Gordon Creek

(Formerly 2007 Timber Sale Thinning)

Environmental Assessment and Finding of No Significant Impact

Environmental Assessment Number OR080-07-05

September 2007

United States Department of the Interior
Bureau of Land Management, Oregon State Office
Salem District
Multnomah County, Oregon

T.1 S., R. 5 E. sections 1, 3, 9, 11, 13, 15; W.M.

Responsible Agency:	USDI - Bureau of Land Management
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BLM
Salem District

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

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FINDING OF NO SIGNIFICANT IMPACT

The Bureau of Land Management (BLM) has conducted an environmental analysis (Environmental Assessment Number OR080-07-05) for a proposal to thin approximately 1805 acres located on BLM lands within the Cascades Resource Area in Multnomah County, Oregon. The proposed action and location for the project area is described below.

- Gordon Creek Project Area, in T.1 S., R. 5 E., sections 1, 3, 9, 11, 13 and 15; W.M. Thin approximately 1805 acres including: 1600 acres of 53 to 72 year-old timber stands; 200 acres of 50 year old two storied stand; and 5 acres of 117 year old stand. Approximately 1305 of these acres are in the Matrix land use allocation (LUA), and 500 in the Riparian Reserve LUA.

The *Gordon Creek Thinning Environmental Assessment* (formerly included in the *2007 Timber Sale Thinning 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 (FONSI). 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*).

The EA and FONSI will be made available for public review. The comment period ends **October 26, 2007**. 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.

Finding of No Significant Impact

Based upon review of the *Gordon Creek Thinning EA* and supporting documents, I have determined that the Proposed Action is not a major federal action and would not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27. Therefore, supplemental or additional information to the analysis in the RMP/FEIS in the form of a new environmental impact statement is not needed. This finding is based on the following discussion:

Context: Potential effects resulting from the implementation of the Proposed Action have been analyzed within the context of the project area boundaries, and Lower Sandy fifth field watershed. The area affected by the Proposed Action is summarized in *Table1* [40 CFR 1508.27(a)]:

Table 1 - Area of 5th Field Watersheds Affected by the Proposed Action

5th Field Watershed	*Acres*	*Percent Affected by proposed activities*	*Project Area*	*Acres in Proposed Action (Approximate)*		
				Matrix (GFMA)	*Riparian Reserve*	*Totals*
Lower Sandy River	47116	3.81	Gordon Creek	1305	500	1805

Intensity:

1. The resources potentially affected by the proposed thinning activities are: vegetation and forest stand characteristics, Corbett water supply, hydrology, fisheries and aquatic habitat, soils, wildlife, air quality and fire/hazard risk, and recreation and rural interface. The effects of commercial thinning are unlikely to have significant adverse impacts on these resources [40 CFR 1508.27(b)(1)] for the following reasons:

   - Project design features described in *(EA section 2.2.2)* 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 and Forest Stand Characteristics *(EA section 3.2.2):* 1/ No special status vascular plant species or bryophytes would be affected. 2/ Noxious Weeds - No significant increase in the noxious weed identified during the field surveys is expected to occur. Any increase that does occur should be short lived due to revegetation by native species in areas increased light exposure and ground disturbing activities. 4/ Stands proposed for thinning are not functioning as late-successional old growth habitat.

   - Hydrology; Beneficial Uses, Fisheries and Aquatic Habitat; and Soils *(EA sections 3.2.3-3.2.5)*: All new road construction would occur outside of riparian reserves on gentle slopes with stable, vegetated surfaces. Gentle to moderate slope gradients in this project area provide little opportunity for surface water to flow. The Stream Protection Zones (60 feet on perennial streams, 25 feet on intermittent streams) would prevent any overland flow and sediment generated by logging from reaching streams. The design features would prevent increasing turbidity at Corbett municipal water intakes. The Stream Protection Zones would maintain the current vegetation in the primary shade zone and treatments would retain most of the current levels of shading in the secondary shade zone. Soil Compaction is limited to no more than 10% of each unit's acreage. Timber haul and road maintenance mitigation measures would take place during weather and road conditions that would not contribute sediment to streams above Oregon DEQ requirement levels. Other road work (including culvert replacement) would take place during the dry season. The proposed action would not result in adverse effects to Aquatic Survey and Manage or 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 may impact existing populations. Therefore, the project would not contribute to the need to list any BLM Special Status Species.

- Wildlife (*EA section 3.2.6*): 1/ Existing snags, remnant old growth trees and coarse woody debris (CWD) would be retained. The few large (≥ 20 inches diameter and ≥ 15 feet tall) snags that would be felled for safety or knocked over by falling and yarding operations would be retained as CWD. 2/ No suitable habitat for any "Survey and Manage" and BLM Special Status species known or likely to be present would be lost. Therefore, the project would not contribute to the need to list any BLM Special Status species. 3/ Thinning would not significantly change species richness (a combination of species diversity and abundance) of the Migratory and Resident Bird community. No species would be extirpated in stands as a result of thinning, though some less common species would be likely to enter thinned stands immediately in response to reduced canopy closure and tree density. 4/ See # 2, for effects to northern spotted owl. . No suitable or dispersal habitat for northern spotted owls would be lost or downgraded.

- Air Quality and Fire Hazard/Risk (*EA section 3.2.7*): The thinning would result in short term increased surface fire hazard risk from the slash but this would be mitigated by treating slash along open roads where the opportunities for ignition are greatest. The risk is also limited because most of the area is closed to public access due to private land closures. After 3 to 5 years the fine fuels would be decayed in most of the units and the risk of surface fire would decrease to near current levels. The thinning itself would decrease the risk of a canopy fire. Piling and burning slash at landings and in some fuel treatment areas would have a very short duration impact on local air quality, but strict adherence to smoke management regulations would result in little or no impact to the public.

- Recreation and Rural Interface *(EA section 3.2.8*): Changes to the landscape character are expected to be low and would comply with Visual Resource Management guidelines. Some disturbance to vegetation would be observable after thinning activities and would be expected to return within five years. A forested setting would be maintained. Rural Interface Area is adjacent to the project area only in Section 9. Recreation and visual resources would be minimally affected in only this one section because the area is not vehicle accessible. Haul routes routinely receive log truck traffic from forest management activities by both private and public landowners. Hauling through the Larch Mountain Education Site would be done primarily during low use periods and measures taken as appropriate to provide for safety.

2. The proposed thinning activities:

- Would not affect 1) public health or safety [40 CFR 1508.27(b)(2)]; 2) unique characteristics of the geographic area [40 CFR 1508.27(b)(3)] - There are no parklands, prime farmlands, wild and scenic rivers, wilderness, or ecologically critical areas located within the project area (*EA Section 3.1, Table 6); 3)* districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor would the Proposed Action cause loss or destruction of significant scientific, cultural, or historical resources [40 CFR 1508.27(b)(8)] (*EA Section 3.1, Table 6).*

- Are not unique or unusual. The BLM has experience implementing similar actions in similar areas without highly controversial [40 CFR 1508.27(b) (4)], highly uncertain, or unique or unknown risks [40 CFR 1508.27(b) (5)].

- Do not set a precedent for future actions that may have significant effects, nor does it represent a decision in principle about a future consideration [40 CFR 1508.27(b) (6)].

- Are not expected to adversely affect Endangered or Threatened Species listed under the Endangered Species Act (ESA) of 1973 [40 CFR 1508.27(b) (9)].

    - *Northern spotted owl (EA Section 3.2.6):* Effects to the species are not significant because: The project maintains dispersal habitat within and between known owl sites, and does not downgrade any suitable habitat within known owl sites; habitat conditions are expected to improve as thinned stands mature (>20 years); Residual trees would increase in size and be available for recruitment or creation of snags, culls and CWD for prey species and nesting opportunities, particularly in Riparian Reserves. Except for the removal of hazard trees to protect public safety, a seasonal restriction on timber harvest and road construction (habitat modifying activities) would be applied from March 1st through June 30th (*EA section 2.2.2*). In addition, a seasonal restriction for spotted owls from March 1 to July 15 on helicopter yarding would be required. ESA Consultation is described in *EA section 5.1.1.1.*

    - *Fish (EA Section 3.2.4):* Effects to the species are not significant because: Lower Columbia River chinook salmon would not be affected because their suspected upstream limit of distribution is approximately five miles downstream of the project area (see *Table 17*). Removal of the fish barrier culvert in the NE¼ of Section 1 would allow for unobstructed upstream movement of resident cutthroat trout and any other resident fish species that may be present, as well as aquatic amphibians such as Pacific giant salamanders. The increased turbidity from the culvert removals is unlikely to be visible or measurable beyond ¼ mile downstream. New road construction would be located in stable locations outside of Riparian Reserves and would not contribute to degradation of aquatic habitat. Populations of sensitive mollusks in spring heads in the area would be protected by untreated buffers that are generally one site-potential tree height wide. Adjacent non-thinned areas should provide adequate refugia for the species. ESA Consultation is described in *EA section 5.1.1.2.*

- Do not violate any known Federal, State, or local law or requirement imposed for the protection of the environment [40 CFR 1508.27(b) (10)] (*EA Section 1.3*).

3. The Interdisciplinary Team (IDT) evaluated the project area in context of past, present and reasonably foreseeable actions [40 CFR 1508.27(b) (7)] and determined that there is a potential for cumulative effects on water quality and fisheries. The proposed action would be expected to temporarily increase stream sediment and turbidity as a result of culvert replacement, road renovation, road maintenance, road use and log fill removal. There is a theoretical potential for increases in stream sediment and turbidity as a result of thinning and logging operations (*EA Sections 3.2.3 and 3.2.4*). These effects are not expected to be significant because:

    - Increases in sediment yield from culvert replacement, road renovation, road maintenance, road use and log fill removal would be local (less than 800 meters downstream) and short-lived (primarily in the first winter following the activity).

- Any sediment increase resulting from thinning would be very difficult to detect 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 0.1 percent of the total sixth field watershed sediment supply) 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 action and connected actions would be unlikely to result in any detectable change for water quality on a sixth or seventh field watershed scale and would be unlikely to have any effect on any designated beneficial uses, including fisheries.

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Leah Schofield, Team Co-Lead — Date

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Approved by: Cindy Enstrom — 9/26/2007
Cindy Enstrom, Field Manager — Date
Cascades Resource Area

ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

1.1 Project Summary

This EA analyzes the effects of commercial thinning operations and connected actions in forest stands in the project area as described in (*EA Sections 2.0 and 3.0).* Average stand age ranges from 53 to 72 years, except for one 200 acre stand with a 50 year two-storied stand, and five acres of a 117 year old stand (*See EA section 7.1.1 - Table 15*).

1.1.1 Project Area Location

The Gordon Creek project area is within Township 1 South, Range 5 East, sections 1, 3, 9, 11, 13, 15. The project area is within the Lower Sandy fifth field watershed, near the City of Corbett in Multnomah County, Oregon. The project area is adjacent to the Bull Run Watershed to the South and South East of Section 13 but does not drain into the Bull Run system (see *Map 1*).

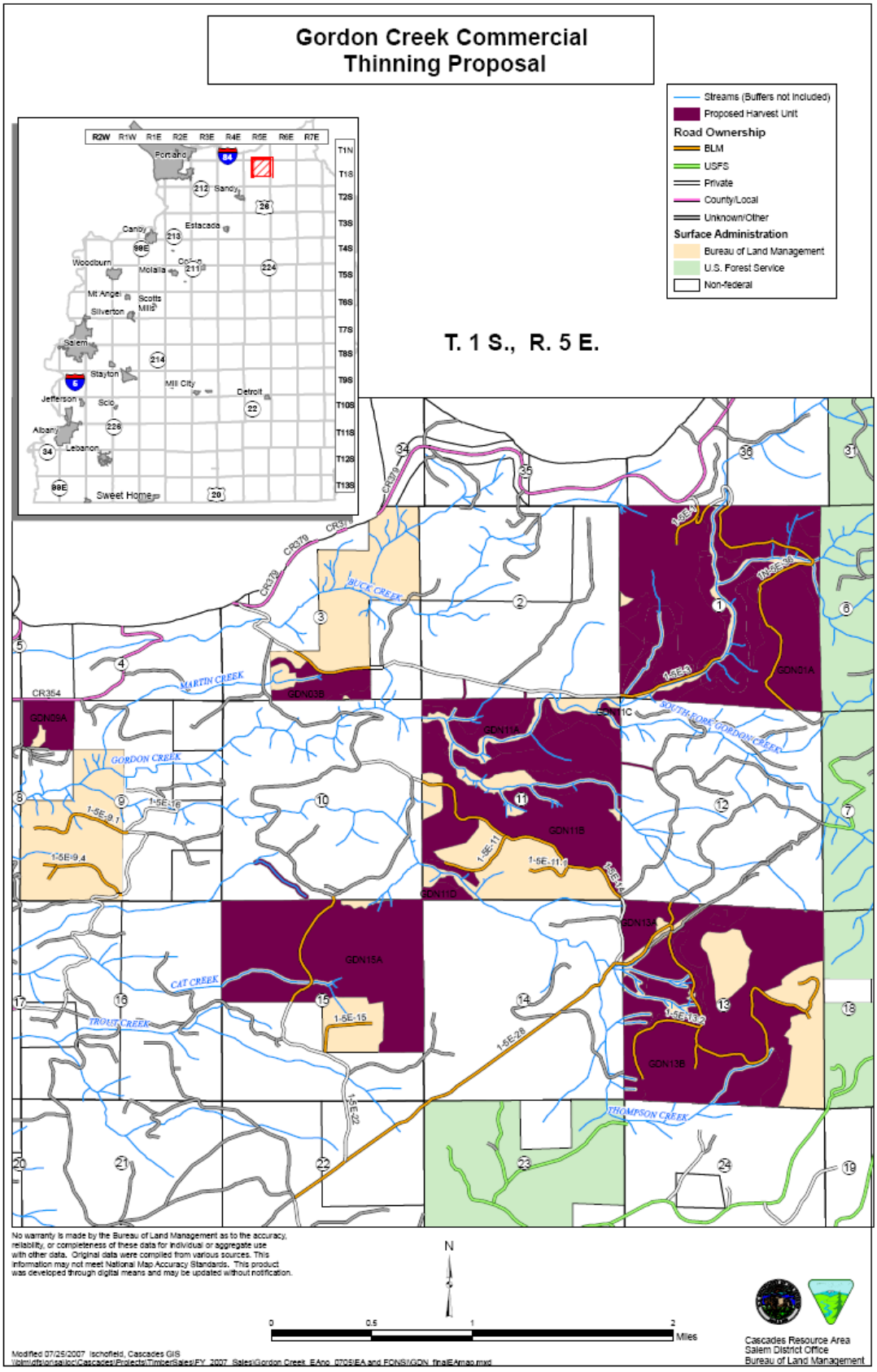
1.2 Purpose of and Need for Action

Data analysis and field examinations by BLM staff have identified specific stands in which growth rates will soon decline or have already started to decline, and/or in which structural diversity is limited. The Salem BLM Resource Management Plan (RMP) describes Management Actions/Direction that may be applied to developing forest stands to attain specific resource objectives. The purpose and need for action is as follows:

- **Matrix Land Use Allocation (LUA) (RMP p. 20-22):** To manage developing timber stands in the Matrix LUA in order to:
  - Maintain the health and growth of developing stands;
  - Achieve a desirable balance between wood volume production, quality of wood, and timber value at harvest (RMP p. D-3);
  - Providing a sustainable supply of timber as described in the RMP (p. 1, 46, 47);
  - Develop timber sales that can be successfully offered to the market place;
  - Retain elements that provide ecosystem diversity (snags, old growth trees, etc.) so that a healthy forest ecosystem can be maintained with habitat to support plant and animal populations (RMP p.1, 20); and
  - Increase protection for the public, facilities and high-value resources from large, intense wildfires in rural/urban interface in accordance with the National Fire Plan's Healthy Forest Initiative and Restoration Act.

- **Riparian Reserve LUA (RMP p. 9-15):** To apply silvicultural practices in some dense conifer-dominated sites within the stands of the Riparian Reserve LUA in order to:
  - Develop future large coarse woody debris, large snag habitat, in-stream large wood and other elements of late-successional forest habitat. (RMP p.1);
  - Continue to develop structural and spatial diversity of the forest ecosystem on a landscape level in the long term.

Map 1: Gordon Creek Project Area



- **Roads:** To maintain and develop a safe, efficient and environmentally sound road system **(RMP p. 62)** in order to:
  - Provide appropriate access for timber harvest, silvicultural practices, and fire protection vehicles needed to meet the objectives above;
  - Limit potential human sources of wildfire ignition by controlling access;
  - Reduce environmental effects associated with identified existing roads within the project area (RMP p. 11).

1.2.1 Decision Criteria/Project Objectives

The Cascades Resource Area Field Manager will use the following criteria/ objectives in selecting the alternative to be implemented. The selected action would:

- Meet the purpose and need of the project (*EA section 1.2*)
- Comply with 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*)
- Would not have significant impact on the affected elements of the environment beyond those already anticipated and addressed in the RMP EIS.
- Implement Best Management Practices (BMP) to protect the community of Corbett's water supply.

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

The proposed commercial thinning activities in the project area have been designed to conform to the following documents, which direct and provide the legal framework for management of BLM lands within the Salem District:

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 (e.g. complies with management goals, objectives, direction, standards and guidelines) as required by 43 CFR 1610.5 (BLM Handbook H1790-1). Implementing the RMP is the reason for doing these activities (RMP p.1-3);
2. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl*, April 1994 (the Northwest Forest Plan, or NWFP);
3. *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, January 2001; including any amendments or modifications in effect as of March 21, 2004.

The analysis in the Gordon Creek Thinning 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 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.

The *Gordon Creek Watershed Analysis* (July 2006) provided additional direction in the development of the proposed thinning activities.

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

Survey and Manage Species Review

The Bureau of Land Management (BLM) is aware of the August 1, 2005, U.S. District Court order in Northwest Ecosystem Alliance et al. v. Rey et al. which found portions of the *Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (January, 2004) (EIS) inadequate. Subsequently in that case, on January 9, 2006, the Court ordered:

- set aside the 2004 *Record of Decision To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern spotted Owl* (March, 2004) (2004 ROD) and
- reinstate the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines* (January, 2001) (2001 ROD), including any amendments or modifications in effect as of March 21, 2004.

The BLM is also aware of the November 6, 2006, Ninth Circuit Court opinion in Klamath-Siskiyou Wildlands Center et al. v. Boody et al., No. 06-35214 (CV 03-3124, District of Oregon). In Northwest Ecosystem Alliance et al. v. Rey et al the U.S. District Court modified its order on October 11, 2006, amending paragraph three of the January 9, 2006 injunction. This most recent order directs:

"Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applied unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:

a. Thinning projects in stands younger than 80 years old;
b. Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;
c. Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement of large wood, channel and floodplain reconstruction, or removal of channel diversions; and
d. The portions of projects involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph."

The majority of the Gordon Creek Project meets **Criterion A.** above: Thinning projects in stands younger than 80 years old. Unit 3A (5 acres) is over 80 years of age and does not fall under Criterion A. Unit 3A was surveyed for red tree voles under the current protocol, and no active nests were found.

Northern Spotted Owl (NSO) Status Review:

The following information was considered in the analysis of the Gordon Creek proposed activities: a/ *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney *et al.* 2004); b/*Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony *et al.* 2004); c/ *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and *Northwest Forest Plan – The First Ten Years (1994-2003):* d/ *Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005). Although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California.

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

Aquatic Conservation Strategy Update

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

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

Previously, in *Pacific Coast Fed. Of Fishermen's Assn. v. Natl. Marine Fisheries Service,* 265 F.3d 1028 (9th Cir. 2001)*(PCFFA II)*, the United States Court of Appeals for the Ninth Circuit ruled that because the evaluation of a project's consistency with the long-term, watershed level ACS objectives could overlook short-term, site-scale effects that could have serious consequences to a listed species, these short-term, site-scale effects must be considered.

EA sections 3.1 - 3.3 show how the Gordon Creek thinning project meets the Aquatic Conservation Strategy in the context of PCFFA IV and PCFFA II.

1.4 Results of Scoping

Scoping Comments are addressed in EA section 5.2. The following is a summary of the primary concerns raised in scoping:

- Protection of the domestic water sources
- Potential sediment generation from different logging methods, especially in the Riparian Reserve
- Potential impacts to Special Status Species

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."

Ownership patterns, some aspects of the road system, and special uses in the area strongly influence the development of the alternatives and effects analysis. O&C lands managed by the BLM are intermixed with private industrial forest lands, typically alternating sections so that the BLM does not manage contiguous blocks of more than one square mile. The US Forest Service (USFS) manages a large block of land adjacent to the east side of the project area. Other special uses within and immediately adjacent to the project area include:

- The Corbett community municipal watershed, one intake on BLM land, another intake adjacent to BLM land, intake and delivery pipes under roads, and the treatment plant.
- The Bull Run watershed, Portland Water Bureau, is adjacent to the south boundary of the project area in Section 13.
- A communications site in Section 13, including underground power lines immediately adjacent to the existing road and transformer(s).
- A major power line and service road that pass through Section 13.
- The Larch Mountain Education Site (BLM) in Section 3.

Most of the haul roads in and near the project area are private roads, with the following features that influence alternative development:

- Most of the roads accessing the project area are gated and are customarily locked. All access to BLM lands in Sections 1, 3, 11, 13 and 15 requires crossing private land and/or use of private roads and legal access is by permission only.
- The BLM does not have rights to use the road system that crosses Gordon Creek.
- Some of the roads are not designed, constructed or maintained to BLM standards.

The amount of road construction and renovation, including temporary stream crossing and removal of an existing log fill stream crossing, is an unresolved resource conflict that led to development of multiple action alternatives. Protection of the Corbett water source and potential sediment generation from different logging methods, especially in the Riparian Reserve, was also a consideration in developing the action alternatives.

Three action alternatives were identified by the Interdisciplinary Team (IDT) that would meet the purpose and need of the project and have meaningful differences in effects from the Proposed Action. Therefore, this EA will analyze the effects of the "Proposed Action (Alternative 1)," "Alternative 2," "Alternative 3," and the required "No Action Alternative".

2.2 Proposed Action (Alternative 1)

See EA Section 7.2.1 for maps of the Proposed Action (Alternative 1)

The Proposed Action is to thin approximately 1805 acres including: 1600 acres of 53 to 72 year-old timber stands; 200 acres of a multiple aged two-storied stand (50 and 32 years old); and 5 acres of 117 year old stand *(Table 15)*.

Within the General Forest Management (GFMA) portion of the Matrix LUA, units would be thinned by removing suppressed, co-dominant, and occasionally dominant trees (thinning from below), leaving residual overstory trees at a stocking level designed to provide for optimum growth, healthy stand structure and habitat requirements. Generally, the largest trees would be left.

In addition, up to six openings of low density retention (retaining approximately 12-20 trees per acre) would be created to provide open area and edge habitat within the larger blocks of these uniform stands. Larger trees, preferably Douglas-fir, that are firmly rooted in mineral soil and show no signs of disease would be selected for retention whenever possible. These openings would be approximately 2.5 acres (one hectare). Fuel treatment, seedbed and planting spot creation, seeding with native species, monitoring natural conifer regeneration, weed control, and conifer planting and maintenance would be done as needed for several years after harvest.

Within the Riparian Reserve LUA, a combination of thinning from below, low density patches, and no-treatment patches would be applied to accelerate the development of diverse forest conditions. At least ten percent of the treatment area would be untreated, and small openings of low density retention (up to one acre in size, retaining approximately 12-20 trees per acre) would be created in 5 – 15 percent of the treatment area. The remaining area would be thinned from below, generally leaving the largest trees where structural and horizontal diversity could be enhanced. See *EA Section 7.1.1, Table 15* for a unit-specific summary of tree densities before and after thinning.

Approximately 80-85 percent of the project area would be harvested using conventional ground-based logging equipment, and approximately 15-20 percent would be harvested using skyline or low-impact ground-based yarding systems. Old railroad grades, skid trails and truck roads are evident throughout the project area and would be re-used for harvest operations where they are suitable for use under current BMP.

2.2.1 Connected Actions

1. **Road Work (***EA Section 2.5 - Table 4; EA Section 7.2 – Maps 2 - 7***):**

- ***New Road Construction*:** "New Construction" is building a road where none existed before. Approximately 6 miles of new road construction would occur. All new roads would be natural surface (no rock would be added), except for approaches to County roads.

