Little Wolf Thrice
Density Management Study
Environmental Assessment

EA #OR – 104 – 08 – 07

U.S. Department of Interior
Bureau of Land Management
Roseburg District
Swiftwater Field Office
Roseburg, Oregon

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U.S. Department of the Interior, Bureau of Land Management
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Foreword

The BLM recognizes the uncertainty surrounding: the U.S. Fish & Wildlife Service's recently approved *Final Recovery Plan for the Northern Spotted Owl* (May 2008), the final rule re-designating critical habitat for the northern spotted owl (Federal Register, Vol. 73, No. 157; Aug. 13, 2008), the *Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management* (2008 Final EIS), and the subsequent District Record of Decision and Resource Management Plans (2008 ROD/RMP), to which this EA is tiered. The spotted owl recovery plan, the final rule re-designating spotted owl critical habitat, and the 2008 ROD/RMP are the subject of legal challenge. However, the Roseburg District has considered this and concludes that the uncertainty surrounding these legal challenges does not invalidate the design and layout of the proposed action described in this environmental assessment.

Revision of a resource management plan necessarily involves the transition from the application of the old resource management plan to the application of the new resource management plan. A transition from the old resource management plan to the new resource management plan avoids disruption of the management of BLM-administered lands and allows the BLM to utilize work already begun on the planning and analysis of projects.

The 2008 ROD allowed for such projects to be implemented consistent with the management direction of either the 1995 RMP (as amended) or the 2008 RMP, at the discretion of the decision maker.

This project is in compliance with the 1995 RMP and meets the requirements designated in the 2008 ROD/RMP for such transition projects:

1. A decision was not signed prior to the effective date of the 2008 ROD (December 30, 2008).
2. Preparation of National Environmental Policy Act documentation began prior to the effective date of the 2008 ROD (i.e. December 30, 2008). The Little Wolf Thrice DMS was initiated on August 21, 2007 and the public was notified of on the project in the Fall 2008 Roseburg District Quarterly Planning Update, and a period for informal scoping was provided.
3. The decision for the DMS analyzed in the Little Wolf Thrice DMS EA will be issued within two years of the effective date of the 2008 ROD.
4. The proposed DMS analyzed in the Little Wolf Thrice DMS EA does not include regeneration harvest; therefore regeneration harvest within a Late-Successional Management Area, would not occur under this project and no harvest would occur in the Deferred Timber Management Area,.
5. The proposed DMS analyzed in the Little Wolf Thrice DMS EA would not result in the destruction or adverse modification of critical habitat designated for species listed as endangered or threatened under the Endangered Species Act.

The proposed action is a density management study within which timber would be commercially harvested. The density management study would thin approximately 20 acre of mid-seral forest (70-80 years old) from the Late-Successional Management Area (LSMA) and Riparian Management Area land use allocations. This project conforms to the Roseburg 2008 Record of Decision and Resource Management Plan (2008 ROD/RMP); however, it would also comply with the requirements of the 1995 Roseburg District ROD/RMP, as it would be in the land use allocations that were previously designated as Late –Successional Reserve and Riparian Reserve under the 1995 ROD/RMP.

Since the planning and design for this project was initiated prior to the 2008 ROD, it contains certain project design features that comply with the 1995 ROD/RMP but are not consistent with the management direction contained in the 2008 RMP including: Riparian Management Area & Riparian Reserve, snag & coarse woody debris retention, and the Aquatic Conversation Strategy (discussed below).

Designated Critical Habitat:

The Little Wolf Thrice DMS is entirely within designated Critical Habitat for the spotted owl under the 1992 Final Rule for *Determination of Critical Habitat for the Northern Spotted Owl* (Fed. Reg.; Vol. 57, No. 10; Jan. 15, 1992; pgs. 1796-1838) and remain critical habitat after the 2008 Final Rule that *Revised Designation of Critical Habitat for the Northern Spotted Owl*. Consequently, there is no information which would change the analysis of effects regarding designated spotted owl critical habitat in the Little Wolf Thrice EA.

Riparian Management Area & Riparian Reserve:

Under the 2008 ROD/RMP, intermittent non-fish bearing streams would have a Riparian Management Area half of one site-potential tree height (i.e. 90 feet) in width and silvicultural activities (e.g. thinning) would not be applied within 35 feet of the stream (2008 ROD/RMP, pg. 35).

Under the 1995 ROD/RMP, as amended, the Riparian Reserve width on intermittent streams was the height of one potential tree height (i.e. 180 feet; 1995 ROD/RMP, pg. 24) but there was no specific management direction limiting silvicultural activities from the stream.

In Little Wolf Thrice DMS, there are non-fish bearing streams. The Riparian Management Areas and associated management direction from the 2008 ROD/RMP would still retain the study design to thin through (i.e. 0 foot buffer) the intermittent, non-fish bearing streams in the project. As stated earlier, Little Wolf Thrice DMS is a transition project and is allowed to have features inconsistent with the 2008 ROD/RMP, but are consistent with the 1995 ROD/RMP (2008 ROD/RMP, pgs. 5-6). Little Wolf Thrice is the second phase of a Density Management Study that replicates the study design from the first phase of the study (completed in 1998) which previously complied with the 1995 ROD/RMP.

Snag & Coarse Woody Debris Retention:

Under the 2008 ROD/RMP, all snags and coarse woody debris would be retained within the Riparian Management Area, except for safety or operational reasons (e.g., maintaining access to roads and facilities [2008 ROD/RMP, pg. 35]). Within the LSMA, snags and coarse woody debris would be retained, except for safety or operational reasons (2008 ROD/RMP, pg. 33).

Under the 1995 ROD/RMP, existing coarse woody debris already on the ground was retained within the Late-Successional Reserve (1995 ROD/RMP, pg. 30) but during partial harvest (such as commercial thinning), it was not necessary to fall the larger dominant or co-dominant trees to provide coarse woody debris (1996 Plan Maintenance in *Roseburg District Annual Program Summary and Monitoring Report Fiscal Year 2007*, pg. 62).

Natural snag recruitment would be monitored for 10 years following treatment. If mortality within the residual overstory trees does not meet the target level for snags (i.e. five snags per acre, as stated in the BLM Density Management Study) within 10 years, then snags would be artificially created to meet the deficit (Cissel et al. 2006, pg. 12). The number of snags that met the 40 percent potential population level of cavity nesting birds was approximately 1.2 snags per acre $\geq$ 11 inches diameter breast height (Nietro *et al*., 1985[1] as cited in the 1994 Roseburg District PRMP/EIS [Chapter 4-43]).

[1] Nietro, W.A. et al. 1985. Snags. In: *Management of Wildlife and Fish Habitats in Western Oregon and Washington*. Publication No. R6-F & WL-192-1985.

Coarse woody debris and snags within the Late-Successional Reserve were managed in a manner that improved conditions for wildlife if they provide late-successional habitat benefits or if their effect on late-successional associated species is negligible (1995 ROD/RMP, pg 38) but there were no explicit requirements within Riparian Reserves for snags or coarse woody debris under the 1995 ROD/RMP.

The Little Wolf Thrice DMS project meets the requirements of the 1995 ROD/RMP for coarse woody debris and cavity nesting birds, because the post-harvest activities include the creation of down woody debris and snags as well as understory density control through commercial thinning (EA, pg. 8).

Aquatic Conservation Strategy:

Hydrology and Fisheries staff within the Swiftwater Field Office assessed the effect of the proposed project on the Aquatic Conservation Strategy (ACS) objectives at both the site and watershed scale (assessment included in Appendix D of the Little Wolf Thrice DMS EA. The proposed project would not retard or prevent attainment of ACS objectives at the site or watershed scales. Instead, the proposed action would speed attainment of these objectives through the density management study commercial thinning prescription and the better understanding of the forest ecosystem the study would generate. Therefore, the proposed action alternative in the Little Wolf Thrice DMS EA is consistent with the ACS, and its objectives at the site and watershed scales.

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A. Background

Approximately 20 acres of mid-seral stage forest would be commercially harvested through thinning activities in accordance with the BLM Density Management Study (Cissel et al. 2006) plan.

The stand proposed for thinning is a mid-seral forest stand 70-80 years old that was previously commercially thinned in 1980 and 1998. The Little Wolf Thrice stand is located in Sections 3 and 10; T. 25 S., R. 08 W.; Willamette Meridian, on Revested Oregon and California Railroad Lands (O&C Lands). The proposed project is located, under theRoseburg District's 2008 Record of Decision and Resource Management Plan (ROD/RMP, 2008), within the Late-Successional Management Area (LSMA).

The Little Wolf Thrice project is the third harvest and the second phase of an ongoing Density Management Study (DMS). The study was formally initiated in 1993 by the Bureau of Land Management (BLM), Pacific Northwest Research Station, US Geological Survey, and Oregon State University (Cissel et al., 2006; pg. 3). Prior to the 2008 ROD/RMP, the Final - Roseburg District Proposed Resources Management Plan / Environmental *Roseburg District Record Of Decision and Resource Management Plan* Impact Statement (USDI, 1994) was the controlling document for land management on Roseburg BLM administered lands. Little Wolf Thrice would use the same treatment area boundaries that were used in the first phase of implementation of the density management study. The Phase I treatment was analyzed under the *Little Wolf Density Management Environmental Assessment* (EA) (No. OR-104-97-03) and implemented as described in *the Little Wolf Density Management Decision Record* (April 29, 1997). The Phase I treatment was implemented in 1998 (Cissel et al., 2006; pg. 131).

As per Instruction Memorandum (IM) OR-2005-083 (August 12, 2005), on-the-ground treatment implementation for Phase II at Little Wolf is proposed for 2009-2010. The IM states that the next phase of the Density Management Study at the Little Wolf site in Roseburg would be implemented in 2010 and that every effort would be made to meet this window.

It is anticipated that the proposed action would yield approximately 112,000 board feet (112 MBF) of timber in support of local and regional manufacturers and economies.

B. Conformance with the Land Use Plan:

This environmental assessment (EA) analyzes the environmental consequences of the Proposed Action Alternative and the No Action Alternative, to explain the environmental effects of each in the decision-making process. In addition to the ROD/RMP, 2008, this analysis tiers to the 2008 Final Environmental Impact Statement for the Revision of the Resource Management Plan of the Western Oregon Bureau of Land Management (2008 Final EIS).
Implementation of the actions proposed in this analysis would conform to the requirements of the 2008 ROD/RMP.

Ongoing research projects would be continued according to current or updated study plans. Management direction on existing study sites that conflict with research objectives would be deferred until the research is complete. New research projects would require study plans that are consistent with the resource management plan or a plan amendment if they are not consistent with the Resource Management Plan (2008 RMP/ROD, Pg. 56).

C. Purpose and Need

The overall objective of the proposed project is to evaluate if alternative thinning treatments accelerate development of late-successional stand characteristics through implementation (continuation) of a designed research study in accordance with the 2008 ROD/RMP . Specific objectives of the proposed action are to:

1. The primary objective of the proposed project is to evaluate if alternative thinning treatments accelerate development of late-successional stand characteristics and vegetation communities (e.g., large trees, mid-seral understory species) in young Douglas-fir forests of the Coast Range in western Oregon through implementation (continuation) of a designed study (Cissel et al., 2006; pg. 16).

   The primary goal of the treatment is to maintain and encourage the development of structural diversity, especially in the understory layers (Cissel et al., 2006; pg. 11).

2. Comply with Section 1 of the O&C Act (43 USC § 1181a) which stipulates that O & C Lands be managed "… for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities…"

D. Decision Factors

The degree to which the objectives previously described would be achieved, including:

- The manner in which commercial thinning would be conducted with respect to cost, the method(s) of yarding, and type of equipment; season(s) of operations; and the manner in which access would be provided, including road renovation, and the types and locations of road construction;

- The nature and intensity of environmental impacts that would result from implementation and the nature and effectiveness of measures to mitigate impacts to resources including, but not limited to, wildlife and wildlife habitat, soil productivity, water quality, air quality, and the spread of noxious weeds;

- Compliance with management direction from the 2008 ROD/RMP;

- The manner in which objectives of the Density Management Study (DMS) plan are achieved (Cissel et al. 2006);

- Compliance with applicable laws including, but not limited to, the Clean Water Act, the Endangered Species Act, O&C Act, and the National Historic Preservation Act; and

- The potential of the alternative to provide revenue to the government from the sale of timber resources in a cost efficient manner.

Chapter 2 Discussion of the Alternatives

This chapter describes the basic features of the alternatives being analyzed.

A. The No Action Alternative

The No Action Alternative would allow existing conditions and trends to continue in their current state. It would not allow for further evaluation of the on-going DMS study. Data would not be collected to determine if alternative thinning treatments accelerate development of late-successional stand characteristics and vegetation communities (e.g., large trees, mid-seral understory species) in young Douglas-fir forests of the Coast Range in western Oregon. It would not prevent the implementation of other reasonably foreseeable federal and private projects. Under the 2008 ROD/RMP, harvest and silvicultural activities are scheduled to occur within the Late-Successional Management Area land use allocation. If the no action alternative were selected there would be no commercial or precommercial thinning via timber management. Furthermore, any additional down woody debris and snag creation, within the bounds of the project area, would increase naturally.

Harvest at the proposed locations for purposes of analysis would not occur for the foreseeable future. Future harvesting in this area would not be precluded and could be considered again under a subsequent analysis. Road maintenance would be conducted as-needed to provide resource protection, accommodate reciprocal users, and protect the federal investment.

B. The Proposed Action Alternative

The Proposed Action would implement the treatments designed by the involved researchers, as defined in the Density Management Study (DMS) plan. Commercial thinning would harvest approximately nine overstory Douglas-fir trees per acre between 9-30 inches DBH. It would be implemented through a timber sale that would yield approximately 112 MBF of timber. The proposed action consists of the following activities (also summarized in Table 1):

1. Vegetative Treatments:

A. Prescriptions

The stand to be treated in Little Wolf Thrice is dominated by trees that are 70-80 years-old. The area was previously commercially thinned in 1980 and later in 1998 as Phase I of the Little Wolf Density Management Study. The stand would be re-thinned with a design that would remove approximately 25 percent of the Douglas-fir trees with diameters at breast height (DBH) within the 9-30 inch range. Generally, minor species of conifers (e.g. grand fir, incense cedar, western red cedar, and western hemlock) less than nine inches DBH, and hardwoods regardless of size, would be reserved from cutting or harvest. Between 9 to10 conifer trees per acre would be harvested from the treatment area.

a) Down Wood Creation:
Within two years after completion of harvest activities, down woody debris levels would be determined from 13 permanent one-quarter acre monitoring plots located in the proposed treatment area. Existing, recently downed trees (class 1 or 2 logs) can be used to satisfy this requirement (Cissel et al., pg. 12). If down woody debris requirements are not met, overstory trees (up to two per acre) would be felled to meet the down woody debris deficit.

b) Snag Creation:
Adequacy of down existing snag levels would be determined from permanent monitoring plots described in the previous section. Natural snag recruitment would be monitored for 10 years following treatment. If mortality within the residual overstory trees does not meet the target level for snags (i.e. five snags per acre, as stated in the BLM Density Management Study) within 10 years, then snags would be artificially created to meet the deficit (Cissel et al. 2006, pg. 12).

c) Understory Density Reduction:
The need for treatment would be assessed following the timber harvest. Precommercial thinning would be prescribed and implemented in thinned areas where patches greater than one acre of conifer reproduction exceed 80 trees per acre (TPA). Conifer understory density following precommercial thinning should be between 50 TPA and 60 TPA (Cissel et al. 2006, pg. 8, 11).

