functionality of 45 acres would be downgraded in the short term from suitable habitat (60 percent canopy cover) to dispersal habitat (40 percent canopy cover). Seasonal restrictions on habitat modification activities (falling, yarding, burning and road building) in suitable habitat (7A) would reduce potential disturbance to any unknown spotted owls during the critical nesting season.

In units 7B and 18A and B, 245 acres of dispersal habitat would be altered in the short term, but the components of spotted owl habitat would be maintained so that the functionality of the habitat remains intact after treatment.

In the long term, thinning can have long-term benefits to spotted owls by encouraging late-successional characteristics to occur more rapidly (BA p. 13, BO p. 21). These stands could attain suitable habitat conditions within 10-30 years as canopy closures increase and late-successional characteristics develop.

No suitable habitat would be altered or downgraded within the provincial home range radius of any known or historic spotted owl sites. None of the proposed units are located in LSR or Critical Habitat for the northern spotted owl.

The proposed project would downgrade suitable and alter dispersal habitat within 1.2 miles of two "Predicted Owl Sites." The presence of spotted owls in the vicinity of the Airstrip units is highly unlikely because both sites likely do not provide enough suitable habitat necessary for maintaining spotted owl life history functions (BO pp. 58-62, 64; ITS 2008 pp. 13-16), and have been surveyed with no responses.

Table 13: Spotted Owl Habitat Modification by Treatment type[1], Land Use Allocation[2], Pre/Post Treatment HabitatType[3], Habitat Modification Type[4], and Effect Determination[5].

5th.Field Watershed	Township-Range-Section - Unit	Proposed Treatment[1]	Acres	Land Use Allocation[2]	Pre/Post Treatment Habitat Type[3]	Habitat Modification[4]	Effect [5]
Middle Clackamas	4S-5E-7 A	Light to moderate thin	45	GFMA	Suitable to Dispersal	Downgrade	LAA
Middle Clackamas	4S-5E-7 B; 18 A & B	Light to moderate thin	245	GFMA/RR	Dispersal to Dispersal	Maintain	NLAA
TOTAL			290				

Notes for Table 13 (BA, pp. 4-5; BO, pp. 14, 15-16):

[1] **Treatment Type: Light to moderate thinning** in dispersal or suitable 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 thinning maintain a minimum of 40 percent average canopy cover. Light to moderate thinning can have long-term benefits to spotted owls by encouraging late-successional characteristics to occur more rapidly.

[2] **MATRIX/GFMA** = General Forest Management Area LUA (Matrix); **RR** = Riparian Reserve LUA.

[3] **Habitat Types: Suitable habitat** consists of forested stands used by spotted owls for nesting, roosting and foraging. Generally these stands are conifer-dominated, 80 years old or older and multi-storied in structure, and have sufficient snags and downed wood to provide opportunities for owl nesting, roosting and foraging. The canopy cover generally exceeds 60 percent. **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) maintained post treatment adequately provides for spotted owl dispersal. **Downgrade suitable habitat** means to change the functionality of spotted owl suitable habitat to dispersal habitat, but still retains the capability to again become suitable habitat in the future.

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

Special Status Species and Other Species of Concern

Bureau Sensitive – Oregon Slender Salamander

Direct effects to Oregon slender salamanders would be limited to mortality or disruption of up to ten percent of individual salamanders during logging operations because up to ten percent of the ground surface would be disturbed by logging operations. The species would be expected to persist where CWD habitat of adequate size and populations currently exist. CWD in the project area would continue to provide habitat for terrestrial salamanders after treatment. Research (Rundio and Olson, 2007) and BLM survey results (Dowlan, unpublished 2006) show that Oregon slender salamander populations are minimally impacted by thinning operations.

Bureau Sensitive – Bald Eagle

The Airstrip Thinning would not be expected to have adverse effects on any known bald eagle nesting sites. Falling up to ten percent of the large diameter trees in unit 7A (potential based on up to ten percent of the unit area contained within road and landing clearing limits and skyline corridors) would not affect potential eagle nesting or perching habitat in the area.

Bureau Sensitive – Peregrine Falcon

The project would have no direct effects to peregrine falcons. The closest nest site is too far away for the project to disturb it. The nesting pair may forage in and around the Airstrip project, but thinning should have no effect on forage or behavior.

Bureau Sensitive – Bats

Bat species which use snags or large trees could be directly affected by a loss of up to ten percent of large diameter trees in unit 7A and large snags throughout the project area. Since approximately 90 percent of the large trees and snags would be retained in the project area and since only about one third of the BLM acres in the project vicinity would be treated, forest habitat features would be maintained in the area. An indirect effect of thinning is that resultant structural changes in forest stands may benefit bats by creating habitat structure in young stands that bats are able to use more effectively than structures in unthinned stands (Humes, Hayes and Collopy, 1999). Bat species which are associated with buildings, bridges, cliffs and caves would not be affected.

Survey and Manage - Red Tree Vole

Undetected red tree vole nests within the 290 acres of the project area could be disturbed or destroyed during thinning operations. Habitat conditions for red tree voles throughout the project area would gradually become more suitable as the stands continue to develop. Large diameter remnant trees should start to display more epicormic branching, an important structure for red tree vole nests. No impacts would occur to the 500 acres of untreated BLM stands in sections 7 and 18.

Survey and Manage - Mollusk Species

Individual mollusks would probably be directly impacted by operations within the project area. Within proposed units, existing CWD and shade from retained trees would provide shade and microclimates that would enable mollusk species to persist. Untreated stands adjacent to thinned units would continue to provide undisturbed habitat.

Migratory and Resident Birds

Short term (one season) direct impacts of thinning operations would be unintentional destruction ("take") of nests, eggs and nestlings and disturbance that would cause nesting failure if operations occur during active nesting periods. This would not reduce the persistence of any bird species in the watershed or populations at the regional scale. Indirect impacts would be to displace individual birds from thinning units due to disturbance. Adjacent untreated areas would provide refuge and nesting habitat, reducing the short term disturbance.

Changes in habitat structure due to the indirect effects of thinning dense conifer stands would have immediate effects on bird communities. Habitat suitability would be immediately enhanced for species which prefer a less dense conifer canopy, and immediately reduced for species that prefer continuous conifer canopies. Since continuous conifer canopies would be maintained in adjacent untreated stands, the overall range of habitat types in the area would become more diverse.

In the long term (to 20 years after treatment) overall bird species richness (a combination of species diversity and abundance) would be expected to gradually increase as stand structure becomes more complex.

Alternative 2 would convert approximately two acres of early seral grasses, shrubs, hardwoods and berry plants to temporary road. This could have a short term effect on migratory birds due to the temporary loss of deciduous trees and fruiting shrubs. These species would begin to grow again after logging operations are completed. Alternative 1 would not directly impact more than a small fraction of the vegetation in the airstrip because new road would be constructed to avoid using the airstrip for a truck road.

Big Game

Big game species would be disturbed during active thinning operations, possibly causing animals to temporarily leave the project area. Thermal and hiding cover quality would be decreased in the short term as a result of thinning, but would still be present in the stands and unaltered in adjacent untreated stands. Vegetative forage would increase as an indirect result of thinning and road closures during the first five years after thinning and attract early successional species such as elk and deer. In the long term, beyond five years, thermal and hiding cover quality would increase while vegetative forage would gradually decrease as the canopy closes and decreases the amount of light reaching the forest floor.

Forage for big game in unit 7B would be affected differently by the two Action Alternatives:

- Alternative 1 would retain most of the two acres of forage for big game species that is currently growing in the airstrip because no ground disturbance would occur except small areas disturbed by falling and skidding trees across the airstrip.
- Under Alternative 2, up to 1.5 acres of existing forage would be impacted within the 2 acres of the old airstrip clearing. Renovating part of the old airstrip (0.28 mile) as a temporary road would clear approximately one acre of existing forage. Skidding, decking and loading operations at landings would disturb up to an additional half acre of existing forage. Forage species would grow in the roadbed again within 1-3 years after logging operations are completed.