- ***Road Improvement*** "Road Improvement" is making an existing road substantially better than its original design, such as making it wider, major changes to alignment, removing substantial vegetation and trees from roadbed, or rocking a road that was originally designed as natural surface. Approximately 4 miles of unmaintained, existing roads would be improved**.**

- ***Road Renovation:*** "Road Renovation" is returning an existing road to its original design standards. Renovation to accommodate timber haul would include roadside brushing, minor realignment, removing vegetation (including some trees) that has grown in the right-of-way, blading road surfaces, shaping roadbeds for proper drainage, spot rocking, and maintaining or replacing culverts and ditches so drainage systems function properly. Existing old railroad grades and other roadbeds would be renovated and used for harvesting operations where they are suitable for use under current BMPs. Approximately 4 miles of existing road in the Gordon Creek project area would be renovated.

- ***Maintenance Renovation:*** "Maintenance Renovation" is the normal, periodic work done to maintain existing, open roads in a useable, safe and environmentally sound condition. It includes roadside brushing, blading road surfaces, maintaining ditches and catchment basins, adding rock to replace normal rockwear and spot repairs. Approximately 11**.**5 miles of existing road to be used as the haul route in the Gordon Creek project area would be maintained in this way.

2. **Fuels Treatments**

- Fuel treatments would be implemented on portions of the project area to decrease intensity and extent of potential wildfires.
- Treatments would include lower relative density thinning (reduce canopy bulk density which reduces likelihood of crown fire), directional falling (to keep tree tops and limbs away from property lines and open roads) and/or treatment of logging slash and ground vegetation.
- The logging slash in treatment areas would be reduced by piling and burning, machine processing (mastication) on-site, or by a combination of these techniques. Of the total number of acres proposed for treatment, approximately 160 acres are proposed for additional treatment after the thinning treatment to reduce hazardous fuels, an initial treatment of 9% of the total area. The following table shows the units and proposed treatments to reduce fire risk.

Table 2 - Proposed Fuel Treatments for Gordon Creek

Section	*Treatment*	*Acres*	*Wildland Urban Interface*
3	Approximately 200'along road across from water treatment to have fuel load reduced through utilization, piling or mastication.	3	Yes
9	Relative density (RD) after thinning at the low end along with surface fuel reduction ~200' near residence on the SE and along roads.	9	Yes
11	Directional felling	10	No
13	RD after thinning to be at the low end along with surface fuel reduction north along and below the ridgeline of the Bullrun Watershed. This will need periodic maintenance to slow fire movement into or out of the Bullrun.	75	No
15	Directional felling along property lines with young stands, additional fuel reduction if needed in these areas	40	No
Total Slash Treatment Acres		137	

3. **Blocking Unauthorized Off-Road Motor Vehicle Trails (RMP p. 41)**
   - Areas within proposed harvest units which are potentially subject to unauthorized use by motorized vehicles would be individually evaluated to determine the best combination of treatments to stabilize and prevent further use of existing trails while avoiding damage to other resources.

4. **Special Forest Products (SFP) (RMP p. 49)**
   - Special Forest Products from the harvest units would be offered for harvest if market demand, product availability, and contract timing allow such offerings.

2.2.2 Project Design Features

Design features would be implemented to reduce the risk of effects to the resources described in *EA Section 3.0*. Project design features described in this section would be implemented in all action alternatives unless otherwise specified. Design features are organized by resource management objectives. Many of the design features contribute to achieving multiple objectives.

1. **Soil Productivity:** Maintain long term soil productivity with minimal productivity loss due to compaction, erosion and reduced fertility caused by the proposed action.
   - *All Timber Harvest Operations*:
     - Project area layout would exclude areas where operations would be expected to cause compaction or erosion greater than the levels analyzed in this EA.

- All logging operations would utilize currently available equipment and practices that are capable of achieving the objectives of the Best Management Practices (BMP) required by law, described in the RMP, and defined by the Interdisciplinary Team of Resource Specialists (IDT) for the project.
- All logging operations would be designed for each site to limit the area compacted less than ten percent of the harvest unit area.
- All logging operations would be designed for each site to avoid concentrating runoff water flows that could cause erosion.
- The majority of logging slash and debris would be left in place, or returned to the harvest area to reduce erosion potential and to return nutrients and organic matter to the soil.
- On compacted or disturbed soil, erosion control measures such as shaping to modify drainage (water bars, sloping, etc.), tilling, slash placement, and seeding with native species would be used as needed to prevent erosion that results in gullies or transporting soil to water courses.

- *Skidding And Other Ground Based Logging Operations*:
  - Skidding (dragging logs behind a skidder) operations would be allowed during relatively dry soil conditions, typically mid-June through October with one end of log suspended.
  - New skid trails would only be allowed on slopes not greater than 35 percent. Uphill skidding would generally be limited to slopes of 20 percent or less.
  - Skid trail locations would be evaluated and approved by the BLM before logging begins. Existing skid trails would be used whenever appropriate (feasible and meets resource objectives).
  - Mechanized falling/processing and log handling operations using low ground pressure tracks or tires would be limited to operating on slopes not greater than 45 percent. When not operating on approved skid trails, these machines would be required to operate on top of a slash and brush mat.
- *Skyline Yarding Operations*:
  - The leading end of all logs would be lifted off of the ground during yarding (one-end suspension) to prevent logs from plowing a groove.
  - Lateral yarding to the skyline would be used to reduce the number of skyline corridors needed and to minimize soil displacement between corridors.
  - Landing size would be limited to the minimum area needed for safe and efficient operations.
- *Other Operations*:
  - Slash and debris piles to be burned would be placed and constructed to affect the minimum area necessary for safe operations (smallest "footprint").
  - Burning would be done after fall rains begin and the soil is wet to reduce the amount of heat imparted to the soil.

2. **Hydrologic Function, Aquatic Habitat and Fisheries:** Protect water quality, channel and bank stability, and flows.
   - ***Water Quality - Sediment Generated by Logging and Roads:*** Design features for logging that prevent or reduce potential erosion and other soil movement; protect water quality by preventing sediment transport to streams, wet areas and riparian areas; and protect the community of Corbett's water source include:

- Equipment and methods for all logging and road operations would utilize currently available equipment and practices that are capable of achieving the objectives of the BMP required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) as well as Aquatic Conservation Strategy Objectives and other objectives described in the RMP and identified by the IDT.
- Areas of undisturbed vegetation would be maintained between harvest areas and streams/ wetlands, also known as Stream Protection Zones (SPZ).
- All new roads and some existing roads would be stabilized or decommissioned after use to prevent erosion and reduce changes to natural drainage patterns.
  - Roads that are expected to be used in the next few years would be stabilized with water bars or other surface shaping, surface tilling, seeding with native species, sediment traps, and/or other techniques to prevent erosion. Culverts and the subgrade would be left intact.
  - Roads that are not expected to be used within the next several years would be decommissioned by removing culverts (or other stream crossing structures such as log fill), constructing water bars or other surface shaping, re-establishing natural drainage patterns, deep tilling, seeding with native species, and/or other techniques to prevent erosion and promote infiltration of water. The material and basic structure of the subgrade would be left in place.
- Natural surface roads that would be kept intact over winter for use the next year would be treated to prevent erosion. Typical control measures include: matting, mulching, drainage modification, seeding, sediment traps and blocking the entrance.
- Sediment would be filtered from ditches that drain into stream crossings. Typical methods include: maintaining vegetation in the ditch and installing artificial sediment traps or filters.
- Hauling would be restricted to times and road conditions that would not generate large amounts of sediment that could enter streams.
  - Natural surface roads – Hauling and other operations would be allowed during dry season and dry conditions only.
  - Rocked roads, not otherwise specifically restricted – Hauling would be allowed only when traffic would not "pump" fines (sand, silt and clay size particles) to the surface where they could be washed into streams by runoff.
  - Wet season/wet condition hauling across the stream crossing in Section 15 would be restricted.
  - Puddles at stream crossings would be prevented by adding rock and/or shaping the road surface.
  - Road and weather conditions would be monitored and hauling would be suspended whenever conditions would potentially introduce of sediment into streams that would exceed State of Oregon turbidity standards established by the Oregon Department of Environmental Quality (DEQ).
  - Road/stream intersections on flowing streams would be visually monitored by the BLM during haul to ensure compliance with State of Oregon turbidity standards.
- Road construction, stabilizing and decommissioning operations would be restricted to dry weather patterns (generally summer months) and dry conditions only.
- Temporary stream crossings (culvert or structure) would be installed, used and removed the same season. Coarse rock (very little fine material that could create sediment) would be used for all fill and would be removed with the culvert/structure.

Work methods and sediment traps would be used as needed to reduce or eliminate potential sources of sediment. Stream channels and banks would be shaped for stability and disturbed soil would be seeded with native plant species.

- Culvert removal/replacement/installation and other in-stream work would be done only during the in-stream work period established for the watershed.

- ***Other Components of Hydrologic Functions, Aquatic Habitat and Fisheries (Channel, Bank, Temperature, Etc.)*:** Design features to avoid adverse negative impacts to hydrologic functions include:
  - A Stream Protection Zone would be established adjacent to each stream where treatment is proposed within the Riparian Reserve. No silvicultural treatment would take place within the SPZ and no vegetation that shades streams would be cut or removed.
    - For perennial streams, the SPZ would extend to topographic or ecological breaks, with a minimum of sixty (60) feet on each side of the channel.
    - For intermittent streams, the SPZ would extend to topographic or ecological breaks, with a minimum of twenty-five (25) feet on each side of the channel.
    - For spring heads with populations of potentially sensitive mollusks or amphibians, the SPZ would extend to a site potential tree height (typically 200-220 feet) from the main spring head except where a topographic feature such as a ridge or a man-made feature such as a road or road cut indicates a logical SPZ boundary.
  - Trees in the harvest unit would be directionally felled to avoid impacts to the SPZ.
  - Trees and snags in the SPZ that must be felled for safe operations would be left onsite as CWD.
  - Roads to be constructed would be located in upland areas on stable ground with low to moderate slopes that do not require extensive cut-and-fill construction methods.

3. **Stand Structure, Wildlife Habitat and Other Vegetation:** Protect and enhance the residual stand, timber production (Matrix), stand diversity, wildlife habitat components and native species.
   - All old growth trees would be left standing.
   - Large snags (generally at least 15 inches diameter and 15 feet tall) would be left standing to the greatest extent possible under legal safety requirements such as Occupational Safety and Health Administration (OSHA) requirements (RMP p D-2), BMP, and standard contractual logging procedures. Any snags which are cut or knocked down incidental to operations would remain on site.
   - Existing CWD would be left in place whenever feasible under standard contractual logging procedures. Skid trail location and techniques requiring minimal movement of CWD would be used to protect the integrity of CWD. If suitable CWD needs to be moved, a section of the log would be cut to allow access, instead of moving the entire log. Large debris would not be piled or otherwise treated during slash treatment.
   - Thinning prescriptions, boundary location and logging methods in the Riparian Reserve LUA would be designed to enhance stand diversity and habitat characteristics.
   - Minor conifer tree species, hardwoods, cull/deformed trees and open grown "wolf trees" would be specifically retained where they are uncommon.

- *Forest Stand Protection:* Operational methods to protect the forest stand from damage would be required, including techniques such as: falling and yarding would be restricted or protection measures used as needed during the spring growing season when bark is easily damaged; directional falling; skid trail alignment; lateral yarding to skylines and location of burn piles to avoid heat damage to trees.

- *Invasive/Non-native plants:* Only native plant species and sterile mulch would be used for vegetating disturbed soil to stabilize it. Logging, road construction and other ground based equipment would be cleaned 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 (RMP p. 64).

4. **Threatened, Endangered or Other Special Status Plant and Animal Species:** Minimize disturbance to federal Threatened and Endangered Species; protect, manage and conserve Special Status plants and animals and their habitats.
   - *Northern spotted owl:* A seasonal restriction on habitat modifying operations (falling, yarding and road construction) and helicopter use *(Alternatives 2 and 3)* would be implemented during the northern spotted owl nesting season. This restriction could be waived if surveys indicate no presence of nesting spotted owls within 0.5 mile of a harvest unit.
   - Operations may be restricted or shut down at any time if plant or animal populations that need protection are found (RMP p. 29).
   - Plant and animal species/populations requiring protection would be buffered in accordance with directed guidance.

5. **Fire and Air Quality:** Reduce long term risk of intense wildfire, reduce potential ignition and intensity of wildfire in the short term, provide for effective fire control, and protect air quality.
   - All burning would occur under favorable smoke dispersal conditions in compliance with the Oregon Smoke Management Plan (RMP p. 22, 65). Burning would take place in the fall after the winter rains begin.
   - Large woody debris would not be piled or treated.
   - Areas along open roads, near residences and adjacent to the Bull Run Watershed boundary would have fuel treatments to provide a fuel break for 100 to 300 feet from the road, residence or boundary.
   - Slash and debris piles at landings would be burned, chipped or removed.

6. **Rural Interface and Recreation:** Reduce potential hazards to rural interface and the Larch Mountain Education Site.
   - Signs and road control would be required where necessary to ensure public safety while thinning, hauling and fuel treatment activities are occurring.
   - The Larch Mountain Education Site parking lot would not be used for landing operations.
   - The trail in Section 3 would not be used as a skid trail and the trail would be repaired if damaged by logging operations.

7. **Cultural Resources:** Protect cultural resources.
   - If prehistoric cultural resources are encountered during project implementation, ground disturbing activities should be restricted or halted until a professional evaluation of the resource including appropriate management recommendations can be made.

Table 3 - Summary of Seasonal Restrictions and Operational Periods

Seasonal Restriction	*Reason*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
Most logging operations and road work	Owl nesting/helicopter use through July 15												
Falling and yarding	Bark slippage												
Tractor operations	Soil damage												
Road Construction / Decommissioning	Soil damage/erosion control												
In-water work, roads[1]	Protect fish species												

Key	Operations generally allowed.	Operations typically dependent on conditions.	Operations generally restricted

[1] Includes live stream culvert replacement

2.3 Alternative 2

See EA Section 7.2.2 for maps of Alternative 2.

This alternative considers minimizing road construction and renovation. The proposed treatment would be the same as in the Proposed Action (Alternative 1) and Alternative 3. Reducing the total amount of road construction and renovation would result in changes to logging methods. The road network proposed in this alternative would lead to the following changes in logging systems and design features, compared to the Proposed Action:

- Approximately 575 acres would be helicopter logged instead of skyline yarding or ground based logging.
- For helicopter logging operations, approximately nine landings (6 log landings and 3 service landings), ½ to one acre in size, would be constructed.
- Roads to helicopter landings (both service and logging) and the work area would be rocked for winter operations. Rock would be obtained from private sources.
- The haul route through private land in Section 12 may be used for winter haul.

Other Connected Actions for Alternative 2 are described in *EA section 2.2.1*. Project Design features for Alternative 2 are described in *EA section 2.2.2*. See *EA section 2.5* for a comparison of the Action Alternatives.

2.4 Alternative 3

See EA Section 7.2.3 for maps of Alternative 3

This alternative considers reduced road construction and renovation compared to Proposed Action (Alternative 1). The proposed treatment would be the same as in the Proposed Action and Alternative 2. Reducing road construction and renovation would result in changes to logging methods. The road network proposed in this alternative would lead to the following changes in logging systems and design features, compared to the Proposed Action:

- Approximately 200 acres would be helicopter logged instead of skyline yarding or ground-based logging.
- For helicopter logging operations, approximately six landings (four log landings and 2 service landings), ½ to 1 acre in size, would be constructed.
- Roads to helicopter landings (both service and logging) and the work area would be rocked for winter operations. Rock would be obtained from private sources.
- The haul route through private land in Section 12 may be used for winter haul

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Other Connected Actions for Alternative 3 are described in *EA section 2.2.1*. Project Design features for Alternative 3 are described in *EA section 2.2.2*. See *EA section 2.5* for a comparison of the Action Alternatives.

2.5 Comparison of Action Alternatives

Table 4 - Summary of Proposed Road Work for Action Alternatives

Alternative	***Road Work (Distances in whole miles, approximate)***						
Type*	***New Construction***	***Road Improvement***	***Road Renovation***	***Total***	***Natural Surface***	***Rocked***	***Maintenance Renovation***
Proposed Action	6	4	4	14	14	0	11.5
Alternative 2	<1	<1	2	3	1	2	11.5
Alternative 3	3	2	4	9	7	2	11.5

* For road work type definitions see 2.2.1., page 17.

Table 5 - Thinning Treatment Summary by Acres for Action Alternatives

Alternative	***Land Use Allocation (Approximate Acres)***			***Logging System (Approximate Acres)***			***Approximate Number of Helicopter Landings***
	Matrix GFMA	***RR***	***Total***	***Ground- based***	***Skyline***	***Helicopter***	
Proposed Action	1305	500	1805	1505	300	0	0
Alternative 2	1305	475	1780	1180	25	575	9
Alternative 3	1305	500	1805	1455	150	200	6

2.6 No Action Alternative

No timber management actions or connected actions would be implemented. Administrative activities and other uses (e.g. road use, road maintenance, harvest of special forest products on public land) would continue on BLM and non-federal lands within and adjacent to the project area according to plans for those areas. This alternative also serves to set the environmental baseline for comparing effects of the Action Alternatives.

2.7 Alternatives Considered But Not Analyzed In Detail

Regeneration Harvest
Generally, the RMP provides for regeneration harvest at Culmination of Mean Annual Increment (CMAI), at an approximate stand age between 70 and 110 years of age. During the first decade, regeneration harvests may be scheduled in stands as young as 60 years in order to develop a desired age class distribution across the landscape (RMP pg. 48). However, CMAI is calculated based on current stand conditions. The Resource Area has determined that these stands are approximately 15 years short of CMAI, therefore it was decided not to propose regeneration harvest at this time.

Reduced Road Construction/Renovation by Skyline Yarding Across Perennial Streams
Project planning indicated that skyline yarding across Gordon Creek with full suspension would be feasible in approximately 4 locations in Section 1, and approximately 5 locations in Section 11. This would reduce road renovation/ construction since roads and landings would only be needed on one side of the stream in these locations.

It would be feasible to fully suspend logs above the ground within the stream protection zone in these areas; however log movement in skyline corridors would break enough branches to reduce shading slightly. Calculations based on assumed scenarios indicate that shading could be reduced by as much as four percent, reducing shade levels from the current 92 percent to 88 percent. While 88 percent is still near the upper end of the published potential effective shade range (80-90 percent), the TMDL agreement (see Hydrology Report) requires no human caused reduction in effective stream shading on land managed by the BLM. BLM could not guarantee zero reduction in effective shading, so this alternative was dropped from further analysis.

Reduced Road Construction/Renovation to combination Skyline/ Tractor Swing with Minimal or No Helicopter Yarding
Since helicopter yarding is the most expensive available logging method, an alternative was presented to use a low cost skyline system with tractor swing system to landings on a reduced road network. The yarder would set up on skid trails instead of natural surface truck roads. This system would be used wherever feasible, defaulting to helicopter yarding only where it is the only technically feasible method.

This alternative would reduce new construction by approximately 1 ¼ miles. This alternative was dropped from further analysis because the IDT concluded that it was not substantially different from the Proposed Action, so it would not broaden the range of alternatives. The IDT concluded that the environmental effects of heavily used skid trails instead of, and in roughly the same locations as natural surface truck roads would be similar. The environmental effects on any areas where this system would be used have been analyzed under the Proposed Action.

Variable Density Thinning in Matrix
The primary functions of the Matrix land-use allocation are the production of timber and other commodities, and providing for connectivity to support dispersal between reserves and providing habitat for species associated with both late successional and younger forests. Variable density thinning (VDT) of forest stands is appropriate in land-use allocations designated to provide greater ecological diversity, owl nesting, foraging, and roosting habitat such as Late Successional Reserves (LSR) and Riparian Reserves (RR), but does not achieve these objectives as well as the proposed prescription. Some variability, including very low density openings, is inherent in the design and implementation of the action alternatives.

Prohibit Winter Haul on Private Roads in Section 12
It is unclear whether the BLM could legally enforce this restriction on private roads, so it was considered prudent to analyze the effects of winter haul on this road system for helicopter logging. In addition, additional costs associated with a summer/fall only operating season for helicopter logging could adversely affect the economic viability of the sale.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Identification of Affected Elements of the Environment

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 Action. *Table 6 (*Critical Elements of the Environment) and *Table 7* (Other Elements of the Environment) summarize the results of that review. Affected elements are **bold**. All entries apply to the action alternatives, unless otherwise noted.

Table 6 - Review of Critical Elements of the Environment (BLM H-1790-1, Appendix 5)

Critical Elements Of The Environment	***Status: (I.E., Not Present , Not Affected, Or Affected)***	***Does this project contribute to cumulative effects? Yes/No***	***Remarks If not affected, why?***
Air Quality (Clean Air Act)	**Affected**	**No**	**Addressed in text (*EA Section 3.2.7*)**
Areas of Critical Environmental Concern	Not Present	No	
Cultural Resources	Not Affected	No	Historic cultural sites and features are present. These resources have been determined not eligible for listing on the NRHP. Completed inventory reports and site record have adequately mitigated impacts to the historic values identified.
Adverse Impacts on the National Energy Policy (Executive Order 13212)	Not Present	No	
Environmental Justice (Executive Order 12898)	Not Present	No	
Prime or Unique Farm Lands	Not Present	No	

Critical Elements Of The Environment		*Status: (I.E., Not Present , Not Affected, Or Affected)*	*Does this project contribute to cumulative effects? Yes/No*	*Remarks If not affected, why?*
Flood Plains (Executive Order 11988)		Not Affected	No	The project is small in scale and would not change the character of the river floodplain, change floodplain elevations, or affect overbank flooding. Addressed in text (Section 3.2.3)
Hazardous or Solid Wastes		Not Present	No	
Invasive, Nonnative Species (plants) (Executive Order 13112)		**Affected**	**No**	**Addressed in text (*EA Section 3.2.2*)**
Native American Religious Concerns		Not Present	No	No known Native American religious sites are in the project area and no concerns from any Tribes were received during the scoping period. Addressed in text (Section 5.2)
Threatened or Endangered (T/E) Species or Habitat	**Fish**	**Affected**	**No**	**Addressed in text (*EA Sections 3.2.4, 5.1.1 & 7.1.2*)**
	Plant	Not Present	No	
	Wildlife (including designated NSO Critical Habitat)	**Affected**	**No**	**Addressed in text (*EA Section 3.2.6*)**
Water Quality (Surface and Ground)		**Affected**	**Yes**	**Addressed in text (*EA Section 3.2.3*)**
Wetlands (Executive Order 11990)		Not Affected	No	No measurable effects to wetlands are expected because all proposed activities would occur outside of known wetlands. Addressed in text (*EA Section 3.2.3*)
Wild and Scenic Rivers		Not Present	No	
Wilderness		Not Present	No	

Table 7 - Review of Other Elements of the Environment

Other Elements of the Environment	*Status: (I.E., Not Present , Not Affected, Or Affected)*	*Does this project contribute to cumulative effects? Yes/No*	*Remarks If not affected, why?*
Fire Hazard/Risk	**Affected**	**No**	**Addressed in text (*EA Section 3.2.7*)**
Other Fish Species with Bureau Status and Essential Fish Habitat (RMP p. 29)	Not Present	No	No fish species with Bureau Status are found within the project area. Thinning and connected actions in the project area would have no effect on Essential Fish Habitat (EFH) as designated under Magnuson-Stevens Fishery Management Act because no EFH exists within the project area.
Land Uses (right-of-ways, permits, etc)	Not Affected	No	

Other Elements of the Environment		*Status: (I.E., Not Present , Not Affected, Or Affected)*	*Does this project contribute to cumulative effects? Yes/No*	*Remarks If not affected, why?*
Late Successional and Old Growth Habitat		Not Present	No	Stands proposed for thinning are not functioning as late-successional old growth habitat.
Mineral Resources		Not Present		
Recreation		**Affected**	**No**	**Addressed in text (*EA Section 3.2.8*)**
Rural Interface Areas		**Affected**	**No**	**Addressed in text (*EA Section 3.2.8*)**
Soils		**Affected**	**No**	**Addressed in text (*EA Section 3.2*.5)**
Special Areas outside ACECs (Within or Adjacent) (RMP p. 33-35)		Not Present	No	
Other Special Status Species / Habitat	Plants	Not Present	No	Addressed in text (*EA Section 3.2.1*) There are no known or suspected T&E plant species or suitable habitat within or adjacent to the proposed project area.
	Wildlife	**Affected**	**No**	**Addressed in text (*EA Section 3.2.6*)**
Visual Resources		Not Affected	No	Addressed in text (*EA Section 3.2.8*)
Water Resources – Other (303d listed streams, DEQ 319 assessment, Downstream Beneficial Uses; water quantity, Key watershed, Municipal and Domestic)		**Affected**	**No**	**Addressed in text (*EA Section 3.2.3*)**
Wildlife Structural or Habitat Components - Snags/CWD/ Special Habitats, road densities		**Affected**	**No**	**Addressed in text (*EA Section 3.2.6*)**

The resources affected by the proposed thinning activities are: vegetation and forest stand characteristics, Corbett water supply, hydrology, fisheries and aquatic habitat, soils, wildlife, air quality and fire/hazard risk, and recreation and rural interface. *EA Section 3.2* describes the current condition and trend of the affected resources and the environmental effects of the alternatives on those resources.