Proposed post-harvest activities include the creation of down woody debris and snags as well as understory density control through precommercial thinning. Harvest activities would occur in 2009-2010. Subsequent non-harvest treatments would be completed within 10 years of harvest completion.

Table 1. Little Wolf Thrice Proposed Activities Summary

Activity		Total
Timber Harvest	Commercial Thinning	20 acres
	Temporary Spur Right-of-Way	0 acres
Yarding	Cable	20 acres
	Ground Based	0 acres
	Incidental	< 2 acres
Hauling	Wet Season	0 miles
	Dry Season	6.16 miles
	Wet-or-Dry Season	0 miles

Road Activities	Roads to be Constructed	0.0 miles
	Renovation of Existing Roads	0.60 miles
	Maintenance of Existing Roads	5.56 miles
	Road Decommissioning (i.e. water barred, seeded/mulched, and blocked)	0.60 miles
Fuel Treatment	Machine Pile and Burn at Landings	2 acres
Down Wood	Create down woody debris	20 acres
Snags	Create snags	20 acres
Understory Density Control	Precommercially thin understory	20 acres

B. Stream Buffers

The Density Management Study design for the Little Wolf project area does not establish separate treatments for upland and riparian areas. The entire project area constitutes a single experimental unit. Variable-width buffers provide for greater utilization of the study site (project area) by reducing the "no treatment" area to the minimum necessary to protect riparian resources. This allows for greater flexibility in individual tree selection to meet the DMS plan requirement for residual overstory tree density following harvest.

As stated in the Density Management, Study, variable-width "no-harvest" buffers would be established within the RMA to protect stream bank integrity, maintain streamside shade for perennial flowing streams and provide a filtering strip for overland run-off. Variable buffer width would be based on site conditions and would have a width between 20 to 50 feet measured from the edges of the stream channel (Cissel et al. 2006, pg. 10). Actual widths would vary depending on stream flow, unique habitat features, streamside topography, stream bank stability, and vegetation. Minimum buffer widths would be used primarily on ephemeral or highly interrupted intermittent streams, which lack riparian vegetation and where riparian habitat components, soil stability issues, and potential impact to downstream fisheries and water quality are also absent.

Where yarding across streams is necessary, logs would be fully suspended over the stream to avoid disturbing the stream channel and banks. No equipment operation would be allowed within the "no-harvest" buffers. If necessary to fell trees within the "no-harvest" buffers for operational purposes, the felled trees would be fallen toward the stream and left in place to provide in-stream wood and protection for stream banks.

C. Timber Cruising

Timber cruising would employ the Hundred Percent Cruise method to determine volume. Approximately 112 MBF of timber would be harvested in this phase of the study.

A small amount of additional timber could potentially be included as a modification to this project. These additions would be limited to the removal of individual trees or small groups of trees that are blown down, injured from logging, are a safety hazard, or trees needed to facilitate the proposed action. Historically, this addition has been less than ten percent of the estimated sale quantity.

a) **Timber Yarding**

The Proposed Action would require skyline cable yarding on 20 acres. Up to two acres of additional, incidental ground-based logging may be necessary (i.e. removal of guyline anchor trees, isolated portions of units, etc.

b) **Timber Hauling**

Approximately 0.60 miles of natural surface roads and 5.56 miles of rocked/paved roads would be used for timber hauling in the dry-season.

2. Fuels Treatment

Prescribed burning of slash (burning under the direction of a written site specific prescription or "Burn Plan") would occur at machine-piled landing piles. The fine fuels generated during the thinning process would remain scattered throughout the treatment units.

3. Road Activities (Renovation, & Decommissioning)

The proposed project would include dry season hauling and use of existing roads to the greatest extent practical. Road renovation and decommissioning would be restricted to the dry season (normally May 15th to October 15th). The operating season could be adjusted if unseasonable conditions occur (e.g. an extended dry season beyond October 15th or an extended wet season beyond May 15th).

A. Renovation – A total of approximately 0.60 miles of the existing natural surface road (Spur 1) would be renovated by brushing, grading, replacing drainage structures and road realignment into bank to avoid shoulder failure**.**

B. Decommissioning – Decommissioning this natural-surfaced spur road would include: installation of waterbars, mulching the running surface with slash and weed-free straw mulch, seeding and blocking traffic with a trench barrier near the road junction. An excavator would construct the waterbars and distribute the slash on one side of the roadbed so that a pathway remains for foot traffic access use to perform future treatments and monitoring. Weed-free straw mulch would be substituted for slash where slash quantity provides insufficient coverage and along the foot

pathway. The first 100 feet of Spur 1, beyond the trench barrier would be covered with woody debris to prevent public all terrain vehicle traffic. All spur bed surfaces would be seeded with native seed (or a sterile hybrid mix if native seed is unavailable). Mulching with straw and seeding as specified above would also be done on all new cut slope disturbances and the existing fill failure on Spur 1.

During decommissioning additional rock or woody debris would be placed in the low water crossings as needed to protect against erosion

Table 2. Little Wolf Thrice Roads & Spurs.

Road #	New Construction (miles)	Renovation (miles)	Surfacing		Decommissioning
			Existing	Proposed	
24-8-36.0 A	-	0.9	Paved	Paved	None
24-8-36.0 B	-	0.5	Rock	Rock	None
25-7-5.1	-	1.7	Rock	Rock	None
25-8-1.1	-	2.46	Rock	Rock	None
Spur 1	-	0.6	Native	Native	Yes
TOTAL	**0**	**6.16**			

C. Additional Project Design Features as part of the Action Alternative

1. **To protect riparian habitat:**
   - **A.** The integrity of the riparian habitat would be protected from logging damage by directionally felling trees away from or parallel to the riparian area.

   - **B.** Prior to attaching any logging equipment to a reserve tree, precautions to protect the tree from damage would be taken. Examples of protective measures include cribbing (use of sound green limbs between the cable and the bole of the tree to prevent girdling), tree plates, straps, or plastic culverts. If, for safety reasons, it would be necessary to fall a reserve tree in the riparian area then it would be fallen toward the stream and left as down woody debris for instream wood and stream bank protection/stabilization.

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

   A. Measures to limit soil erosion, sedimentation and compaction from roads would consist of:

   a) Renovation of Spur 1 would include establishing low water crossings where Spur1 crosses a first order stream and dry-season wet spots that are fed by seeps. These crossings would be lined with rock sufficient to support traffic.

b) Waterbars would be spaced in accordance with the high-erosion class guide-lines in Best Management Practices (Table C-5) (2008 ROD/RMP, pg. C-33).

Table 3. Erosion Class

Gradients (%)	Water Bar Spacing (feet)
2-5	200
6-10	150
11-15	100
16-20	75
21+	50

Spacing is determined by slope distance and is the maximum allowed for the grade.

c) During decommissioning additional rock or woody debris would be placed in the low water crossings as necessary to protect against erosion.

B. Measures to limit soil erosion, sedimentation, and compaction from logging would consist of:

Use of cable logging systems that limit ground disturbance. This would include the use of partial or full suspension and using intermediate supports, as necessary. In some small areas, partial suspension might not be physically possible due to terrain. Where excessive soil furrowing occurs, it would be hand waterbarred and filled with limbs or other organic debris.

C. Measures to protect the duff and surface soil layer would consist of:

Burning of slash piles during the late fall to mid-spring season when the soil, duff layer (soil surface layer consisting of fine organic material), and large down log moisture levels are high. This would confine burn impacts to the soil underneath the piles and lessen the depth of the impacts (i.e., loss of organic matter, and the change of soil physical properties, ecology and soil nutrients).

D. Measures to protect slope stability would consist of:

Cable yarding would not be permitted on very steep slopes (i.e. 70 percent and greater) when soil moisture levels are high enough to squeeze water from soil samples by hand. Soil moisture would be considered too high if cable yarding creates glazed imprints on the soil and channels water down-slope. This generally occurs when the soil moisture is greater than 30 percent.

3. To protect air quality:

All prescribed burning (i.e. slash piles) would have an approved "Burn Plan," and be conducted under the requirements of the Oregon Smoke Management Plan and in a manner consistent with the requirements of the Clean Air Act (ODEQ and ODF, 1992).

4. **To prevent and/or control the spread of noxious weeds:**

   Logging and road construction equipment would be required to be cleaned and free of weed seed prior to entry onto BLM lands (BLM Manual 9015-Integrated Weed Management).

5. **To protect cultural resources:**

   If any objects of cultural value (e.g. historic or prehistoric ruins, graves, fossils, or artifacts) are found during the implementation of the proposed action, operations would be suspended until the site has been evaluated to determine the appropriate mitigation action.

6. **To protect Special Status Plants and Animals:**

   Special Status (Threatened or Endangered, proposed Threatened or Endangered, State listed, Bureau Sensitive, or Bureau Strategic,) plant and animal sites would be protected to conserve (as Threatened or Endangered under the Endangered Species Act), according to established management recommendations (2008 ROD/RMP).

   A. If during implementation of the proposed action, any Special Status Species are found that were not discovered during pre-disturbance surveys; operations would be suspended and appropriate measures would be implemented, as needed, before operations would be resumed.

   B. The project area occurs within the Tyee Spotted Owl Demography Study Area and has had annual survey data since 1983. Two consecutive years of surveys (2007 and 2008) have determined there are no known spotted owl nest sites within 65 yards of the proposed unit boundaries therefore, harvest activities (e.g. falling, bucking, and yarding) would not be seasonally restricted. However, if new information becomes available as a result of future surveys within the demography study area and owls are detected within or adjacent to the proposed project area, the waiver for seasonal restrictions would no longer be valid until nesting location and/or status has been determined. If an activity center is located within 65 yards of the unit boundary, seasonal restrictions would apply from March 1st thru July 15th, both days inclusive unless subsequent surveys have determined nesting attempt has failed. Waiver of the seasonal restriction is valid until March 1st of the following year.

7. **To prevent and report accidental spills of petroleum products or other hazardous material and provide for work site cleanup:**

   The operator would be required to comply with all applicable State and Federal laws and regulations concerning the storage, use and disposal of industrial chemicals and other hazardous materials. All equipment planned for in-stream work (e.g. culvert replacement) would be inspected beforehand for leaks. Accidental spills or discovery of the dumping of any hazardous materials would be reported to the Authorized Officer and the procedures outlined in the "Roseburg District Hazardous Materials (HAZMAT)

Emergency Response Contingency Plan" would be followed. Hazardous materials (particularly petroleum products) would be stored in appropriate and compliant UL-Listed containers and located so that any accidental spill would be fully contained and would not escape to ground surfaces or drain into watercourses. Other hazardous materials such as corrosives and/or those incompatible with flammable storage shall be kept in appropriate separated containment. All construction materials and waste would be removed from the project area.

D. Resources that Would be Unaffected by Either Alternative

1. Resources Not in Project Area

The following resources or concerns are not present and would not be affected by either of the alternatives: Areas of Critical Environmental Concern (ACECs), Research Natural Areas (RNAs), prime or unique farm lands, floodplains/wetlands, solid or hazardous waste, Wild and Scenic Rivers, and Wilderness.

The proposed action is consistent with Executive Order 12898 which addresses Environmental Justice in minority and low-income populations. The BLM has not identified any potential impacts to low-income or minority populations, either internally or through the public involvement process. No American Indian religious concerns were identified by the team or through correspondence with local tribal governments.

There are currently no energy transmission or transport facilities, and/or utility rights-of-way in proximity to the proposed project unit.

2. Cultural Resources

Little Wolf Thrice was inventoried for cultural resources and none were discovered (February 1996; May 1996). It was determined that there would be no effect to any cultural resources since none were identified in the Little Wolf Thrice project area. The Swiftwater Field Office has completed its Section 106 responsibilities under the 1997 National Programmatic Agreement and the 1998 Oregon Protocol.

3. Visual Resource Management

The VRM classification for this area is IV. Major modification of the existing character of the landscape is allowed as stated in the 2008 ROD/RMP (pg. 58). The ROD/RMP further states that "[m]anagement activities would dominate the view and would be the major focus of viewer attention 2008 ROD/RMP (pg. 58).

Chapter 3 Affected Environment & Consequences by Resource

This chapter discusses the specific resources potentially affected by the alternatives and the direct, indirect and cumulative environmental effects[b] of the alternatives over time. This discussion is organized by individual resource, and provides the basis for comparison of the effects between alternatives. The cumulative effects of the BLM timber management program in western Oregon have been described and analyzed in the *Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management* (October 2008), incorporated herein by reference.

A. Forest Vegetation

1. Affected Environment

The forest stand comprising the proposed project area originated from wildfire(s) in the early 1900s. The majority of the overstory trees are approximately 70-80 years. The stand was previously commercially thinned in 1980 and 1998. A relatively dense conifer/hardwood/shrub understory is present and originated from natural regeneration following the first commercial thinning harvest (Bailey and Tappeiner 1998) Current stand structure is shown below (Figure 1).

Figure 1.

Analysis of effects utilized vegetation data for live and dead wood stand components collected from permanent monitoring plots within the project area that were last measured in 2004 (USDI, 2009).

Douglas-fir comprises 98 percent of the overstory on a basal area basis. Other conifer species in the stand include incense-cedar, western hemlock, and grand fir. Hardwood species include Pacific madrone, golden chinquapin, big-leaf maple, and red alder. Table 4 (below) provides a summary of the existing stand condition in 2009 as projected with the Organon growth and yield model (Hann 2006) using the 2004 measurement dataset.

[b] Cumulative effects are the impacts of an action when considered with past, present, and reasonably foreseeable future actions. (40 CFR 1508.7)

The understory is dominated by Douglas-fir, sword fern, salal, Oregon grape, poison oak, ocean spray and other shrub and herbaceous species. Scotch broom is present on the project area and is most vigorous in association with roads. Understory tree density averages approximately 1,100 trees per acre with wide variations in stocking over the proposed project area.

The level of existing down woody debris is approximately 14 cubic feet per acre. There are approximately five snags (0.25 snags per acre) over 18 inches DBH within the proposed project area.

Table 4. Existing Stand Conditions

Unit #	Acres	Trees Per Acre		Basal Area (ft^2/acre)		Mean Diameter (inches)	Canopy Cover %	Relative Density Index	Average Crown Ratio	Down Woody Debris ($feet^3$)[1]	# of Snags Per Acre[2]
		C	H	C	H						
1	20	47	4	143	2	23	68	31	0.48	14	¼

C = Conifer; H = Hardwood
Attributes based on overstory trees (>9" DBH) except for DWD & Snags
[1] DWD = down woody debris ≥ 10" diameter large end and ≥ 5' long derived from DMS monitoring plots
[2] Snags ≥ 18" DBH and ≥ 50' tall determined by observation during tree marking

2. No Action Alternative

Under this alternative no treatments would be conducted on the proposed project area.

Current relative density (RD) for the overstory is well below the suppression related mortality threshold of RD ≈ 50-55 (Curtis and Marshall 1986) and within the range recommended by Hayes et. al. (1997), Chan et. al. (2006) and Churchill (2005) for the promotion of understory development and vertical diversity. However, relative density would increase leading to declining diameter growth rates in the absence of treatment (Curtis and Marshall 1986) and live crown reduction (Curtis and Marshall 2002). It is expected that the overstory relative density would reach a level of RD > 40 within 20 years at which point the potential for understory tree release becomes increasingly unlikely (Churchill 2005).