3.3.5.2 Cumulative Effects

Old Growth and Large Diameter Trees, Snags and CWD

All identified old-growth trees, and approximately 90 percent of large diameter trees, snags larger than 15 inches diameter and CWD would be retained within the project area. The project area comprises 37 percent of BLM managed lands in sections 7 and 18, so at least 96 percent of these features would be retained on BLM land in this contiguous block of BLM land.

This block of BLM land comprises less than 1 percent of the combined 6th field watersheds (EA 3.2). Falling two old-growth snags to facilitate road construction in unit 7B, each approximately 60 inches diameter, would reduce the number of large diameter snags in the project vicinity. This would reduce high value habitat for bats, primary excavators and cavity users in the watershed by an unknown percentage. Snags and large diameter green trees felled and left on site as CWD would provide habitat for numerous dead-wood associated species (Aubry 2000; Bowman et.al. 2000; Butts and McComb 2000) for a period of a few years (smaller diameter and highly decayed pieces) to many decades (large diameter and sound wood).

Federally Listed Species - 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. 4; BO, p. 15), 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 (BO pp.71-73).

Cumulative effects to spotted owls and their habitat were analyzed thoroughly at multiple scales in the BA, including the current Environmental Baseline (BA pp.17-28), and Cumulative Habitat Effects Summary (BA pp. 66). 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 (BA pp. 71-114), including the Cascades Resource Area where the Airstrip Project is located (BA pp. 79-86).

The BO 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 Airstrip Project) are not likely to jeopardize the continued existence of the spotted owl and are not likely to adversely modify spotted owl critical habitat (BO pp. 97-98), and would not likely diminish the effectiveness of the conservation program established under the NWFP to protect the spotted owl and its habitat (BO p. 98).

The proposed project would not contribute to cumulative effects to spotted owls because dispersal habitat within and between known owl sites would be maintained, and no suitable habitat would be removed or downgraded within known owl sites. Forty-five acres of suitable habitat within one computer generated Predicted Site and five acres in another Predicted Site would be downgraded to dispersal habitat. However, these sites were analyzed and found to be below the thresholds for suitable habitat necessary to support spotted owls in the Airstrip vicinity. Consequently, the presence of resident spotted owls in the Airstrip area is highly unlikely. Silvicultural prescriptions that promote multi-aged and multi-storied stands may increase the quality of spotted owl habitat over time (BO p. 82).

Other BLM Special Status Species

The proposed project 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. No adverse cumulative effect to red tree vole habitat is expected because:

- The red tree vole is considered to be a late successional associate and units 7B and 18 A and B are not late successional habitat over 80years of age.
- Unit 7A has late successional characteristics and was surveyed for red tree voles. None were found.
- Thinned stands would attain older forest conditions more rapidly than similar unthinned stands. This effect would be long lasting in the Riparian Reserve (10 acres) where future harvest would not be planned.
- Undisturbed habitat in the same or similar age classes as the project area exists adjacent to the proposed thinning units and provides connectivity to other habitat in the vicinity.

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

No adverse cumulative effects would occur to migratory birds because:

- The proposed project would not reduce the persistence of any bird species in the watershed or populations at the regional scale.
- Habitat changes resulting from the proposed project would not eliminate any forest cover type, or 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.

Big Game

No adverse cumulative effects to big game species populations are expected. The proposed project 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. Forage would increase after harvest.

3.3.5.3 No Action Alternative

Habitat Structure, Residual Old Growth Trees, Snags and Coarse Woody Debris

Dense stands in units 7B and 18A and B would grow more slowly compared to thinned stands. In the short term (less than 20 years) there would be an increase in the number of small (<15 inches diameter) snags created by self-thinning through suppression mortality. Suppression mortality would not provide snags large enough to meet habitat needs described in Table 12; or CWD large enough to meet RMP standards until later in the life of the stand (approximately 20-40 years) when suppressed trees achieve these diameters before dying.

These small diameter snags would provide foraging habitat, but are of very limited use for nesting (Rose et. al., 2001; Carey et. al., 1991; Huff and Raley, 1991).

The stands would remain less diverse for a longer period of time than thinned stands because it would take longer to develop late successional habitat conditions including understory and ground cover development compared to thinned stands.

In unit 7A the complex structure associated with the two storied stand would not be altered by management activities. These structural elements that provide habitat to a suite of wildlife species would not be downgraded due to thinning. In portions of the unit where there is a dense second story of 60 year old Douglas-fir no additional light would reach the forest floor to stimulate growth of shrub and ground cover understory plant species without thinning. Large diameter CWD would not be created by felling any of the large diameter conifers, because there would be no landing construction or skyline corridors. There would be no loss of old growth or large diameter trees and snags in the project area due to thinning, so all of these trees would continue to provide wildlife species with nesting, roosting and foraging habitat. In particular, the two large diameter snags in and adjacent to the proposed road would not be felled since the road would not be constructed. This would retain these two snags in a watershed where low numbers of large diameter snags exist. Large diameter hard CWD would not be recruited in the short term because no large diameter trees or snags would be felled.

Some of the large diameter trees may die from natural causes or from disease introduced through the notches cut into some of these trees in the north end of unit 7A, creating large diameter snags. Some of these large diameter trees may fall from natural causes, creating large diameter hard CWD. Suppressed trees in the second story would die, creating mostly small (<15 inches diameter) snags as described above.

Dense canopies in these stands would remain dense without thinning or unpredictable natural disturbances (wind, fire, disease). Light reaching the forest floor would continue to be limited so that shrub and ground cover species would not become established and grow and those already present would continue to decline in vigor. This understory element of stand structure would develop slowly so species which prefer developed understories would not be expected to occupy these stands. Forage for big game species would not increase in vigor.

Road construction, skyline corridors and skid trails would not be created, so the linear openings would not be created. Thermal and hiding cover would not be reduced in the short term and big game forage growth would not increase.

Federally Listed Species: Northern Spotted Owl

There would be no immediate change in spotted owl habitat and no effect to spotted owls caused by management action. Suitable habitat in unit 7A would be maintained, not downgraded to dispersal habitat. Dispersal habitat in the remaining units would be expected to develop into suitable habitat in 20-40 years without treatment.

Survey and Manage, and BLM Special Status Species

In the short term (5 years) there would be no immediate change in current habitat conditions for Survey and Manage and BLM Special Status Species. In the long term (20-60 years):

- Material available for CWD recruitment would be smaller compared to thinned stands because of slower growth rates.
- It would take longer to recruit large CWD for Oregon slender salamander habitat to replace the existing well-decayed material that will eventually disappear.
- No undetected red tree vole nests would be affected because the conifer canopy would not be disturbed.
- Optimal red tree vole habitat conditions would develop more slowly in units 7B and 18A and B, because older forest conditions would develop more slowly compared to thinned stands.
- Current conditions would persist for mollusk species and there would be little change in CWD/hardwood components.

Migratory and Resident Birds

Species richness of bird communities would continue to reflect the simple, single-story mid-seral forest stage found in units 7B and 18A and B for a longer period of time, and overall bird species richness would be less than if these stands were thinned. Legacy features in the future stand would likely be smaller and less persistent, especially those features that provide habitat for cavity nesting species.

Big Game

In the short term (<5 years) thermal and hiding cover quality would remain the same as current conditions because there would be no disturbance from project operations. There would be no increase in vegetative forage because there would be no increase in light reaching the forest floor. In the long term (5+ years) forage quality would continue to decrease as less light reaches the forest floor.