3.2 Affected Environment and Environmental Effects

3.2.1 Existing Watershed Condition

The Gordon Creek Watershed is located in the lower Sandy River basin, approximately 20 miles east of Portland, Oregon. The sixth-field watershed covers approximately 11,000 acres. Gordon Creek drains the southwest side of Larch Mountain (Gordon Creek Watershed Analysis (GCWA) p. 1-2). This watershed is not a key watershed as defined in the Northwest Forest Plan (NWFP), p. A-5 (GCWA p. 2-1).

Approximately 24% of the watershed is managed by BLM, 47% is private, 28% is Forest Service (USFS), and 1% is local government. USFS lands are concentrated in the upper quarter of the watershed, while BLM lands are intermingled with private lands in the middle portion (GCWA p. 1-5).

Historical human use in the watershed focused on logging (GCWA 10-1) (EA section 3.2.2). Today, a major land use in the watershed is industrial forestry (GCWA p. 1-5). Two water intakes for the Corbett Water District municipal water supply are within this watershed (GCWA p. 1-8).

There are 65 miles of useable road in the Gordon Creek Watershed, most of which are closed to the public. Two features, proximity to stream and slope steepness, are important determinants of road-associated erosion potential. Approximately 25 percent of the roads are within 200 feet of a stream, but only a small fraction of those are on steep slopes. Slope gradients are moderate throughout the majority of the watershed. Slope gradients for nearly two thirds (63%) of the watershed are less than 20 percent. Roads are closed to the public primarily as a result of the intermingled private and public ownership pattern (GCWA pp. 1-8, 3-8).

Eighty (80) percent of Gordon Creek Watershed is dominated by closed-canopy conifer forests; 20 percent of the watershed area is covered by mixed conifer-broadleaf forests (GCWA p. 5-2). The watershed is dominated by closed mid-seral stands 41- to 80-years of age, which lack structure and characteristics of late successional stands (GCWA p. 11-1). Approximately 92 percent of BLM forest stands within the Gordon Creek watershed are less than 70 years old. BLM land is within the General Forest Management Area (GFMA) portion of the Matrix land use allocation described in the Salem District Resource Management Plan (RMP p.5), (NWFP p. A-5), and within the Riparian Reserve land use allocation (GCWA p. 1-5).

3.2.2 Vegetation and Forest Stand Characteristics

Source*: Gordon Creek Silvicultural Prescriptions – 2007 Timber Sale Thinning EA; Cascade Resource Area Botanical Report – 2007 Timber Sale EA; 2007 Timber Sale Thinning EA-Wildlife report; BLM archival records; Gordon Creek Watershed Analysis*

Affected Environment

Stand Characteristics and History

The original forest stands throughout the project area were clearcut logged in the 1920s and 30s. Other parts of Larch Mountain area were logged beginning in the 1800s when Bridal Veil Lumber Company built their mills and started laying railroad line. Timber sale dates on BLM managed land in the Gordon Creek area ranged from 1925 to 1936, almost exclusively to Bridal Veil Lumber Company. Site preparation was largely neglected, or incidental to fires in the area. Generally, two seed trees per acre were left, along with some cull trees.

Some augmentation with planting or broadcast seeding may also have been done, but much of the regeneration was from seed produced by the smaller, more poorly formed or diseased trees, rather than the larger, healthier and straighter trees.

Railroad logging was a very common logging method in the northwest in that era, and was used extensively in the Gordon Creek area. The logging methods used shaped the terrain, access and forest stands in the project area today. There are railroad grades throughout the project area, many with extensive cut-and fill roadbeds and through-cuts, often 15-20 feet deep. Some of these were mainlines, such as the north-south Brower Mill Road, while many of them are simply spurs used entirely for logging specific areas.

There are also numerous other roadbeds and trails throughout the stands in the area that were likely a combination of railroad spurs, truck roads and skid trails used by oxen and/or bulldozers. Where railroad trestles crossed streams in gentle curves, truck roads often continued upstream with steeper slopes and sharper curves to a suitable truck road crossing. Yarding on most slopes was done with steam donkeys and hi-lead cable systems that often provided no suspension while dragging logs up the hillside. In relatively flat areas or where gentle slopes led downhill to loading areas, skidding with oxen, bulldozers, and hi-lead yarding were used.

The current stands are largely dominated by western hemlock followed by Douglas-fir, with scattered western redcedar and Pacific silver fir. The stands average 53-72 years of age in most of the area. Most stands are mixed, tightly spaced and exhibit a simple stand structure. The stands are lacking species diversity, ground cover, deciduous shrub understory layers, and lacking structural diversity, especially large remnant overstory trees.

Other species such as bigleaf maple constitute a small portion of the canopy composition in some stands. Canopies are generally closed (80-90 percent), and understory vegetation is sparse because of limited light reaching the forest floor. The understory that is present consists mostly of oxalis, foam flower, vine maple, devil's club, salal, Alaska huckleberry, rhododendron, Oregon grape, big huckleberry and beargrass.

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

Comprehensive botanical inventories of the proposed project area were conducted between April and August 2005. No Threatened & Endangered, Bureau Special Status, Special Attention or Survey & Manage vascular plants, lichens, or bryophytes were found within the proposed project area or close proximity during record searches or field surveys. *Gymnopilus punctifolius*, a Bureau Special Status fungi species was identified within the proposed project area. This fungus would not receive a protection buffer due to its status as a Bureau Tracking Species.

Invasive/ Non-Native Species

The following invasive/non-native Priority III invasive/nonnative species were found to occur within or adjacent to the project area; tansy ragwort (*Senecio jacobaea*), bull thistle (*Cirsium vulgare*), Canadian thistle (*Cirsium arvense*), St. John's wort (*Hypericum perforatum*) and scotch broom (*Cytisus scoparius*). These species were found primarily within the existing road corridors.

A Noxious Weed Risk Assessment of the project area was conducted and the area was found to have a risk rating of moderate (Cascade Resource Area Botanical Report – 2007 Timber Sale EA). A moderate rating indicates the proposed project could proceed as planned with measures in place to control and/or prevent the establishment of invasive/non-native plant species in areas of ground disturbance (See *EA section 2.2.2*).

Environmental Effects

3.2.2.1 All Action Alternatives

Vegetation and Forest Stand Characteristics

Matrix (GFMA)

Thinning would increase average stand diameter growth by reducing competition for water, light and nutrients, and concentrate future growth on fewer trees to develop larger-diameter dominant and co-dominant trees compared to an unthinned stand.

Thinning these stands at this time would slow crown recession, and would lead to the development of larger crowns and larger limbs as they grow into the spaces left after harvest has occurred. Less-dense wood (wider growth rings) and a higher proportion of wood with large knots in the live crown would be expected to develop throughout the thinned areas compared to the No Action Alternative. Areas thinned for the first time would be expected to develop these characteristics faster than untreated areas. Distribution of residual trees would be more or less uniform throughout the treatment area with spacing prescribed to achieve a desirable balance between room for growth and stocking levels that efficiently utilize the site for timber production.

Understory and ground cover species would increase in vigor, variety, and structural complexity with the additional light reaching the forest floor (*See photos 1-4*). The forest canopy would be expected to close again in 10-20 years.

The 2.5 acre very low density patches would begin providing edge, open area and forage habitat within the first year after harvest. Conifer seedlings would be established (growing well, survival not threatened) within the first 5-7 years after harvest and brush species would become established to provide that habitat niche.

Based on BLM experience with similar thinning projects, maintaining the prescribed stocking levels in thinned areas would provide trees in these stands with levels of mutual support and wind resistance that only occasional windthrow would be expected with normal wind patterns. Expected levels of windthrow would enhance structural complexity and CWD without substantially reducing timber production. If an abnormal high wind event occurred within the first 2-5 years, additional windthrow would be possible and could reduce timber production in the stand and would require evaluation for further treatment at that time. The openings created would contribute to structural complexity.

Windthrow within and adjacent to the 2.5 acre low density patches would be expected, at somewhat higher levels than elsewhere in the stand, but having essentially the same overall effects.

Roads, skid trails and skyline corridors would create narrow linear openings through the vegetation. Ground cover and brush would re-establish quickly in skyline corridors, but more slowly in compacted skid trails and road beds. Current access would remain the same before and after the project. The proposed project would not increase public access to Bull Run Watershed.

Riparian Reserves (RR):

Application of thinning prescriptions, including one-acre low density patches, and untreated areas would result in a wide range of residual tree densities with immediate overstory spacing diversity. Understory and ground cover would remain sparse in unthinned patches, and vigorous dense shrub patches would develop in heavily-thinned patches, resulting in an enhanced layer effect to the canopy and understory. The proposed action and associated design features would promote the growth of large trees faster, and provide a renewable supply of snags and CWD. Existing conifer regeneration would be enhanced in areas where gaps are created, and new conifer regeneration would be initiated by natural seeding.

Future entries may be needed to maintain or further enhance structural and horizontal diversity within stands. The increased growth in these stands would be expected to develop tree size and crown characteristics associated with mature and late-successional forest more quickly than untreated forest stands in the area.

Windthrow effects in Riparian Reserves would be expected to be similar to or lower than in the adjacent matrix since higher canopy closure would be maintained and since the low density patches would be smaller, allowing less wind velocity increase.

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

The proposed project would have no effect on any Threatened or Endangered Species, nor would it contribute to the need to list any Special Status/Special Attention/Survey & Manage Species known or expected to occur in the vicinity of the project area (*EA section 3.2.2*). If any previously undiscovered SEIS Special Status, Special Attention or Survey & Manage Species are discovered on site, appropriate mitigation would be implemented as described on page 2-41 of the RMP/FEIS.

The photos indicate the visual differences in stand characteristics that typically result from thinning prescriptions proposed in the Matrix LUA. All photos were taken from edge of road.

Photo 1: *Current dense stand before treatment. Note dead vine maple and very little understory.*

Photo 2: *Anticipated result after treatment (photo taken on adjacent private land). Note understory development.*

Photo 3: *Dense canopy view before thinning treatment.*

Photo 4: *Canopy view after thinning treatment (photo taken on adjacent private land), example of tree crown spacing.*

Invasive /Non-native Plant Species (Including Noxious weeds)

No adverse effects from invasive/non-native species would be anticipated. Observations in previous thinning projects throughout the Cascade Resource Area have not identified long term increases or expansion of existing populations. Roadside populations of noxious weeds could increase in vigor in the short term as more sunlight reaches the forest floor after treatment. Any plants spread from roadside to interior would remain low-vigor or die out completely and would not be expected to compete successfully with native species. As the canopy closes over the next 20 years, it is anticipated that any populations in the project area would be shaded-out and be reduced to low-vigor populations. Design features would reduce or eliminate the possible introduction of invasive/non-native species not known from the proposed project area. Weed response would be monitored following harvest treatments and weed treatments if needed under the *Cascades Resource Area Invasive/Non-Native Plant Management EA,* #OR-080-02-02.

3.2.2.2 Alternatives 2 and 3

Effects to vegetation under Alternatives 2 and 3 would be similar to the Proposed Action since the basic stand treatment is identical under all three action alternatives. The following text shows the differences between Alternatives 2 and 3 and the proposed action.

Alternatives 2 and 3: Less forest land would be converted to road than in the Proposed Action. The converted area would be directly proportional to length of road to be constructed (see *Table 4)*. No skid trails or skyline corridors would be used in helicopter logging areas, so those linear openings would not be created through the vegetation.

Alternative 3: Many of the same locations that would have been used for roads under the Proposed Action would be skid trails rather than natural surface truck roads.

3.2.2.3 No Action Alternative

Vegetation and Forest Stand Characteristics (all LUAs)

Without thinning, crowns would be expected to recede (become smaller relative to the total tree height as lower limbs are shaded out and die) over the next 10 to 20 years, reducing the live crown ratio (expressed as a percent of the tree height that has live limbs) and slowing growth rates on the trees.

Average tree size would continue to increase, but at a slower rate as competition for light and nutrients increases. Suppression mortality of smaller and weaker trees in the stand would be expected. Declining vigor in understory and ground cover species, where they are present, would be expected with increased shading from the closed canopy. Denser wood (narrower growth rings because of slower growth) and longer clear boles (tree trunk) would develop, compared to the Proposed Action.

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

With no human caused changes and excluding natural disturbances to the habitat that currently exists at the proposed project sites, no impact to any known or undiscovered Threatened, Endangered, Special Status, Special Attention, and Survey and Manage botanical species would be expected to occur. However, as the habitat in the proposed project area naturally changes over time, species composition for the different botanical groups would both increase and decrease during different stages of succession as suitable environmental conditions and substrates become available.

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

With the design features proposed for the project area, established invasive/non-native species population numbers would remain at or near current levels in the short term. Over time these levels would decline as native vegetation encroaches and displaces the non-natives species. These species would likely maintain a small population along roads and in natural openings and may increase in population size in areas where natural disturbances occur. The existing populations are currently being managed under the *Cascades Resource Area Invasive/Non-Native Plant Management EA* (#OR-080-02-02).

3.2.3 Hydrology

Source: *2007 Gordon Creek Hydrology/Channels/Water quality report*

Affected Environment

Stream Channels and Wetlands: Functional Condition

The project area contains reaches of both North Fork Gordon Creek, mainstem Gordon Creek and Thompson Creek, as well as several small headwater streams tributary to Gordon Creek in the Sandy River watershed. Resource Area Staff concluded that the project area streams field reviewed on BLM land are in "proper functioning condition" (U.S.D.I., 1998).

Where roads cross streams, the bed and banks of channels have been altered. Within the road prism (estimated at 30 feet maximum width) the channel surface, banks and bed have been compacted (bulk density of soils increased by as much as 30%), vegetation disturbed or removed and the bed/banks within the road prism have been obliterated. In some locations restrictions in stream flow due to undersized culverts or log fills have resulted in the deposition of sediment and woody material upstream of the crossing, and in some cases erosion of the road surface when the culvert overflowed. In other locations outflows from culverts have scoured the beds and banks of stream channels downstream from culverts. Both effects are generally limited to less than 100 feet upstream or downstream from the culvert and, due to the stable nature of most channels in the watershed, little to no additional disturbance to channel morphology has been noted.

Two wetland\pond complexes in the project area were identified on National Wetlands Inventory maps. Both wetlands are excluded from areas proposed for treatment.

Watershed Hydrology

Gordon Creek is similar to other Western Cascades streams where highest discharge takes place during winter storm events. Summer base-flow (when mean stream discharge drops below 20% of the mean winter flow) normally begins in perennial channels sometime in July and continues from August-October. Many small headwater channels (intermittent or ephemeral) dry up completely during this period.

Peak flow refers to the instantaneous maximum discharge associated with individual storm or snowmelt events (U.S.E.P.A., 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. The proportion of the seventh field watersheds in the project area within rain-on-snow (ROS) elevations varies from a high of 90% in Thompson Creek to a low of 0% in Lower Gordon Creek. The risk of peak flow enhancement within each seventh field varies with the proportion of an area that has been recently harvested. The proportion of ROS area with current crown closure <35% ranged from a high of 15% to a low of 5%, below the lowest threshold (20%) for a risk of existing effects. Therefore, there is currently a *low risk of peak-flow enhancement* due to forest harvest in all of the project watersheds (see Hydrology report pp 16-17).

Estimated channel network expansion at road-stream intersections for project watersheds range from a low of 8% in Middle Gordon to as high as 22% in Thompson Creek. The Wemple study implies that drainage density increases due to road stream intersections of approximately 20% or greater have the capacity to alter both the timing and quantity of peak flows (Wemple et al, 2003). Based on this, Thompson Creek (23%) and Upper Gordon Creek (20%) are at risk for augmentation of peak flows due to the road network in the watershed. The highest risk for water quality degradation in these two watersheds appears to be due to the proximity of the existing road network to streams (see Hydrology report pp. 10-11).

Water Quality and Beneficial Uses

Recognized beneficial uses of in-stream flows include municipal and domestic water supply, anadromous fish, resident fish, recreation, and esthetic values. Portions of the North and South Forks of Gordon Creek are the municipal watershed for the city of Corbett which withdraws surface water from Gordon Creek in Section 1 of the project area.

The North Fork intake is on BLM land in the SW ¼ of Section 1 and the South Fork intake is on private land in the NE ¼ of Section 12. Gordon Creek is not a key watershed or a Wild and Scenic River.

The ODEQ's 2002 303d List of Water Quality Limited Streams is a compilation of streams which do not meet the state's water quality standards. Gordon Creek is listed for not meeting summer stream temperature standards. As a result, the Sandy River Basin TMDL was issued as an order by the ODEQ on March 14, 2005.

According to the *Northwest Forest Plan Temperature Total Maximum Daily Load (TMDL) Implementation Strategies* (U.S. Forest Service and Bureau of Land Management. 2005) BLM actions would not reduce effective shade along perennial streams and would recover shade along reaches where it is below its potential range. Field surveys, review of aerial photographs and IVMP (interagency vegetative mapping project) data indicate that shading is near to full potential along the perennial streams on public lands in the project area with canopy closure exceeding 80% along most stream reaches. A 2006 survey along the main channel of North Gordon Creek in the project area estimated existing average effective shade (solar pathfinder measurements) to be 92 percent (Hawe, 2006). This is above the upper end of the range of *potential* effective shade (80-90 percent) for this reach. These data support the conclusion that existing stream side shading from riparian vegetation is adequate to buffer adjacent streams from temperature increases on public lands (see Hydrology report pp.20-21).

Neither the State of Oregon, nor the water provider for the City of Corbett (correspondence, field trip), have identified water quality concerns or issues in the Gordon Creek watershed related to sediment supply, transport or turbidity levels. During winter field reviews of area streams water clarity appeared high and high turbidity levels were not noted.

The Oregon Water Resources Department (OWRD), together with the Oregon Department of Environmental Quality (DEQ), is responsible for the regulation and protection of ground water quality and quantity. The DEQ has not identified any groundwater pollution problems within project watersheds. Six ground water wells, five for domestic water use and one for the City of Corbett, are located within project sections in Gordon Creek.

Environmental Effects

3.2.3.1 Proposed Action

Stream Channels and Wetlands

In general, there would be no direct alteration of the physical features of the project area stream channels or wetlands under this proposal. New road construction would not cross stream channels or wetlands. Stream banks, wetlands and channel beds are protected with a minimum buffer of 60 feet on perennial streams (and 25 feet from intermittent channels) from direct physical alteration or disturbance by harvesting equipment.

New road construction would not cross stream channels or wetlands, however, reconstruction of some stream crossings on roads that have not been maintained is proposed. Repairs to existing roads at stream crossings would maintain the channel alterations currently in place. In some cases, larger culverts and more stable fills would allow for improved channel morphology over the long term by reducing sediment inputs at the crossing and by increasing the culvert's capacity to accommodate the stream during peak flows (i.e., passage of water, wood and bed-load).

The temporary crossing structure on private land proposed in upper Gordon Creek (north of Section 1) would likely require bank and bed disturbance as the existing materials would be excavated and removed.

The reconstructed crossing in the southwest of Section 1 would also disturb the bed and banks by removal of the existing structure and replacement with a culvert and new fill material. Based on observations of existing culverts and stream crossings, effects from maintenance of stream crossings would be limited to site disturbance and unlikely to result in any alterations to stream channels or floodplains anywhere else in the watershed.

Effects from maintenance and replacement of stream crossings would be limited to the site of disturbance (i.e., not extend more than 100 feet downstream or upstream from the disturbance) and unlikely to result in any alterations to channels or floodplains downstream or elsewhere in the watershed. Indirect effects, such as increases in bank erosion, channel incision, loss of floodplain connectivity or alteration of local wetland hydrology, to stream channel or wetland morphology or function would be unlikely because of the stability and resiliency of channels in the project area (See Hydrology report pp 23-25). The removal of the log fill crossing structure in the SW ¼ of Section 1 would provide for improved stream flow and passage of sediment, organic materials and aquatic organisms and would eliminate the existing debris and potential fish barrier.

In all cases, long term effects on channel function or morphology from disturbance at stream crossings would be unlikely because the channels at these locations are resilient and would adjust to accommodate the new structures without creating bed or bank instability. Any channel adjustments would likely occur within the first one to three years following disturbance.

Watershed Hydrology

Ground Water Hydrology

It is unlikely the proposal would result in any detectable change to local ground water because the proposal would retain more than 40 percent (50 percent in Riparian Reserves) of the existing forest cover and the root systems of the conifers retained would quickly exploit any additional soil moisture availability (Troendle et al., 2006). Proposed road construction would not involve extensive cut and fill construction with excavation into side slopes where water tables could be intercepted.

Mean Annual Water Yield

Increases in mean annual water yield following the removal of watershed vegetation have been documented in numerous studies around the world (Bosch et al., 1982). Forest vegetation intercepts and evapo-transpires precipitation that might otherwise become runoff. Therefore, it is likely this proposal would result in some incremental increase in annual water yield (Troendle et al., 2006). However, the "increase in fall and winter discharge from forest activities is likely to have little biological or physical significance" (USEPA. 1991).

Base Flow

When a stand is thinned the root systems of the conifers retained would quickly exploit any additional soil moisture availability and transpire it as "water use per unit of leaf area can increase dramatically" (Troendle et al., 2006). Therefore, we conclude the proposal would be unlikely to result in any detectable change to local base flow.

Peak Flow Effects

Timber Harvest

Since portions of the project area lay in a zone subject to transient snow accumulations in the winter, we conclude that the reduction in stand density may result in increased snow accumulation.

However, it is unlikely this additional snow would melt quickly enough to contribute to peak flow increases. Research on snow accumulation and melt-off in Western Cascades (Berris, 1984) indicates that the prime mechanism responsible for increased rates of snow melt in forest openings relative to closed forests is turbulent heat flux from high wind speeds close to the snow surface. Retaining >40% average canopy closure in thinned stands would maintain wind speeds over the snow pack near the same velocity found in closed stands thus eliminating this influence (Troendle et al., 2006). The Oregon State Assessment does not consider forest with canopy closure >30% to be a substantial factor in ROS events.

Existing Roads

Most of the roads that would be utilized under this proposal already exist. This proposal would not alter these roads in a way that would likely reduce or increase any existing effect to peak flows attributable to the current road network, and thus, it would maintain the current condition and trends relative to hydrology and stream flow that existing roads contribute to. Improvement and repair of road surfaces may reduce existing road effects on peak flows by routing water to locations where it can infiltrate the soil but this would not be a detectable effect.

New Road Construction

New road construction under the proposed action would be limited to stable slopes primarily outside of riparian reserves, and no new stream crossings would be constructed. Slopes in this area are low to moderate and would not require extensive cut and fill construction. Road surfaces would be designed to efficiently drain surface water to adjacent slopes where it would infiltrate into the soil and groundwater. The proposed new roads are at low risk for intercepting ground water and routing surface drainage to streams; therefore, they are unlikely to result in an extension of the stream network or to have any detectable effect on watershed stream flow or peak flows.

Water Quality and Beneficial uses

Stream Temperature

To ensure that any harvesting adjacent to perennial streams would not increase summer temperature maximums, the BLM has agreed to follow the ***Northwest Forest Plan Temperature TMDL Implementation Strategies*** (U.S. Forest Service and Bureau of Land Management. 2005), allowing no reduction in effective shade to these streams. No detectable reduction in effective shade is anticipated since no shade producing vegetation within the "primary shade zone" (estimated to be no more than 60 feet from the active stream channel in all cases) of perennial streams would be removed and at least 50 percent canopy closure would be retained in the secondary shade zone.

Sediment Supply, Transport and Turbidity

Road Construction and Maintenance

All new road construction would occur on low to moderate slopes with stable surfaces emanating from the existing road network. The risk of road related landslides in these locations is minimal.