Height and diameter growth rates of the understory trees are negatively correlated with overstory density and can be expected to decline without further reduction in the overstory density (Chan et al. 2006). In addition, competition between understory trees would lead to reduced photosynthetic capacity as crown recession increases resulting in decreased diameter growth and increasing height to diameter ratios. As trees increase in height, with little increase in diameter, they become unstable and more susceptible to damage from wind, ice and snow damage (Wonn and O'Hara 2001).

Increasing overstory and tree understory relative densities would likely result in a reduction of vigor in the non-tree vegetation, leading to a less diverse vegetative composition of the stands (Chan et al. 2006)

Without further treatments in the short-term, the primary DMS objective of evaluating whether alternative thinning treatments accelerate development of late-successional stand characteristics could not be met.

Chronic tree mortality from future inter-tree competition, pathogens, wind and other weather related episodic mortality are expected to contribute a low level of snags and down woody debris over the long-term (Cissel et al. 2006). Current recruitment rates of down woody debris and snags appear to be at very low levels as evidenced by current levels on the project area and observed low overstory mortality in the past thirty years. It is unlikely that substantial amounts of dead wood would be generated by passive management.

Height to diameter ratios of overstory trees are currently within the range of 50 to 80 indicating high individual tree structural stability and resistance to endemic windthrow or stem snap-out (Wonn and O'Hara 2001), thereby reducing the potential for any substantial snag and down woody debris recruitment in the foreseeable future.

Under the No Action Alternative, the objective to evaluate if alternative thinning treatments accelerate development of late-successional stand characteristics through continued implementation of a research study would not be met. Increasing overstory relative density coupled with current high understory density reduces that likelihood that a multi-cohort stand structure could be maintained (Cissel et al. 2006, pg. 11). Also, given the stable structure of the overstory trees the risk of blowdown or stem breakage is low, thereby limiting the likelihood of snag or down wood development.

3. Proposed Action Alternative

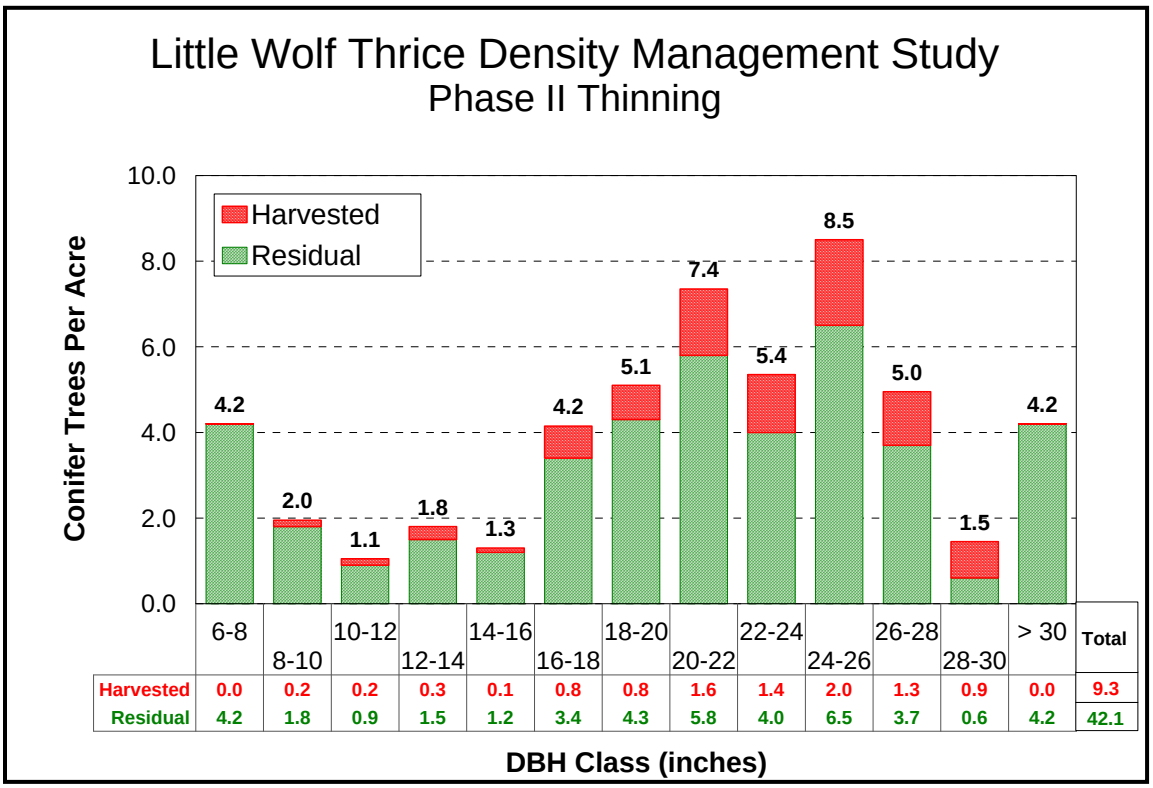
Any existing down woody debris originating as result of natural processes or timber harvest activities would be counted towards meeting the down wood goal of two total trees per acre.

Up to five overstory trees per acre within the 20-30 inch DBH range would be killed and left standing on the site within 10 years of the completion of the commercial thinning harvest to meet short-term snag goals. Any existing snags originating as result of natural processes or timber harvest activities would be counted towards meeting the snag recruitment goal of five total snags per acre.

Precommercial thinning would reduce understory density to approximately 50 to 60 trees per acre.

Commercial thinning and down wood and snag creation are expected to result in overstory relative densities (a means of describing the level of competition among trees

in a stand relative to some theoretical maximum) of less than 40 for up to 30 years longer than without treatment. The effects of this level of relative density on overstory trees include: continued high rates of diameter growth (Curtis and Marshall 1986), maintenance of stable height to diameter ratios (Wonn and O'Hara 2001), and reduced rates of crown recession (Curtis and Marshall 2002).



	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-26	26-28	28-30	> 30	Total
Harvested	0.0	0.2	0.2	0.3	0.1	0.8	0.8	1.6	1.4	2.0	1.3	0.9	0.0	9.3
Residual	4.2	1.8	0.9	1.5	1.2	3.4	4.3	5.8	4.0	6.5	3.7	0.6	4.2	42.1

Figure 2. Little Wolf Thrice Density Management Study, Phase II Thinning.

Felling and yarding of overstory trees are expected to result in a reduction of understory tree density, but it is expected that post-harvest density would still be sufficient to provide for future stand structure (Cissel et al. pg. 11). Damage estimates from other studies such as Tesch et al. (1986) and Newton and Cole (2006) indicate that post-harvest understory density would still be in excess of the threshold suggested by Wilson and Baker (2001) for the maintenance of long-term tree stability as measured by height to diameter ratios. Shrub and herbaceous cover may also be reduced temporarily due to harvest activities, but increased post-thinning light levels should stimulate new germinants leading to increased cover, as well as accelerated growth rates of residual plants (Chan et al. 2006; Bailey et al. 1998). As observed in previous timber harvests, disturbed soil, due to log yarding and road subsoiling, would also provide seedbeds for initiation of new germinants of trees, shrubs, forbs and herbs.

The proposed precommercial thinning would substantially enlarge available growing space for the residual trees thus promoting increased diameter growth and improving individual stem stability, i.e. height to diameter ratios (Oliver and Larson 1990; Wampler 1993; Churchill 2005).

Active creation of snags and down wood would provide for those structural components in the short-term. A high proportion of the actively created snags are expected to persist for at least 50 years. Actively created down wood would increase over that same time frame as portions of snags break off and become down wood (Mellen and Ager 2002.)

In summary, active management would promote the achievement of the primary project objective; to evaluate if alternative thinning treatments accelerate development of late-successional stand characteristics. It would also accomplish the primary goal of the treatment; to maintain and encourage the development of structural diversity.

Overstory density would be reduced to approximately 37 trees per acre immediately following harvest. This total includes five trees per acre retained for future snag recruitment and two trees per acre reserved for future down woody debris objectives within the proposed action.

Table 5. Predicted Post-Treatment Overstory Stand Condition (Harvest, DWD & Snag Creation)

Unit #	Treat-ments	Trees Per Acre		Basal Area (ft^2/acre)		Mean Diameter (inches)	Canopy Cover %	Relative Density Index	Average Crown Ratio	Down Woody Debris ($feet^3$)[1]	# of Snags Per Acre[2]
		C	H	C	H						
1	H+D	36	4	111	4	23	51	23	0.49	500	0.25
1	Snag	37	5	121	4	24	53	26	0.45	500	5.25

Treatments:
C = Conifer; H = Hardwood
H+D = commercial thinning harvest and down wood creation
Snag = snag creation (10 years post-harvest)
Attributes based on overstory trees (>9" DBH) except for DWD & Snags
[1] DWD = down woody debris ≥ 10" diameter large end and ≥ 5' long
[2] Snags ≥ 18" DBH and ≥ 50' tall

4. Effects

While the proposed treatments in Little Wolf Thrice would reduce tree densities, this would not affect stand ages or seral stages classification in the short-term. In the long-term, the treatment would accelerate the development of late-successional (seral) stand conditions as described above in the Forest Vegetation – Proposed Action Alternative section.

Through 2010, the Swiftwater Field Office is planning commercial thinning in mid-seral and mid-seral forest stands on approximately 1,100 acres in the Upper Umpqua watersheds and no regeneration harvests (Table 6). The harvest is part of a Density

Management Study and would contribute information to evaluate the affect of thinning on forested stands over time and the resulting stand structure.

Table 6. Planned BLM Timber Sales through 2010 in Upper Umpqua Fifth-field Watershed.

Sale Name	Commercial Thinning (acres)	Regeneration Harvest (acres)
Basin Arizona	278	0
Callahan Mudaxle	200	0
Devil's Den	230	0
TOTAL	708	0

The ROD/RMP assumes the environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area (2008 ROD/RMP, pg. 9). Because the objectives are different for each private landowner, the timing of harvest would vary throughout the watershed. Forest lands would maintain a mosaic pattern of age classes in the watershed as different forest stands are harvested and replanted. The majority of private lands would maintain early and mid-seral forest type characteristics.

B. Wildlife

1. Federally Threatened & Endangered Wildlife Species

1.A Northern Spotted Owl

A. Affected Environment

Disturbance: The project area occurs within the Tyee Spotted Owl Demography Study Area and has had annual survey data since 1983. Based on current survey data, there are no known spotted owl nest sites within 65 yards of the proposed unit boundaries. Disruption to nesting spotted owls is not expected to occur because there is no nest site or activity center known to be present 865 yards (0.5 mile) of the Little Wolf Thrice unit. However, if new information becomes available (e.g. incidental observation) and owls are detected within or adjacent to the proposed project area, the waiver for seasonal restrictions would no longer be valid until nesting location and/or status has been determined.

Habitat: Dispersal habitat for the spotted owl consists of conifer-dominated forest stands with canopy closures of 40 percent or greater and an average diameter at breast height of 11 inches or greater. Spotted owls use dispersal habitat to move between blocks of suitable habitat; juveniles use it to disperse from natal territories. Dispersal habitat may have roosting and foraging components, enabling spotted owls to survive, but lacks structure suitable for nesting. Although suitable habitat also functions as dispersal habitat, these terms are used separately. The stand within the proposed Little Wolf Thrice harvest unit

does not contain structures suitable for nesting but is considered to be dispersal habitat for the northern spotted owl.

a) *Home Range* – The home range is an estimated area of habitat used by a pair of spotted owls to obtain cover, food, mates and care for their young. The Coast Range provincial home range estimate is a 1.5 mile radius circle centered on a documented owl activity center. There are six known spotted owl sites, which include sixteen activity centers, within 1.5 miles of the proposed Little Wolf unit. The closest spotted owl activity center (i.e. Lower Little Wolf II [IDNO 1894O]) is located approximately 865 yards (0.5 mile) from the unit. The other activity centers are located approximately 1090 to 2,860 yards (0.6 to 1.6 mile) from proposed unit boundaries. Proposed treatment would occur within the home range of five spotted owl sites (Table 7).

Table 7. Northern Spotted Owl Habitat within Known Home Ranges.

Northern Spotted Owl Site (IDNO) Bold IDNO indicates activity center used for this analysis.		**Federal Land** (acres)	**Habitat on Federal Lands Only** (acres)			
			Suitable Habitat		**Dispersal-Only Habitat**	
			Current Condition	**Habitat Modified* through Proposed Action**	**Current Condition**	**Habitat Modified* through Proposed Action**
Caseknife Creek (**0280O**, A)	Home Range (4,524 acres)	3,135	2,371	0	85	3
	Core Area (502 acres)	452	386	0	0	0
	Nest Patch (70 acres)	70	68	0	0	0
Little Wolf Trib (**0284**O, **A**-B)	Home Range (4,524 acres)	2,376	1,324	0	803	20
	Core Area (502 acres)	292	231	0	50	0
	Nest Patch (70 acres)	64	53	0	11	0
Lower Little Wolf I (**0285**O-D, **G**)	Home Range (4,524 acres)	2,951	2,314	0	63	0
	Core Area (502 acres)	502	408	0	0	0
	Nest Patch (70 acres)	70	69	0	0	0
Lower Little Wolf II (**1894O**-A)	Home Range (4,524 acres)	2,919	2,067	0	320	20
	Core Area (502 acres)	472	295	0	36	0
	Nest Patch (70 acres)	70	59	0	0	0
Upper Little Wolf	Home Range (4,524 acres)	2,586	1,797	0	348	20

Northern Spotted Owl Site (IDNO) Bold IDNO indicates activity center used for this analysis.		Federal Land (acres)	Habitat on Federal Lands Only (acres)			
			Suitable Habitat		Dispersal-Only Habitat	
			Current Condition	Habitat Modified* through Proposed Action	Current Condition	Habitat Modified* through Proposed Action
(**0388O**, A)	Core Area (502 acres)	362	293	0	44	0
	Nest Patch (70 acres)	70	70	0	0	0
Wolf Forks (**0287O**)	Home Range (4,524 acres)	2,021	1,153	0	706	14
	Core Area (502 acres)	337	122	0	255	0
	Nest Patch (70 acres)	70	15	0	55	0

* Under the Proposed Action dispersal-only habitat would have a reduction in quality but would maintain its function.

b) *Core Area* – The core area is a 0.5-mile radius circle used to describe the area most heavily used by spotted owls during the nesting season (USFWS, 2008). Core areas represent areas defended by territorial spotted owls and generally do not overlap the core areas of other spotted owl pairs. None of the acres proposed for treatment are located within core areas associated with a spotted owl activity center (Tables 7 and 8).

Table 8. Northern Spotted Owl Habitat within Proposed Project Area.

Sale	Unit	Unit Acres	Unit Acres within…						Total	
			Nest Patch		Core Area		Home Range			
			Suitable Habitat	Dispersal-only Habitat	Suitable Habitat	Dispersal-only Habitat	Suitable Habitat	Dispersal-only Habitat	Suitable Habitat	Dispersal-only Habitat
Little Wolf Thrice	3A	20	0	0	0	0	0	20	0	20
TOTAL		**20**	0	0	0	0	0	20	0	**20**

c) *Nest Patch* – Within the core area, the nest patch is defined as the 300 meter radius circle (0.19 miles) around a known spotted owl nest site (USFWS, 2008). Activities within this area are considered likely to affect the reproductive success of nesting spotted owls and are used in determination of incidental take. There are no acres planned for treatment within a nest patch associated with an activity center (Tables 7 and 8).

d) *Designated Critical Habitat* – Critical Habitat is a specific geographical area designated by the USFWS as containing habitat essential for the conservation of a Threatened or Endangered species. Critical Habitat for the spotted owl

was designated in *Federal Register 73* and describes the Primary Constituent Elements that support nesting, roosting, foraging, and dispersal. Designated Critical Habitat also includes forest land that is currently unsuitable, but has the capability of becoming suitable habitat in the future (73 FR 47347).