3.3.6 Air Quality and Fire Hazard/Risk

Source Incorporated by Reference: *Airstrip Thinning Air Quality and Fire Hazard/Risk Specialist Report. 2011, Caliva (Fuels Report)*

Affected Environment

Air Quality

The Airstrip Thinning project area is approximately 7 air miles east of Estacada, near the edge of the Willamette Valley which is a smoke sensitive receptor area (SSRAA). It is more than 10 miles west of any wilderness area. Burning is regulated to prevent any smoke intrusion into SSRAs and to prevent reduced visibility in wilderness areas.

Fire Hazard/Risk

Fire hazard/risk in the Airstrip project area is low because the site topography, fuel loading and arrangement of fuels are not likely to result in fire intensity and rate of spread that is likely to escape initial fire suppression efforts or grow into a large scale fire. Fuel loading in the timber stands is estimated to range from less than 5 to 30 tons per acre based on visual estimates utilizing GTR-PNW-105 (USDA PNW 1980), series 1-DF-2 and 2-DF-4.

These stands are a combination of Fuel Model 8 (closed timber litter without much branch or log fuel) and Fuel Model 10 (closed timber with litter and understory and larger dead fuels). The Fire Regime Condition Class is currently 3.

Wildland / Urban Interface

There is an RV park in section 18 west of and downhill from unit 18A, with harvested area in early successional forest between the park and BLM land. Road 4-5E-18 through unit 7A is used by the public to access the USFS Ladee Flat OHV area which is more than a mile east of BLM land.

Environmental Effects

3.3.6.1 Action Alternatives

No differences in effects to air quality or fire risk have been identified between the Action Alternatives.

Air Quality

Pile burning may change local (within less than ½ mile of the project area) air quality for a short time (several hours intermittently within a few days period) but the risk that smoke would enter the SSRA or Estacada is low because smoke would be dissipated by the favorable wind conditions that must be met to comply with the Oregon Smoke Management Plan. A temperature inversion may trap some smoke near the ground overnight, resulting in short term (hours) impact to the local air quality, usually clearing by mid-morning as the inversion lifts.

Fire Hazard/ Risk

Immediately after thinning the fuel loading, risk of a fire start and resistance to control would all increase at the sites as a result of thinning slash created by thinning operations. While these risk factors would be increased, the risk of escaped wildfire would be expected to remain low because:

- The continued existence of a tree canopy shades fuels and maintains cooler temperatures and higher humidity on the site, keeping potential fire intensity and rate of spread low;
- Existing maintained road systems provide adequate access for initial attack suppression forces to quickly respond to any fire that starts in the project area.

Logging slash would add 10-15 tons per acre of fuel to the forest floor, increasing loading to 15-45 tons per acre (PNW-105 series: 1-DF-2, 2-DF-4 and the PNW - 258 series) (USDA PNW, 1990).

Fuel models would shift from 8 and10 to 10 and 11 (closed timber similar to model 10 but with more fuels on the ground) by adding light logging slash. Unthinned stands would remain as fuel model 8.

Overall risk of a fire start in the project area would be expected to remain low because removing logging slash adjacent to open roads by piling and burning would immediately reduce the potential for accidental human caused fire starts to near pre-treatment levels.

Risk of a fire start in untreated slash would be low due to the lack of ignition sources since people would not commonly enter those areas and treatment would not increase potential for lightening caused fires. Risk of a fire start in untreated areas would be greatest during the first fire season following harvest when the needles dry out but remain attached to branches ("red slash"). Fire risk diminishes within one year of harvest as the red needles drop and the area "greens up" with new vegetative growth of ground cover and understory plants.

Wildland / Urban Interface

Access to the Ladee Flat OHV area and other uses accessed by the 4-5E-18 road would likely be delayed on a single day during pile burning operations. Road use at that time would likely be low because pile burning would be done after the fall rains begin when use intensity is low. BLM experience with burning piles adjacent to roads shows that in most cases safe passage would not be delayed more than one hour. The RV park and other Interface areas are too far away from the project area to be impacted by burning operations.

3.3.6.2 Cumulative Effects

The cumulative potential for wildfire start and growth would increase in the short term (1-3 years) as a result of the proposed project 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 (1-2 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 clearcut or in early seral stages with low fire risk.

3.3.6.3 No Action Alternative

Air Quality

There would be no change to the affected environment caused by management actions and no short term impacts to air quality from pile burning.

Fire Risk

In the short term (1-3 years) little change in fire risk would be expected because changes in fuel loading occur slowly without catastrophic natural events.

In the long term (one to several decades), suppression mortality and ladder fuels (dead limbs, small trees and understory vegetation that provide a way for fire to climb from surface fuels into the tree canopy) would continue to increase as the stands age. Fire intensity, duration and the potential for a crown fire typically increase in dense conifer stands as surface fuels and ladder fuels increase. Potential risk can change annually over decades with changing weather conditions and patterns. 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. 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 Carbon Storage, Carbon Emissions and Climate Change

Sources Incorporated by Reference: *Airstrip Thinning Carbon Calculations (ARS Carbon Calc;, Airstrip Thinning Carbon Report; 2008 FEIS: Volume I, Pages 220-224; Volume II, Pages 537-543, and Volume III, Appendices, Pages 28-30; and Memo on Carbon in Harvested Wood*

Resource Specific Methodology

The BLM modeled forest stand growth using data from stand exams and modeled using ORGANON. The BLM compiled models to calculate carbon contained in biomass in: the live tree pool in decadal increments, "other than live tree" biomass, harvested forest products, fuel used to harvest timber and slash burning into a "carbon calculator" tool used to quantify changes in carbon storage and release. The BLM calculated carbon sequestration, storage and emissions at the project scale as a basis for evaluating their significance relative to the following spatial and temporal scales. All quantities and percentages for the Airstrip Thinning project area were generated by this carbon calculator.

Spatial Context: Climate change is inherently a global issue. Carbon cycling is only an issue as it relates to contributing to greenhouse gasses and these gasses potentially contribute to climate change. Carbon cycling at the project level is compared at regional, continental and global scales to provide perspective.

Temporal Context: The BLM selected 0-10 years as the short term analysis time period because all operations and direct carbon emissions would occur within one decade. The BLM selected 11-30 years as the long term analysis period because the BLM would assess the project area for potential management needs within that time. Some projections to 100 years are made to provide perspective.

Affected Environment

Carbon currently contained in biomass in the Airstrip Thinning project units = 39,300 tonnes (0.000039 gigatonnes (Gt)). Of this, 30,900 tonnes (approx. 80 percent) is in live trees and 8,400 tonnes (approx. 20 percent) is in "other than live trees" biomass. This comprises the following portions of forest carbon storage at larger scales:

- 0.0023-0.0026 percent of 1.5-1.7 Gt in the Pacific Northwest, Cascades Range (Hudiburg, et al. 2009)
- 0.00014 percent of 27 Gt in the United States (US EPA, 2009)
- 0.000009-0.00003 percent of 132-457 Gt Worldwide (Matthews et al, 2000, p. 58)

Average annual sequestration (accumulation) of carbon in live trees in the Airstrip Thinning units is currently 654 tonnes (0.00000065 Gt). This is 0.0035 percent of 0.00169 Gt on BLM-managed lands in western Oregon and 0.00034 percent of 0.191 Gt in the United States (2008 FEIS, p. 4-537).

Environmental Effects

3.3.7.1 Action Alternatives

No differences in effects to carbon storage, carbon emissions or climate change have been identified between the Action Alternatives.