Road construction in this proposal would not cause an expansion of the stream network and therefore it would not provide additional opportunities for road sediment from fill failures or ditch-line run-off to enter stream channels.

All road construction would utilize the BMPs required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce non-point source pollution to the maximum extent practicable. BMPs recognize and make use of the fact that, although road construction may lead to an increase in sediment available for erosion, without pathways or mechanisms for that sediment to enter streams, it would not affect water quality.

Maintenance and improvements of existing roads (i.e., culvert replacement, added rock and blading of road surfaces, removal of log fill stream crossings and failing culverts) and construction of temporary stream crossings would occur during the dry season. This would likely result in increased turbidity during project implementation at stream/road intersections on perennial streams. Low flow and stream velocity, combined with the existing stream structure present in the North Fork of Gordon Creek, would allow sediment produced by installation, use and removal of the temporary stream crossing to precipitate out of the water quickly. Increased turbidity would not likely be visible beyond 800 meters below the crossing site or at the Corbett water intake (North Fork) approximately one mile downstream. During project work, turbidity in flowing streams would be visually monitored and be maintained within limits set by the Oregon DEQ.

Turbidity at stream crossings may also increase slightly in the first winter following the project. This would be most evident during early winter storms at a few locations where run-off on the road surface may be diverted to stream channels. Increased turbidity is unlikely to be visible beyond 800 meters below the site of the disturbance (see Foltz and Yanosek, 2005) and would be most evident during the rising water phase of the storm, decreasing again as the water level falls.

Turbidity levels would likely decrease as disturbed road surfaces (and the disturbed channel bed) become “armored” (i.e., fines are removed). Within one or two years, the supply and transport of fines from the road surface would return to pre-project levels. Any sediment yield increase would be difficult to measure and is unlikely to contribute more than a small fraction to the supply or transport of fine sediment in these watersheds. Over the long term, road repairs would help reduce the risks to water quality and watershed hydrology that these roads currently pose by improving road drainage, fill stability and increasing the size of culverts to accommodate greater stream flow volume.

Hauling

The main haul routes would be on rocked forest roads to paved county roads. Project design features call for no hauling during wet periods and/or wet road conditions when the potential for fine sediment delivery to streams is highest.

To ensure that haul is not contributing to increased turbidity exceeding Oregon DEQ standards in local streams, the authorized officer would visually monitor the road network and turbidity levels at road/stream intersections during haul. If turbidity levels approach limits set by the Oregon DEQ, the authorized officer would require the BLM contractor to reduce fine sediment run-off into the stream. Methods include (but are not limited to): adding rock to the road and grading of the road surface to improve drainage, placement of bark bags or other material in the ditch to filter sediment out of the water, and/or restricting haul until the contractor has mitigated the problem or road and weather conditions change so that sediment is not generated and transported to the stream.

Tree Harvest and Yarding

Mass Wasting Potential: Areas with potential for slope instability and mass wasting were identified during field work for the project proposal. All proposed treatment units are outside of any areas mapped as unstable or prone to mass wasting. Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting induced by loss of root strength are unlikely to result from this action. In addition, the minimal levels of surface disturbance under this proposal would be unlikely to result in the concentration of runoff on mass wasting susceptible slopes.

Surface Erosion Potential: WEPP (Water Erosion Prediction Project): The "Disturbed WEPP" module was utilized to predict runoff, surface erosion and sediment yield due to timber harvest and ground-based yarding for the proposed action, at a "representative" location adjacent to the Gordon Creek main channel in Section 1.

Total sediment yields from all sources (i.e., mass wasting, surface erosion, bank erosion, etc.) for small, forested watersheds in the Pacific Northwest range from 0.02-19.43 with a mean of 1.752 t/ac/yr (Patric, 1984). Both the proposed action and alternatives would likely maintain sediment delivery to Gordon Creek at the low end of this range. The predicted sediment yield under the "worst case scenario" in Section 1 (0.09 t/ac/yr) is well below the average background yields in forested watersheds (1.752 t/ac/yr).

Sediment transport normally increases during large storm events thus increasing turbidity and reducing the clarity of the water so that sediment supplied by either alternative would be unlikely to be discernible by an observer. As stream flows recede sediment would deposit and turbidity would return to background levels at low flow.

Therefore, it is unlikely that any of the three action alternatives would result in a detectable effect to the levels of turbidity or water clarity in Gordon Creek. Similarly, turbidity levels would be unlikely to reach levels that would cause additional treatment expense or technical difficulties for the Corbett Water provider.

Typically, sediment yields from forest harvest decrease over time as a negative exponential (Dissmeyer, 2000). The quantity of surface erosion with delivery of sediment during large storm events would likely drop back to current levels (0.004 t/ac/yr) within three to five years as the remaining forest stand fills out.

The Corbett water treatment facility manager verbally indicated that turbidity is fairly common at the South Fork intake, which has been their primary source during the winter. (The proposed project has less than 100 acres tributary to the South Fork intake.) The North Fork intake has not had similar problems and is typically the summer source. Corbett's turbidity monitoring equipment is new and they do not have base-line information yet for future monitoring.

3.2.3.2 Cumulative Effects of the Proposed Action

Channel Morphology: With the exception of road maintenance sites at stream crossings and the replacement of some wood structures with culverts, this proposal would be unlikely to result in any measurable direct effects to channel morphology. Since the proposal is not likely to result in effects that extend beyond the site of disturbance and these effects would be of relatively short duration (channel adjustment within one to three years) the proposal would be unlikely to contribute to any cumulative effects in these watersheds.

Peak Flow: Since the proposal is not likely to result in measurable direct or indirect effects to peak flow the proposal would be unlikely to contribute to any potential cumulative effects to peak flows in these watersheds. Current condition of the watersheds in the project area indicates low risk for augmentation of peak flows due to forest openings. This proposal would result in a minimal net increase in forest openings in ROS areas with crown closure <35% and would be unlikely to contribute cumulatively to the augmentation of peak flows even if they were occurring in these watersheds as a result of past forest harvest. Proposed road use and construction is unlikely to alter surface or subsurface hydrology or to contribute cumulatively to any change from current conditions in the watershed.

Sediment Supply and Turbidity

According to watershed analysis, past harvest activities and road building have likely increased sediment yields in the Gordon Creek watershed relative to an undisturbed condition. Future harvesting on private lands is likely to occur and this could also contribute to an increase in sediment yields.

However, given the high variability in logging methods and their effects on different parts of the landscape, it is not feasible to predict how much additional sediment *hypothetical* logging on private lands would produce. Therefore, it is assumed that quantities of sediment reported in the scientific literature represent a meaningful "average" that provides a basis for comparison.

Total sediment yields from all sources (i.e., mass wasting, surface erosion, bank erosion, etc.) for small, forested watersheds in the Pacific Northwest range from 0.02-19.43 with a mean of 1.752 tons/acre/year (Patric, 1984). Assuming an "average yield" of 1.752 tons/acre/year in the Upper Gordon Creek seventh field watershed (2,400 acres), total sediment yield would be 4,000 tons/year. As indicated earlier, this average is assumed to be a result of all activities in the watershed, including harvest on private lands, and is therefore an estimate of the "cumulative" sediment yield in the watershed. It is likely that this estimate is on the high side of what is actually occurring.

The estimated average increase of 0.09 tons/acre/yr directly attributable to the proposed action is an increase of 9 tons (100 treated acres) on a seventh field watershed basis. Accounting for the 50% estimated precision of the WEPP model, this represents between approximately 0.1-0.3% of mean annual yield in this watershed. Given the inherent variability in sediment yield measurements, on a watershed scale this is certainly not a detectable effect. The alternative proposals would be approximately 0.05-0.15% of background. None of the alternatives would likely increase sediment supplies to a level that would result in a direct risk to beneficial uses of the water or contribute in a detectable manner to cumulative sediment yields on the seventh field watershed scale.

In the short term, the proposed action would contribute to the cumulative sediment supply in these watersheds, but the magnitude (0.3% maximum) and duration (risk is highest in the first year following treatment) of the effect would be non-detectable relative to the overall sediment supply in given current technology. Typically, sediment yields from forest harvest decrease over time as a negative exponential (Dissmeyer, 2000). The quantity of surface erosion with delivery of sediment during large storm events would likely drop back to current levels (0.004 tons/acre/yr) within three to five years as the remaining forest stand fills out.

In a similar manner, the risk of short term (during the action and the first winter following) increases in stream turbidity as a result of road repair and hauling may contribute to increased turbidity levels directly below road/stream intersections. These would be maintained below the limits required by the Oregon State DEQ. Cumulatively the limited magnitude (not visible more than 800 meters downstream of the crossing) and duration (primarily in the first winter following road repairs) of this effect would be non-detectable on the scale of the seventh field watershed and would be unlikely to have any effect on any designated beneficial uses.

Over the long term, the incremental improvement of forest stand characteristics (increased species diversity and wood recruitment) in the riparian would support the cumulative improvement in these conditions that is anticipated throughout these watersheds in response to the forest plan. This would add cumulatively to the improvement in the condition of water quality in the watershed.

3.2.3.3 Environmental Effects of Alternatives 2 and 3

These alternatives differ primarily in the quantity and location of road construction and yarding methods. Therefore, all environmental effects would be the same or less than those as disclosed in the previous discussion with the exception to those discussed below as pertaining to road construction and yarding methods.

Yarding Methods: Under these alternatives, surface erosion with sediment delivery to streams in harvested units would be reduced by as much as 50% relative to cable yarding under the proposed alternative. However, as discussed under the WEPP analysis above, none of the alternatives would likely increase sediment delivery to Gordon Creek to a level that would result in a detectable direct/indirect or cumulative effect to water quality on the seventh field watershed scale or that would threaten beneficial uses of the water.

Road Construction

Under these alternatives, less road construction is proposed, thus avoiding any additional risk these roads would create. In particular, the two reconstructed stream crossings proposed near Section 1 would not occur and thus alterations of channel banks and bed at these locations (as discussed in the previous proposal) would be avoided. However, the proposed road construction under all of the alternatives presents a low risk to water quality degradation in Gordon Creek (see discussion above).

Additional forest openings would be created to facilitate helicopter operations under these proposals. However, the location adjacent to existing roads on flat surfaces results in very low risks to water quality or hydrology. Hauling under the helicopter proposal would more likely occur in the winter and thus there would be increased risk for turbidity increases at stream channel crossings.

Hauling

Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity and suspended sediment transport with indirect detrimental effects on the stream's physical and biological attributes (Cederholm et al. 1980). Since more of the harvest would be conducted with helicopter under these alternatives, hauling would be primarily in the winter. In some cases, haul may extend into the wetter periods of the year (October – February). Therefore, the risk of increased turbidity and fine sediment entry into stream channels at crossings is greater under these proposals.

To ensure haul is not contributing to increased turbidity in local streams, the authorized officer would visually monitor the road network and turbidity levels at road/stream intersections during haul. If turbidity levels approach limits set by the Oregon DEQ, the authorized officer would require the BLM contractor to reduce fine sediment run-off into the stream. Methods include (but are not limited to): adding rock to the road and re-grading of the road surface to improve drainage, placement of bark bags or other material in the ditch to filter sediment out of the water, restricting haul until conditions improve.

3.2.3.4 Cumulative Effects of Alternatives 2 and 3

Cumulative effects under both alternative actions would be essentially the same as under the proposed action. While the input of sediment as a result of yarding may be reduced under these alternatives, the risk of sediment input from hauling increases. The risk of short term (during the action and the first winter following) increases in stream turbidity as a result of road repair and hauling may contribute to increased turbidity levels directly below road/stream intersections. These would be maintained below the limits required by the Oregon State DEQ. Cumulatively the limited magnitude (not visible more than 800 meters downstream of the crossing) and duration (primarily in the first winter following road repairs) of this effect would be non-detectable on the scale of the seventh field watershed and would be unlikely to have any effect on any designated beneficial uses.

3.2.3.5 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* section of this report. Any existing effects in the watershed would continue to occur from the development and use of private and other agency lands (primarily timber harvesting and road building). Undersized culverts could plug and overflow and erode the road surface (generating sediment) or fail catastrophically (causing mass wasting).

3.2.4 Fisheries and Aquatic Habitat

Source: *2007 Timber Sale Thinning EA - Fisheries and Aquatic Habitat* (Fisheries Report)

Affected Environment

Fish Presence in Project Area

Fish presence/absence survey reports may be found in the individual project files. Following are summaries of the findings of those surveys.

Many fish-bearing streams exist within the project area adjacent to proposed thinning units. Resident cutthroat trout (*Oncorhychus clarki*) are the only fish known to be present, although other fish species are found downstream from the proposed project area. See *Table 17* for approximate distances downstream from proposed project units to potential resident cutthroat trout and anadromous salmonid habitat. Most of the major and some of the minor tributaries to Gordon Creek are also fish-bearing.

Section 1: There are two fish-bearing tributaries to North Fork Gordon Creek. One is an unnamed 4th order stream that enters from the northeast near the center of the section, and is fish-bearing upstream (in both forks where it forks near the section line) beyond the east boundary of the section. The other is an unnamed 2nd order stream that enters from the northeast near the southwest corner of the section. On this stream the end of fish use is posted approximately 0.5 mile upstream from the mouth.

Section 11: The mainstem of Gordon Creek is fish-bearing throughout the project area where it flows through Section 11. The North and South Forks of Gordon Creek join in the northwest corner of the section to form mainstem Gordon Creek. Both forks are fish-bearing; the South Fork at least as far upstream as the first road crossing to the east in Section 12; the North Fork throughout its course through Section 1. One additional fish-bearing tributary is an unnamed 3rd order stream that enters from the south near the northwest corner of the section. Thompson Creek, also tributary to Gordon Creek, is fish-bearing where it flows northwesterly through the southwest corner of the section.

Section 13: Two 2nd order streams (tributaries to Thompson Creek) that arise west of Road 1-5E-28 and flow west out of the section are fish-bearing for some distance.

Section 15: A 2nd order stream (tributary to Cat Creek) that crosses Road 1-5E-22 near the center of the section is fish-bearing up to the confluence of two 1st order streams approximately 200 feet upstream of the road.

Threatened / Endangered Species

Three fish species listed as 'threatened' under the Endangered Species Act of 1973 (ESA) are found in the Gordon Creek watershed. They are: Lower Columbia River (LCR) coho salmon (*Oncorhynchu (O.) kisutch*), LCR steelhead trout (*O. mykiss*) and LCR chinook salmon (*O. tshawytscha*). See *Table 17* for estimated distances downstream from proposed project units to habitat that may be occupied by any or all of the ESA listed fish species.

The Gordon Creek project watershed (Gordon Creek 6th field) has LCR coho salmon, LCR steelhead trout and LCR chinook salmon present at varying distances downstream of the proposed project units in Gordon Creek, Buck Creek, Cat Creek and the Sandy River. A barrier falls located in the NW¼ of Section 10, T1S, R5E is believed to be the upstream limit of anadromous fish distribution in Gordon Creek. Of the three ESA listed fish species found in Gordon Creek, only steelhead are known to ascend the stream as far as the barrier, but coho may also be able to ascend Gordon Creek up to that point. Chinook distribution is suspected to end several miles downstream near the mouth of Cat Creek. See *Table 17*.

Special Status Species Presence in the Project Area

Survey and Manage Aquatic Mollusk - Columbia duskysnail

The Columbia duskysnail (Lyogyrus n. sp. 1; S & M Category A) is a Columbia Gorge endemic, found on both sides from east and south of Portland to Hood River, Oregon. Most sites are in Gorge tributaries; a few other sites occur in drainages originating from near Mount Hood, Oregon, to Mount St. Helens, Washington. In the Salem BLM District, it is likely to be found only in the Cascades Resource Area, and only in cold, pure, well-oxygenated springs in Clackamas and Multnomah Counties. The Columbia duskysnail is present in spring heads adjacent to Units 3A, 11B, 13B and 15A.

Bureau Assessment Species – Cascade Torrent Salamander

Species in the genus *Rhyacotriton* are nearly always found in cold, clear streams, seepages, or waterfalls from sea level up to about 4,000 feet in elevation. They are frequently found in intermittent streams and seeps, usually under woody debris, under rocks, or buried in very loose uncompacted gravel. The Cascade torrent salamander (*Rhyacotriton cascadae*) has been found throughout the Cascades Resource Area. The species was found in spring heads adjacent to Units 11B and 13B.

Bureau Assessment Species – Cope's Giant Salamander

Larvae of Cope's giant salamander (*Dicamptodon copei*) are found in streams or occasionally (in Washington) in ponds and lakes, from sea level to 4,400 feet. There are very few known sites in Oregon. On Salem BLM lands larvae have been found only in the upper reaches of the Gordon Creek watershed. The species was found in mainstem Gordon Creek adjacent to Unit 1A.

Other Aquatic Species

The pristine springsnail (*Pristinicola hemphilli*; Bureau Tracking species) is found in springheads adjacent to Units 3A, 11B, 13B and 15A. Another species of springsnail (Promenetus umbillicatellus; common name unknown) is found in one springhead adjacent to Unit 3A. Springsnail species are thought to occur only in cold, pure, well-oxygenated springs and spring-fed streams.

General Stream Habitat Conditions

Large Streams: Streams are well shaded by closed canopies provided by coniferous and deciduous trees. The larger streams within the project area (Gordon Creek, North Fork Gordon Creek, South Fork Gordon Creek and Thompson Creek) are mostly low gradient (1-4%), confined boulder-cobble channels with well vegetated, stable beds and banks. Instream large woody debris (LWD) loading levels are fairly high, although most of the pieces of large wood are very old and were probably recruited to the stream channels prior to the logging of the old growth trees in the 1930s and 1940s. The short-term recruitment potential for future LWD is limited due to the stand age (~60 years) and size (avg. dbh <21") of the riparian trees.

Small Streams

- Smaller streams within the project area are generally low gradient (0.5-3%), with unconfined channels. Dominant substrates are cobble, gravel, sand and silt.
- Instream LWD loading levels are fairly high, although most of the pieces of large wood are very old and were probably recruited to the stream channels prior to the logging of the old growth trees in the 1930s and 1940s. Although the trees in the riparian areas are generally young (~60 years old) and small diameter (avg. dbh <21"), LWD recruitment potential is thought to be adequate because smaller trees can provide the functions of LWD in smaller streams.

Section 1

A fish passage barrier culvert is located in the NE¼ of Section 1 on the southern of two forks of the fish-bearing tributary to N.F. Gordon Creek just west of the section boundary along the railroad grade. The culvert is perched, preventing upstream fish passage. Blockage of upstream fish passage results in isolation of the population upstream of the barrier.

The barrier would prevent recolonization of the upstream habitat in the case of a natural or human caused event that results in a severe reduction or extirpation of the upstream population. The fill over the culvert is eroding, apparently due to blockage at the culvert inlet. Blockage of the culvert inlet, and the resultant erosion of the fill has the potential to result in catastrophic failure of the culvert, which could cause severe damage to downstream aquatic habitat and populations of aquatic species.

A log fill stream crossing (*circa* 1930) is located in the SW ¼ of Section 1 in the unnamed second order tributary to N. F. Gordon Creek near the SW section corner. The log fill may be a fish passage barrier that isolates the fish populations upstream and downstream of the log fill.

Section 3: Two springheads that support springsnails are found within Unit 3A. The Columbia duskysnail, the pristine springsnail (Bureau Tracking species) and *Promenatus umbillacatellus* (common name unknown; no special status in Oregon) are found in springheads within Section 3.

Section 13 (West side)

In Section 13 west of Road 1-5E-28 and north of Road 1-5E-13.2 two streams (headwater tributaries to Thompson Creek) originate at springs near Road 1-5E-28 and flow westward for approximately 0.5 mile before exiting Section 13. Both streams are fish-bearing for some portion of their course within Section 13. At the spring origin and for an unknown distance downstream the southernmost stream is known to provide habitat for the Columbia duskysnail, pristine springsnail and the Cascade torrent salamander, and the other stream is suspected to also provide this habitat. Both streams flow in unconfined channels over cobble, gravel, sand and silty substrates. The age, size and density of the trees in the Riparian Reserve LUA of both streams are similar to those of the surrounding areas, as is the understory vegetation, although near the streams understory vegetation is composed of species more typical of streamside and wet areas. Both streams are well shaded and contain abundant LWD. Most of the instream LWD is very old, probably recruited to the stream channels prior to the logging of old growth trees in the area in the 1930s and 1940s. Some smaller woody debris is present as a result of more recent mortality of trees from the current stands. Due to the small size of the streams, conifers of the sizes found in the current stands (avg. dbh <21") are capable of fulfilling the functions of instream LWD.

The spring-fed origins of both streams is presumed to be what makes them capable of supporting populations of Columbia duskysnail, pristine springsnail and Cascade torrent salamander, all of which are species dependent on a perennial supply of cold, clear water. Disturbances in the area that alter the water temperature or result in the introduction of sediment to the water may be detrimental to the persistence of these species.

The cutthroat trout present in the streams are probably more tolerant of minor seasonal increases in temperature, but may not be so tolerant of increases in sediment. Trout population numbers are low enough that sediment inputs to the water may threaten the persistence of trout in the headwater streams, either by mortality resulting from the turbid water, or by forcing individual fish to move downstream. Recolonization of abandoned upstream habitat may not be possible due to numerous vertical steps created by logs and boulders that the fish would likely not be able to ascend.

Section 14

In Section 14 along Road 1-5E-28 two perched and undersized live-stream culverts are located on 3rd order headwater forks of Thompson Creek, both of which originate in Section 13. Both culverts are barriers to upstream migration for resident fish and potentially for aquatic amphibians. The probable inability of the culverts to accommodate the water, sediment and woody debris associated with a 100 year flow event poses a risk of culvert failure which could result in severe adverse effects on downstream aquatic species and habitat.

The private road system in Section 12 is minimal standard rocked roads that create a risk of road sediment input to first and second order streams that flow west into BLM land in Section 11 if heavy traffic occurred during the wet season. Approaches to stream crossings are confined in through-cuts with no ditches and few opportunities to divert flows onto stable, vegetated slopes. There are puddles on the road surface at stream crossings.

Section 15: In Section 15 where Road 1-5E-22 crosses a headwater tributary to Cat Creek the crossing is in a depression where water puddles and mud accumulates, creating a risk source of sediment input to the stream if heavy traffic occurred during the wet season.

Environmental Effects

3.2.4.1 Common to All Action Alternatives

General Stream Habitat Conditions

Removal of the fish barrier culvert in the NE¼ of Section 1 would allow for unobstructed upstream movement of resident cutthroat trout and any other resident fish species that may be present, as well as aquatic amphibians such as Pacific giant salamanders. A short-term input of sediment and turbidity is expected to occur. The increased turbidity from the culvert removal is unlikely to be visible or measurable beyond ¼ mile downstream. It would probably have short-term adverse effects on resident fish within 1/8 mile downstream of the culvert site.

Replacement of the two live-stream culverts in Section 14 along Road 1-5E-28 would restore unimpeded upstream fish passage for resident cutthroat trout and aquatic amphibians, if present. A short-term (hours) input of sediment is expected to occur in Thompson Creek during project implementation, and again during the first fall rainstorm.

The increased turbidity from the culvert removals is unlikely to be visible or measurable beyond ¼ mile downstream. It would probably have short-term (hours) adverse effects on resident fish within 1/8 mile downstream of the culvert sites.

At the stream crossing in Section 15 on Road 1-5E-22 wet season log hauling would not be anticipated because logging in the section would be limited to dry season, so the potential risk of sediment input to the unnamed Cat Creek tributary that could have been caused by hauling during wet season/road conditions would be eliminated.

For units that have cable and/or helicopter yarding proposed, with potential winter hauling, the restriction of log hauling to periods of dry road conditions would keep road derived sediment inputs to stream channels at acceptable levels.

Where wet season logging occurs adjacent to 25 foot stream protection zones (SPZ), there may be slight sediment increases in some of those intermittent streams which would not be expected to adversely affect aquatic species or habitat downstream of these sites. Where logging occurs in any allowable season adjacent to wider SPZ or wider buffers, no adverse effects to aquatic species or habitat in springheads or streams would be expected. New roads proposed for construction would be located in stable locations outside of Riparian Reserves (RR) and would not contribute to degradation of aquatic habitat. Reducing the density of trees within the RR is expected to have a long-term beneficial effect on aquatic habitat as a result of an anticipated acceleration in growth rate of the trees left in the stands. Accelerated growth of trees within the RR is expected to improve LWD recruitment potential to the aquatic systems.