The proposed unit is located within spotted owl designated Critical Habitat Unit 8. The proposed density management would treat 20 acres of dispersal-only habitat within Critical Habitat.

B. No Action Alternative

The quality and availability of northern spotted owl habitat would be unaffected under the No Action alternative. The 20 acres of the mid-seral stand included in Little Wolf Thrice would provide dispersal habitat similar to current levels. Suitable habitat characteristics would develop more slowly when compared to the proposed action (see *Forest Vegetation- Proposed Action Alternative*, pgs. 13-15).

C. Proposed Action Alternative

Local, project specific impacts to northern spotted owl habitat due to density management activities would include the modification of approximately 20 acres of dispersal-only habitat (Table 8).

The proposed density management would accelerate the development of late-successional characteristics used by spotted owls (e.g. large diameter trees, multiple canopy layers, understory development, and hunting perches). Development of late-successional characteristics and suitable habitat from dispersal-only habitat would be expected sooner than through natural stand development (see *Forest Vegetation: Proposed Action Alternative 13-15*).

Though the quality of dispersal-only habitat would be temporarily reduced by density management, the capability of the habitat to function for dispersing spotted owls would be maintained. Vertical and horizontal cover would be reduced within the proposed unit through the reduction in canopy cover with varying levels of residual tree density. The post-treatment stand average canopy cover is expected to be 51 percent (±4 percent) and average tree diameter is expected to be 23 inches dbh. Thus, this stand is expected to function as dispersal habitat because post-treatment canopy cover would exceed 40 percent and the average tree diameter would exceed 11 inches dbh (Table 5), figures widely used as minimum criteria describing functioning dispersal habitat (Thomas et al. 1990). However, spotted owls would likely use unthinned stands over the newly thinned stand until the canopy cover in thinned stands returns to pre-treatment levels in about 10 to 15 years (Meiman et al. 2003).

a) *Home Range* –Twenty acres (≤ 0.8 percent of federal acres within a home range) of dispersal-only habitat would be modified within each home range of three spotted owl sites (Little Wolf Trib, Lower Little Wolf II, and Upper Little Wolf). Three (0.1 percent) and fourteen acres (0.7 percent) would be modified within the Caseknife Creek and Wolf Forks sites, respectively (Table 7).

b) Core Area –There would be no treatment of habitat within a spotted owl core area (Tables 7 & 8).

c) Nest Patch – There would be no treatment of habitat within a spotted owl nest patch (Tables 7 & 8).

d) *Designated Critical Habitat* – The proposed harvest would modify approximately 20 acres of dispersal-only habitat within designated Critical Habitat Unit 8 for the northern spotted owl. Post-treatment canopy cover is projected to be 51 percent (±4 percent) (Table 5). While at least 40 percent canopy cover would be maintained following treatment, primary constituent elements of spotted owl Critical Habitat would be removed by removing some co-dominant trees and reducing tree densities contributing to canopy cover and multiple canopy layers.

Within the *Recovery Plan for the Northern Spotted Owl* (USFWS, 2008; pg. 20), Recovery Action 5 states to manage habitat-capable lands within Managed Owl Conservation Areas (which are coincident with designated spotted owl critical habitat units) to produce the highest amount and highest quality spotted owl habitat the lands are capable of producing. The proposed action provides long-term benefits for spotted owls by thinning younger forests to accelerate the development of late-successional characteristics even though it temporarily reduces dispersal-only habitat. Therefore, the proposed action meets Recovery Action 5.

1.B Marbled Murrelet

A. Affected Environment

The proposed project is located approximately 32.5 miles from the coast within the Marbled Murrelet Inland Management Zone 1 (within 0-35 miles of the coast). There are no known occupied sites within one mile of the proposed project area. The closest known occupied marbled murrelet site (Rader Creek) is located 2.5 miles west of the proposed project area. To avoid disruption to nesting marbled murrelets, suitable habitat adjacent to the proposed unit and any scattered suitable platform trees within the

proposed unit were surveyed in 2007-2008 following the Pacific Seabird Group two-year protocol (Evans et al., 2003). No marbled murrelets were detected or observed during the survey effort. Therefore, seasonal restrictions would not be required for the marbled murrelet within the project area until April 1, 2013.

B. No Action Alternative

The quality and availability of marbled murrelet habitat would be unaffected under the No Action alternative. Suitable habitat characteristics would develop more slowly when compared to the proposed action (see *Forest Vegetation: No Action Alternative* and *Proposed Action Alternative*).

C. Proposed Action Alternative

Local, project specific impacts to marbled murrelets due to density management activities would include the modification of approximately 20 acres of mid-seral habitat. Micro site conditions around residual trees with potential structure within the unit boundaries and adjacent stands may be modified by removing adjacent trees, thus reducing the cover immediately adjacent to suitable nest trees. Removing adjacent trees may provide murrelets with additional access to suitable nest platforms that were located within the canopy and not accessible during pre-harvest stand conditions.

2. Bureau Sensitive Species

Bureau Sensitive species suspected to occur within the project area and that may be affected by the proposed action are discussed below. Other Bureau Sensitive and Bureau Strategic species suspected to occur on the Roseburg BLM District but not in the project area are discussed briefly in Appendix A.

No Action Alternative

No suitable habitat or habitat features for BLM Special Status Species would be affected under the No Action Alternative and any species sites in or adjacent to the project area would be expected to persist. The development of suitable habitat characteristics for these species such as large trees, snags, down woody debris, and a well-developed understory would occur more slowly than compared to the proposed action (see discussion of effects to forest vegetation, pgs. 13-16). As such, the effects of the No Action Alternative are not discussed on a species-by-species basis below.

2.A Fisher (Bureau Sensitive)

A. Affected Environment

Fishers primarily use mature closed-canopy forests with the presence of large diameter trees, snags, and downed wood for natal and foraging behaviors, and with some deciduous component, frequently along riparian corridors. Although

the project area does not contain suitable natal or foraging habitat, the fisher may use the proposed units as dispersal habitat. The nearest known observation (April 2000) is approximately 7.7 miles southwest of the proposed project area (ONHP 2008); however, fishers may use the proposed units because they are capable of traveling six miles within a few hours and more than 29 miles in two days (Verts and Carraway, 1998).

B. Proposed Action Alternative

Treatment of the mid-seral stands would improve the quality of dispersal habitat by reducing stand densities, thus creating conditions favorable for the development of a multi-canopy understory habitat and larger trees. Additionally, the project design retains snags and down woody debris (pgs. 4-5) which would maintain habitat for potential prey species (i.e. small mammals) that use these habitat features. Fishers would be able to continue to use the proposed units for dispersal habitat post-harvest. Additional downed wood would be created if there is in insufficient downed wood post harvest.

Development of late-successional characteristics would be expected sooner than through natural stand development (see discussion of effects to forest vegetation, pgs. 13-15). Thus the proposed action is expected to produce suitable fisher natal and foraging habitat sooner than through natural stand development.

2.B Purple Martin (Bureau Sensitive)

A. Affected Environment

Purple martins are Neotropical migrants that nest in colonies within snag cavities located in forest openings, meadows, and other open areas. The project area does contain snags and some snags are located in open areas adjacent to the project area, typical of purple martin colonies. There are currently no known purple martin sites within the project area and the nearest known purple martin colony is approximately 11 miles south of the proposed project area. However, because foraging purple martins travel several miles from nesting colonies, they would be expected to forage above the canopies within the project area from March thru September.

B. Proposed Action Alternative

Snags are expected to be retained in the proposed units due to the protection afforded snags in the project design (pgs. 4-5). However, unless large openings are created around these snags, the proposed units would continue to be unsuitable for purple martins to colonize the existing snags. Purple martins would continue to forage above the canopies within the units post-harvest.

2.C Townsend's Big-eared Bat (Bureau Sensitive) & Fringed Myotis (Bureau Sensitive)

A. Affected Environment

Townsend's big-eared bat and the fringed myotis can roost in snags or trees with deeply furrowed bark, loose bark, cavities, or with similar structures typically found in late-successional conifers. Surveys have not been conducted for either bat species since surveys are not practical. Potential bat roosts are typically located within the overstory canopy, thus it is unknown if the Townsend's big-eared bat or the fringed myotis is present within the proposed project area. There are currently five snags (>18 inches DBH) within the proposed unit. No caves are present within the harvest unit.

B. Proposed Action Alternative

Existing snag habitat is expected to be retained in the harvest units due to the protection afforded them by the project design (pgs. 4-5). As described under the Proposed Action (pg. 4), snags may be created incidentally through harvest operations or weather damage, thus providing additional snag recruitment as future habitat for bats. Active snag creation (up to five trees per acre) would be completed within ten years after harvest, providing future roost opportunities for bats.

3. Effects

The BLM manages 51,859 acres of conifer forest lands in the Upper Umpqua fifth-field watershed. Of this total, there are 32,041 acres of mid-seral stands representing 62 percent of forest lands managed by the BLM. In the Upper Umpqua fifth-field watershed there are approximately 14,805 acres of mid-seral forest stands managed by the BLM that would develop into mid-seral forest stands over the next 20 to 30 years (USDI, BLM, 2005, Table 4).

Based on the Upper Umpqua Watershed Analysis (pg. 39), of the 72,917 acres of forested land in private ownership within the watershed there are approximately 34,765 acres of mid-seral forest (refer to Table 4 below). The Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management included private, local, state and federal forest lands as part of the planning area analyzed. (FEIS, 2008, pg. 27). If timber harvest on private forest lands continues at a comparable rate, then mid-seral forest habitat would be unavailable on private lands within the next 40 years.

Availability of mid-seral forest habitat is the primary wildlife concern in the Upper Umpqua fifth-field watershed. Currently, there is less late-successional forest habitat available than on historic average. Stands in this area begin functioning as mid-seral habitat at approximately 80 years of age when characteristics like large diameter trees, a secondary canopy layer, snags, and cavities have developed. Early and mid-seral habitat is expected to be common on both BLM and private land in the watershed due to past and future timber harvest, but not all this habitat is useful to wildlife. Private lands in particular may be managed for a densely-stocked Douglas-fir, with few large residual trees remaining after harvest and deciduous and minor conifer species are targeted for elimination through herbicide treatment and thinning. These stands are not expected to

provide high levels of habitat for wildlife species that use attributes like herbaceous understory vegetation, a shrub or mid-story layer, or large residual trees and snags. The proposed thinning would help moderate this trend by providing high-quality mid-seral wildlife habitat.

While the proposed action would reduce tree densities, it would not affect overall stand ages or affect the ability of the project area to grow into mid-seral habitat in the RMAs included in the project. The proposed action may temporarily reduce the utility of the project area for some wildlife species by removing canopy cover and horizontal structure. However, sufficient residual tree density, snags, and down woody debris would remain to provide continued wildlife habitat and treated stands would regain pre-project cover characteristics as discussed in *Forest Vegetation* (pgs. 13-15). Consequently, the proposed action would not affect the availability of mid-seral habitat in the watershed, and would contribute to the development of functional mid-seral habitat. Additionally, mid-seral habitat would be continually developing in the watershed as the RMP is implemented. These factors indicate that the proposed action would not cause detrimental cumulative effects to the continued availability and functionality of wildlife habitat in the Upper UmpquaWatershed or to species associated with it.

C. Fire and Fuels Management

1. Affected Environment

The Little Wolf Thrice project falls outside the Wildland Urban Interface (WUI) boundary as identified in the Roseburg District Fire Management Plan. In most areas, current fuel conditions are best described by photo 1-MC-3 in *Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest* (Maxwell and Ward, 1980). Based on this photo series, the estimate for downed woody debris in Little Wolf Thrice is 11 tons per acre although there are some areas that have a lighter fuel load. A fairly continuous shrub layer exists in the project area that could serve as ladder fuels in the event of a fire. Overall the current risk of wildfire in the Little Wolf Thrice project is relatively low to moderate.

2. No Action Alternative

Downed fuels would continue to gradually accumulate adding to the existing fuel conditions of 11 tons per acre. The risk of wildfire would also gradually increase as fine fuels continue to accumulate.

3. Proposed Action Alternative

After commercial thinning and density management, the down woody debris would increase from 11 tons per acre to approximately 15 tons per acre as depicted in the photo 2-DF-3-PC from *Photo Series for Quantifying Forest Residues in the Coastal Douglas-Fir – Hemlock Type* (Maxwell and Ward, 1976). The down woody debris created at landings by the proposed action would be machine piled and burned to reduce concentrated fuel loads. The remaining fuels created by the proposed action would be

predominately small (i.e. less than three inches in diameter) and scattered over the harvest area. Normal thinning operations would reduce the shrub layer therefore reducing the risk of crown fire in the area.

4. Effects

The additional amount of down woody debris created by the Little Wolf Thrice Density Management (i.e. four tons per acre) would not increase the fire risk to the area. There are no additional actions planned in this area for the foreseeable future. In addition, most of the fine fuels, less than one inch in diameter, would degrade within two years after harvest and decrease the risk of a fire building in an intensity that would be capable of consuming larger diameter fuels. Later pre-commercial thinning would increase fuel loading but are expected to remain within acceptable risk levels for this non-populated area.

D. Soils

1. Affected Environment

The topography within the proposed unit varies from 15 to 65 percent (gentle to steep) except for a small area of slopes 65 percent to 90 percent (steep to very steep) in the NE corner of the unit overlooking a draw. (Table 9).

Table 9. Slope Distribution, Amount, and Percent of Project Area.

Unit	Percent Slope	Area	
		(acres)	(percent)
1	0 to 65	19.5	97.5
	greater than 65	0.5	2.5

The soils on the steep to very steep slopes are shallow to moderately deep (10 inches to 40 inches) down to hard sandstone bedrock. The soils on the gentle and moderate slopes are typically very deep (greater than 60 inches to bedrock) and well drained and have loam surfaces and clay loam subsoils. These soils are moderately sensitive to compaction. Currently compaction is at negligible, in the unit.

Flow of water from cut slope seeps carved a gully down a 250 foot long segment of Spur 1 roadbed that was softened by subsoiling during Phase I. This segment is on a 15 to 20 percent grade approximately 1,500 feet past the start of Spur 1. A waterbar constructed on a gentle grade immediately above the steep grade was inadequate to contain the flow from two of the seeps (field observations, Cressy, 1999). Subsequently six waterbars were hand-dug, effectively diverting the flow and sediment onto the forest floor (field observations, Cressy, 2000). This and subsequent vegetative growth stabilized the gully, decreasing erosion to minor levels. Inconsequential amounts of erosion occurred elsewhere on the subsoiled roadbed surfaces. Presently, erosion is not occurring at measurable levels inside the Little Wolf Thrice Unit because: (1) vegetation and woody debris dissipate rainfall energy and hold soil in place and (2) natural soil structure and porosity allow high water infiltration rates into the soil.

No post-harvest landslides were identified inside the unit, by interpreting the aerial photos dating from 1965 to 2004. Two small road-caused landslides (Spur 1) that occurred after the 1998 thinning were identified from field investigations. One is a 0.01 acre road cut slump that occurred at one of the seeps responsible for the gully. The other is a 0.07 acre fill failure at a draw crossing.