In the short term (0-10 years) the proposed thinning would reduce carbon storage in the live trees pool by 7,000 tonnes, to 23,900 tonnes in the project area immediately after thinning. Carbon removed would be transferred to the "other than live trees" and "harvested wood products" pools or would be emitted as carbon dioxide (CO_2). Changes to storage in the "other than live trees" pool were not quantified because they are assumed to balance in the long run (30 years) as logging slash and understory growth adds biomass while decay and fuels treatments reduce biomass and emit CO_2.

In the short term average annual emissions of carbon would be 150 tonnes (0.00000015 Gt) caused by harvest operations (diesel fuel used), fuels treatments (slash burning), and decay or burning (without energy capture) of forest products. This comprises the following portions of carbon emissions at larger scales:

- 0.000009 percent of 1.6 Gt in the United States (US EPA, 2009. pp. 2-3)
- 0.000002 percent of 6.8 Gt Worldwide (Matthews et al, 2000, p. 58)

In the short and long term (0 to 30 years) the 91-102 trees per acre retained after thinning (EA section, 3.3.1, Table 9) would continue to store carbon and sequester additional carbon at an average rate of 470 tonnes per year. This would increase total carbon storage in the project area to 37,850 (0.000038 Gt) tonnes, a net increase of 13,950 tonnes (0.000014 Gt) of carbon stored.

In the long term (11-30 years) an additional 350 (0.00000035 Gt) tonnes of carbon would be emitted from harvested wood by decay and burning without energy capture. 4,300 tonnes (0.0000043 Gt) of carbon would remain stored in wood products still in use, in landfills, or burned with energy capture.

3.3.7.2 Cumulative Effects

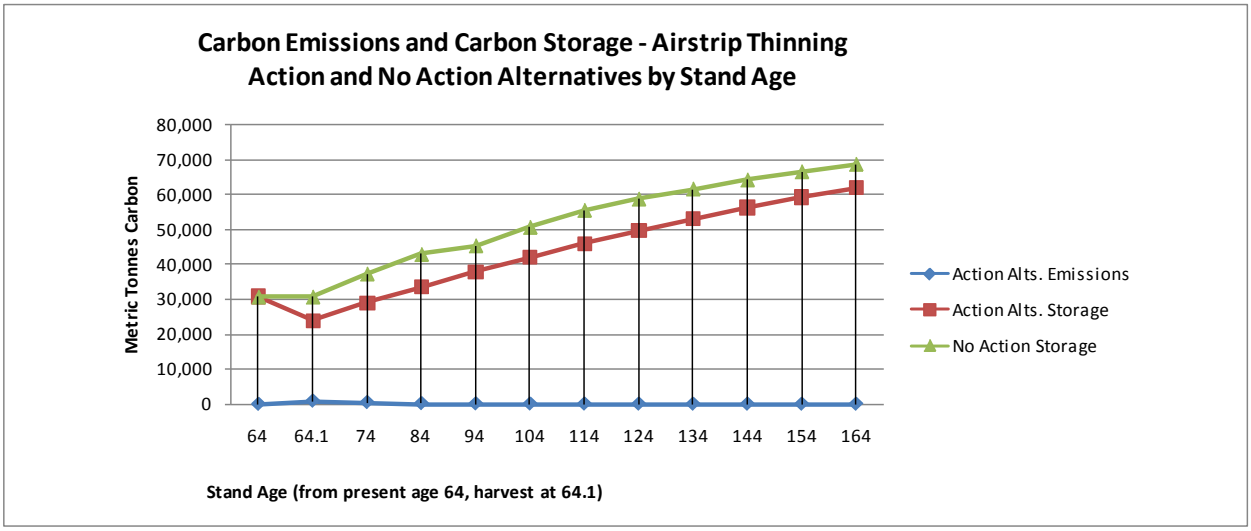
The proposed thinning would contribute to cumulative effects to carbon emissions by emitting a total of 0.0000015 Gt of Carbon over the next 10 years which is 0.000009 percent of US emissions and 0.000002 percent of global emissions. The incremental increase in carbon emissions as greenhouse gasses that could be attributable to the proposed project is 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.

3.3.7.3 No Action Alternative

Under the no action alternative, no changes to carbon emissions (as greenhouse gasses), carbon storage or carbon sequestration would be caused by management actions.

Live tree carbon storage would increase to 45,420 tonnes (0.000045 Gt), a net increase of 14,540 tonnes (0.000015 Gt) from present levels. This is 7,560 tonnes (0.0000076 Gt) more total storage of carbon in the project area after 30 years than for the action alternatives.

Figure 12: Carbon Emissions and Storage



3.3.8 Recreation, Visual Resources and Rural Interface

Source Incorporated By Reference: *Recreation/Visual/Rural Interface Evaluation, Jarrett 2011 (Recreation Report).*
Resource Specific Methodology: The BLM resource specialist queried BLM's GIS data base and reviewed other records for land use status, Visual Resource Management (VRM) classification, Wild and Scenic River status, Wildland/Rural Interface and established recreation uses. VRM Class is based on: 1/ a Scenic Quality Evaluation process; 2/ Sensitivity level (high, medium, low) analysis; and 3/ Delineation of distance zones (foreground/middle ground, background, seldom seen). He also visited the site to assess resource values and potential conflicts or impacts.

Affected Environment

Access

Unit 7B is readily accessible to the public via Road 4-5E-18, the US Forest Service North Fork Road that is paved through most of the unit. The North Fork Road accesses the USFS Ladee Flat OHV Use Area and potentially active logging units. Units 7A and 18A&B are accessible to the public only by foot because the existing roads are privately owned and gated.

Recreation

The project area is in a forested setting modified by roads and timber harvest on both private and public land in the area. Current recreational use includes casual day use activities, unregulated paintball activity and unauthorized Off Highway Vehicle (OHV) use and shooting. Physical barriers to OHV use have been installed by the BLM.

Unmanaged target shooting historically caused safety hazards and contributed to garbage (used as targets), vandalism and tree damage/mortality in the Ladee Flat area, especially in the 1980s and 90s. The airstrip itself was popular as a rifle range and there was no backstop, so spent rounds could fall on Highway 224 and the North Fork Reservoir.

Trees at the west end of the airstrip have visible deformities consistent with damage from bullets.

A Federal Register closure on shooting was implemented in 1992 because of the concern for public safety (USFS 1996, p 2-59). Part of the objective for ripping and planting the airstrip was to create a visual screen to make the airstrip unusable as a long range (300+ yards) rifle range. There is no visual evidence of recent shooting near the west end of the airstrip.

All user-created trails (OHV and foot trails) within the proposed units are in the General Forest Management Area (GFMA) and are outside of any designated Special Recreation Management Area (SRMA). Providing and/or enhancing recreational opportunities in areas outside of an SRMA conflict with the goal and intent of the MATRIX/GFMA Land Use Allocation (LUA).

Road 4-5E-18 (North Fork Road) accesses the USFS Ladee Flat OHV Use Area and USFS lands used for dispersed recreation.

Rural Interface Areas (RIA)

There are no private non-commercial properties adjacent to project boundaries. There is a private RV park near the southern boundary of unit 7B and the western edge of units 18A&B. The haul route from unit 7B and the RV park share the final approach to Oregon State Highway 224. In general, the concerns of property owners near timber harvest and hauling activities tend to be associated with noise, traffic and dust from project implementation. State and county roads likely to be used as haul routes commonly experience log truck traffic.

Wild and Scenic Rivers

The lower 14.4 miles of the North Fork Clackamas River is eligible for inclusion in the Wild and Scenic River (WSR) system. The RMP (p. 37) and National Wild and Scenic river management policy provide direction for interim protection of eligible river segments on BLM administered land. The North Fork Clackamas River eligibility is classified as "recreational" with a "potential classification" as Scenic with fisheries listed as an outstandingly remarkable value (Recreation Report, p. 2). Three hundred fifty-eight (358) acres of BLM managed land is within the ½ mile wide river corridor (¼ mile each side of the river's center line).