Roads along the haul routes are generally well established rocked roads and paved roads. Any natural surface roads in the project area would only be used for hauling during the dry season. Sediment effects from hauling on rocked roads would be minimized by restricting hauling to periods of dry road conditions, site specific sediment control measures and monitoring.

The most likely short-term adverse effects of sediment on fish would be displacement, decreased feeding ability and gill abrasion. No long-term adverse effects of these operations on aquatic species or habitat are expected downstream of the culvert sites and road/stream intersections.

Special Status Species - Aquatic

Threatened/Endangered Species

Sediment inputs associated with road repair/decommissioning; culvert placement/removal and timber hauling could affect Endangered Species Act (ESA) listed fish species (*EA sections 3.2.4.1 -3.2.4.5)*. ESA consultation with NOAA Fisheries is described in *EA section 5.1.1.2.*

Survey and Manage Aquatic Mollusks - Columbia duskysnail

No adverse effects to the Columbia duskysnail are expected to result from thinning. Buffers of 200 - 220' (one site potential tree height) radius, or to a logical break such as an existing road or trail, around the springheads would provide adequate protection to the populations and springheads.

Bureau Assessment Species – Cascade torrent salamander and Cope's Giant salamander

No adverse effects to Cascades torrent salamander or Cope's giant salamander are expected as a result of thinning. Post-thinning surveys at 12 western Oregon density management sites on initial effects of headwater Riparian Reserves with upslope thinning on stream habitats and amphibians (Olson, 2006 in review) found no evidence of adverse effects from thinning to torrent salamanders present in the project area. Buffer widths around the springheads of 220' (one site potential tree height) and SPZs with a minimum width of 60 feet in the streams downstream of the buffers would be adequate to protect aquatic habitat and aquatic amphibians such as the Cascades torrent salamander and Cope's giant salamander.

The proposed action would not result in adverse effects to Survey and Manage or 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 may impact existing populations. Therefore, the project would not contribute to the need to list any BLM Special Status Species.

3.2.4.2 Proposed Action

Section 1

The proposed skyline logging is not expected to disturb streambanks alter shading because all logs would be yarded away from the stream protection zones (SPZ). See Hydrology Environmental Effects for results of sediment yield modeling.

The proposed new road construction is not likely to result in degradation of aquatic habitat or an increase in the stream drainage network because none of the proposed road locations are near streams. All are primarily on ridgetop or midslope locations and have slopes of <10%.

Wet season hauling from the NW corner of Section 1 would not result in increased sediment input to streams. The location of the new road proposed for construction is on a ridgetop and nearly flat. On the short, steeper part of the existing road that meets the paved Larch Mountain Road, runoff would be directed to stable vegetated slopes, preventing it from reaching stream channels.

At the temporary culvert installation in Gordon Creek on Longview Fibre land just north of Section 1 the rock fill is expected to cause very little sediment input to Gordon Creek. A small amount of sedimentation would occur during installation while preparing the streambed, and again during removal. The sediment effects on fish are not expected to be greater than short-term (hours) displacement during project implementation due to the composition of the rock fill and the coarse, rocky nature of the streambed. Lasting adverse effects on aquatic habitat are not expected for the same reasons.

Section 3: No activities in this section are expected to affect fish or aquatic habitat because of the buffer that would be placed on the springheads. Although ground-based yarding is proposed within the Riparian Reserve LUA (RR) of 1st and 2nd order streams, the topography is nearly flat, and no skidding within 75 feet of the SPZs would be allowed. Winching of logs away from the stream channels is not expected to cause sedimentation of the streams due to the topography within the RR in which ground-based yarding may occur. The short spur roads proposed for construction would have no effect on aquatic habitat due to their locations. All are on flat ground with no proximity to streams.

Section 11: The new road construction that follows the boundaries of the RR in the northwest, northeast and southwest quarters of the section is not likely to result in increased sediment input to streams due to the relatively flat topography upon which the roads would be located.

Section 13: Skyline yarding of the RR areas in the west side of the section is not expected to result in a level of ground disturbance that would have the potential to introduce sediment to the streams or alter the water quality of the springs (see *EA section 2.2.2*).

Section 15: The ground in this section is flat enough that ground-based yarding is not expected to result in disturbance to streambanks or aquatic habitat.

Cumulative Effects: Cumulative effects to aquatic habitat are described in the Hydrology Section (*EA section 3.2.3*).

3.2.4.3 Alternative 2

Section 1: Wet season hauling from the NW corner of Section 1 would not result in increased sediment input to streams. The location of the new road proposed for construction is on a ridgetop and nearly flat. On the short, steeper part of the existing road that meets the paved Larch Mountain Road, runoff would be directed to stable vegetated slopes, preventing it from reaching stream channels.

Sections 11 and 12: Sediment would be introduced into the streams at road crossings in Section 12 and potentially flow into Section 11 within 1/8 mile of the stream crossings. Sediment levels would be maintained within Oregon DEQ requirements. The most likely short-term adverse effects of sediment on fish would be displacement, decreased feeding ability and gill abrasion. No long-term adverse effects of these operations on aquatic species or habitat are expected downstream of the intersections

Section 13: Helicopter yarding within the Riparian Reserve LUA (RR) in the west side of the section is not expected to result in a level of ground disturbance that would have the potential to introduce sediment to the streams or alter the water quality of the springs.

Cumulative Effects: Cumulative effects to aquatic habitat are described in the Hydrology Section (EA section 3.2.3).

3.2.4.4 Alternative 3

Section 1

The proposed skyline logging near streams is not expected to disturb streambanks or decrease stream shading because all logs would be yarded away from the stream protection zones (SPZ) and there would be no yarding across streams. See Hydrology Environmental Effects for results of sediment yield modeling. Helicopter yarding near streams would not result in ground disturbance that could lead to increased sediment input to streams.

The proposed road improvement/renovation is not likely to result in degradation of aquatic habitat or an increase in the stream drainage network because none of the road locations are near streams.

Wet season hauling from the NW corner of Section 1 would not result in increased sediment input to streams. The location of the new road proposed for construction is on a ridgetop and nearly flat. On the short, steeper part of the existing road that meets the paved Larch Mountain Road, runoff would be directed to stable vegetated slopes, preventing it from reaching stream channels.

At the temporary culvert installation in Gordon Creek on Longview Fibre land just north of Section 1 the rock fill is expected to cause very little sediment input to Gordon Creek. A small amount of sedimentation would occur during installation while preparing the streambed, and again during removal, but sediment effects on fish are not expected to be greater than short-term (hours) displacement during project implementation due to the composition of the rock fill and the coarse, rocky nature of the streambed. Lasting adverse effects on aquatic habitat are not expected for the same reasons.

Section 3

No activities in this section are expected to affect fish or aquatic habitat because of the buffer that would be placed on the springheads.

Although ground-based yarding is proposed within the RR of 1st and 2nd order streams, the topography is nearly flat, and no skidding within 75 feet of the SPZs would be allowed. Winching of logs away from the stream channels is not expected to cause sedimentation of the streams due to the topography within the RR in which ground-based yarding may occur.

The short spur road proposed for construction would have no effect on aquatic habitat due to their locations. All are on flat ground with no proximity to streams.

Section 11: The new road construction and road improvement/renovation is not likely to result in increased sediment input to streams due to the relatively flat topography upon which the roads would be located. The effects of potential wet season hauling on the private roads in Section 12 would be similar to, but to a lesser degree, than described in Alternative 2 because of lower traffic volume.

Section 13: Skyline yarding of the RR areas in the west side of the section is not expected to result in a level of ground disturbance that would have the potential to introduce sediment to the streams or alter the water quality of the springs.

Section 15: The ground in this section is flat enough that ground-based yarding is not expected to result in disturbance to streambanks or aquatic habitat.

Cumulative Effects: Cumulative effects to aquatic habitat are described in the Hydrology Section (*EA section 3.2.3*).

3.2.4.5 No Action

Under the No Action alternative no change in the existing aquatic habitat conditions would be expected. Canopy closure in primary and secondary shade zones along stream channels would remain at current levels until they are changed by natural processes. Dense stands of riparian trees would be expected to self-thin over time, contributing LWD to stream channels and providing shade to streams at varying levels as overstory densities change through gradual self-thinning and/or large and small scale events such as snow/ice break, windthrow and wildfire. Natural sediment inputs to streams would vary as sediment contributing events occur within the RR. Populations of aquatic species would be expected undergo natural cycles of increase and decline.

No increases in stream sedimentation would occur as a result of culvert removals or replacements or installation of a temporary stream crossing structure, however, the fish barrier culvert in the NE¼ of Section 1 would continue to block upstream passage of cutthroat trout, and potentially amphibians, as would the two culverts in the forks of Thompson Creek in Section 14. The culvert in the southwest corner of Section 1 and the two culverts in the forks of Thompson Creek in Section 14 would continue to pose a risk of failure due to their size relative to their contributing watershed area.

3.2.5 Soils

Source: *2007 Timber Sale Thinning EA, Soils Report*

Affected Environment

Typical soils in the project area formed in colluvium (material rolling downhill) from sedimentary, tuffaceous, basalt, and andesite rock and volcanic ash. Soils in river floodplains formed in alluvium (water transported materials). Soils in the project area range from clay loams to silty clay loams to silt loams to cobbly loams with different density of gravels or cobbles. Project soils are well-drained to moderately well-drained and moderately deep to very deep on the western low foothills and foot slopes of the Cascade Mountains. Project soils are suited for growing Douglas fir and western hemlock.

Slopes in the project area seldom exceed 35 percent (see *Table 8*). Steeper grades have lower infiltration capacity and structural stability. Where slopes approach 50 percent or steeper, erosion potential is moderate to severe.

Moderate and highly compacted soils have persisted in many of the existing railroad grades/skid trails in the project area that date back to the original logging in the 1920's and 30's. The railroad grades/skid trails are generally less than 15 feet in width so the timber stands are generally fully occupied by tree canopies

The WEPP (Water Erosion Prediction Project) soil erosion model was used to predict potential changes in erosion and sediment yield from the Proposed Action and Alternative 2. The expected background erosion rate (existing condition and No Action Alternative) in Gordon Creek is estimated at 0.004 tons/acre/year (8 pounds, or about ½ gallon of dry soil) (30 year average). Typical sediment for small, forested watersheds in the Pacific Northwest range from 0.02-19.43 with a mean of 1.752 t/ac/yr (Patric, 1984). By comparison, surface erosion on croplands averages 44.5 tons/acre/year in the United States.

Table 8 - Slopes in the Project Area

Project Area	***Project Acres by Percent Slope****		
	0-20% slope	***20-50% slope***	***50+ Slope***
Gordon Creek	63%	30%	7%

** Estimate from slope classification of DEM (Digital Elevation Model) Acres are rounded.*

Environmental Effects

3.2.5.1 Proposed Action

Timber Harvest

Ground-based Yarding

Soil compaction and topsoil displacement from skid trails and landing operations is expected not to exceed ten percent of each project area – consistent with RMP standards and guidelines (p. C-1-2). The following design features would reduce the relative degree of soil compaction where ground-based equipment operates and keep soil compaction to less than ten percent of the harvest unit area (*EA Section 2.2.2*):

- Limiting tractor operations to periods of low soil moisture when resistance to compaction is higher,
- using one-end suspension, spacing and location of skid trails, and
- operating skidding equipment only on slopes of 35 percent or less.

Surface erosion and dry ravel resulting from thinning would be minimal because the ground is flat or on gentle (<35%) slopes. The Proposed Action would leave the majority of the surface vegetation, root systems, and litter intact, and limbs from thinned trees would remain on site to further reduce rain impact, surface flow velocity and drying.

Other Ground-based Logging Operations: Limiting mechanized felling/processing and log handling equipment operations to periods of low soil moisture, operating such equipment only on slopes of 45 percent or less, and requiring the equipment to operate on a slash mat when not on an approved skid trail or road would reduce the relative degree of soil compaction and displacement where these machines operate.

Skyline Yarding: On portions of units that would be skyline-yarded, compaction from yarding logs with one end suspension would be relatively light, and generally not exceeding two to four feet wide. Severe erosion and soil rutting in skyline yarding corridors would be prevented by constructing water bars and leaving slash on corridors where appropriate. Skyline landing impacts would be similar to ground-based landings.

Effects on Site Productivity: For skyline and helicopter yarding systems, measurable long term effects on site productivity would be expected to be minimal (no measurable reduction in overall yield) to none. For skidding areas, less than 10 percent of the area would be covered by skid trails. Of this area, some would be heavily used with moderate to heavy compaction, while other portions would be lightly used with low to moderate compaction. Soil disturbance and compaction from mechanized harvesters and log handling equipment working on a slash mat between skid trails would not be expected to be extensive enough to cause any measurable reduction in productivity.

Surface Erosion Potential: WEPP modeling predicts surface erosion in the first year after harvest, with storm events, is estimated at 0.045 tons/acre. Erosion potential would decrease rapidly to background rates as understory and ground cover vegetation grows and would be expected to return to current levels within three to five years.

Roads

The roads to be constructed would be on relatively gentle topography, and the total width of the clearing would be around 20 feet. New roads would be located and designed so that any resulting runoff would infiltrate rapidly into adjacent undisturbed soils, well away from riparian areas (see design features, *EA Section 2.2.2*, # 2).

Closing roads after use by placing slash debris on exposed surfaces, constructing water bars, seeding with native species, and/or blocking vehicle access would decrease surface erosion and runoff. The slash would also provide a source of organic material to the disturbed soil.

Depending on expected future transportation needs, some road beds would be stabilized and left to be utilized in the next harvest cycle. The design features for treating these roads after operations (shaping and/or ripping roadbeds, partially covering with slash, revegetating, and blocking access) would stabilize the soil surface while leaving the subgrade intact for use in future management operations (*EA Section 2.2.2,* # 1, 2). The subgrades would remain as non-forest land. Other roads would be closed (ripped, seeded, and blocked) following harvest. Some recovery to a forested condition would occur in these areas over time.

On existing roadbeds, encroaching vegetation would be removed and surface rock would be added where needed. Cross drains and stream crossings (culverts) would be added, improved, or replaced to meet current design criteria for 100 year flood events. These improvements would enhance drainage and road surface conditions, decrease road surface erosion into streams, and lower risk of culvert or fill failure. See *EA section 2.2.1, # 1*, and *EA section 2.5*, *Table 4* for proposed road work.

Pile Burning: On the sites where piles are burned, surface organic material would be removed and the soil exposed to potential erosion until revegetated. However, such localized erosion is highly unlikely to deliver sediment to streams, since burn-pile areas are outside of the Riparian Reserve LUA, isolated, widely dispersed, and typically smaller than 20 feet in diameter surrounded by vegetated area. Since burning would occur during wet soil conditions, heat damage to the upper soil layer would be moderated and only occur in scattered localized sites. See *EA Section 3.2.7* for additional information on pile burning.

Cumulative Effects

The combined effect of the proposed action (density management, road work, fuels treatments, skid trail construction, and CWD creation), would increase the overall amount of compacted/disturbed surfaces in the Gordon Creek watershed. Eight miles of new road surfaces is an increase by 12% in the watershed as a whole (8 miles/ 65 miles) and results in an overall maximum increase in compacted surfaces due to roads from the existing 1.6% of the Gordon Creek watershed to 1.8% under this proposal. However, most of these surfaces would not be retained over the long term (i.e., some decommissioning is proposed) so that at the conclusion of the project the quantity of compacted road surfaces would begin to decrease over time from the maximum and would approach current levels.

There is an overall maximum increase of 180 acres in compaction/disturbance of soils under the proposed action, approximately 1.6% of the Gordon Creek watershed. The extent of compacted/disturbed soil surfaces in the Gordon Creek watershed as a whole was not estimated and a "cumulative" total has not been determined. At the conclusion of the project the quantity of compacted/disturbed soils would begin to decrease over time from the maximum and would approach current levels within a decade as soil surfaces recover.

On the watershed scale, the magnitude of the cumulative increase in compacted/disturbed soil surfaces is very limited (1.6 percent of the total watershed) and of short duration (maximum during the first year following disturbance with a fairly quick decline toward existing levels in the first decade). There is a small risk for a cumulative reduction in overall site productivity from top soil displacement, as the proposed activities have the potential to remove and/or displace soil nutrients. However, the limited magnitude and duration of the effect (the quantity of surface erosion during large storm events, for example, would likely drop back to current levels of 0.004 t/ac/yr within three to five years as the remaining forest stand fills out) would likely be undetectable on both the local and watershed scale.

3.2.5.2 Alternatives 2 and 3

Direct Effects that Differ From the Proposed Alternative

- These proposals would reduce ground based and skyline yarding, road construction and renovation while adding helicopter yarding. Helicopter yarding would require additional acres disturbed for the construction of landings and additional rocking of roads. The total acres of soil compaction and displacement would be reduced to 5-7 percent of the treatment area under Alternative 2 and to 6-9 percent under Alternative 3.
- Permanently compacted surfaces due to new road construction would be reduced from 21 acres in the Proposed Action to approximately 12 acres under Alternative 2 and to approximately 13 acres under Alternative 3.
- Soil productivity losses would be reduced under both alternatives primarily due to the reduction in permanently compacted surfaces with less road construction. Soil erosion (not including road surfaces) would be reduced from an estimated total for the project area as a whole of 272 tons in the first year for the proposed action to 39 tons with Alternative 2 (reduction by 85%), primarily as a result of helicopter yarding in place of skyline yarding and ground based logging in some areas. Surface erosion for Alternative 3 was not computed but would be approximately mid-way between the proposed alternative and Alternative 2 because some steeper areas closer to riparian reserves and streams would be helicopter yarded as opposed to skyline yarded.

3.2.5.3 No Action Alternative

Existing, maintained rocked roads would continue to be part of the transportation system and be maintained according to the Salem District transportation management plan, and would remain as non-forest land and provide access for management activities.

Historic unmaintained roads and landings would be left in their current condition, which range from virtually no evidence of recovery to advanced recovery where understory vegetation is similar to adjacent areas. Vegetation and other natural processes would continue to slowly break up compaction and continue the process of recovering productive capability over time.

3.2.6 Wildlife

Source: *2007 Timber Sale Thinning EA - Wildlife Report*

Affected Environment

Variation in forest stand conditions within stands and at the landscape level have been identified as a key factor in providing habitat for a diversity of forest organisms. Some of the things that have been found to be important contributors to habitat diversity and species richness include; dead wood in the form of snags and down logs, remnant live trees (trees that are older and larger than most of the trees in the stand), and vertical and horizontal variation in tree and understory canopies. Hardwood trees and shrubs in particular have been found to be important contributors to forest biodiversity, providing important elements of habitat such as shelter, cover, food sources, foraging area, and other habitat conditions. All of these features are generally lacking in the managed stands proposed for thinning.

Residual Old-Growth Trees, Coarse Woody Debris (CWD), and Special Habitats:

Table 18 shows a summary of special habitats, remnant old growth and CWD by project area.

Residual Old-Growth Trees

Residual old-growth trees are present in low numbers in the Gordon Creek project area in Unit 3B and in the southeast corner of Unit 15A and absent in the other units (*Table 18*).

Coarse Woody Debris (CWD)

Large Logs, Decay Classes 1 and 2: CWD that would meet RMP management direction (240+ linear feet per acre of material in decay classes 1 or 2, at least 20 inches in diameter at the large end, and 20 feet in length) is currently lacking (0-60 linear feet per acre) in all of the units proposed for thinning (RMP, p. 21).

Large Logs, Decay Classes 3-5: Large CWD in more advanced decay conditions (decay class 3, 4 & 5) is present in all of the units, ranging from 240 to 500 + linear feet/acre and are usually remnants of the cull logs described earlier.

Small Logs: The less decayed logs in smaller size classes found in these units (generally 6 - 14 inches diameter) are mostly the result of recent self-thinning in crowded, overstocked stands. These small logs are much less useful to forest floor-associated animal species for cover, and usually last less than two decades

Special Habitats: There are no special habitats present in or adjacent to any of the units. Special habitats include wet and dry meadows, talus, cliffs and rock outcrops.

Snags and Snag-Associated and Cavity Nesting Species

Stands throughout the project area generally have a near-term (less than three decades) snag deficit (RMP, p. 21). Snag habitat does not meet the 40 percent of maximum population densities requirement for the five woodpecker species (RMP, p.21; as referred to in Neitro *et al* (1985)). Most of the snags that are present are small (less than 20" dbh) and/or highly decayed. Trees that could have developed into large snags and down logs were removed by past timber management treatments and relatively few trees have grown large enough to create suitable snags at this time (*Table 19*).

The hairy woodpecker, red-breasted sapsucker and pileated woodpecker are species associated with conifer stands in the western Cascade Mountains, and are most likely to be affected by thinning young stands. Northern Flicker and Downy woodpecker are not typically associated with closed-canopy conifer-dominated stands in the western Cascades, though both species may be found in or around the project area.

Threatened and Endangered Species

Northern Spotted Owl

The proposed thinning units provide approximately 1,800 acres of dispersal habitat and less than 5 acres of suitable habitat in the Lower Sandy River. There are two known spotted owl sites in the Gordon Creek watershed, located to the northeast and the southeast of the Gordon Creek project area on adjacent Forest Service and Portland Water Bureau lands.

These sites were located during the late 1980s, and have not been surveyed since the early 1990s, when they were both occupied by pairs. Portions of T.1S., R.5E., sections 1 and 13 are located within the provincial home range radius of these known spotted owl sites. Suitable habitat that is proposed for thinning is located in T.1S., R.5E., Section 3 outside the provincial home range of any known spotted owl sites. There are no unmapped LSRs in the vicinity of the proposed units.

BLM Special Status Species:

Resource Staff assessed the potential presence of BLM Special Status Species (Sensitive and Assessment categories) in the Cascades Resource Area Wildlife Report. Listed species that are either confirmed or potentially expected to occur in the project area are documented below. Vegetation surveys (stand exam data) indicate that most of the stands proposed for thinning are lacking in habitat elements that support diverse populations of wildlife species, especially CWD, snags (with loose or detached bark), deciduous understory and ground cover vegetation, or deep accumulation of leaf litter. Habitat and range data and previous surveys for mollusks and amphibians conducted over 9000 acres on the Cascades Resource Area since 1991 indicate that no terrestrial mollusk Bureau Sensitive and/or Survey and Manage mollusk species are likely to be present in the proposed thinning units.

Bureau Sensitive – Oregon Slender Salamander

Oregon slender salamander, a Bureau Sensitive Species, is expected to occur in portions of the project area where CWD of adequate size (generally >16" diameter at the large end) occurs. Oregon slender salamander has been found throughout the Cascades Resource Area in stands across the full range of seral stages. Its distribution on BLM land within the planning area appears to be limited by dry conditions at low elevations along the Willamette Valley floor, and by cold conditions at higher elevations (Dowlan, unpublished 2006).

Habitat is generally described as conifer-forested stands dominated by Douglas-fir with large amounts of large rotten (decay class 3 to 5) Douglas-fir down logs. Old logs, stumps and large woody material piles around stumps, and exfoliated tree bark on the ground are used for cover, feeding and breeding. Larger material that can hold moisture through summer drought is generally considered to be most important in maintaining moderate subsurface microclimate conditions. Optimal habitat for these animals is generally described as late-successional forest conditions with cool, moist microclimates and large down wood.

The species has been found in Sections 3 and 15 of the Gordon Creek project area. It is likely to be found in all other sections of the project area due to the relative abundance of CWD in the advanced stages of decay.

Bureau Assessment/Survey and Manage – Larch Mountain salamander

The Gordon Creek project area is about two to four miles southwest of the closest known site. Larch Mountain salamander is associated with rocky, talus areas usually on steep slopes and coarse woody debris in older forests. There are no known sites on Salem BLM lands.

Habitat for Larch Mountain Salamander is not present in the project area because it lacks rocky substrates, steep slopes, talus, and older forest and substantial retention of pre-disturbance components which would be impacted by this proposal. Therefore, proposed ground-disturbing activities are unlikely to have "deleterious effects" as described in the LMS protocol, and no effects to Larch Mountain salamander are anticipated.

Bureau Sensitive - Northern Goshawk

The proposed thinning units provide marginal habitat for Northern Goshawks. The goshawk is a Bureau Sensitive species which prefers older forests with dense canopy closures at higher elevations while proposed units are mid seral stands. No goshawks are known to be present in the project area.