The soils on the 0.5 acre of steep to very steep slopes are considered to be fragile due to slope gradient but suitable for forest management with mitigation for surface erosion and shallow-seated landslides. These fragile soils are classified as FGR (Fragile, but suitable soils, with proper project design features) under the Timber Production Capability Classification (TPCC) system (Appendix B, Table B-1).

2. No Action Alternative

A. Soil Compaction/Displacement & Productivity

Soil compaction from past harvests, currently at low levels, would continue to slowly decrease as plant roots penetrate through the soil, organic matter becomes incorporated into the soil, and small animals burrow through the soil layers. Soil erosion would remain at very low levels. The duff layer would increase with the accumulation of needles, twigs, and small branches, along with decomposing larger woody material, absent a fire of sufficient intensity to consume the material.

B. Landslides & Slope Stability

Landslides on the potentially unstable area classified as FGR (about 0.5 acre) would have a low probability of occurring (less than ten percent chance in a given year). If landslides do occur within the next ten years they would likely be less than 0.1 acre in size and few in number. This assessment is based on:

- No in-unit landslides that were solely related to harvest (no influence from road disturbance) were identified (aerial photo interpretation and field observations ; Cressy, 1999 & 2008);
- The two road-caused landslides identified from field investigations have the combined size of only 0.08 acres (field observations; Cressy, 1999 & 2008);
- The Oregon Department of Forestry found that landslide numbers were lowest in mid-seral stands (31 to 100 years old) following the intense 1996 storms (ODF, 1999, pg. 64).

3. Proposed Action Alternative

A. Soil Compaction/Displacement & Productivity

Spur 1 would be re-compacted, since it would not be subsoiled, there would be a net long-term loss of soil productivity on its 1.1 acre road bed (greater than 50 years) (Froelich and McNabb, 1984, pg. 178). Excavating trench waterbars in the

subsoiled road bed in addition to mulching and seeding would avoid the problem of gullying and erosion experienced in 1999. This assessment is based on the successful stabililizing of the Spur 1 gully by hand-dug waterbars (field observations, Cressy, 1999 and 2008).

Approximately 20 acres would be cable-yarded. Cable yarding corridors would cover about three percent of the treatment area's surface (Adams 2003) or about 0.6 acres. Soil disturbance from cable yarding would vary by topography (convex versus concave slope, slope steepness, and the presence or absence of pronounced slope breaks), and amount of logs yarded. Compaction would typically be absent or light with little soil displacement in the cable-yarding corridors, partly because intermediate supports would be required where necessary to achieve one-end suspension. The typical light compaction would be confined to the topsoil and would recover without mitigation. There would be small areas with heavier compaction, especially along terrain breaks. The use of intermediate supports would keep the heavier compaction to a minimum. Excessive furrowing, if created, would be hand waterbarred and filled with limbs or other organic debris to prevent erosion, sedimentation, and the channeling of water onto potentially unstable slopes (project design features, pg. 8).

Surface soil erosion in disturbed areas would be controlled by applying erosion control measures (e.g. new cut slope disturbances and fill slope failure in Spur 1 would be mulched with weed-free straw, or equivalent, and seeded; pg. 10). With the project design features described in *Chapter 2*, resulting soil erosion would be limited to localized areas, and any reduction of soil productivity due to erosion would be very minor. The effects to soils would be consistent with those identified and considered in the 2008 FEIS (pg. 56).

There would be a flush of sediment from the re-opened spur and cable-yarding corridors during the first wet-season event following harvest and decommissioning. The amount of sediment generated from yarding trails and corridors would be too small to reliably measure. Little sediment would reach streams because overland flow is rare on these high infiltration soils covered with slash and residual vegetation, because yarding away from streams would prevent disturbance to stream channels and stream banks and because the post-harvest reclamation would include a channel with erosion protection features where Spur 1 crosses a small first-order stream.

B. Landslides & Slope Stability

Cutting about five (5) feet into the Spur 1 cut slope where the fill failure occurred to reestablish bed width would not destabilize the natural slope above.

Where soils are classified as FGR (about 0.5 acres), the risk of in-unit landslide occurrence would be slightly more than the risk under the no action alternative, but would still be in the low range (less than 10 percent chance for a given year). The continued 'low-risk' conclusion is based on the following:

- Only three trees would be cut on the one-half acre of FGR classified soils.
- No observed harvest-related landslides have occurred inside the project area since the unit was first thinning (aerial photo interpretation and field observations. Cressy, 1999 & 2008.)

The period of maximum vulnerability would be the ten year period immediately following harvest as root systems and canopies expand. If an in-unit landslide does occur during this period of vulnerability, it would likely be less than 0.1 acre in size, for similar reasons as stated previously under the No Action Alternative (pg. 23). The chance of a landslide impacting a stream is very low since the FGR area is adjacent to a draw that does not have a stream channel and because this area is eight hundred feet upslope of Little Wolf Creek.

4. Effects

Soil productivity in the Little Wolf Thrice area would be maintained in the short-term (less than ten years) following implementation of the proposed action except for the 1.1 acre of Spur 1 roadbed that would not be subsoiled. The small amount of compaction resulting from skyline cable yarding during the dry season would recover quickly. In the long-term, soil productivity would be maintained at the watershed scale on BLM administered land because of natural recovery of past impacts to the soil. As a result, cumulative effects to soil productivity at the site scale and fifth-field watershed scale would be negligible. These effects would not exceed the level and scope of effects considered and addressed in the current ROD/RMP (2008 ROD/RMP). The effects of forest management on private timber lands in the watershed would be variable due to indeterminate future private management activities.

Landslide aerial photo inventories within the Swiftwater Resource Area show a substantial decline in the number of landslides since the mid 1980s. The declining number of landslides corresponds with improved management practices and lower harvest levels (USDI, UUWA, April 2002). Road-related landslides have exhibited the greatest decline. Fluctuations occur because of variations in weather and levels of management activity. Because of management improvements, lower harvest and RMAs, the distribution of landslides in time and space and their effects, now, more closely resemble the natural variability within relatively unmanaged forests (Skaugset and Reeves 1998).

E. Hydrology

1. Stream Temperature, Water Quality, & Beneficial Uses

A. Affected Environment

Average annual precipitation in the Upper Umpqua Watershed area ranges from 50 to 56 inches, occurring primarily between November and April. Precipitation occurs mostly as rainfall since 96 percent of the drainage is less than 2,000 feet in

elevation (E&S Environmental Chemistry, Inc, 2006). Therefore, more of the annual stream flow is concentrated to this period (Harr, et al. 1979). Within the project area are 2 intermittent non-fish bearing streams and adjacent to the unit there is 1 perennial fish bearing stream.

Water yield and peak flows are dependent upon the capture, storage, and runoff of precipitation. Water yield is the total amount of water that comes out of a watershed or drainage measured over a period of time. Timber harvest can result in increases in water yield or peak flows due to a decrease in evapotranspiration and interception (Satterlund and Adams, 1992). The final 2008 Final EIS (pgs. 753 through 759) analyzed all of the subwatersheds in western Oregon to see if they are susceptible to peak flows due to regeneration harvests on public and private lands. As a result of this analysis the Rader Wolf Creek subwatershed was found to be in no threat of an increase in peak flows due to timber harvest operations.

Roads can affect the hydrologic function of a watershed in a number of ways. They can increase the drainage density of a watershed and act as a preferential pathway for surface runoff. The increase in surface runoff can decrease the volume of water that infiltrates into groundwater or soil water storage. The increase in surface runoff also can increase the rate at which runoff is routed through a basin, which can result in higher peak flows and less time between a precipitation event and peak runoff (Harr, et al. 1975).

B. No Action Alternative

Existing roads and landings may modify storm peaks by reducing infiltration, which would allow more rapid surface runoff (Ziemer, 1981, pg. 915). Existing roads may also intercept subsurface flow and surface runoff and channel it more directly into streams (Ziemer, 1981, pg. 915). However, peak flows have been shown to have a statistically significant increase due to effects from roads only when roads occupy at least 12 percent of the watershed (Harr, et al. 1975). Currently roads occupy less than 3 percent of the subwatershed in which the proposed project resides.

C. Proposed Action Alternative

The impact of thinning would result in a decrease in evapotranspiration which may lead to an increase in water yield. Removal of trees can increase soil moisture and base stream flow in summer when rates of evapotranspiration are high. These summertime effects last a few years until the canopy closes and the understory develops (Ziemer and Lisle, 1998, pg. 61). Because evapotranspiration from riparian vegetation accounts for most of the daytime decreases in summertime low-streamflow conditions (Bond et al., 2002), riparian buffers reduce the potential for thinning treatments to increase summertime low-flows (Moore and Wondzell, 2005). According to the 2008 FEIS, “stand summaries indicate that 40 to 50% canopy closure as a surrogate measured would

maintain 50% of the basal area which has been shown to have an inconsequential effect on peak flow increases". As stated in the Forest Vegetation, Proposed Action Alternative section (Table 5 Pg. 17) the predicted post treatment canopy cover is 51%, which would in turn have "insconsequential effect on peak flow increases.

Bosch and Hewlett (1982, pg. 16) concluded that water yield increases are usually detectable when at least 20 percent of the forest cover has been removed in a watershed. Stednick (1996, pg. 88) evaluated twelve studies in the Pacific Coast hydrologic region and determined there was no measurable annual yield increase until at least 25 percent of the watershed was harvested. These relationships are based on watersheds that were clearcut logged with minimal stream buffers. To date, no research has been published that describes the effect that commercial thinning treatments designed following the Western Oregon Plan Revision guidelines have on stream flow.

No measurable effect to water yield or peak flow would be anticipated as a result of the proposed action because the Little Wolf Thrice project would involve thinning less than one percent of the Little Wolf Creek drainage (7th field HUC) and less than 0.1% of the Rader Wolf Subwatershed (6^{th} field HUC). Without a measurable effect to peak flow, the proposed action would also have no measurable effect on channel geometry. In addition, 100 percent of the proposed project is located below the rain on snow area (i.e. less than 2,500 feet), and would have no potential to impact the amount of, or timing of snow-melt runoff. Also, as stated in the affected environment, the 2008 FEIS concluded that the Rader Wolf Subwatershed is not susceptible to peak flows within the Rain Dominated Zone.

Within the subwatershed of the project area, roads occupy less than three percent of the land. Therefore, no statistically significant increase in peak flows would be expected to occur due to road effects. Also, all roads used within the project area would be decommissioned and subsoiled following timber harvest, which would allow all infiltration processes to return to pre-project conditions.

2. Effects

While the proposed treatments in Little Wolf Thrice would reduce tree densities and canopy cover within the project area this would not have an effect on peak flow increases within the project area. It is projected that the canopy cover would be reduced by 25 percent and that Basal area would be reduced by 21 percent. According to reports by Ziemer (1981, 1998) there is a non-statistical increase (four percent) in peak flow for 80-year-old conifer stands that were harvested where, 50 percent of the basal area was retained. Since only 21 percent of the basal area within the project area would be removed it is believed that the effects of peak flows within the project area would be insignificant.

Road densities and conditions within the project area would remain the same into the reasonably foreseeable future for the Little Wolf Creek drainage. Since the road would be decommissioned after the project is completed, there would be no net increase in road density within the drainage area.

Variable width "No-harvest" buffers, with a minimum distance of 20 feet on intermittent streams and 50 feet on perennial or fish bearing streams, would be established on all streams adjacent to the proposed units. These "no-harvest" buffers would prevent disturbance to stream channels and stream banks. They would also intercept surface run-off and act as a filter strip to prevent sedimentation of streams, such that there would be no cumulative degradation of water quality in Upper Umpqua Watershed and Rader Wolf Creek Subwatershed (Fischer et. Al., 2000).

F. Aquatic Habitat & Fisheries

1. Aquatic Habitat

A. Affected Environment

The aquatic habitat analysis area includes the thinning units and the haul route to the nearest paved road. There are two non-fish bearing streams within the project area and one fish bearing stream adjacent to the project area (Little Wolf Creek, 200 feet). Little Wolf Creek contains Oregon Coast coho salmon, Oregon Coast steelhead, and cutthroat trout. The section of Little Wolf Creek adjacent to the project area contain high quality fish habitat. Large wood in the stream channel created complex pools for juvenile habitat and traps gravels for spawning habitat.

B. No Action Alternative

Aquatic habitat in fish-bearing streams downstream of the project area would remain unaffected.

C. Proposed Action Alternative

Key factors defining the quality of aquatic habitat are water temperature (previously discussed in hydrology section; pgs. 28) substrate/sediment, large woody debris, pool quality, and habitat access. Project Design Features and the small size of this project would prevent any effects to large woody debris, pool quality, or habitat access in Little Wolf Creek.

2. Fish Populations

A. Affected Environment

a) Federally Threatened Species

On February 4, 2008 NOAA Fisheries listed the Oregon coast coho salmon evolutionary significant unit (ESU) as threatened under the Endangered Species Act. This includes the designation of critical habitat.

The closest coho presence is approximately 0.1 miles downstream of the project area in Little Wolf Creek.

b) Bureau Sensitive Species

Bureau Sensitive fish species and their habitats are managed by the BLM so as not to contribute to the need to list under the Endangered Species Act, and to recover the species (USDI 2008, pg. 35). Bureau Sensitive fish species present in the Upper Umpqua watershed includes the Oregon Coast coho salmon (discussed above), chum salmon (*Oncorhynchus keta*), Oregon Coast steelhead (*Oncorhynchus mykiss*), and the Umpqua chub (*Oregonichthys kalawatseti*). Oregon Coast steelhead are present approximately 0.1 miles downstream of the project area. Chum salmon and Umpqua chub are not present in the project area.

B. No Action Alternative

Fish species and populations would remain unaffected.

C. Proposed Action Alternative

Streams within the project area are ephemeral with hard buffers of trees and would not contribute sediment to Little Wolf Creek outside the range of natural variability. The small amount of timber volume associated with the project would result in a very light amount of haul along the 2.6 mile haul route along Little Wolf Creek. Ditch banks along the haul route are well vegetated and there are no direct connections to the stream, this has been shown to decrease road sediment from reaching streams (Black and Luce, 1999). These factors along with project related PDFs would prevent any direct or indirect effects to stream habitat and fish populations in Little Wolf Creek.

D. Effects

Sediment regime, stream temperature, water chemistry, peak flows, and water yield together influence fish habitat or aquatic species. Since water temperature, water chemistry, sediment regime, peak flows, and water yield would not be affected by the proposed action (pg. 31) fish habitat and aquatic species would not be affected.

Therefore, fish habitat and fish populations impacted by the Little Wolf Thrice Density Management would not be incrementally affected by the proposed action at the project level nor would they add to the cumulative effects at the fifth-field watershed.

3. Essential Fish Habitat

a) Affected Environment

Essential Fish Habitat is designated for fish species of commercial importance by the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Federal Register 2002, Vol. 67/No. 12). Streams and habitat that are currently or were historically accessible to Chinook and coho salmon are considered Essential Fish Habitat. The nearest Essential Fish Habitat (Little Wolf Creek) is approximately 0.1 miles downstream from the proposed project.

B. No Action Alternative

Essential Fish Habitat adjacent to the project area would remain unchanged.

C. Proposed Action Alternative

The proposed action would have no direct or indirect effects on Essential Fish Habitat. As stated previously, this project will have no direct or indirect effects on stream habitat. Without any mechanisms for an adverse effect to Essential Fish Habitat, no mitigation measures are proposed.

G. Botany

1. Special Status Species

A. Affected Environment

The project area is within the known range of Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), a Federally Threatened plant. Field surveys were conducted in the spring and summer of 2007. No Special Status plant species were found.

B. No Action Alternative

No suitable habitat or habitat features would be affected.