Interim protection measures are designed to "[m]anage the natural integrity of river-related values to maintain or enhance the highest tentative classification determined for rivers found eligible or studied for suitability." (RMP p. 37) Interim protection for this river segment essentially means that any proposed treatment within the river corridor must conform to the goals and objectives for VRM Class 2 areas, described below. This designation influenced the range of alternatives analyzed for this project because it restricts the visual changes that can be made by management actions.

Visual Resource Management (VRM)

The lower half of unit 7A is VRM Class 2, as well as being within the eligible Wild & Scenic river corridor described above. Portions of the north and western edges of unit 7B are within the eligible Wild & Scenic river corridor and would be managed within VRM Class 2 standards. VRM Class 2 management standards are to: Retain the existing character of the landscape; manage for low levels of change to the characteristic landscape where management actions can be seen but cannot attract the attention of the casual observer; and any change should repeat the basic elements of form, line, color, texture and scale found in the natural features of the surrounding area/landscape.

The remainder of the project area (NW half of unit 7A, most of 7B, and units 18A&B) is designated as VRM Class 4. This allows major modifications of character of the landscape where management activities may dominate the view and be the major focus of viewer attention. However the guidelines also direct the BLM to minimize the visual effect of management activities through careful location, project design, and repeating the basic elements of form, line, color and texture found in the natural features of the landscape.

Environmental Effects

3.3.8.1 Action Alternatives

No differences in effects to recreation, visual resources or rural interface have been identified between the two Action Alternatives.

Access

Logging and burning operations on and adjacent to Road 4-5E-18 (North Fork Road) would cause delays of generally less than one hour for recreational, commercial (logging) and administrative (Law Enforcement, USFS and BLM personnel) traffic on weekdays for a few weeks to a few months during the contract period. No other changes to access would be caused by the proposal.

Recreation

There would be an increase in log truck traffic on Road 4-5E-18 North Fork Road) and Highway 224 which have recreational traffic, and on County Road 34021 (Squaw Mountain Road) which has local residential traffic. Public use of the proposed harvest units would be restricted for weeks to months during thinning and burning operations. Nearby public lands would continue to provide opportunity for similar recreational uses.

Rural Interface Areas (RIAs)

There would be a short term (weeks to months during a three year period) increase in log truck traffic near residences on county roads and state highways on the haul route.

Wild and Scenic Rivers (WSR)

BLM management actions within the eligible river segment would not compromise the potential classification of "Scenic" for this river segment because proposed treatments would conform to the goals and objectives for VRM Class 2 areas (Recreation Report, p.3).

BLM management actions would not compromise the Outstandingly Remarkable Value of "Fisheries" because the project would not impact fish populations or habitat. (EA section 3.3.3.1)

Visual Resources

Changes to landscape character would be low because a forested setting would be maintained in all of the proposed units. Changes would be most noticeable as disturbance to understory vegetation. Understory vegetation would be expected to return to a continuous live plants appearance within two to five years.

3.3.8.2 Cumulative Effects

Cumulative effects to recreation, visual character and rural interface areas would be minimal because a forested setting would be maintained and access would not be changed.

3.3.8.3 No Action Alternative

No modifications to the landscape character of the project area would be expected to occur within the next ten years, with the exception of unplanned changes due to wildfire, windthrow, disease, etc. (Recreation Report, p. 2)

3.3.9 Cultural Resources

Sources Incorporated By Reference: *Cultural Resource Pre-Disturbance Inventory Report – Airstrip Thinning Timber Sale (B. Beckman, 2009, updated by H. Ulrich, 2010)*

Affected Environment

EA Section 3.2 describes the affected environment and the interplay between the physical environment and historical events. Cultural features identified are:

- Sites of the Ladee logging company facilities including railroad grades, a logging incline and Logging Camp 1. These sites are well documented, but few traces remain (SHS 734, C803, C847, Paullin [Master's thesis] 2007). An Airstrip was built atop the site of Camp 1 and the logging railroad mainline in 1946;
- The mapped route (GLO 1890) of the Warm Springs trail, the trail is no longer evident (SHS583, C847);
- Mining claims on North Fork Clackamas, filed 1934, remains of pits and a tunnel noted 1951 (SHS702).

Access to the Ladee Flat was provided by the logging incline from 1923 to 1929. Until the CCC built a truck road (now Road 4-5E-18) in 1934, the only other access was by foot. The airstrip was built in 1946 and abandoned in the 1960s. The logging railroad grade along the west side of the North Fork Clackamas is evident to the bottom of the incline, but the remainder of the railroad grade has been obliterated by Highway 224. There is currently a gate and parking area adjacent to the North Fork at the railroad grade and an undeveloped foot trail that follows the grade and continues upstream.

Environmental Effects

3.3.9.1 Action Alternatives

No differences in effects to cultural resources have been identified between the Action Alternatives.

No effects to cultural resources would be anticipated as a result of the project. The incline is completely outside of unit boundaries and would not be affected.

The logging camp, trail, mining pits and railroad hardware have essentially been obliterated by previous actions and natural deterioration. Additional surveys are planned. Any cultural resources found by these additional surveys or during operations would be protected as directed by the BLM Archaeologist. Little or no additional information of value about historical activities beyond what is described by Paullin is likely to be found because of the degree of disturbance that has occurred since 1929.

3.3.9.2 Cumulative Effects

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

3.3.9.3 No Action Alternative

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

3.3.10 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	In compliance with PCFFA IV (Civ. No. 04-1299RSM), this project complies with the Aquatic Conservation Strategy described in the Northwest Forest Plan and RMP. This project also complies with the PCFFA II (265 F.3d 1028 (9th Cir. 2001)) by analyzing the site scale effects on the Aquatic Conservation Strategy. EA sections 3.2, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.11 and 5.1 show how the Airstrip Thinning project meets the Aquatic Conservation Strategy in the context of the PCFFA cases.
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). Effects to this element are addressed in text (EA Sections 3.3.2 and 3.3.3).

Element of the Environment /Authority	Remarks/Effects
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, 3.3.6).
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).
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 2.2.4 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 2.2.4, #20)
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 no wetlands are within the project area and adjacent wetlands would be protected by buffers. (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 the project would: 1/ avoid compromising the potential classification of "Scenic" by conforming to the goals and objectives for VRM Class 2 areas; and 2/ would not compromise the Outstandingly Remarkable Value of "Fisheries" by not impacting fish populations or habitat (EA Section 3.3.8).

Element of the Environment /Authority	Remarks/Effects
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 there are no Wilderness Areas or areas being considered for Wilderness Area status in or adjacent to the project area.

3.3.11 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. Units 7A and 7B maintain full untreated Riparian Reserves of at least 200 feet (streams without fish) and 400 feet (fish bearing streams). In units 18A and B, Stream Protection Zones (SPZ), minimum width 100 feet each side of the stream, would protect streams from direct disturbance from logging. Road and landing locations have been minimized in Riparian Reserves. The shade reduction from the road Right-of-Way at the temporary crossing between units 18A and B would be confined to a small area (30 feet of stream channel) and short term (<5 years) because the stream is narrow so shrubs and limb growth from adjacent trees would restore shade. Addressed in text (EA sections 3.3.2-3.3.3).

ACS Component 2 - Key Watershed: The project would comply with Component 2 because the Airstrip Thinning project is not within a Key Watershed. (RMP p. 7).

ACS Component 3 - Watershed Analysis: The project would comply with Component 3 by incorporating the following recommendations from the NFCRWA and LCRWA:

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 10 acres of Riparian Reserve to develop and maintain late seral stand characteristics, maintaining 50% 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 10 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.