Survey and Manage Category B – Red Tree Vole

Red tree vole is associated with conifer forests west of the Cascades summit. The project area is within the "Northern Mesic Zone" of the range identified for the species. Though the project area is within the Northern mesic zone of the red tree vole range, none of the stands that would be thinned meet the stand-level criteria as described by Biswell, et al (2002).

In addition, the majority of the project area falls under an exemption issued in the October 11, 2006, modified injunction in Northwest Ecosystem Alliance et al. v. Rey et al., which makes an exemption from surveying for thinning projects in stands under 80 years of age. Unit 3A (5 acres) is over 80 years of age, and was surveyed for red tree voles under the current protocol, and no active nests were found.

Bats

Three former Protection Buffer bat species occur in the Cascades Resource Area (silver-haired bat, long-eared myotis, and long-legged myotis). These species are associated with caves and mines, bridges, buildings, cliff habitat, or decadent live trees and snags with sloughing bark.

Large snags and standing dead trees with bark attached are used variously as solitary roosts, maternity roosts, and hibernacula by these species, and six other bat species associated with Douglas-fir forests (Christy and West 1993). Since this habitat is very rare in the project area, presence of these three species is unlikely. Other Special Status bat species are more closely associated with caves, rock outcrops, buildings and abandoned mines, habitat features not present in the project area.

Migratory and Resident Bird Species

Bird species richness at the stand level has been correlated in some recent studies with habitat patchiness, densities of snags, and density by size-class of conifers (Hagar, McComb, and Emmingham 1996, Hansen et al. 2003). Even-aged conifer stands provide habitat for a relatively high abundance of a few bird species (hermit warbler, red-breasted nuthatch, and golden-crowned kinglet, for example) which feed on insects gleaned from conifer foliage, however, these species are generally common in conifer stands of all ages.

The proposed thinnings are located in the Western Oregon Cascades Physiographic region. The Partners in Flight conservation plan which addresses the Western Oregon Cascades is the *Conservation Strategy for Landbirds in Coniferous Forest of Western Oregon and Washington* (1999). None of the proposed thinnings are located in a high priority forest type and the Western Oregon Cascades is not identified as a high priority physiographic region.

The structurally simple, even-aged, single-layered, closed-canopy stands with poor understory development that characterize the project area are relatively low in landbird species composition and richness. Focal species for this forest condition include the Hutton's vireo and black-throated gray warbler. The habitat attributes that these species associate with are deciduous canopy/subcanopy layers. The light-limited understory of unthinned stands does not provide for a diverse community of shrub and ground cover plant species that are important in providing insect and plant food resources for bird species which rely on living deciduous trees, shrubs, and leaf litter (Hagar 2004). Abundance of arthropod prey species has been correlated with understory and midstory vegetation, particularly tall shrubs and hardwoods. These habitat elements are lacking or poorly-developed in most of the stands proposed for thinning.

Studies conducted in western Oregon have helped to define a typical avian community that is most closely associated with the simple structure of the stands in the project area. The most common species include: hermit warbler, golden-crowned kinglet, winter wren, red-breasted nuthatch, and Swainson's thrush, all of which are also common (or more abundant) in stands with greater structural complexity. Based on current habitat conditions, no migratory or resident bird species with BLM special status are expected to occur in the project area.

Big Game

Big game species that are found in the project area include Roosevelt elk (*Cervus elaphus roosevelti*) and black-tailed deer (*Odocoileus hemionus*). The project area is in mid seral stands which provide hiding and low quality thermal cover. Early seral communities and mid seral stands are abundant on adjacent private lands surrounding the project area. The Salem District Record of Decision and Resource Management Plan (RMP) approved May 1995, identifies no critical winter or summer range in the project area (RMP p.26).

Environmental Effects

3.2.6.1 Proposed Action

Research that has occurred since the 1980s has determined that it is possible to develop desired structural and compositional diversity in young managed stands through specific actions. Thinning forest stands produces what has been described as "cascading ecological effects" (Hayes, Weikel and Huso, 2003) that result from reduced competition between overstory trees and increased availability of solar radiation to the forest floor. Growth, size, branch diameter, and crown ratio of the remaining trees is increased, and development of understory vegetation is stimulated.

These changes effectively increase structural complexity and alter habitat quality and availability for a range of invertebrate and vertebrate species. These changes are considered to be beneficial since there is an abundance of simplified structure habitats in the vicinities of the project area.

In the Riparian Reserve (RR), greater variability in thinning densities (compared to adjacent Matrix stands) would add a greater degree horizontal complexity to these stands and acquire desired vegetation characteristics needed to attain ACS objectives (RMP, p. 11).

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

Residual old growth trees would be protected from damage associated with logging activities or silvicultural practices (*EA section 2.2.2*). All dead wood that is on-site when timber marking takes place would remain on-site, either in the form of standing snags or as down logs, after thinning. Design features would protect most existing snags 15 inches diameter and larger in all decay classes to effectively reserve the best existing habitat features for primary excavators (woodpeckers), and secondary cavity users, such as songbirds, and small mammals.

Some snags larger than 15 inches diameter may be felled for safety reasons, or fall incidental to thinning operations, with smaller diameter and taller, leaning snags most likely to be felled or knocked over. Any snag that falls as a result of thinning operations would remain on-site as CWD, providing habitat for a different, but also key, group of dead-wood associated species.

Most units throughout the project area are expected to remain in a snag deficit condition (RMP, p. 21) for one to four decades, until live trees become large enough (at least 20" dbh) to provide for recruitment of large snags and CWD which would meet RMP requirements. As a result of thinning, growth of residual live trees would be accelerated, so that larger trees would be available sooner than without thinning to contribute additional large snags and CWD in the future stand. The RMP guidelines (RMP p. 21) for snags (40 percent maximum population densities) and CWD (240+ linear feet per acre of material in decay classes 1 or 2, at least 20" in diameter at the large end, and 20 feet in length), could be met in one to four decades. Large diameter CWD in more advanced decay conditions would remain and contribute to forest floor wildlife habitat conditions for many decades before passing through decay class five to become unrecognizable as down logs.

It is anticipated that less than ten percent of existing CWD would be directly impacted by logging. Less than ten percent of the thinning area would be directly impacted by skidding, which is the operation with the highest potential impact to existing CWD. BLM oversight of skid trail locations would ensure that skid trails were located to avoid impact to high value CWD whenever feasible, reducing the anticipated impacts below the ten percent level that would be expected from locating skid trails without concern for CWD. The same principles generally apply to snag protection. Observations of the project area indicate that most of the snags larger than 15 inches diameter are not hazardous.

For Riparian Reserves (RR), silvicultural treatments are recommended to acquire desired vegetation characteristics needed to attain ACS objectives (RMP, p. 11). The Proposed Action and associated design features for RR would contribute to accomplishing these management directions by promoting higher diameter growth rates to become large trees faster, and providing a renewable supply of snags and large CWD.

Federally Listed Species: Northern Spotted Owl

No known spotted owls would be affected by thinning or connected actions. In the short-term, disturbance associated with thinning (logging, road-building, etc,) may have temporary effects on the presence or movement of spotted owls. However, since thinning would maintain dispersal habitat, the ability of the habitat to accommodate movement of birds after thinning is completed would be maintained.

Seasonal restrictions on habitat modification activities (felling, yarding, and road building) would minimize the risk of disturbance to any unknown northern spotted owls during the critical nesting season.

In the short term, approximately 1800 acres of dispersal and 5 acres of suitable habitat would be degraded as a result of thinning, but no habitat would be downgraded to a lower classification. To "degrade" habitat means to affect the quality of spotted owl dispersal or suitable habitat without altering the functionality of (or downgrading) such habitat.

These stands would be maintained as dispersal and suitable habitat after harvest. In the long term, canopy closures in the dispersal habitat would increase and these stands could attain suitable habitat conditions within 10 to 40 years.

Thinning treatments in these dense, uniform stands are expected to have long-term benefits to spotted owls by encouraging late-successional characteristics to develop at least ten years more rapidly than they would be expected to develop without treatment. In 10 to 40 years these stands could develop foraging and nesting structure and be upgraded to suitable habitat. Residual trees would increase in size and be available for recruitment or creation of snags, culls and CWD for prey species and nesting opportunities for spotted owls.

Special Status and Survey and Manage Species

Bureau Sensitive – Oregon Slender Salamander

Oregon slender salamanders would be expected to persist at sites within stands where CWD of adequate size and distribution currently occurs, although some mortality to individuals could result from crushing or loss of wood/soil contact. Design features limit skid trails that could impact CWD to less than ten percent of the project area and provide for protection of CWD as feasible, so at least 90 percent of the CWD currently on-site prior to thinning is expected to last for many decades continue to provide refuge for terrestrial salamanders after treatment.

Second-year post-treatment surveys in the Keel Mountain Density Management Study Area (one of the ongoing research projects on BLM land in the Cascades Resource Area) indicate that Oregon slender salamander was not affected by thinning (Rundio and Olson 2006 in review). These results are consistent with survey results elsewhere in Cascades Resource Area from stands that had been subjected to timber harvest in the past (Dowlan, unpublished 2006).

Bureau Sensitive – Northern Goshawk

No Northern goshawks are known to be present in the project area, so none are likely to be affected by thinning. Marginal goshawk habitat in the proposed units would be temporarily altered due to reduction of canopy closures below current levels. This habitat would become higher quality habitat as structural complexity of stands increases and larger trees become available for nest platforms.

Survey and Manage Category B – Red Tree Vole

No known red tree voles would be affected by the proposed projects. Habitat conditions for red tree voles would become more suitable after thinning as the stands continue to mature and develop older forest characteristics sooner than they would without thinning. In the short-term, it is possible that undetected nests within marginal habitat could be disturbed during thinning.

Migratory and Resident Birds

Changes in habitat structure are expected to have an immediate effect on bird communities in thinned stands. The future development of hardwood/brush components and canopy layers would favor mid seral focal species such as the Hutton's Vireo and black-throated gray warbler. Thinning densely-stocked conifer stands would be expected to immediately enhance habitat suitability for species which prefer a less dense conifer canopy, and reduce habitat suitability for species that prefer continuous conifer canopies. Individuals of some species may be displaced from thinned areas, but would find refugia in nearby unthinned patches, and return as stands respond to thinning and the canopy closes. No species would be extirpated and no migratory or resident bird species with BLM special status would be impacted in these stands as a result of thinning.

Overall bird species richness (a combination of species diversity and abundance) would be expected to gradually increase for up to 20 years (prior to the closing of the canopy again) as hardwood components of stand structure develop, plant species composition becomes more complex, and hardwood shrub layers, epiphyte cover, and snag density become more prominent within the stands.

Big Game

Big game species would be temporarily disturbed by the proposed action. Logging equipment noise and human presence may cause animals to avoid or disperse from the project area temporarily. Thermal and hiding cover would be maintained after harvest, though its quality would decrease in the short-term (0 to10 years) as a result of thinning, opening roads, renovating roads and road improvements (Cole, et al. 1997, Trombulak and Frissell 1999, USDA (PNW) 2006). Vegetative forage such as saplings, shrubs, grasses and forbs would increase as a result of openings created by thinning and road closures after thinning. As a result of increased light, forage quantity would increase and attract early successional species to the areas such as elk and deer.

In the long term (10+ years), thermal and hiding cover quality would improve and vegetative forage such as saplings, shrubs, grasses and forbs would decrease as a result of canopy closure decreasing the amount of light reaching the forest floor.

Cumulative Effects

Residual Old Growth Trees, Snags and CWD

Regardless of the scale for assessing cumulative effects, design features would protect existing CWD, residual old growth trees, and snags 15+ inches dbh. Existing old-growth remnants, snag and CWD habitat elements would be largely retained through thinning, with a minor degree of loss as a result of falling and yarding operations. Some snags, especially smaller diameter/taller snags, would be felled for safety reasons, or fall incidental to thinning operations. Any snag that falls for any reason as a result of thinning operations would remain on-site to become CWD, providing important habitat for a different, but also, key group of dead-wood associated species.

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

Northern Spotted Owl

The proposed action alternative would not contribute to cumulative effects to northern spotted owls because the proposed action maintains dispersal habitat within and between known owl sites, and does not downgrade any suitable habitat within known owl sites.

The scale for cumulative effects for the northern spotted owl is the provincial home range of any known spotted owl site (known owl site). The scale was chosen because a goal for conservation and recovery for spotted owl would be to maintain suitable owl habitat within the provincial home range of known owl sites, and maintain dispersal habitat between LSRs and known owl sites.

BLM Special Status and Survey and Manage Species

The proposed action alternative 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 area, 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 proposed action would not eliminate connectivity between project units or adjacent untreated stands under BLM management. No adverse cumulative effects to red tree vole habitat are expected because:

- No suitable habitat (as described in the Management Recommendations for the Red Tree Vole, Version 2.0 p. 7) would be lost or altered;
- The thinned stands would attain older forest conditions sooner as a result of the density management thinning project.
- Undisturbed habitat in the same or similar age class with connectivity to the thinning units exists within the project area, and elsewhere within the affected section.

Thinning in the project area, either individually or collectively, would not be expected to contribute to the need to list any Bureau Sensitive species under the Endangered Species Act (IM OR-91-57, Oregon-Washington Special Status Species Policy) because habitat for the species that is known to occur in the project area 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

Habitat changes resulting from the proposed action would not eliminate any forest cover or change habitat patch size. Therefore, thinning would not contribute to a fundamental change in the species composition of existing bird communities within the watershed. Therefore, no adverse cumulative effects would occur to migratory birds.

Big Game

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

3.2.6.2 Alternatives 2 and 3

As a result of less road construction, ground based logging, and fewer skyline corridors, Alternatives 2 and 3 would result in less ground disturbance and thus fewer impacts to snags, CWD, and duff/litter layers, and the species associated with these elements, than Alternative 1. Openings created by skyline corridors and skid trails would be reduced under Alternatives 2 and 3. However, Alternative 2 and 3 would require clearing for helicopter landings not required under Alternative 1.

3.2.6.3 No Action Alternative

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

Overcrowded stands with low vigor and small crowns would grow more slowly compared to thinned stands. Self thinning would occur, but diameter growth would not accelerate as fast as in thinned stands. Snags and CWD created by self thinning mortality would not be large enough to meet RMP standards until later in the life of the stand (approximately 20 to 50 years) when suppressed co-dominates achieve these diameters before dying. Without management intervention, stands would take longer to develop late successional habitat conditions and remain less diverse for a longer period of time.

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. Habitat conditions would remain as described in the Affected Environment, and would continue to develop slowly over time for reasons stated above. In unthinned areas, it would take approximately 20 to 50 years to develop suitable habitat conditions if left untreated.

Survey and Manage and BLM Special Status Species

In the short term, there would be no immediate change in current habitat conditions for Survey and Manage and BLM Special Status Species. In the long term (20 to 50 years):

- Development of Oregon slender salamander habitat conditions would likely be delayed (compared to the proposed action) without the addition of new large woody material to replace existing well-decayed material that would eventually disappear.
- The development of goshawk habitat would take longer because structural complexity of stands and larger trees would take longer to develop.

- Since no new disturbance to the conifer canopy would occur, no undetected red Tree Vole nests would be affected. Optimal red tree vole habitat conditions, presumed to be older forest conditions, would develop more slowly without thinning.

Migratory and Resident Birds

Habitat conditions would remain as described in the Affected Environment, and would continue to develop slowly over time. Species richness of bird communities would reflect the simple single storied mid seral stages for a longer period of time, and overall bird species richness would be less. Legacy features in the future stand would likely be smaller and less long-lasting, especially those that provide habitat for cavity-nesting species.

Big Game

In the short term (0 to 10 years), there would be no disturbance effects due to the proposed action. Thermal and hiding cover quality would remain the same. There would be no increase in vegetative forage due to increased light to the forest floor. In the long term (10+ years), thermal and hiding cover quality would gradually decrease as overstocked stands mature hindering mobility. Forage quantity would decrease over time as less light reaches the forest floor.

3.2.7 Air Quality and Fire Hazard/Risk

Source: *2007 Timber Sale Thinning EA - Fuels Management /Fire Ecology Fuels and Air Quality Report (Fuels Report)*

Affected Environment

Air Quality: Prevailing winter winds are from the west and would carry any smoke from the project area away from the Willamette Valley. Madras is one of the down-wind communities potentially affected by the project. The community is located approximately 50 miles to the east, so smoke from the project poses very little if any threat to their air quality.

Fire Hazard/Risk: The modeling predictions of fire regimes for the Gordon Creek area are mixed severity with a 50-100 year fire return interval at the lower elevations and a 100-200 year interval at the higher elevations.

Table 9 - Modeling Predictions of Fire Regimes for the Project Area

Project Name	*Fire Return Interval*	*Severity*
Gordon Creek	50-100 years	Mixed
	100-200 years	Mixed

Since it has been 100 years since a large fire occurred in the project area, the potential risk for a fire is greater today. There are also predictions that climate change would result in more frequent and larger fires (Westerling etal 2006, Swetland 2006, Whitlock etal 2003).

In 2006 a complex of lightning-caused fires occurred near Mt. Hood. Another fire, the Blister Fire, (20+ miles S of Gordon Creek and north of Bagby Springs started by a lightning strike and burned ~800 acres. Closer fires were detected and put out in the Salmon-Huckleberry Wilderness. There are two primary sources of fire ignitions: lightning and humans. Potential on-site conditions which trigger fuel treatments for Gordon Creek are:

- Private property boundaries
  - Industrial forest lands with young forest stands (high surface fire potential)
  - Wildland Urban Interface (WUI) with residences
- Open roads
- Slash loading is above normal levels or near any of the above type sites.
- High fire danger seasonally
- High recreational use areas

In the WUI and along open roads the potential for a human caused start are highest along with the potential costs. The current strategy to reduce the risk of a human caused fire from being started is to reduce fuels in accessible areas or decrease access during periods of high risk. The current strategy to reduce the risk of a fire start from becoming a large fire is through thinning of the forest and the aggressive initial attack through a contract with the Oregon Department of Forestry and their fire protection crews. Existing forest roads in these areas provide access for fire control.

In forests that have not experienced fire for many decades, multiple fuel treatments over time (e.g. thinning and surface fuel reduction) may be required to substantially affect crown fire and surface fire hazard.

The acres in sections 3 and 9 are within the WUI and are near open roads. Most of the other units are behind a closed road system that gets some dispersed recreation. Existing fuel loading for this project area varies between 20 to 48 tons/ac of 1000 hour fuels. Fine fuels are not inventoried but would not increase pre-harvest levels to any great degree.

Environmental Effects

3.2.7.1 Proposed Action

Air Quality:

Smoke produced from burning should have little impact on people. Burning after the fall rains begin usually results in rain scrubbing smoke particles out of the air before the smoke travels off site in the air-shed. Smoke produced should be low in quantity because of the small number of piles to be burned and because the covered wood would be dry.

Fire Hazard/Risk

Thinning would reduce the canopy bulk density (CBD) to levels that would be unlikely to sustain a high intensity crown fire. Fuel treatments in areas with elevated risk of human caused ignition would reduce potential starts. Fuel treatments adjacent to areas with high value (BLM resources such as riparian habitat, and private lands) would reduce potential costs associated with fire control and fire damage.

Maintaining roads would provide access for rapid and effective initial attack of any fire starts that do occur. Access control with gates or road blocks which are easily removed with initial attack dozers would provide for initial attack access while reducing potential for human caused fire starts.

Wildfire 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. All thinning projects result in short term (1-3 year) increased fire ignition potential because of the increased fine dead fuel.

The increased fuel loadings within the stand after thinning would increase the risk of a fire start and if one started that it would be a higher intensity fire. This risk would be greatest during the first year "red needle stage". Risk would decline within three years following harvest as needles and twigs (fine fuels) detach and break down. Initiation and growth of under story vegetation would combine with break down of the slash and provide green fuels that would not burn as easily except under dry conditions. A return to pre-harvest fuel levels occurs after a decade or two.

Thinning from below removes ladder fuels (fuels that provide a "ladder" for fire to climb from the surface into the crowns) and decreases tree crown density (or crown bulk density). This translates, in Agee's studies (1996) to a relative density of 35-45 as the level where crown bulk density cannot sustain a crown fire.

Thinning is followed by a reduction in the surface fuel load, either by fuel treatment or natural processes. Machine fuel treatment (also called mastication, mulching or chopping) changes the size and distribution of the fuels which reduces the intensity of a fire and ignition potential. Piling and burning small diameter slash removes activity fuels. Natural decay and understory vegetation growth reduce the ability of surface fuels to carry fire. This two step approach reduces tree canopy, ladder fuels and surface fuels, thereby reducing both the intensity and severity of potential wildfires (Graham, *et al*, 2004). Reducing fuel loads also results in more efficient and quicker fire suppression, less risk for fire fighters and less resource damage.

3.2.7.2 Alternative 2 and 3

The amount of fuel left behind after helicopter yarding is expected to be higher than the proposed action. Delimbing in the unit and leaving small diameter treetops with limbs attached in the unit would create an arrangement of fuels that is more vertical than conventional ground-based or cable logging systems.

The resulting fuel load would make the areas that are untreated more difficult to contain if a wildfire was to start because of the size and arrangement of the fuels. Helicopter yarding would create larger slash piles at landing areas.

Cumulative Effects

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. The cumulative potential for wildfire start and growth would increase in the short term (1-3 years) and decrease in the longer term (1-2 decades) as a result of the proposed action.

Adjacent to the project area is the Bull Run watershed. This area is untreated and poses a potential fire hazard to BLM lands. Although the primary sources of fire ignitions are lightning and humans, we have no control over lightning; however treatment and access control can reduce the potential for human caused fires and reduce fire intensities. There is currently no public access allowed in the proposed area and would remain under these conditions during and following treatment.

3.2.7.3 No Action Alternative

Under the no action alternative, there would be no effect on air quality from burning, although intense wildfires would produce a large quantity of smoke in a short period of time if they were to occur. Since wildfires often occur under east wind conditions, the Willamette Valley would be in the path of the smoke.

Severity and the potential for a crown fire would be higher for dense stands with accumulating surface fuels in the long term (one to several decades). The potential risk can change annually with weather conditions and possibly increase in the longer term if predicted climate change takes place. Consequently, without treatment potential fire hazards are greater to the neighboring communities, adjacent high value lands, Bull Run watershed, Corbett water source and private property.

3.2.8 Recreation, Visual Resources and Rural Interface

Source: *2007 Timber Sale Thinning EA – Recreation, Visual and Rural Interface Resources Report*

Affected Environment

Recreation: Larch Mountain Environmental Education Site is located in Section 3 adjacent to the proposed treatment area. Use of this facility is by schools and outdoor education groups. The project area is characterized by a forest setting and are accessed by paved or gravel forest roads. Recreational use of the Gordon Creek project area is relatively low due to locked gates and a general lack of off-road trails.

Visual Resources: This project area is classified as VRM Class 4. VRM class 4 allows for major modifications of the existing character of the landscape.

Table 10 - Acres in Each VRM Class by Project Area

Project Name	*VRM Class 2 (Acres)*	*VRM Class 3 (Acres)*	*VRM Class 4 (Acres)*
Gordon Creek	0	0	1805

Rural Interface Areas (RIAs): The unit in Section 9 is in a Rural Urban Interface Area according to the Salem District Resource Management Plan (RMP p. 39).

Environmental Effects

3.2.8.1 All Action Alternatives

Recreation and Visual Resources: The sounds of logging in Section 3 near the Larch Mountain Education Site and hauling past the trail head and parking area would be noticeable for short periods to school groups using the site but would not interfere with use of the Site. Scheduling and contract requirements would provide for public safety. The trail south of the Education Site and Corbett water treatment plant would be closed while logging operations are active.

Recreational use within the proposed units would be restricted in the short term during the thinning operation. A forest setting would still be maintained, and vegetation disturbed by logging activities would be expected to return within five years. The thinning of the proposed units would open up the stand, which may make it easier to walk or ride horses through the units.

Unauthorized, user-created OHV trails would be impacted as part of the proposed project, reducing the number of these trails available for this use. Entrances to existing OHV trails within unit boundaries would be blocked, as would skid trails and other potential entry points resulting from the proposed action. Large amounts of logging slash and debris would deter OHV users from re-opening existing trails or creating new ones.

There may be some disturbance to nearby residences associated with logging and hauling activities (weeks), but this is a common, ongoing activity in these areas. There may also be some short-term (days) decline in visual quality as a result of the smoke created by burning debris piles in the winter. The piles would be burned in compliance with Oregon smoke management regulations.