C. Proposed Action Alternative

No special status species were found in surveys conducted therefore there are no botanical concerns on this project under this alternative.

2. Noxious Weeds

A. Affected Environment

There are noxious weed infestations scattered throughout the project area. The severity of infestations ranges from low to moderate (1%-25% canopy cover) and the weeds are generally located within the road prism of the previously used spurs in the project area. The primary species of noxious weeds in the project area

include approximately 1 acre of Scotch broom (*Cytisus scoparius*) and 1 acre of Himalayan blackberry (*Rubus discolor*).

Noxious weeds were mechanically treated in the project area in 2007. All infestations were cut, lopped and scattered before seed set.

B. No Action Alternative

Noxious weeds within the project area would be managed as part of the Roseburg District's Noxious Weed Program and would be monitored and evaluated for treatment at regular intervals (USDI 1995a). A follow-up treatment for noxious weed populations is planned for 2009-2010 by applying approved herbicides or manual removal.

Over time, the distribution and abundance of noxious weeds in the project area would decline. Repeated treatments of existing noxious weed populations, limited opportunities (e.g. exposed mineral soil) for establishment of new infestations, and ongoing competition from native vegetation would reduce the noxious weed numbers in the project area.

C. Proposed Action Alternative

Soil disturbance associated with commercial thinning (e.g. ground-based yarding, cable-yarding corridors, spur road renovation, and slash pile burning) would create areas of exposed mineral soil, which would serve as habitat for noxious weeds. New weed infestations on exposed mineral soil would be expected while there are openings in the canopy. As the conifer canopy closes, noxious weeds would decrease in abundance as native understory species eventually overtop and out-compete weeds for sunlight, soil moisture, and soil nutrients. Project design features that require logging and construction equipment to be clean and free of weed seed prior to entry onto BLM lands would help control and/or prevent the spread of noxious weeds in the project area (pg. 11).

Scotch broom is known to have long lived seeds, which can remain viable up to 80 years. Existing infestations of Scotch broom would be treated with herbicides prior to commercial thinning operations in order to limit the development and spread of seeds. As under the No Action Alternative, noxious weeds would be monitored, evaluated, and treated under the Roseburg District's Noxious Weed Program.

Chapter 4 Contacts, Consultations, and Preparers

A. Agencies, Organizations, and Persons Consulted

The Agency is required by law to consult with certain federal and state agencies (40 CFR 1502.25).

1. **Threatened and Endangered (T&E) Species Section 7 Consultation**

The Endangered Species Act of 1973 (ESA) requires consultation to ensure that any action that an Agency authorizes, funds or carries out is not likely to jeopardize the existence of any listed species or destroy or adversely modify critical habitat.

A. U.S. Fish & Wildlife Service

Consultation with the U.S. Fish & Wildlife Service is in process for the northern spotted owl and marbled murrelet for *Actions Proposed by the Roseburg District BLM for Fiscal Years 2009-2010*. When consultation has been completed, the results would be disclosed in the project specific decision document and Finding of No Significant Information (FONSI).

B. NOAA Fisheries Service

The Swiftwater fisheries staff has determined that this project would have no effect on Oregon Coast coho salmon. The proposed action and its interrelated and interdependent actions would have no direct effects on the Oregon Coast coho salmon and would not destroy or adversely modify designated critical habitat (pg. 33). In addition, project design features would ensure that no indirect effects to Oregon Coast coho salmon or their habitat would occur (pg. 33). Consultation with NOAA is not required for projects that are determined to have a "No Effect" on the Oregon Coast coho or its critical habitat.

2. Cultural Resources Section 106 Compliance

Compliance with Section 106 of the National Historic Preservation Act under the guidance of the 1997 National Programmatic Agreement and the 1998 Oregon Protocol has been documented with a clearance worksheet dated February 13, 1996 and an Attachment C dated May 9, 1996. A "No Effect" determination was made. It has been determined that there would be no effect to scientific, cultural, or historical resources.

B. Public Notification

1. Notification was sent (September 10, 2008) to the **adjacent landowner**, **landowners along the proposed haul route, holders of registered water rights within one mile downstream of the project area**, and interested members of the **general public**. One comment letter was received. Comments received typically concerned the general design of the proposed project. The comments were considered, although not specifically for each comment, in the design of the proposed project.

2. Notification was provided (September 10, 2008) to affected **Tribal Governments** Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz, and the Cow Creek Band of Umpqua Tribe of Indians). No comments were received.

3. The **general public** was also notified via the *Roseburg District Planning Updates* (i.e. Winter 2007, Spring 2008, Summer 2008, Fall 2008, Winter 2008, Spring 2009) which were sent to approximately 150 addressees. These addressees consist of members of the public that have expressed interest in Roseburg District BLM projects.

4. If the decision is made to implement this project, the EA, FONSI and DR would be sent to USFWS, NOAA Fisheries, Oregon Department of Environmental Quality, and the Oregon Department of Fish and Wildlife and would be provided to certain **State, County and local government** offices.

5. A 30-day **public comment period** will be established for review of this EA. A Notice of Availability will be published in *The News-Review*. The public comment period will begin with publication of the notice published in *The News-Review* on July 1, 2009 and end close of business July 31, 2009. Comments must be received during this period to be considered for the subsequent decision. If the decision is made to implement this project, a notice would be published in *The News-Review* and notification sent to all parties who request them.

C. List of Preparers

Core Team

Craig Kintop	Project Leader
Bruce Baumann	Pre-sale Forestry/Layout
Al James	Management Representative
Jeff McEnroe	Fisheries
Dan Cressy	Soils
Keith Karoglanian	Hydrology
Krisann Kosel	Fuels Management
Elizabeth Gayner	Wildlife
Jeff Wall	Planning & Environmental Coordinator

Brian Cyr	Engineering
Terrie King	Engineering
Ron Wickline	Botany/Weeds
Joe Keady	Cruising

Expanded Team (Consulted)

Isaac Barner	Cultural Resources
Ron Murphy	Recreation / Visual Resource Management

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E. Definitions and Acronyms

ACS	-	Aquatic Conservation Strategy
BLM	-	Bureau of Land Management
BMP	-	Best Management Practice
DFC	-	Desired Future Condition
DMS	-	Density Management Study
EA	-	Environmental Assessment
EIS or FSEIS	-	Environmental Impact Statement / Final Supplemental EIS
DBH	-	Diameter at Breast Height
NEPA	-	National Environmental Policy Act
NWFP	-	Northwest Forest Plan
PDF	-	Project Design Features
RMP	-	Resources Management Plan
ROD	-	Record of Decision
T&E	-	Threatened or Endangered

Basal area (BA): the cross-sectional area of a tree measured at 4.5 feet above the ground. The cross-sectional area of all trees in an area expressed per unit of land area, e.g. basal area per acre.

Canopy: The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple-canopy or layered condition can result.

canopy cover: the proportion of the forest floor covered by the vertical projection of overstory tree canopy.

Coarse Woody Debris (CWD): Those portions of trees that have fallen to the ground that are at least 20" in diameter measured at the small end.

Cohort: a group of trees developing after a single disturbance, consisting of trees of a similar age.

Commercial thinning: any type of thinning producing merchantable material at least equal to the value of the direct cost of harvesting.

Crown: the part of a tree or woody plant bearing live branches and foliage.

Crown ratio: the proportion of crown length to total tree height.

Diameter breast height (DBH): the diameter of a tree measured outside the bark at 4.5 feet above the ground level on the uphill side of the tree.

Down Woody Debris (Down Wood): portion of tree that has fallen or been cut and left on the ground.

Forest stand: an aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

Height to diameter ratio: the ratio of tree height to diameter at 4.5 feet above the ground, which serves as an indicator of individual tree stability, i.e. the ability to resist stem breakage or damage from snow, ice, or wind.

Intermittent Stream: Any nonpermanent flowing feature having a definable channel and evidence of annual scour and deposition. Normally streams with seasonal flow.

Ephemeral Stream: Streams that contain running water only sporadically such as in direct response to a precipitation event.

Mean diameter: the diameter of the tree of average basal area in reference to a stand or group of trees.

Multi-cohort: Forest stand with two or more distinct tree layers in the canopy. Also called a multi-layered or multi-storied stand.

Overstory: that portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct canopy layer.

Precommercial thinning: the practice of reducing the density of trees within a stand by manual cutting or girdling to promote growth increases or maintain growth rates of desirable tree species. The trees killed are generally unmerchantable and retained on the treated area.

Relative Density (RD): a means of describing the level of competition among trees in a stand relative to some theoretical maximum.

Peak Flow: The highest of stream or river flow occurring in a year or from a single storm event.

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

Snag: standing (upright) dead tree boles.

Stand: see "Forest stand".

Subsoiling: The practice that shatters soil compaction, thereby reducing the effects to soil productivity and improving water infiltration. This is accomplished by a device known as a winged subsoiler which is a pulled by or attached to a crawler tractor, or mounted to the arm of an excavator.

Understory: that portion of trees which form the lower layer in a forest stand which consists of more than one distinct canopy layer.

Seral Stages - The series of relatively transitory plant communities which develop during ecological succession from bare ground to the climax stage. There are five stages:

- Early-Seral Stage - The period from disturbance to crown closure of conifer stands, usually occurring from 0-15 years. Grass, herbs, or brush are plentiful.
- Mid-Seral Stage - The period in the life of a forest stand from crown closure to first merchantability. Usually ages 15 through 40. Due to stand density, brush, grass or herbs rapidly decrease in the stand. Hiding cover may be present.
- Late-Seral Stage - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. This is under a regime including commercial thinning, or to 100 years of age, depending on wildlife habitat needs. During this period, stand diversity is minimal, except that conifer mortality rates will be fairly rapid. Hiding and thermal cover may be present. Forage is minimal.
- Mature-Seral Stage - The period in the life of a forest stand from culmination of mean annual increment to an old-growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present.

Appendix A. Wildlife Special Status Species

Project: Little Wolf Thrice Commercial Thinning
Prepared By: Elizabeth Gayner
Date: September 30, 2008
SSSP List Date: July 26, 2007 *(IM-OR-2007-072)*

The following tables include those species which are documented or suspected to occur within the Roseburg District BLM. Those Bureau Sensitive or Bureau Strategic species which are suspected or documented to occur within the project area may be further discussed in the body of the EA as appropriate.

Bureau Sensitive Species. BLM districts are responsible to assess and review the effects of a proposed action on *Bureau Sensitive* species. To comply with Bureau policy, Districts may use one or more of the following techniques:

a. Evaluation of species-habitat associations and presence of potential habitat.
b. Application of conservation strategies, plans, and other formalized conservation mechanisms.
c. Review of existing survey records, inventories, and spatial data.
d. Utilization of professional research and literature and other technology transfer methods.
e. Use of expertise, both internal and external, that is based on documented, substantiated professional rationale.
f. Complete pre-project survey, monitoring, and inventory for species that are based on technically sound and logistically feasible methods while considering staffing and funding constraints.

When Districts determine that additional conservation measures are necessary, options for conservation include, but are not limited to: modifying a project (e.g. timing, placement, and intensity), using buffers to protect sites, or implementing habitat restoration activities (IM-OR-2003-054).

Strategic Species. If sites are located, collect occurrence data and record in corporate database.

Table A-1. Bureau Sensitive & Strategic Wildlife Species.

Species	Status[1]	Present in Project Area?[2]	General Habitat Requirements
BUREAU SENSITIVE			
American Peregrine Falcon *Falco peregrinus anatum*	BS, SE	No Habitat	Cliffs, rock outcrops; open habitats for hunting birds
Bald Eagle *Haleaeetus leucocephalus*	BS, ST	No Known Nest/ Roost Sites	Late successional forests with multi-canopies, generally within two miles of a major water source
Chace Sideband *Monadenia chaceana*	BSO	Out of Range	Rocky, talus habitats in the Klamath Province and southwards
Columbian White Tailed Deer *Odocoileus virginianus leucurus*	BSO, CR	No Habitat	Bottomlands, oak/hardwood forests; cover for fawning
Crater Lake Tightcoil *Pristiloma arcticum crateris*	BSO	No Habitat	Perennially wet areas in late seral forests above 2000ft elevation and east of Interstate-5; seeps, springs, riparian areas
Fisher *Martes pennanti*	BS	Suspected	Structurally complex forests; mature open forests with large live trees, snags, and down wood.
Foothill Yellow-legged Frog *Rana boylii*	BSO, V	No Habitat	Low gradient streams/ponds; gravel/cobble, bedrock pools
Fringed Myotis *Myotis thysanodes*	BSO, V	Suspected	Late-successional forest features (e.g. snags or trees with deeply furrowed bark, loose bark, cavities), caves, mines, bridges, rock crevices

Species	Status[1]	Present in Project Area?[2]	General Habitat Requirements
Green Sideband *Monadenia fidelis beryllica*	BSO	Out of Range	Coast Range, riparian forests at low elevations; deciduous trees & shrubs in wet, undisturbed forest
Harlequin Duck *Histrionicus histrionicus*	BS, U	No Habitat	Mountain Streams in forested areas on west slope of the Cascade Mountains
Lewis' Woodpecker *Melanerpes lewis*	BSO, CR	No Habitat	Open woodland habitat near water; open woodland canopy and large diameter dead/dying trees, snag cavities
Northwestern Pond Turtle *Clemmys marmorata marmorata*	BS, CR	No Habitat	Ponds, low gradient rivers; upland over-wintering habitat, CWD
Oregon Shoulderband *Helminthoglypta hertleini*	BSO	No Habitat	Talus and rocky substrates, grasslands or other open areas with low-lying vegetation
Oregon Vesper Sparrow *Pooecetes gramineus affinis*	BS, CR	No Habitat	Open habitats such as grasslands, meadows, farmlands
Pallid Bat *Antrozous pallidus*	BS, V	No Habitat	Usually rocky outcroppings near open, dry open areas; occasionally near evergreen forests
Purple Martin *Progne subis*	BSO, CR	Suspected	Snags cavities in open habitats (e.g. grasslands, brushlands, open woodlands)
Rotund Lanx *Lanx subrotundata*	BSO	No Habitat	Major rivers and large tributaries with cold, well-aerated water and rocky substrate
Scott's Apatanian Caddisfly *Allomyia scotti*	BSO	Out of Range	High-elevation (>4,000ft), cold streams in the mountainous regions of Oregon
Spotted Tail-dropper *Prophysaon vannattae pardalis*	BSO	Out of Range	Mature conifer forests in the Coast Range; associated with significant deciduous tree/shrub component
Townsend's Big-eared Bat *Corynorhinus townsendii*	BS, CR	Suspected	Late-successional forest features (e.g. snags or trees with deeply furrowed bark, loose bark, cavities), caves, mines, buildings, bridges, tunnels
Western Ridgemussel *Gonidea angulata*	BS	No Habitat	Creeks, rivers, coarse substrates; Umpqua R. and possibly major tribs.
White-Tailed Kite *Elanus leucurus*	BS	No Habitat	Open grasslands, meadows, emergent wetlands, farmlands, lightly, wooded areas; wooded riparian habitats close to open hunting; tall trees and shrubs
BUREAU STRATEGIC			
Broadwhorl Tightcoil *Pristiloma johnsoni*	Strategic	Out of Range	Moist forest sites, typically with deciduous component; Coast/Cascades in WA, Coast Range in OR, as far south as Lane County
Klamath Tail-Dropper *Prophysaon sp. nov.*	Strategic	Out of Range	Moist, open areas along streams or springs in Ponderosa Pine forests; as far North as Crater Lake
Merlin *Falco columbarius*	Strategic	No Habitat	Coniferous forests adjacent to open habitats, along forest edges.
Pristine Springsnail *Pristinicola hemphilli*	Strategic	No Habitat	Shallow, cold, clear springs/seeps; strongly spring-influenced streams, slow-moderate flow; Umpqua R. drainage
Oregon Giant Earthworm *Driloleirus macelfreshi*	Strategic	Suspected	Deep, moist, undisturbed soils of riparian forests.