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.

Action Alternatives: The proposed thinning from below in a selected 10 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 390 acres of unthinned Riparian Reserve in the project vicinity would "maintain" as described for the No Action alternative.

ACSO 2: Maintain and restore spatial and temporal connectivity within and between watersheds. Addressed in Text (EA sections 3.3.1,3.3.3, 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 400 acres of Riparian Reserve in the Airstrip project vicinity.

Action Alternatives: Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development in the ten 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.

ACSO 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. Addressed in Text (EA sections 2.3.4, 3.3.2, and 3.3.3). In summary:

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

Action Alternatives: Physical integrity of channels at existing stream crossings would be altered for one to several years, following installation and removal of one temporary stream crossing. Within the road prism (estimated at 30 feet maximum width), the channel surface, banks and bed would be compacted (bulk density of soils increased by as much as 30%), vegetation would be disturbed or removed from the banks within the road prism, and the bed/banks would be reshaped and stabilized with woody debris and vegetation after use. Due to the low flow and small size of the channel at the temporary crossing and the low gradient and vegetation both up and downstream from the fill removal, little to no additional disturbance to channel morphology would be expected either upstream or downstream from the crossings.

ACSO 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Addressed in Text (EA sections 2.3.4, 3.3.2, and 3.3.3). In summary:

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

Action Alternatives: Stream Protection Zones (SPZs) would be maintained in the ten treated acres of Riparian Reserve LUA (RR) and no treatment in the remaining 390 acres of RR.

The proposed new and renovated roads are on ridge top or upper-slope locations with no hydrologic connections or proximity to streams or riparian areas. 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 3-5 years), current conditions and trends in turbidity and sediment yield would likely be maintained under the proposed project.

ACSO 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Addressed in Text (EA sections 2.3.4, 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.

Action Alternatives: Stream protection Zones (SPZs) and untreated RRs would be maintained (minimum of 100 feet on streams adjacent to units 18 A and B; at least 200 feet for non-fish bearing perennial and intermittent streams and 400 feet on fish bearing streams in section 7 for units 7 A and B). Hauling restrictions and sediment control measures would minimize sediment delivery. Short-term localized increases in stream sediment can be expected during installation and removal of one temporary stream crossing (culvert), but BMPs and mitigation measures would be implemented to limit acceleration of sediment delivery to streams.

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 sections 2.3.4, 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.

Action Alternatives: 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 390 of 400 acres of Riparian Reserve. In the ten 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.

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 2.3.4; 3.1.2; 3.3.2). 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.

Action Alternatives: 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 390 of the 400 acres of Riparian Reserve in the project vicinity. In the ten acres of treated Riparian Reserve, all operations, equipment and disturbances are kept a minimum of 100 feet from all wetlands and stream channels. Thus, the current condition of floodplain inundation and water tables would be maintained.

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 2.3.1; 2.3.4; 3.3.1; 3.3.2; and 3.3.3). 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.

Action Alternatives: The current species composition and structural diversity of plant communities would continue along the current trajectory in 390 of the 400 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 100 feet of the stream and wetlands in the ten treated acres.

ACSO 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species. Addressed in Text (EA sections 2.3.1; 2.3.4; 3.3.1; 3.3.2; 3.3.3 and 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.

Action Alternatives: 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 390 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.

3.3.12 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 1.2.4 and the project objectives in EA section 1.2.2.

DF 1: Provide timber resources and revenue to the government from the sale of those resources (objectives 1 and 2);

DF 2: Provide for economically efficient short-term and long-term management of public lands in the project area (objectives 2 and 8);

Decision Factors 1 and 2: The No Action alternative would not meet the objectives associated with these decision factors since no timber sale would take place.

The alternatives 1 and 2 would provide timber resources to the market and would implement 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 (EA section 2.3.1; 2.3.2; 2.3.3f, and 2.3.4).

DF 3: Provide for safe, economically efficient and environmentally sound access for logging operations, fuels management and fire suppression and administration on public lands (objectives 2, 4, and 8);

Decision Factor 3: The No Action and both action alternatives would all meet the objectives associated with this decision factor because permanent, maintained roads provide access for fire suppression and administration. Access for logging and fuels management would only be needed for the two action alternatives.

DF 4: Provide for increased survival and growth of conifer species while retaining structural and habitat components such as large trees, snags, and coarse woody debris (objectives 1, 2, 3, 5, 6 and 7);

Decision Factor 4: The No Action alternative would not meet the objectives associated with this Decision Factor because: 1/ Stand health and 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 sections 3.3.1, 3.3.5)

The action alternatives would meet the objectives associated with *Decision Factor 4* 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 sections 3.3.1, 3.3.5).

DF 5: Provide habitat for special status, SEIS special attention and other terrestrial species associated with a variety of seral stages and forest stand characteristics in the vicinity of the project area (objectives 3, 5, 6 and 7);

Decision Factor 5: The No Action alternative would achieve some of the objectives associated with this Decision Factor because: 1/ It retains intact the two storied stand in and adjacent to unit 7A, which currently has numerous large trees and some late successional characteristics. 2/ All large diameter snags in the area would remain standing until falling from natural causes.

No Action would not fully meet other objectives compared to the action alternatives because: 1/ The ten 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 action alternatives.

2/ The late-mid seral stage stands in the remainder of the proposed project area are currently over-represented in the watershed. The characteristics described for Decision Factor 4 would apply to these stands. (EA sections 3.3.1, 3.3.5)

The action alternatives would meet some of the objectives associated with this Decision Factor because: 1/ The action alternatives would increase habitat diversity on a landscape level in the vicinity of the project area by accelerating growth of trees in units 7B and 18A and B, 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 sections 3.3.1, 3.3.5)

The action alternatives would not fully meet some of the objectives associated with this Decision Factor because: 1/ In unit 7A (45 acres), the action alternatives would downgrade spotted owl habitat within the unit boundaries in the short term, recovering as canopy grows to over 60 percent cover. The portions of this stand in Riparian Reserves adjacent to unit 7A would not be affected. 2/ Falling two large diameter snags in the Right-of-Way for the new road in the southern part of unit 7B would reduce available large snag habitat, which has been identified as "lacking" in the area (NFCRWA, p. 5-1), and convert it to large diameter CWD habitat, which also does not meet RMP standards in the area. (EA sections 3.3.1, 3.3.5)

DF 6: Provide for aquatic habitat and water quality/quantity by designing new roads and using all roads to avoid increasing the quantity of water and sediment delivered to streams (objectives 4 and 8).

Decision Factor 6: The No Action alternative meets the objectives associated with this Decision Factor because no new roads would be constructed and all existing roads are designed to prevent delivery of sediment to streams.

The action alternatives meet those objectives because only one new stream crossing would be created by new road construction and road design, construction operations and maintenance would be designed to avoid increasing the quantity of water and sediment delivered to streams. (EA sections 2.2.3, 2.2.4, 3.3.2 and 3.3.3)

DF 7: Promote the development of healthy late-successional characteristics in the Riparian Reserve LUA (objective 5):

Decision Factor 7: All of the alternatives partially meet the objectives because natural stand development processes will continue in all Riparian Reserve areas in section 7 and most or all Riparian Reserve areas in section 18. (EA sections 2.2, 2.3, 3.3.1.2, 3.3.5.3, 3.3.11)

Both action alternatives would contribute to meeting objectives on ten acres of Riparian Reserve in section 18 because thinning would allow for more rapid development of large conifers as sources for future CWD, large snags, LWD and structural diversity by reducing competition and allowing more light to reach the forest floor. Both action alternatives would inhibit achievement of objectives on approximately one acre of Riparian Reserve between units 18A and B because vegetation would be cleared for road construction. (EA sections 2.2.1, 2.2.3, 2.2.3.1, 2.2.4, 3.3.1, 3.3.5, 3.3.11)

DF8. Minimize the potential for human sources of wildfire ignition and prevent large scale, intense wildfires in the project area (objective 9):

Decision Factor 8: The No Action alternative would meet the objective because the current potential for wildfire is relatively low and the existing road system provides adequate access for suppression forces if a wildfire were to start.