Rural Interface Areas (RIA's): Since this is a thinning and fuels treatment would take place adjacent to residence near Section 9, no adverse effects would be expected.

Cumulative Effects: The proposed action would not have a measurable impact on visual resources, recreation or rural interface. All activities are common and ongoing in the affected areas. Hence, the proposed action would have no cumulative effects.

3.2.8.2 No Action Alternative

There would be no change to current use patterns. Logging and hauling would continue to be frequent activities since much of the surrounding land is private industrial forest land where timber management is a common practice. Use of the Larch Mountain Education Site and the loop trail south of the Site and water treatment plant would continue. The Corbett water providers would continue to use the road facilities. Low levels of horse riding, bicycle riding and hiking recreation use would continue.

3.3 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. Table 14 describes how the project complies with the four components of the Aquatic Conservation Strategy.

Table 11 - Compliance with Components of the Aquatic Conservation Strategy

ACS Component	*Project Consistency*
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. Stream Protection Zones (SPZ) would protect streams from direct disturbance from logging. Road and landing locations have been minimized in Riparian Reserves.
Component 2 - Key Watershed	The project would comply with Component 2 by establishing that the Gordon Creek project is not within a Key watershed. No new open, permanent roads are proposed within the project area. Riparian Reserve management direction has been incorporated in the design of thinning units in the project area (RMP p. 7).
Component 3 - Watershed Analysis	The project would comply with Component 3 by incorporating the following recommendations from the Gordon Creek Watershed Analysis [July 2006]. • Terrestrial Recommendation 1: Density management and thinning in RR to develop and maintain late seral stand characteristics. 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. Maintains 50% average crown closure in RR. Low density areas enhance spatial variation and provide for development of opening/shrub/edge habitat for 10-20 years. Untreated areas provide additional range of species and density mix.(WA 11-3,4) • Terrestrial Recommendation 2: Develop standing dead and down LWD by leaving enough trees for future recruitment if needed. Thinning would leave many times the recommended retention to develop large trees for future recruitment. Low density areas retain at least the recommended retention levels. This goal would be achieved over time.(WA 11-5,6)

ACS Component	*Project Consistency*
Component 3 - Watershed Analysis (Continued)	• Terrestrial Recommendation 3: Road densities. Many existing roads in the project area are being decommissioned by natural processes and would continue to do so. Roads to be constructed, improved or renovated for use in this project would be located on ridgetops and stable, gentle slopes to avoid sedimentation impacts. Roads used in the project would be stabilized or decommissioned and closed after use. (WA 11-6) • Terrestrial Recommendation 4: Noxious weeds. Equipment washing required. Vegetation Management EIS provides further guidance. (WA 11-6,7) • Aquatic Recommendation 1: Riparian Condition and LWD on Federal Lands, accelerate growth for recruitment of LWD for stream structure. Thinning is designed to accelerate growth. Suitable large trees would be available years to decades sooner than without treatment. • Aquatic Recommendations 3-7: Stream flows, water quality, ODEQ 303(d), and stream temperatures. The project would not contribute to detectable changes in these elements. (WA 11-8) • Aquatic Recommendation 7 - Soils, Slope Stability and Mass Wasting: Project design avoids erosion. Road drainage improvement and culvert replacement are proposed. There are no slides or bare slopes identified in the project area. (WA 11-8) • Human Uses Recommendation 1 – Timber Management in the Matrix Land Use Allocation. Provide timber sales that are marketable, provide a balance between wood volume/quality/value, and maintain a healthy forest ecosystem. The project was designed so that all action alternatives achieve these objectives.
Component 4 - Watershed Restoration	The project would comply with Component 4 by varying treatments in Riparian Reserves, which would further enhance terrestrial habitat complexity in the long and short term. 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.

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 action alternatives do not retard or prevent the attainment of any of the nine ACS objectives for the following reasons (See *Table 12*).

Table 12 - Compliance with the Nine ACS Objectives

ACS Objectives	*Remarks*
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. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 1.*	**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 combination of thinning from below, low density thinning and unthinned areas in 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. Since RR provide travel corridors and resources for aquatic, riparian dependant and other late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 2.*	**No Action Alternative:** The No Action alternative would have little effect on connectivity except in the long term within the affected watersheds. **Action Alternatives:** Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development. In time, the RRs would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as RRs develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 3.*	**No Action Alternative:** It is assumed that the current condition of physical integrity would be maintained. **Action Alternatives:** Maintains: Physical integrity of channels at existing stream crossings would be altered for one to several years following repair/maintenance and installation/removal of temporary stream crossings (2 temporary crossings under Action Alternatives 1 and 3; 1 temporary crossing under Action Alternative 2) 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 disturbed or removed and the bed/banks within the road prism would be obliterated. Due to the stable nature of channels at these locations, little to no additional disturbance to channel morphology would be expected either upstream or downstream from the crossings.

ACS Objectives	*Remarks*
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 4.*	**No Action Alternative:** It is assumed that the current condition of the water quality would be maintained. **Action Alternatives:** Stream Protection Zones (SPZs) in the Riparian Reserve LUA (RR) would be maintained. The proposed roads for are on ridge top or upper-slope locations with no hydrologic connections or proximity to streams or riparian areas. Overall, these action alternatives 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 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 action alternatives.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 5.*	**No Action Alternative:** It is assumed that the current levels of sediment into streams would be maintained. **Action Alternatives:** Stream protection Zones (SPZs) in RRs would be maintained (minimum of 60 feet on fish bearing streams and 25 feet on non-fish bearing streams in treatment areas). Hauling restrictions and sediment control measures would minimize sediment delivery. Short-term localized increases in stream sediment can be expected during culvert removal and replacement, but BMPs and mitigation measures would be implemented to limit acceleration of sediment delivery to streams. As a result, it is unlikely that this proposal would lead to a measurable change in sediment regime, including increases in sediment delivery to streams, stream turbidity, or the alteration of stream substrate composition or sediment transport regime. No sediment is expected from ephemeral stream crossings after one season.
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. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 6.*	**No Action Alternative:** No change in in-streams flows would be anticipated. **Action Alternatives:** A preliminary analysis for the risk of increases in peak flow as a result of forest harvest was conducted using the Oregon Watershed Assessment Manual watershed analysis methods for forest hydrology (OWEB, 1997). Because the proposed project would remove less than half the existing forest cover in RRs and less than 60 percent of the forest cover in Matrix, it is unlikely to produce any measurable effect on stream flows. Within the RRs, the riparian canopy would be retained 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.

ACS Objectives	*Remarks*
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 7.*	**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. **Action Alternatives:** There would be no alteration of any stream channel, wetland or pond morphological feature. All operations, equipment and disturbances are kept a minimum of 60 feet from all wetlands and perennial stream channels, and 25 feet from all intermittent stream channels. Thus, the current condition of floodplain inundation and water tables would be maintained.
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. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 8.*	**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:** SPZs would maintain structural diversity of plant communities in riparian areas and wetlands from 25 feet (intermittent streams) to 60 feet (perennial streams) in treatment areas. Thinning in Riparian Reserve LUA (RR) outside of the SPZs would help to restore species composition by allowing more understory development and structural diversity by creating horizontal and vertical variations that are currently lacking in the riparian treatment areas.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 9.*	**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 action would have no adverse effect on riparian dependent species. Populations of sensitive mollusks in spring heads in the area would be protected by untreated buffers that are generally one site-potential tree height wide (except where existing features, such as roads, define a logical boundary). Although thinning activities may affect other invertebrates within the treatment areas, 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 RRs. 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.

3.4 Comparison of Alternatives with regard to Purpose and Need

Table 13 - Comparison of Alternative by Purpose and Need

Purpose and Need (Section 1.2)	*No Action*	*Proposed Action Alternative 1*	*Alternative 2*	*Alternative 3*
Maintain the health and growth of developing stands.	**Does not fulfill.** Stand health and tree growth rates would decline if stands are not thinned. Competition would result in mortality of smaller trees and some co-dominant trees in the stands.	**Fulfills.** Stand health and tree growth rates would be maintained as trees are released from competition.		
Achieve a desirable balance between wood volume production, quality of wood, and timber value at harvest (RMP p. D-3).	**Partially fulfills.** Partially meets wood volume production over course of rotation. Logs at end of rotation would be smaller diameter which generally reduces value compared to thinned stands.	**Fulfills.** Maintains volume production throughout the rotation (management cycle) of the stand. Lengthens the rotation so that logs at end of rotation would be larger diameter.		
Provide a sustainable supply of timber as described in the RMP (p. 1, 46, 47).	**Does not fulfill.** Provides no timber at this time.	**Fulfills.** Provides timber at this time and in a sustainable manner.		
Develop timber sales that can be successfully offered to the market place.	**Does not fulfill.** Does not develop a timber sale.	**Fulfills.** Develops timber sale(s) that would be viable.	**Partially fulfills.** Develops timber sale(s) that would probably be viable, but at a much lower price than the proposed action.	
Retain elements that provide ecosystem diversity (snags, old growth trees, etc.) so that a healthy forest ecosystem can be maintained with habitat to support plant and animal populations (RMP p. 1, 20).	**Partially fulfills.** Retains existing elements, but does not enhance conditions to provide these elements for the future stand.	**Fulfills.** 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. This adds an element of diversity to the landscape not provided on BLM lands as soon under the No Action alternative.		

Purpose and Need (Section 1.2)	*No Action*	*Proposed Action Alternative 1*	*Alternative 2*	*Alternative 3*
Increase protection for the public, facilities and high-value resources from large intense wildfires in rural/urban interface and high-use recreation areas in accordance with the National Fire Plan's Healthy Forest Initiative and Restoration Act.	**Does not fulfill.** Dense forest stands with high crown densities are more susceptible to a high intensity, stand replacement wildfire that escapes initial attack and could threaten the public and other resources.	**Fulfills.** Managed, thinned forest stands are less prone to catastrophic wildfires. Fires that do start tend to be easier to control in managed stands. Maintaining logging roads provides faster access for suppression forces if a fire does start.	**Partially fulfills.** Fewer logging roads means less access for fire control, so fires could be somewhat larger than with the proposed action. Vegetative and fuel factors would be as with the proposed action and current access would be maintained, so large fires (>100 acres) would not be expected.	**Partially fulfills**. Road access would be in between Alternatives 1 and 2, and vegetative and fuel factors would be similar to both.
Develop future large coarse woody debris, snag habitat, in-stream large wood and other elements of late-successional forest habitat. (RMP p.1)	**Fulfills, but not as soon.** Trees would continue to grow slowly until reaching suitable size.	**Fulfills.** Would develop large trees that could become high value CWD 10-30 years sooner by concentrating stand growth on fewer stems.		
Develop structural and spatial stand diversity on a landscape level in the long term.	**Fulfills** by maintaining current trends that would develop diversity slowly.	**Fulfills** by accelerating changes in some parts of some stands to develop more elements of diversity faster.		
Provide appropriate access for timber harvest, silvicultural practices, and fire protection vehicles.	**Fulfills.** The basic road network exists and most of the roads can be used.	**Fulfills.** Existing roads would be maintained for travel and culvert upgrades would reduce potential for crossing failures.	**Fulfills.** Road network similar to No Action with some additional open road.	**Fulfills.** Road network between levels described for Alternatives 1 and 2.
Reduce potential human sources of wildfire ignition by controlling access.	**Partially fulfills.** Many of the road systems are currently gated. Low levels of activity fuels along roads would be maintained. Unauthorized OHV roads would continue to provide access to potential ignition sources away from roads.	**Fulfills.** Potential ignition sources created by logging would be mitigated where public access is available. Fewer unauthorized OHV roads would be accessible.		

Purpose and Need (Section 1.2)	*No Action*	*Proposed Action Alternative 1*	*Alternative 2*	*Alternative 3*
Reduce adverse environmental effects associated with identified existing roads within the project area (RMP p. 11).	**Fulfills.** No active problems have been identified for any existing roads. The log fill would not be removed and result in increase potential for catastrophic failure of this crossing.	**Fulfills.** In addition to maintaining roads to prevent development of adverse effects associated with roads, culvert upgrades would reduce potential for catastrophic failure of stream crossings in high flow events. Removal of log fill would reduce potential for catastrophic failure of this crossing.	**Fulfills.** In addition to maintaining roads to prevent development of adverse effects associated with roads, culvert upgrades would reduce potential for catastrophic failure of stream crossings in high flow events. In these alternatives the log fill would not be removed and result in increase potential for catastrophic failure of this crossing.	

4.0 LIST OF PREPARERS

Resource	*Name*	*Initials*
Silviculture	Charley Thompson	RJH
Cultural Resources	Fran Philipek	FMP
Hydrology/ Water Quality/Soils	Patrick Hawe	WPH
Botany TES and Special Attention Plant Species	Terry Fennell	TGF
Wildlife TES and Special Attention Animal Species	Jim England	JSE
Fire/Fuels	Barbara Raible	BR
Fisheries	Dave Roberts	DAR
Recreation, Visual Resources Management and Rural Interface	Zachary Jarrett	ZJ
Logging Systems	Michael Barger	MB
Engineering	Steve Ditterick	Bobbie Smith for S.D.

5.0 CONTACTS AND CONSULTATION

5.1 Consultation

5.1.1 ESA Section 7 Consultation

5.1.1.1 US Fish and Wildlife Service

The Gordon Creek proposal will be included in the Consultation process for FY 2009 and 2010 habitat modification projects in the Willamette Province. The consultation process is expected to begin during the spring of 2008, and a Biological Opinion (BO) is expected by October 2008. The Gordon Creek proposal may affect, but is not likely to adversely affect the northern spotted owl primarily due to the modification of dispersal habitat. A seasonal restriction from March 1 through June 30 on habitat modification activities associated with disturbance would minimize the risk of disturbance to spotted owls.

The Gordon Creek proposal is not expected to jeopardize the continued survival of the spotted owl. None of the proposed units are located in Critical Habitat for the northern spotted owl.

The proposed thinnings and connected actions described in this EA will incorporate all Reasonable and Prudent Measures, Terms and Conditions, and any applicable Management Standards described in the BO.

5.1.1.2 NOAA Fisheries (NMFS)

Consultation with the National Marine Fisheries Service on the potential effects of the proposed project on LCR coho salmon and LCR steelhead trout has been completed. Consultation has been conducted under the *Biological Assessment for Fiscal Year 2007-2009 Low-Risk Thinning Timber Sales on the Mt. Hood and Willamette National Forests, and portions of the Eugene and Salem Bureau of Land Management Districts.* A Letter of Concurrence from NOAA Fisheries, dated April 12, 2007 was received for this project. Project conformance documentation with this Letter of Concurrence will be completed prior to the Field Manager selecting an alternative.

Endangered Species Act (ESA) Determination of Effect for Listed Fish Species

The project would have an ESA determination of "May Affect, Not Likely to Adversely Affect" on Lower Columbia River (LCR) coho salmon and LCR steelhead trout (*Table 14* and *EA section 3.2.4*). LCR chinook salmon would not be affected because their suspected upstream limit of distribution is approximately five miles downstream of the project area (see *Table 17*).

Table 14 - Endangered Species Act (ESA)Determinations of Effect for Lower Columbia River Coho Salmon and Lower Columbia River steelhead trout

Species	*Project Area*	*Effect Call*	*Remarks*
Lower Columbia River (LCR) coho salmon, LCR steelhead trout	Gordon Creek	May Effect, Not Likely to Adversely Affect	See EA Section 3.2.4
LCR chinook salmon	Gordon Creek	No Effect	See EA Sections 3.2.4

The project would have no effect on Critical Habitat for the species listed above, and would have "no adverse effects" on Essential Fish Habitat (EFH) as designated under the Magnuson-Stevens Fishery Conservation Act.

5.1.2 Cultural Resources - Section 106 Consultation with State Historical Preservation Office:

5.1.2.1 Cultural Resources

Cultural resource surveys were conducted throughout the sale area between October 2005 and May, 2006 (CRIR # C0603, C0604, C0605, C0608, C0609, and C0611). As a result of these surveys, historic cultural features dating to between 1924 and 1940 and associated with railroad logging operations by the Bridal Veil Lumber Company were identified in sec. 1, 3, 11, and 15 of the sale. Cultural sites related to historic logging were recorded in section 1 (1-5-1-1SE-h) and in section 11 (1-5-11-1SE-h). A historic dump site dating to 1940-1942 was recorded in section 9 (1-5-9-1SE-h). All three sites were determined not eligible for the National Register of Historic Places and assessed as not having other values requiring conservation in place. The recording conducted as a result of these inventories adequately documents the heritage values of the three sites and multiple individual historic features and a determination of No Effect was made. The Oregon State Historic Preservation Office concurred with this No Effect determination for section 9 in a letter dated Nov. 17, 2006. SHPO did not provide comments on the No Effect determinations for the remainder of the project area and the comment period has expired.

5.2 Public Scoping and Notification - Tribal Governments, Adjacent Landowners, General Public, and State County and local government offices

Gordon Creek (along with the Beeline and McDowell project areas) was included in the 2007 Timber Sale thinning scoping letter sent out to federal, state and municipal government agencies, nearby landowners, tribal authorities, and interested parties on the Cascades Resource Area mailing list. The letter described a summary of the proposed action for each project area, and included maps.

5.2.1 Response to Scoping Concerns/ Comments:

Letters and scoping comments were received from three organizations and a small number of interested individuals. Substantive comments were grouped for response.

1. **Thinning on Matrix LUA:**

- K.S. (an individual): Thinning is OK, but no harvest of mature or old-growth trees. Use a diameter limit on stands 76-95 years old to ensure not harvesting mature/old-growth.
- Oregon Wild: Use Variable Density Thinning (VDT) and manage for habitat and decadence. Thin only where needed ecologically. VDT includes ¼ - ½ acre gaps, and range of low density to high density retention.
- Bark: Log only young plantations.
- American Forest Resource Council (AFRC): Be sure that harvest is economically viable. Encourages use of regeneration harvest for mature stands. Use small patch cuts for deer and elk forage within thinned stands.
- C.L: Thinning project is a good idea and long overdue.

Response: The proposed treatments were evaluated by the IDT to fulfill the Purpose of and Need for Action for the Matrix Land Use Allocation (*EA section 1.2*) and Decision Criteria/Project Objectives (*EA section 1.2.1*). The IDT developed the Proposed Action to commercially thin from below (*EA Section 2.2*) with Design Features developed to achieve resource objectives with an economically viable timber sale (*EA section 2.2.2*). The Affected Environment and Environmental Effects for the resources directly involved in these comments are described in the following sections:

- Vegetation and Forest Stand Characteristics (*EA section 3.2.2*)
- Wildlife (*EA section 3.2.6*)

2. **Treatment in Riparian Reserves, water quality and fisheries:**

- K.S.: No entry into Riparian Reserves.
- Oregon Wild: Encourage young stand thinning to enhance structure as long as it can be done without impacting water quality and aquatic habitat.
- Bark: 50 foot buffers on all streams. Conservative action. Course wood placement and in-stream fish habitat improvements are the biggest need.
- AFRC: Riparian Reserves are not addressed separate from timber harvest.
- Corbett Water Board: Impacts to water quality as a result from thinning.

Response: The proposed treatments were evaluated by the IDT to fulfill the Purpose of and Need for Action for the Riparian Reserve Land Use Allocation (*EA section 1.2*) and Decision Criteria/Project Objectives (*EA section 1.2.1*). The IDT developed the Proposed Action to implement variable density thinning in portions of the Riparian Reserve that are contiguous with Matrix harvest units (*EA section 2.2*) with Design Features developed to achieve specific resource objectives as part of an economically viable timber sale (*EA section 2.2.2*).

The Affected Environment and Environmental Effects for the resources directly involved in these comments are described in the following sections:

- Vegetation and Forest Stand Characteristics (*EA section 3.2.2*)
- Hydrology (*EA section 3.2.3*)
- Fisheries and Aquatic Habitat (*EA section 3.2.4*)
- Soils (*EA section 3.2.5)*
- Wildlife (*EA section 3.2.6*)

3. **Wildlife Habitat, Old-Growth Trees, Snags, CWD**

- K.S.: Mature and Old-Growth trees should not be harvested. BLM lands are particularly important for protecting proper ecosystem function.
- Oregon Wild: VDT achieves wildlife objectives, especially northern spotted owl dispersal. Protect remnant older trees and snags. Survey for Special Status Species.
- Bark: Retain ALL snags.
- AFRC: Provide forage for ungulates by creating patch cuts since forage in thinned stands is not adequate.

Response: The IDT developed the Proposed Action (*EA section 2.2*), Connected Actions (*EA section 2.2.1*) and Design Features (*EA section 2.2.2*) to incorporate the elements of the Purpose and Need (*EA section 1.2*) and Decision Criteria (*EA section 1.2.1*) that pertain to these resources. The Affected Environment and Environmental Effects for the resources directly involved in these comments are described in the following sections:

- Vegetation and Forest Stand Characteristics (*EA section 3.2.2*)
- Wildlife (*EA section 3.2.6)*

4. **Roads: Construction, renovation, decommissioning, access, etc.**

- K.S.: Obliterate new road. Decommission some existing roads, especially near streams.
- Oregon Wild: Temporary roads are better than permanent roads, but still cause problems. Carefully evaluate every new road for necessity (length of road v. acres reached).
- Bark: No new roads. Reduce overall road density.
- AFRC: New roads are often necessary for cost effective logging. Roads provide access for wildfire control. Do not decommission permanent roads. Allow for improved roads used for winter logging.
- Portland Water Bureau: Concerned about increased public access to Bull Run Watershed as a result of thinning.

Response: The requirements for the road system needed to fulfill the Purpose of and Need for Action (*EA section 1.2*) and Decision Criteria/Project Objectives (*EA section 1.2.1*) were evaluated by the IDT and are described in Connected Actions (*EA section 2.2.1*, item 1). The IDT developed Design Features (*EA section 2.2.2*) to achieve resource objectives with an environmentally sound road system that would facilitate an economically viable timber sale and provide access for wildfire control. The Affected Environment and Environmental Effects for the resources directly involved in these comments are described in the following sections:

- Vegetation and Forest Stand Characteristics (*EA section 3.2.2*)
- Hydrology (*EA section 3.2.3*)
- Fisheries and Aquatic Habitat (*EA section 3.2.4*)
- Soils (*EA section 3.2.5*)
- Wildlife (*EA section 3.2.6*)
- Fire Hazard/Risk (*EA section 3.2.7*)

5.2.2 EA Public Comment Period

The EA and FONSI will be made available for public review. The comment period ends **October 26, 2007**. 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, 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 AND COMMON ACRONYMS

6.1 Interdisciplinary Team Reports

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

Fennell, T., 2007. *Cascade Resource Area Botanical Report – 2007 Gordon Creek T.S.* Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Jarret, Z., 2007. *2007 Timber Sale Thinning EA – Recreation, Visual and Rural Interface Resources Report.* Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Raible, B. 2007. *2007 Timber Sale Thinning EA - Fuels Management /Fire Ecology Fuels and Air Quality Report* [Fuels Report], Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

England, J., Irving, J., and S. Dowlan, 2006. *2007 Timber Sale Thinning EA* – [Wildlife Report] Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Hawe, P., 2006. *Hydrology/Channels/Water quality reports:* 2007 Timber Sale Thinning EA- [Hydrology Report] Gordon Creek, Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Hawe, P. 2006. *2007 Timber Sale Thinning EA Soils Report.* [Soils Report] Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Roberts, D., 2006. *2007 Timber Sale Thinning EA -Fisheries and Aquatic Habitat.* [Fisheries Report] Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

Thompson, Charley, 2006. *Gordon Creek Silvicultural Prescriptions – 2007 Timber Sale Thinning EA.* [Silvicultural Prescription] Cascades Resource Area, Salem District, Bureau of Land Management. Salem, OR.