[1] Status abbreviations: FE--Federal Endangered, FT--Federal Threatened, SE--State Endangered, ST--State Threatened, XC--Former Federal Candidate, CR--ODFW Critical, V--ODFW Vulnerable, P--ODFW Peripheral/Naturally Rare, U--ODFW Undetermined, BS-- Bureau Sensitive in Oregon and Washington, BSO-- Bureau Sensitive in Oregon,

Appendix B. Soils

Project: Little Wolf Thrice Commercial Thinning & Density Management
Prepared By: Dan Cressy
Date: April 15, 2008

Table B-1. Timber Production Capability Classification (TPCC).

Unit	FGR[1] (acres)	FPR[2] (acres)	FSR[3] (acres)	FGNW[4] (acres)	FPNW[5] (acres)	Category 1[6] (acres)
7A	1	0	NA	0	0	NA
Total	**1**	**0**	**NA**	**0**	**0**	**NA**

[1] **FGR** = soils considered fragile due to slope gradient but suitable for forest management with mitigation for surface erosion and landslides.
[2] **FPR** = soils on moderate slopes that have mildly active slump-earth flow topography and are suitable for forest management with mitigation for slump-earth flow movements.
[3] **FSR** = fragile soils due to moisture deficiencies caused by shallow, rocky soils on but are suitable for timber production with mitigation.
[4] **FGNW** = soils considered fragile due to slope gradient and unsuitable for forest management even with mitigation for surface erosion and landslides; withdrawn from units.
[5] **FPNW** = soils on moderate slopes that have active slump-earth flow topography and are not suitable for forest management because of active movement; withdrawn from units.
[6] **Category 1** = soils that are highly sensitive to broadcast burning due to shallow soil depths, that have A horizons less than 4 inches in depth and/or that are on slopes over 70 percent.

Table B-2. Mass Wasting & Landslides in the Action Area. An analysis of mass wasting events initiating inside the proposed thinning unit was done using aerial photo interpretation covering 1960 to 2004 and field reconnaissance.

Unit	# Debris Torrents	# Landslides			
	Large (>0.5 acre)	Small (< 0.1 acre)	Medium (0.1-0.5 acre)	Large (> 0.5 acre)	All
	0	2	0	0	0.09
Total	**0**	**2**	**0**	**2**	**2 (0.08 acres)**
Probability of occurrence expected within units:					
No Action Alternative	low	low	low	low	low
Action Alternative (Treatment)	low	low	low	low	low
Cumulative Effects	Unchanged[2]	Unchanged[2]	Unchanged[2]	Unchanged[2]	Unchanged[2]

[1] Both of the identified landslides were road-related. One was a cut slope slump. The other was a fill failure at a draw crossing. Both occurred shortly after the 1998 density management thin.
[2] "Unchanged" indicates that the current conditions and current probabilities of mass wasting or landslide events are expected to be essentially the same at the 6th field watershed scale.

Appendix C. Botany Special Status Species

Project: Little Wolf Thrice Commercial Thinning
Prepared By: R.S.Wickline
Date: June 9, 2008
SSSP List Date: February 8, 2008 (IM-OR-2008-038)

Those Bureau Strategic species which are suspected or documented to occur within the Roseburg District BLM area are detailed below in Tables H-1 and H-2 and may be further discussed in the body of the EA as appropriate.

Bureau Sensitive Species. BLM districts are responsible to assess and review the effects of a proposed action on *Bureau Sensitive* species. To comply with Bureau policy, Districts may use one or more of the following techniques:

a. Evaluation of species-habitat associations and presence of potential habitat.
b. Application of conservation strategies, plans, and other formalized conservation mechanisms.
c. Review of existing survey records, inventories, and spatial data.
d. Utilization of professional research and literature and other technology transfer methods.
e. Use of expertise, both internal and external, that is based on documented, substantiated professional rationale.
f. Complete pre-project survey, monitoring, and inventory for species that are based on technically sound and logistically feasible methods while considering staffing and funding constraints.

When Districts determine that additional conservation measures are necessary, options for conservation include, but are not limited to: modifying a project (e.g. timing, placement, and intensity), using buffers to protect sites, or implementing habitat restoration activities (IM-OR-2003-054).

Strategic Species. If sites are located, collect occurrence data and record in corporate database.

Table D-1. Federally Listed & Bureau Sensitive Botanical Species.

Species	Within species range?	Habitat Present?	Species Present?	Reason for concern or no concern	Surveys Completed	Mitigation Measures
Threatened & Endangered Species						
Lupinus sulphureus ssp. *kincaidii* Kincaid's lupine (T)	**Yes**	**Yes**	N/A	Surveys performed, not detected.	May/June 2008	N/A
Plagiobothrys hirtus Rough popcorn flower (E)	**No**	No	N/A	No habitat present.	N/A	N/A
Sensitive Species						
Chiloscyphus gemmiparus Liverwort	**No**	No	N/A	No habitat present.	N/A	N/A
Diplophyllum plicatum Liverwort	**No**	No	N/A	No habitat present	N/A	N/A
Entosthodon fascicularis Moss	**No**	No	N/A	No habitat present	N/A	N/A
Gymnomitrion concinnatum Liverwort	**No**	No	N/A	No habitat present.	N/A	N/A
Helodium blandowii Moss	**No**	No	N/A	No habitat present	N/A	N/A
Meesia uliginosa Moss	**No**	No	N/A	No habitat present	N/A	N/A
Schistostega pennata Moss	**No**	No	N/A	No habitat present	N/A	N/A
Tayloria serrata	**No**	**No**	**N/A**	No known habitat.	N/A	N/A

Species	Within species range?	Habitat Present?	Species Present?	Reason for concern or no concern	Surveys Completed	Mitigation Measures
Moss						
Tetraphis geniculata Moss	**No**	No	N/A	No habitat present	N/A	N/A
Tetraplodon mnioides Moss	**No**	No	N/A	No habitat present	N/A	N/A
Tomentypnum nitens Moss	**No**	No	N/A	No habitat present	N/A	N/A
Tortula mucronifolia Moss	**No**	No	N/A	No habitat present	N/A	N/A
Trematodon boasii Moss	**No**	No	N/A	No habitat present.	N/A	N/A
Bridgeoporus nobilissimus Giant polypore fungus	No	No	N/A	Out of range.	N/A	N/A
Cudonia monticola *Fungi*	**No**	No	N/A	No habitat present	N/A	N/A
Dermocybe humboldtensis Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Gomphus kauffmanii Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Helvella crassitunicata Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Leucogaster citrinus Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Otidea smithii Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia californica Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia dissiliens Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia gregaria Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia olivacea Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia oregonensis Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia pseudofestiva Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia scatesiae Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia sipei Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Phaeocollybia spacidea Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Pseudorhizina californica Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Ramaria amyloidea Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Ramaria gelatiniaurantia Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Ramaria largentii Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Ramaria spinulosa var. *diminutiva*	**No**	No	N/A	No habitat present	N/A	N/A

Species	Within species range?	Habitat Present?	Species Present?	Reason for concern or no concern	Surveys Completed	Mitigation Measures
Fungus						
Rhizopogon chamalelotinus Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Rhizopogon exiguus Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Sowerbyella rhenana Fungus	**No**	No	N/A	No habitat present	N/A	N/A
Adiantum jordanii California maiden-hair	**Yes**	No	N/A	No habitat present.	N/A	N/A
Arabis koehleri var. *koehleri* Koehler's rockcress	**Yes**	No	N/A	No habitat present.	N/A	N/A
Arctostaphylos hispidula *Hairy manzanita*	**Yes**	No	N/A	No habitat present.	N/A	N/A
Asplenium septentrionale Grass-fern	**Yes**	No	N/A	No habitat present.	N/A	N/A
Bensoniella oregana Bensonia	**Yes**	No	N/A	No habitat present.	N/A	N/A
Botrychium minganense Gray moonwort	**No**	No	N/A	No habitat present.	N/A	N/A
Calochortus coxii Crinite mariposa-lily	**Yes**	No	N/A	No habitat present.	N/A	N/A
Calochortus umpquaensis Umpqua mariposa-lily	**No**	No	N/A	No habitat present.	N/A	N/A
Camassia howellii Howell's camas	**Yes**	No	N/A	No habitat present.	N/A	N/A
Carex brevicaulis Short stemmed sedge	**Yes**	No	N/A	No habitat present.	N/A	N/A
Carex comosa Bristly sedge	**Yes**	No	N/A	No habitat present.	N/A	N/A
Carex gynodynama Hairy sedge	**Yes**	**No**	**N/A**	No habitat present.	N/A	N/A
Carex serratodens Saw-tooth sedge	**Yes**	No	N/A	No habitat present.	N/A	N/A
Cimicifuga elata Tall bugbane	**Yes**	**No**	N/A	No Habitat present	N/A	N/A
Cypripedium fasciculatum Clustered lady slipper	**Yes**	**No**	N/A	No Habitat present	N/A	N/A
Delphinium nudicaule Red larkspur	**Yes**	**No**	N/A	No Habitat present	N/A	**N/A**
Epilobium oreganum Oregon willow-herb	**Yes**	**No**	N/A	No Habitat present	N/A	**N/A**
Eschscholzia caespitosa Gold poppy	**Yes**	No	N/A	No habitat present.	N/A	**N/A**
Eucephalus vialis Wayside aster	**Yes**	**No**	N/A	No habitat present	N/A	**N/A**
Horkelia congesta ssp. *congesta* Shaggy horkelia	**Yes**	**No**	N/A	No habitat present	N/A	**N/A**
Horkelia tridentata ssp. *tridentate* Three-toothed horkelia	**Yes**	**No**	N/A	No habitat present	N/A	N/A
Iliamna latibracteata California globe-mallow	**Yes**	No	N/A	No habitat present.	N/A	N/A
Kalmiopsis fragrans	**Yes**	No	N/A	No habitat present.	N/A	N/A

Species	Within species range?	Habitat Present?	Species Present?	Reason for concern or no concern	Surveys Completed	Mitigation Measures
Fragrant kalmiopsis						
Lathyrus holochlorus Thin-leaved peavine	**Yes**	No	N/A	No habitat present.	N/A	N/A
Lewisia leana Lee's lewisia	**Yes**	No	N/A	No habitat present.	N/A	N/A
Limnanthes gracilis var. *gracilis* Slender meadow-foam	**Yes**	No	N/A	No habitat present.	N/A	N/A
Lotus stipularis *Stipuled trefoil*	**Yes**	No	N/A	No habitat present.	N/A	N/A
Meconella oregana *White fairypoppy*	**Yes**	No	N/A	No habitat present.	N/A	N/A
Pellaea andromedifolia Coffee fern	**Yes**	No	No	No habitat present	N/A	N/A
Perideridia erythrorhiza Red-rooted yampah	**No**	No	N/A	No habitat present.	N/A	N/A
Polystichum californicum California sword-fern	**Yes**	No	N/A	No habitat present.	N/A	N/A
Romanzoffia thompsonii *Thompson's mistmaiden*	**Yes**	No	N/A	No habitat present.	N/A	N/A
Schoenoplectus subterminalis Water clubrush	**No**	No	N/A	No habitat present.	N/A	N/A
Scirpus pendulus *Drooping rush*	**No**	No	N/A	No habitat present.	N/A	N/A
Sisyrinchium hitchcockii Hitchcock's blue-eyed grass	**Yes**	No	N/A	No habitat present.	N/A	N/A
Utricularia gibba Humped bladderwort	**Yes**	No	N/A	No habitat present	N/A	N/A
Utricularia minor Lesser bladderwort	**Yes**	No	N/A	No habitat present.	N/A	N/A
Wolffia borealis Dotted water-meal	**Yes**	No	N/A	No habitat present.	N/A	N/A
Wolffia columbiana Columbia water-meal	**Yes**	No	N/A	No habitat present.	N/A	N/A

[1] Surveys are considered not practical for these species based on the 2003 Annual Species Review (IM-OR-2004-034).

Table D-2. Bureau Strategic Botanical Species.

Scientific Name	Roseburg Occurrence?	Occurrence in the Project Area?
Bryophytes		
Cephaloziella spinigera	Suspected	None Observed
Grimmia anomala	Suspected	None Observed
Scouleria marginata	Suspected	None Observed
Fungi		
Cazia flexiascus	Suspected	None Observed
Choiromyces alveolatus	Suspected	None Observed
Clavariadelphus subfastigiatus	Documented	None Observed
Gymnomyces monosporus	Documented	None Observed
Helvella elastica	Documented	None Observed
Hygrophorus albicarneus	Suspected	None Observed
Mycena quinaultensis	Suspected	None Observed
Nolanea verna var. *isodiametrica*	Suspected	None Observed
Plectania milleri	Suspected	None Observed
Psathyrella quercicola	Suspected	None Observed
Ramaria abietina	Documented	None Observed
Ramaria rubribrunnescens	Suspected	None Observed
Ramaria suecica	Documented	None Observed
Ramaria thiersii	Suspected	None Observed
Rhizopogon brunneiniger	Suspected	None Observed
Rhizopogon clavitisporus	Suspected	None Observed
Rhizopogon flavofibrillosus	Documented	None Observed
Rhizopogon variabilisporus	Suspected	None Observed
Sarcodon fuscoindicus	Documented	None Observed
Lichens		
Buellia oidalea	Suspected	None Observed
Lecanora pringlei	Suspected	None Observed
Lecidea dolodes	Suspected	None Observed
Leptogium rivale	Documented	None Observed
Leptogium teretiusculum	Documented	None Observed
Peltula euploca	Suspected	None Observed
Vezdaea stipitata	Documented	None Observed
Vascular Plants		
Camissonia ovata	Suspected	None Observed
Frasera umpquaensis	Suspected	None Observed

Appendix D. Aquatic Conservation Strategy Assessment

Project: Little Wolf Thrice Commercial Thinning
Prepared By: Dan Dammann and Jeff McEnroe
Date: June 18, 2009

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The ACS must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over broad landscapes as opposed to individual projects or small watersheds. (Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, page B-9).

ACS Components:

Riparian Reserves (ACS Component #1)

Riparian Management Areas were established. Under the 2008 ROD/RMP, fish-bearing streams and perennial, non-fish bearing streams would have a Riparian Management Area one site-potential tree height in width. Intermittent, non-fish bearing streams would have a Riparian Management Area half of one site-potential tree height in width (2008 ROD/RMP, pg. 35). As stated in the Density Management, Study, variable-width "no-harvest" buffers would be established within the RMA to protect stream bank integrity, maintain streamside shade for perennial flowing streams and provide a filtering strip for overland run-off. Variable buffer width would be based on site conditions and would have a width between 20 to 50 feet measured from the edges of the stream channel (Cissel et al. 2006, pg. 10). One of the objectives of this project is to speed development of large trees to provide an eventual source of large woody debris to stream channels.

Key Watersheds (ACS Component #2)

Under the 1994 ROD/RMP, Key Watersheds were established "as refugia . . . for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species [1994 ROD/RMP, pg. 20]." There are no key watersheds within the Upper Umpqua River fifth-field watersheds.