Both action alternatives meet the objective because activity fuels (fuels most likely to catch on fire and spread if ignited) would be reduced below the danger point near roads where there is the highest potential for human-caused ignitions. The existing roads provide access for initial attack suppression forces and the new and renovated roads could easily be re-opened by suppression dozers to provide additional access for firefighters and equipment. Therefore, if a fire were to start, it is likely to be controlled before becoming a large scale wildfire. (EA sections 2.2.3.2, 2.2.4, 3.3.6)

DF 9. Maintain the potential classification and Outstandingly Remarkable Values for potential Wild and Scenic River designation of the North Fork Clackamas River (objective 10).

Decision Factor 9: The No Action alternative meets the objective by not changing the forest stands within or adjacent to the designated river segment corridor.

Both action alternatives meet the objective by implementing design features that meet requirements for maintaining the potential classification and values, including VRM Level 2 standards. (EA sections 2.2.4, 2.3, 3.3.8)

4.0 LIST OF PREPARERS

Table 15: List of Preparers

Resource	Name
Writer/Editor	Keith Walton
NEPA Review	Carolyn Sands
Botany	Terry Fennell
Cultural Resources	Heather Ulrich
Engineering	Steve Ditterick
Fire/Fuels	Maria Caliva
Fisheries	Bruce Zoellick
Hydrology/ Water Quality	Patrick Hawe
Logging Systems	Seth Macalady
Recreation, Visual Resources Management and Rural Interface	Zachary Jarrett
Silviculture	Dan Schlottmann
Soils	Patrick Hawe
Wildlife	Corbin Murphy, Jim England

5.0 CONTACTS AND CONSULTATION

5.1 Consultation

5.1.1 US Fish and Wildlife Service (USFWS)

The Airstrip Project was submitted for Formal 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 FY2011/2012 consultation process. The *Biological Assessment of Likely to Adversely Affect (LAA) Projects with the Potential to Modify the Habitat of Northern Spotted Owls, Willamette Planning Province - FY 2011-2012* 9(BA)., was submitted in July 2010. Using effect determination guidelines, the BA concluded that the Airstrip Thinning may affect, and is likely to adversely affect the northern spotted owl due to the modification of suitable habitat (BA, pp. 30-31, 34-35, 58-59).

The *Biological Opinion (BO) Regarding the Effects of Habitat Modification Activities on the Northern Spotted Owl and its Critical Habitat within the Willamette Province, FY2011-2012* (BO) associated with the Airstrip Project was issued in February 2011 (FWS reference #13420-2010-F-0157). The BO concurred that the habitat modification activities described in the BA, including the Airstrip Thinning, are not likely to jeopardize the continued existence of the spotted owl and are not likely to adversely modify spotted owl critical habitat (BO, pp. 97-98). Furthermore, the proposed project 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 (BO, p. 98).

The proposed thinning and connected actions described in this EA have incorporated the applicable General Standards that were described in the BA (p. 11) and BO (BO, pp. 17-18); and comply with all reasonable and prudent measures outlined in the BO (BO, p. 100). This includes delaying proposed activities to avoid disrupting owls at known or predicted owl sites until after 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 Airstrip 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. No trees would be thinned in the Riparian Reserve on the North Fork Clackamas River and its tributaries, resulting in no impacts to listed fish habitat, water quality, and LW in the NF Clackamas River. No-entry buffer widths of 100 to 200 ft. on three small perennial 1st and 2nd order tributaries to the Clackamas River would prevent impacts to water quality, and listed fish habitat located 0.4 mile downstream in the North Fork Reservoir.

Large wood (LW) levels in North Fork Reservoir would not be affected by the thinning project both because of the width of the no-entry buffers, and small size (capability) of tributary channels to move LW. Turbidity and sediment associated with a temporary road crossing on a small 1st order tributary to the Clackamas River would not impact listed fish habitat 0.55 mile downstream because the sediment would either be filtered by a wetland or retained in a low gradient channel section between the road crossing and reservoir.

Steelhead trout and salmon habitat would not be impacted by log hauling as haul routes are all paved roads where they cross tributary streams to the Clackamas and NF Clackamas Rivers.

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

Cultural resource surveys were conducted throughout the sale area in February 2009. Additional surveys were conducted in March and November 2010. Surveys were conducted on part of unit 7B in 1980 and 1082 for a prior project (C803 and C847). Intensive surveys were done in the vicinity of the Airstrip by Paullin (Master's Thesis) in 2007, but records of her surveys were not filed with SHPO. (Report # C0802). SHPO has requested additional surveys with specific requirements; these surveys and subsequent consultation are in process. Most traces of historical and prehistoric cultural resources have been obliterated by prior management activities including logging and construction of the airstrip. The location of "The Incline" has been protected by excluding it from the project area. No additional cultural resources are expected to be found.

5.2 Public Scoping and EA Public Comment Period

For the results of project scoping, see EA section 1.4. The EA and FONSI will be made available for public review from June 01, 2011 to July 01, 2011 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 Cindy Enstrom, Field Manager, Cascades Resource Area, 1717 Fabry Road S., Salem, Oregon 97306. Emailed comments may be sent to OR_Salem_Mail@blm.gov. Attention: Cindy Enstrom

6.0 LIST OF INTERDISCIPLINARY TEAM REPORTS INCORPORATED BY REFERENCE

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

Caliva, M. 2011. Airstrip 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., 2010. Cascades Resource Area Botanical Report Proposed Airstrip Thinning Timber Sale (Botany Report), Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

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Murphy, C., England, J., 2011. Cascades Resource Area Wildlife Report Airstrip Project (Wildlife Report) Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