6.2 Common Acronyms

ACS – Aquatic Conservation Strategy
BLM – Bureau of Land Management
BMP – Best Management Practice(s)
BO – Biological Opinion
BS – Bureau Sensitive, a category of species under the Oregon/Washington Special Status Species Policy
CONN – Connectivity land use allocation (Matrix)
CWD – Coarse Woody Debris
DBH – Diameter Breast Height
EA - Environmental Assessment
ESA – Endangered Species Act
FONSI – Finding of No Significant Impact
GFMA – General Forest Management Area land use allocation (Matrix)
NEPA – National Environmental Policy Act (1969)
NOAA – National Oceanic Atmospheric Administration (National Marine Fisheries Service [NMFS] is now called NOAA Fisheries)
NWFP – 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 Related Species within the Range of the Northern Spotted Owl (1994) (Northwest Forest Plan)
ODEQ – Oregon Department of Environmental Quality
PSZ – primary shade zone
RIA – Rural-Urban Interface
RMP – Salem District Record of Decision and Resource Management Plan (1995)
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/no-cut buffer/no-treatment Zone /stream buffer)
TMDL – total maximum daily load
USDI – United States Department of the Interior
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service
WUI – Wildland-Urban Interface

7.0 ADDITIONAL SUPPORTING DATA AND MAPS OF THE ACTION ALTERNATIVES

7.1 Tables

7.1.1 Vegetation

Table 15 – Gordon Creek Vegetation Summary

T-R-S	*FOI Unit #*	*Size in Acres*	*Current Stand Age class*	*Trees per acre before treatment*	*Trees per acre after treatment*	*Average Diameter*	*% Canopy closure before treatment*	*% Canopy closure after treatment*
1-5-1	010	245	55	224	120	15	88	55
	020	230	59	180	120	17	92	65
	030	95	66	166	120	18	90	70
	050	15	68	121	80	20	85	60
	060	20	53	175	120	16	76	55
1-5-3	010	25	72	120-170	80-120	17	80	55
	020	5	117	100-120	50-70	23	90	60
1-5-9	030	20	61	120	80	19	74	55
	080	15	71	127	80	16	80	55
1-5-11	010	345	65	95-184	80-120	19	87	55
	040	10	61	132	80	19	82	55
1-5-13	010	165	62	206	120	16	93	60
	010	200	60	145	80	17	88	55
	040	20	54	205	120	15	93	60
	070	25	66	142	120	16	80	70
1-5-15	010	210	50/32	150/302	120	17	80	60
	020	105	62	130	90	17	76	55
	030	30	59	110	80	21	85	65
	110	25	58	127	80	20	85	55
		1805						

1. Unit acres differ from total project acres due to rounding.

7.1.2 Fisheries and Aquatic Habitat

Source*: 2007 Timber Sale Thinning EA - Fisheries and Aquatic Habitat (Fisheries Report)*

Table 16 - In-Water Work Period for Affected Watersheds

Watershed	*Project Area*	*In-water Work Period*
Gordon Creek Watershed	Gordon Creek	July 15th-August 31st

Table 17 shows approximate distances downstream from proposed project units to the nearest potential resident and ESA listed fish habitat[1] (distance estimates in miles unless stated in feet)

Table 17 – Distances to ESA Listed Fish Habitat

Unit Number	*Distance to resident cutthroat trout habitat*	*Distance (in miles) in Gordon Creek*		
		To steelhead habitat	*To coho habitat*	*To chinook habitat*
GDN 1A	Minimum 60 feet on North Fork Gordon Creek & unnamed 1st order tributary	2.25	2.25	5.75
GDN 3A	1 mile in Gordon Creek	1	1	4
GDN 11A,B	Minimum 60 feet on Gordon Creek, NF & SF Gordon Creek & unnamed tributary	0.75	0.75	4.25
GDN 11C	Minimum 60 feet on North Fork & South Fork Gordon Creek	2	2	5.5
GDN 11D	Minimum 60 feet on Thompson Creek	2.5	2.5	4.75
GDN 13A	Approximately 400 feet on unnamed tributary to Thompson Creek	3	3	5.25
GDN 13B	200 feet on unnamed tributary to Thompson Creek	3.25	3.25	5.5
GDN 15A	Minimum 60 feet on Cat Creek	3	3	3

[1] Upstream limits of anadromous fish distribution are obtained from *streamnet.org.* Stream distances are stream reach lengths summed in ArcGis.
[2] Not applicable. No native coho are not found in watersheds upstream of Willamette Falls.

7.1.3 Wildlife

Source: *2007 Timber Sale Thinning EA- Wildlife report*

Table 18 - Summary of Special Habitats, Remnants, and Coarse Woody Debris (CWD)

Name/Unit#	*Location*	*Seral Stage*	*Remnant Old Growth*	*Special Habitats**	*CWD****
1A	1S-5E-1	Mid	No	No	0'/500'+
3B	1S-5E-3	Late Mid	Yes	No	<60'/240'
9A	1S-5E-9	Mid	No	No	0'+/240'
11A-D	1S-5E-11	Mid	No	No	<60'/500'+
13A-B	1S-5E-13	Mid	No	No	0'/500'+
15A	1S-5E-15	Mid	Yes	No	0'+/240'+

Seral Stage Age Classes (years) based on Stand Exam data: Early Seral = 0-30; Early Mid Seral = 30-40; Mid Seral = 40 – 60; Late Mid Seral = 60 -80; Early Mature Seral = 80 - 120; Mature = 120 - 200; Old Growth =200+
* 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.
*** Linear ft/acre >19" dbh & >20' long, hard (decay classes 1-2)/soft (decay classes 3-5) logs.

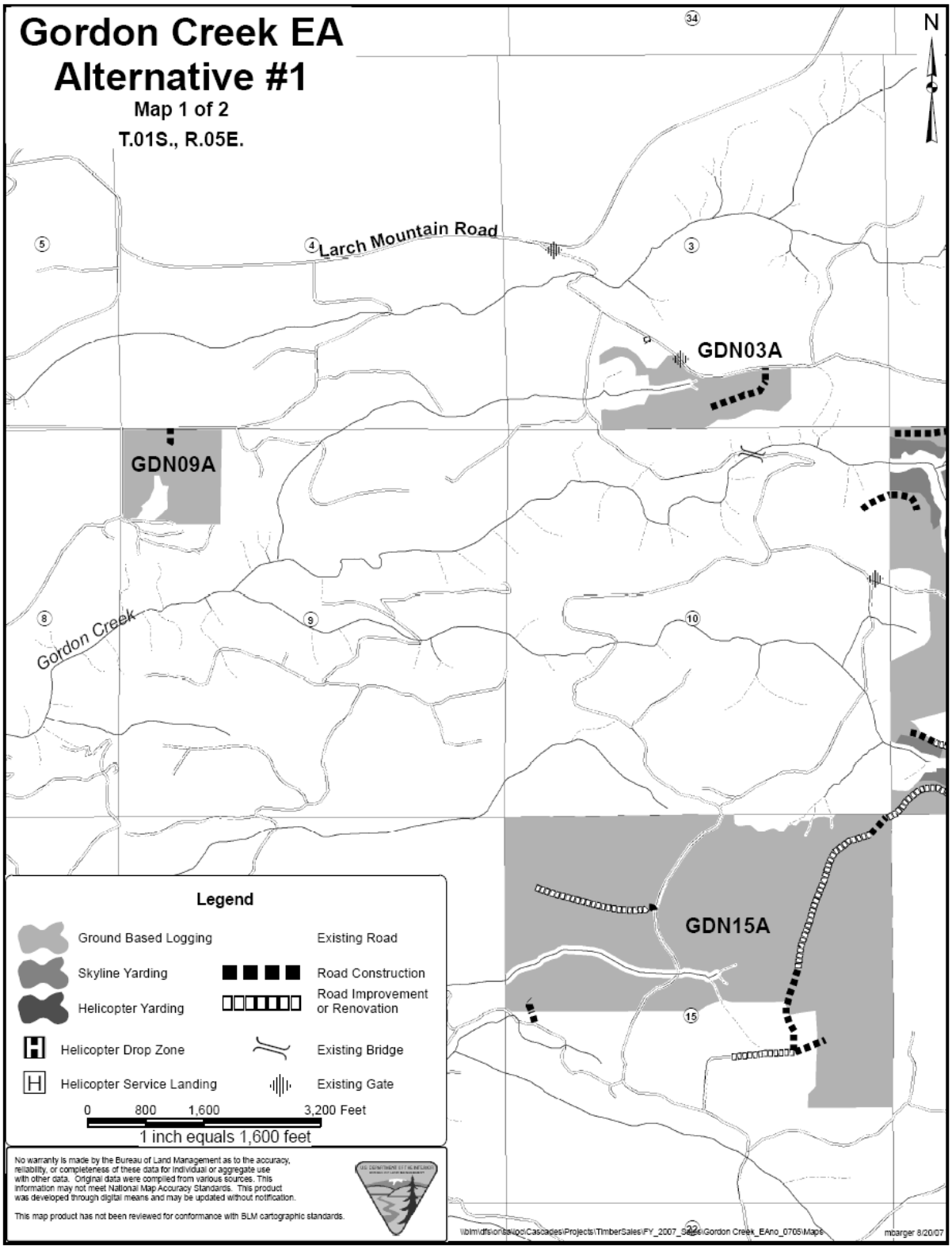
Table 19 - Summary of Snags Currently Available By Project Area

Snags at least 15' tall/100 acres						
Section (all units)	*Hard snags 15-25"*	*Soft snags 15-25"*	*Hard snags 25"+*	*Soft snags 25"+*	*Total hard snags 15"+*	*Total soft snags 15"+*
1S-5E-1	63	0	0+	43	90	43
1S-5E-3	100	100	0	0+	100	125
1S-5E-9	50	100	0	0+	50	125
1S-5E-11	30	20	0	170	30	190
1S-5E-13	250	0	0	50	250	50
1S-5E-15	240	150	0+	200	260	350

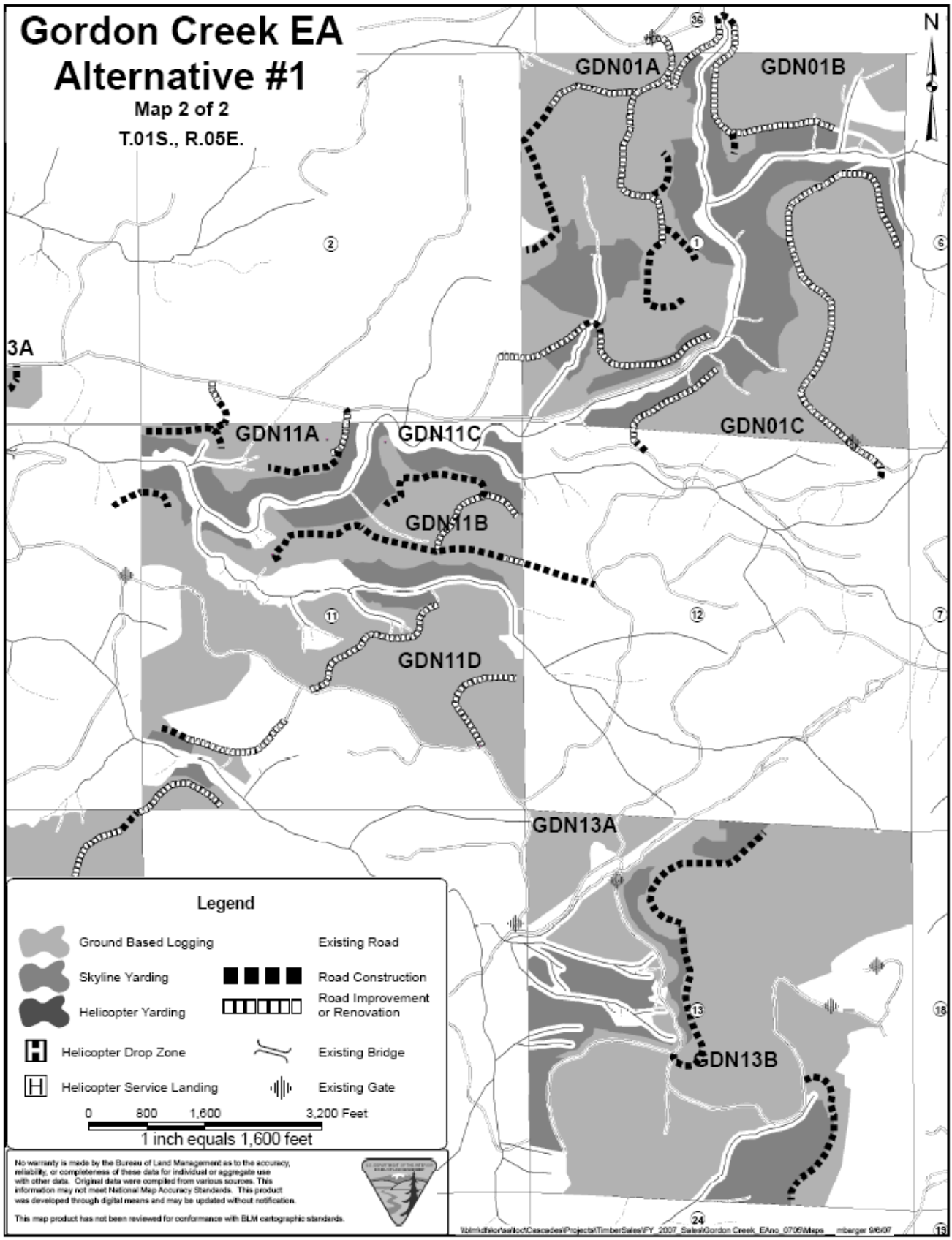
7.2 Visual Comparison (Maps) of Action Alternatives

7.2.1 Alternative 1 (Proposed Action)

Map 2: Alternative 1 (Proposed Action) – Map 1 of 2

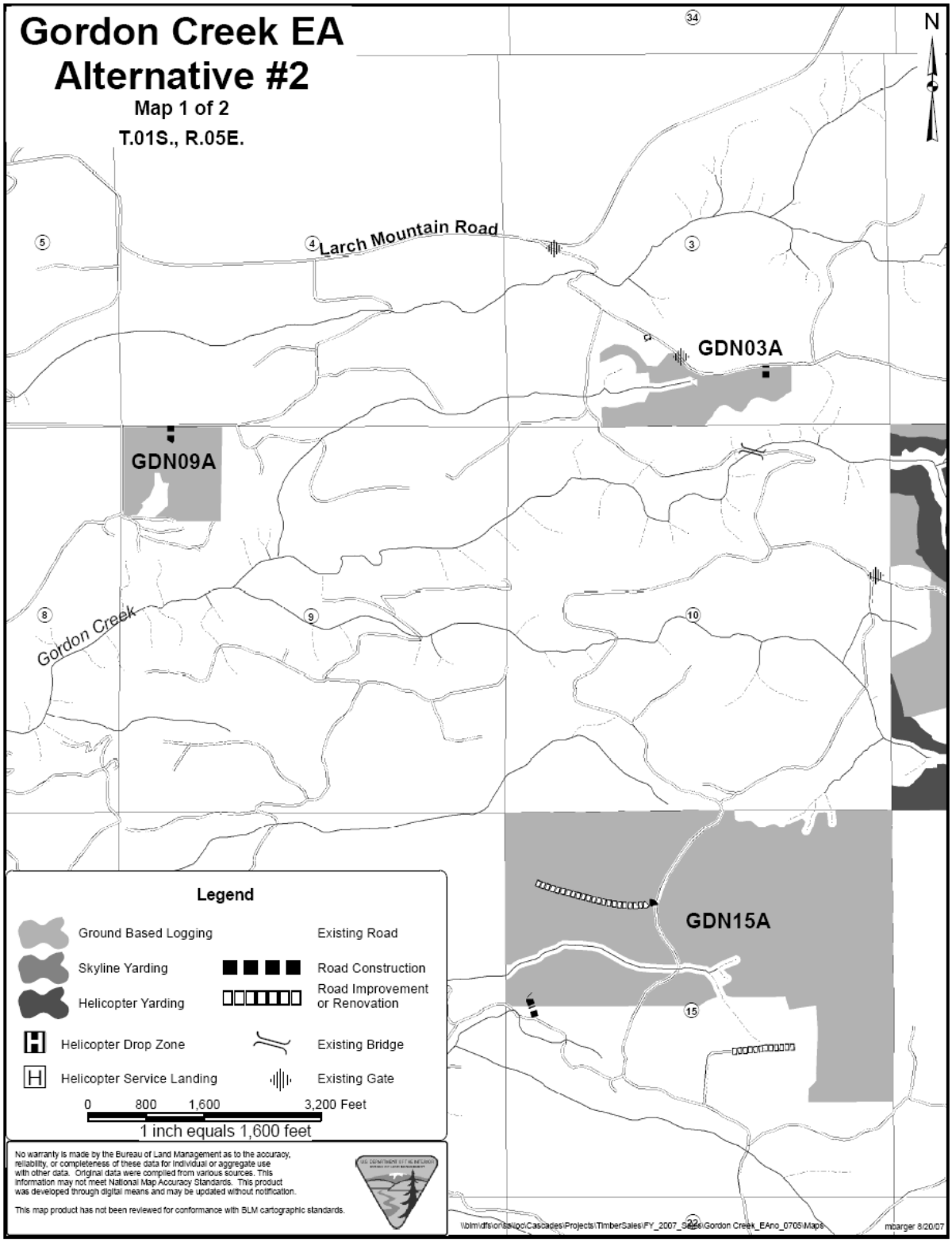


Map 3: Alternative 1 (Proposed Action) – Map 2 of 2

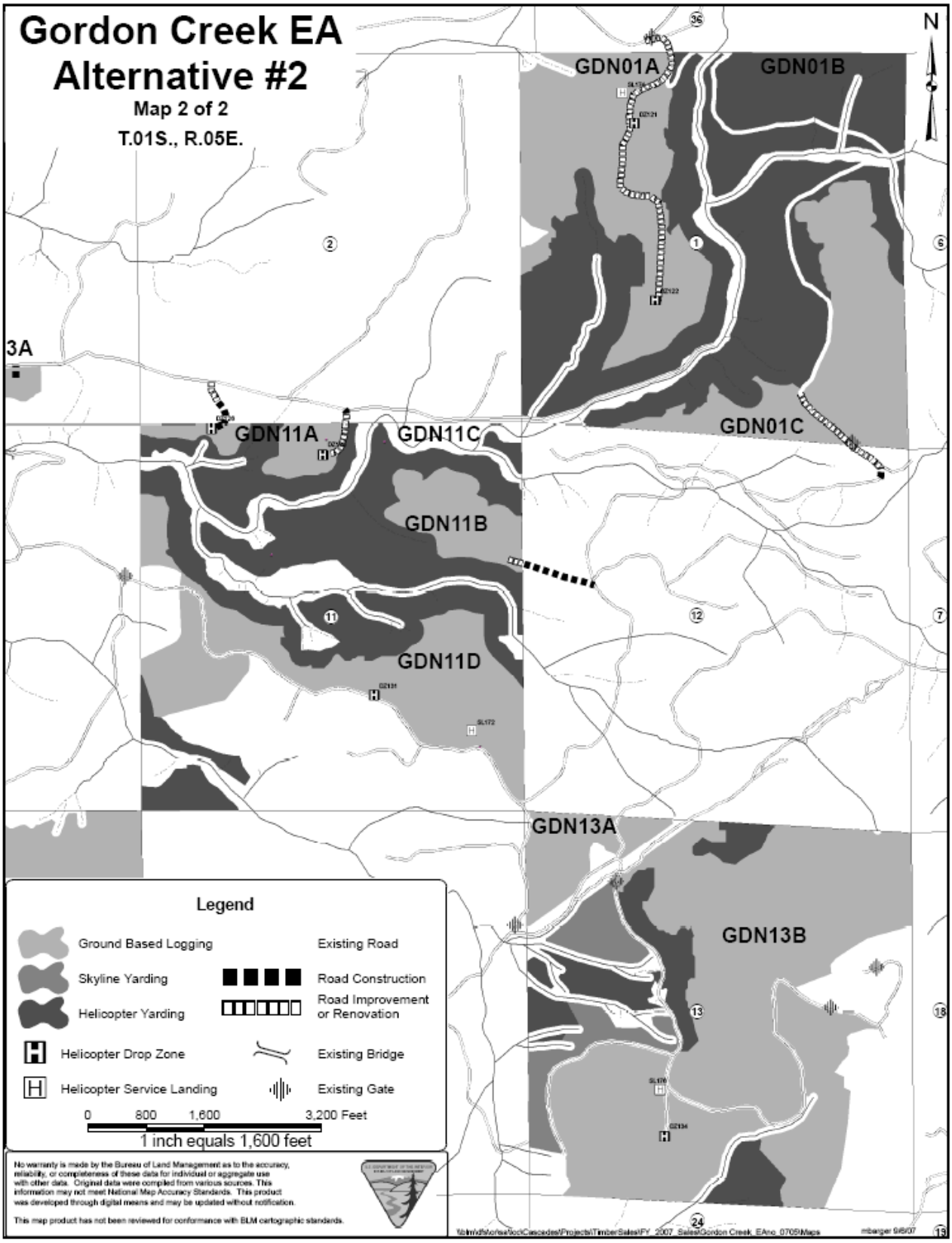


7.2.2 Alternative 2

Map 4: Alternative 2 – Map 1 of 2

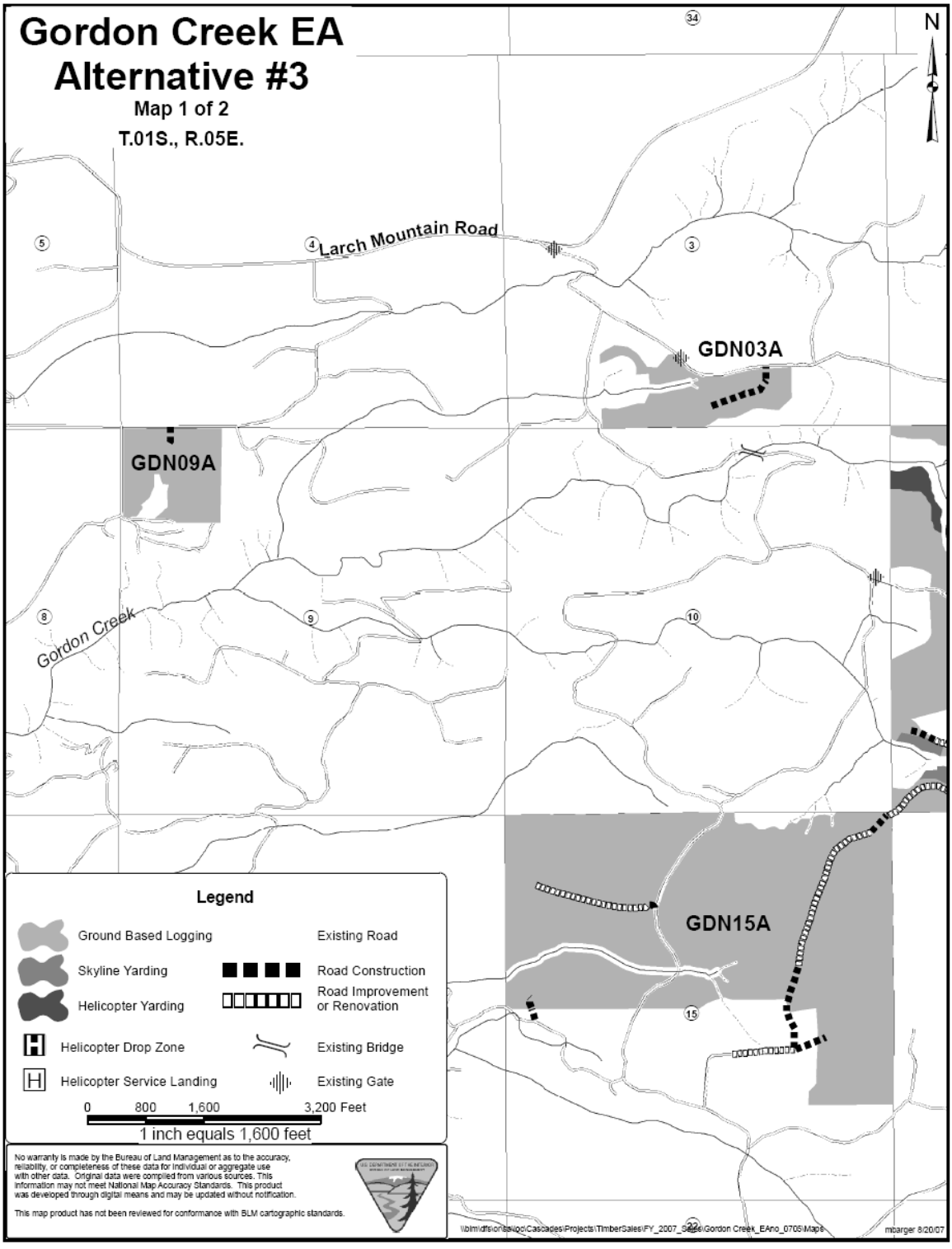


Map 5: Alternative 2 – Map 2 of 2



7.2.3 Alternative 3

Map 6: Alternative 3 – Map 1 of 2



Map 7: Alternative 3 – Map 2 of 2