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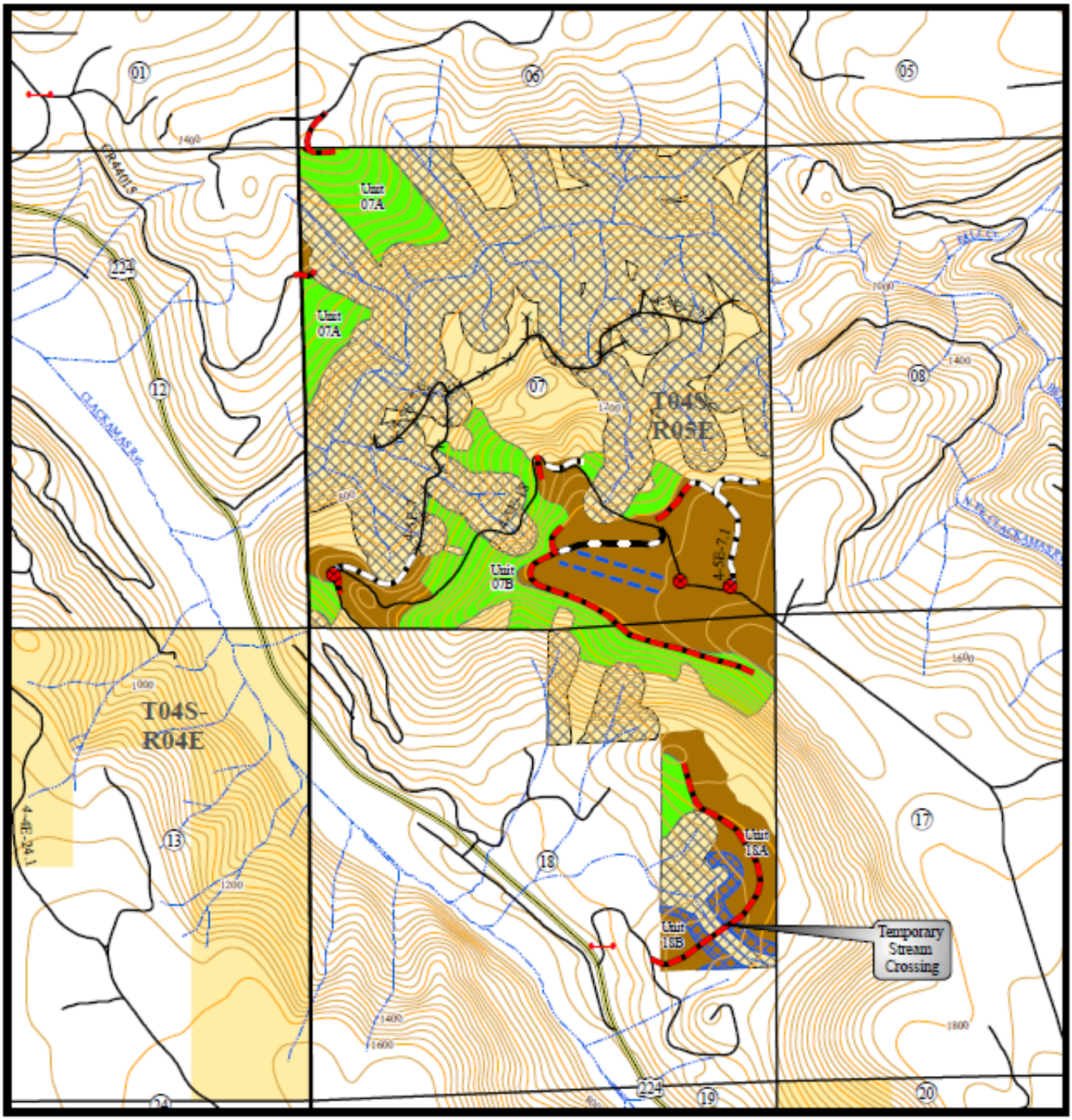
Ulrich, H. and B. Beckman. 2010 Cultural Resource Inventory Reports, Airstrip Thinning Timber Sale Pre-project Surveys. Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR. (Original report by Beckman 2009, updated by Ulrich 2010.)

Zoellick, B., 2010. Airstrip Thinning Fisheries Specialist Report (Fisheries Report) Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

7.0 PROJECT MAPS, GLOSSARY AND ACRONYMS

7.1 Maps of the Action Alternatives

Airstrip Thinning: Alternative 1



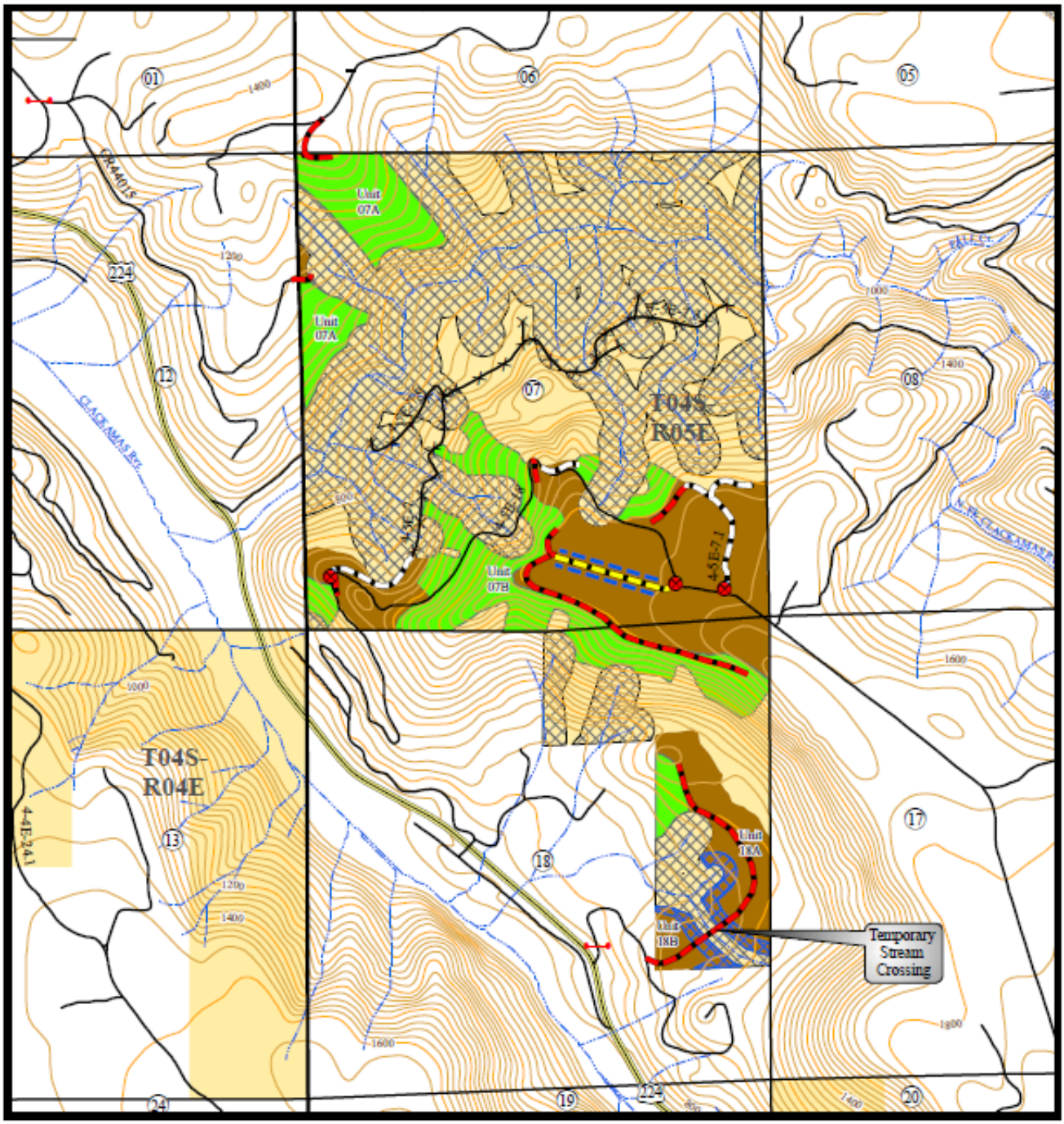
Contour Interval : 40'

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.

- Existing Roads
- Streams
- Highways
- New Const Alt 1
- New Construction
- Renovation
- Decommissioned Roads
- Earth Berm
- Gate
- Airstrip
- Non-Treated Federal Riparian Reserves
- Proposed Skyline Yarding
- Proposed Ground-Based Yarding
- Proposed Ground-Based Yarding in Riparian Reserves
- BLM

May 25, 2011
Bureau Of Land Management
Salem District Office
Cascades Resource Area

Airstrip Thinning: Alternative 2



Contour Interval : 40'

1,000 500 0 Feet

May 25, 2011
Bureau Of Land Management
Salem District Office
Cascades Resource Area

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- Existing Roads
- Streams
- Highways
- Renovation Alt 2
- New Construction
- Renovation
- Decommissioned Roads
- Earth Berm
- Gate
- Airstrip
- Non-Treated Federal Riparian Reserves
- Proposed Skyline Yarding
- Proposed Ground-Based Yarding
- Proposed Ground-Based Yarding in Riparian Reserves
- BLM

N W E S

7.2 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 2mm 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.

7.3 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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