Watershed Analysis (ACS Component #3) and other pertinent information:

In developing the project, the Upper Umpqua Watershed Analysis was used to evaluate existing conditions, establish desired future conditions, and assist in the formulation of appropriate alternatives. Existing watershed conditions are described in the Hydrology (pg. 31-33) and Fisheries (pg. 33-35) sections of the EA and in the Upper Umpqua Watershed Analysis. The short and long term effects to aquatic resources are also described in these sections of the EA.

Watershed Restoration (ACS Component #4)

One of the purposes of this project is to speed development of large trees to provide an eventual source of large woody debris to stream channels (2008 ROD/RMP, pg. 35). Therefore, the treatments within the Riparian Management Area (RMA) as part of the proposed action are considered to be a watershed restoration project.

Additionally, since 1994, some stream enhancement projects have been implemented in the Upper Umpqua Watershed. This includes placing instream structures (e.g. logs, boulders, root wads, etc…) to improve aquatic habitat along at least 6 miles of stream and replacing at least 8 culverts identified as barriers to fish passage to open up access to additional habitat. This work has been done in collaboration with private timber companies, Oregon Department of Fish and Wildlife, and the BLM. Approximately 82 miles of road were identified for improvement or decommissioning, 30 miles of stream for instream restoration and 32 culverts for replacement. This work would be implemented as budgets allow.

Range of Natural Variability within the Upper Umpqua River Watershed:

Based on the dynamic, disturbance-based nature of aquatic systems in the Pacific Northwest, the range of natural variability at the site scale would range from 0-100 percent of potential for any given aquatic habitat parameter over time. Therefore, a more meaningful measure of natural variability is assessed at scales equal to or greater than the fifth-field watershed scale. At this scale, spatial and temporal trends in aquatic habitat condition can be observed and evaluated over larger areas, and important cause/effect relationships can be more accurately determined.

Natural disturbance events to aquatic systems in the Pacific Northwest include wildfires, floods, and landslides. Average fire return intervals at the drainage scale were calculated between 50 and 75 years (prior to the advent of fire suppression). The more destructive stand replacement fires occurred irregularly at intervals up to 350 years (Upper Umpqua Watershed Analysis pg 23). Most of the Upper Umpqua Watershed is dominated by Tyee Formations of sandstones and siltstones which have a relatively high frequency of debris avalanches on slopes steeper than 65 percent and debris flows on slopes steeper than 35 percent.

Timber harvesting and road construction over the past 50 years have substantially increased the frequency and distribution of landslides above natural levels in the Upper Umpqua Watershed. However, there is a downward trend in landslide incidence over the last 50 years that is associated with improved management practices (Upper Umpqua Watershed Analysis, pg. 116). On BLM land, future landslides, mostly during large storm events, are expected to deliver large wood and rock fragments to lower-gradient streams because of BLM Riparian Management Areas. These events would more closely resemble landslides within relatively unmanaged forests. These disturbance events are the major natural sources of sediment and wood to a stream system and are very episodic in nature.

Due to the dynamic nature of these disturbance events, stream channel conditions vary based on the time since the last disturbance event. This results in a wide range of aquatic habitat

conditions at the site level. Site level habitat conditions can be summarized by Oregon Department of Fish and Wildlife (ODFW) habitat surveys. Surveys have been conducted throughout the Upper Umpqua Watershed mostly in the third through sixth-order streams. Approximately 20 stream reference reaches in the Coast Range of the Umpqua Basin were used to compare against all surveyed streams. These relatively unmanaged reaches represent the variability of conditions within natural stream systems as well as characteristics desirable for a variety of fish species (including salmonid habitat). When compared to these "reference streams", aquatic habitat survey data from the Upper Umpqua Watershed indicates that most of the tributaries are lacking large woody debris. While this condition is considered typical at any given site scale, it is considered atypical for most streams to be devoid of wood at the larger fifth-field scale. Therefore, at this larger scale, aquatic habitat conditions are considered to be outside the range of natural variability.

Because of its dynamic nature, sediment effects to streams can only be described in general terms. It is important to remember that ODFW instream habitat data is a snapshot in time. When compared to reference reaches, sediment conditions in many of the tributaries of the Upper Umpqua Watershed appear to be lacking gravel substrate when compared to the reference reaches (Personal Observation, McEnroe).

Stream temperatures vary naturally in this watershed as a result of variation in geographic location, elevation, climate, precipitation, and distance from the source water (Upper Umpqua Watershed Analysis, pg 88). Stream temperatures also naturally vary as a response to the natural disturbance events mentioned in the previous paragraphs, as well as current practices on private forest, agricultural, and residential properties. Due to the large amount of riparian clearing that has occurred over the last 150 years (converting forest into farmland), coupled with management-induced channel widening, irrigation withdrawals, and loss of gravels, it is likely that stream temperature increases have been greater over larger spatial and temporal scales than observed naturally. One of BLM's objectives for managing Riparian Management Areas is to maintain and enhance shade providing vegetation along streams.

Changes in stream flow can result from consumptive withdrawals and effects of land use activities on storm water runoff, infiltration, storage and delivery. Commercial and domestic withdrawals are common along the Upper Umpqua River and its' tributaries. There is evidence that previous management has heavily influenced stream channels throughout the Upper Umpqua Watershed (Upper Umpqua Watershed Analysis, pg. 90). Over the last 150 years, much of the lower elevation forest land has been converted to farmland. Many tributaries within the Upper Umpqua Watershed have also been cleaned (had large wood removed) or salvage logged. BLM Forest management in the Upper Umpqua Watershed would be designed to reduce or prevent watershed impacts. One of BLM's objectives for managing Riparian Management Areas is to provide for riparian and aquatic conditions that supply stream channels with shade, sediment filtering, leaf littler and large wood, and streambank stability.

Table D-1. Individual Aquatic Conservation Strategy Objective Assessment.

ACS Objective	Site/Project Scale Assessment	Fifth-Field Watershed Scale Assessment
	Scale Description: One 20 acre unit identified in this project is located in one seventh-field drainage (Little Wolf Creek) totaling roughly 5870 acres in size. The BLM manages approximately 3,700 acres of this drainage (63%). Units proposed for treatment represent 0.3% of the total drainage area, and 0.5% of the BLM-managed lands in the drainage.	Scale Description: This project is located in the Upper Umpqua Fifth-Field Watershed. The Upper Umpqua watershed is roughly 169,800 acres in size. The BLM manages approximately 58,700 acres in the Upper Umpqua watershed (35%). The proposed project represents approximately 0.01% of the total drainage area for the Upper Umpqua Watershed and 0.03% of the BLM-managed lands in the watershed.
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.	Trees within the treated riparian stands would attain larger heights and diameters in a shorter amount of time than if left untreated. PDF's such as variable width "no-harvest" buffers established along streams would retain shading and therefore maintain water temperature. "No-harvest" buffers established on streams in or adjacent to proposed units would prevent disturbance to stream channels and stream banks and intercept surface run-off allowing sediment transported by overland flow to be filtered out before reaching active waterways (refer to *Hydrology* pg. 33) and would prevent impacts to aquatic resources. This treatment would speed attainment of this objective.	This treatment would also speed attainment of this objective at the watershed scale.
2. Maintain and restore spatial and temporal connectivity within and between watersheds	Within the drainage, the proposed project would have no influence on aquatic connectivity. Therefore this treatment would maintain the existing	Within the watersheds, the proposed project would have no influence on aquatic connectivity. Therefore this treatment would maintain the

ACS Objective	Site/Project Scale Assessment	Fifth-Field Watershed Scale Assessment
	connectivity condition at the site scale.	existing connectivity condition at the watershed scale.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations	Treatments would not reduce canopy closure to an extent that could potentially influence in-stream flows (refer to *Hydrology* pg. 32). In addition, "no-harvest" buffers established on all streams in or adjacent to proposed units would prevent disturbance to stream channels and stream banks (refer to *Proposed Action*, pg. 8). Therefore, these treatments would maintain the physical integrity of the aquatic system at the site scale.	This treatment would also maintain the physical integrity of the aquatic system at the watershed scale.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.	Project design features (PDF) would ensure that water quality would not be adversely impacted by the proposed action. PDF's such as variable width "no-harvest" buffers established along streams would retain shading and hence maintain water temperature. "No-harvest" buffers established on streams in or adjacent to proposed units would prevent disturbance to stream channels and stream banks and intercept surface run-off allowing sediment transported by overland flow to be filtered out before reaching active waterways (refer to *Hydrology* pg. 33). Therefore, this treatment would maintain the existing water quality at the site scale.	Based on the information discussed at the site scale, this project would also maintain water quality at the watershed scale.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved.	As mentioned above, "No-harvest" buffers established on streams in or adjacent to proposed units would prevent disturbance to stream channels and stream banks and intercept surface run-off allowing any management related sediment transported by overland flow to settle out before reaching active waterways (refer to	This project would maintain the existing sediment regime at the watershed scale as well.

ACS Objective	Site/Project Scale Assessment	Fifth-Field Watershed Scale Assessment
	Hydrology pg. 33). Therefore, this project would maintain the existing sediment regime.	
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.	Treatments would not reduce canopy closure to an extent that could potentially influence in-stream flows (refer to *Hydrology* pg. 32). The project would involve partial removal of vegetation on areas constituting ten percent or less of each affected sub-watershed. In addition, new road construction would not noticeably extend the drainage network or contribute to a potential increase in peak flow because there is no new road construction proposed. Road renovation or decommissioning of existing roads would be located on ridge tops or stable side slopes with adequate cross drain structures preventing channel extension on roads that do cross streams. Therefore, this treatment would maintain stream flows within the range of natural variability at the site scale (EA pgs. 10 and 33)	As discussed at the site scale, density management treatments would not reduce canopy closure to an extent that could potentially influence in-stream flows. Therefore, at the larger watershed scale, this treatment would also maintain stream flows within the range of natural variability.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and woodlands.	As discussed in #6 above, this project would maintain stream flows within the range of natural variability at the site scale. Therefore, it would also maintain stream interactions with the floodplain and respective water tables at the site scale.	At the watershed scale, this project would also maintain stream interactions with the floodplain and respective water tables within the range of natural variability.
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	The proposed treatment is designed to return riparian stands to a more natural density and growth trajectory. Therefore this treatment would serve to restore plant species composition and structural diversity at the site scale.	The proposed treatment is designed to return riparian stands to a more natural density and growth trajectory. Therefore this treatment would serve to restore plant species composition and structural diversity at the larger watershed scale as well.

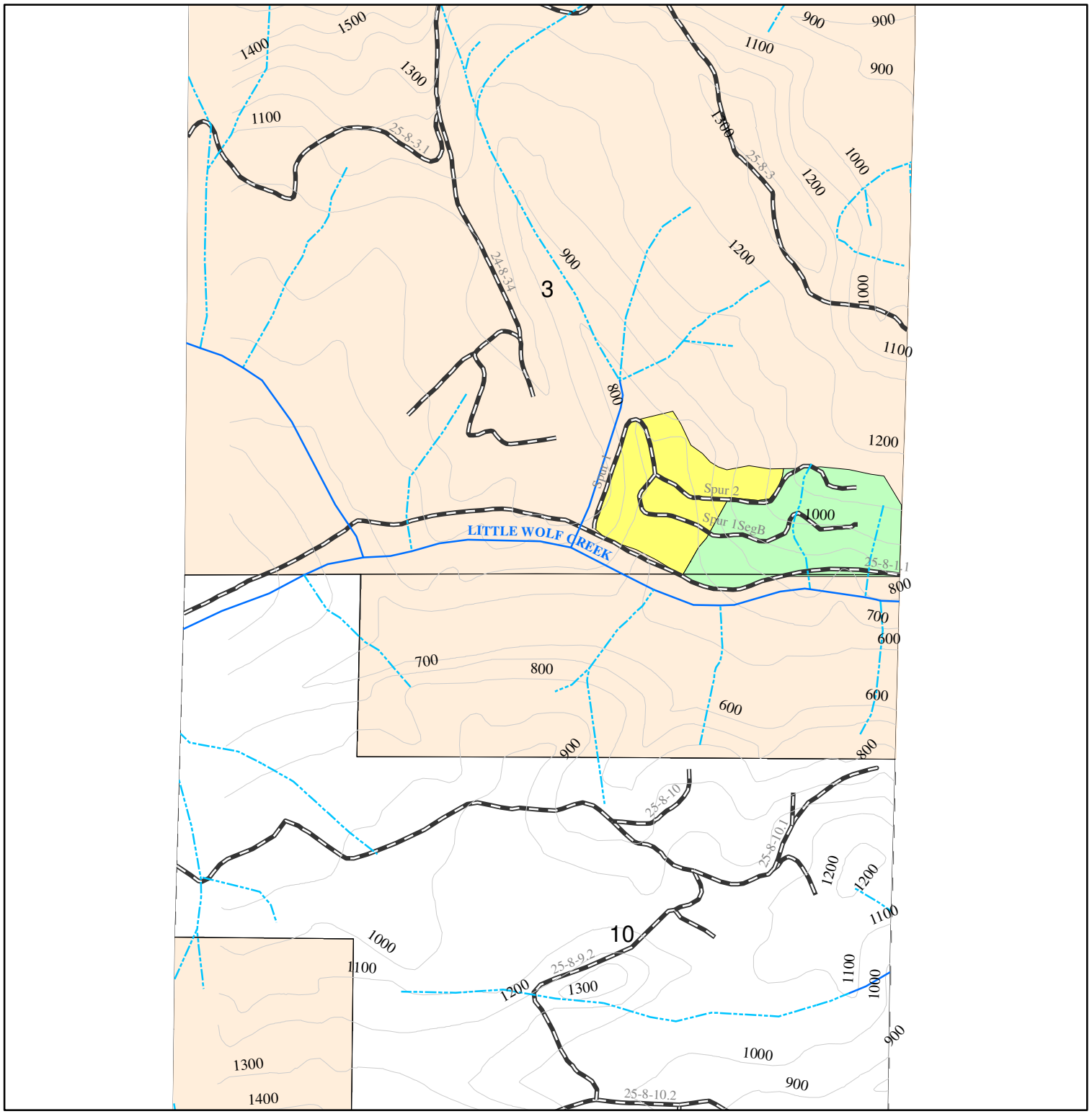
ACS Objective	Site/Project Scale Assessment	Fifth-Field Watershed Scale Assessment
regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.		
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.	As mentioned previously, one of the objectives of this project is to restore riparian stand conditions in the proposed treatment areas. Implementation of riparian restoration projects will help restore adequate habitat to support riparian-dependent species at the site and watershed scales.	As mentioned previously, one of the objectives of this project is to restore riparian stand conditions in the proposed treatment areas. Implementation of riparian restoration projects will help restore adequate habitat to support riparian-dependent species at the site and watershed scales.

ACS Summary:

Based upon the information listed above, the proposed action would meet ACS objectives at the site and watershed scale. In addition, based upon the restorative nature of the action, this project would not retard or prevent attainment of ACS objectives; it would actually speed attainment of these objectives. Therefore, this action is consistent with the ACS and its objectives at both the site and watershed scales.

Appendix E. Map Packet Table of Contents

Little Wolf Thrice Density Management Study Area
Third Thinning



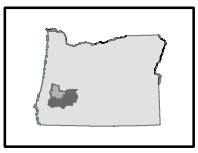
0 500 1,000 2,000 Feet

Legend

Little Wolf Density Management Area
- Control
- Rethinning

Roads
Intermittant Streams
Perennial Streams

Land Management Status
- BLM O&C Land
- Private Land



United States Department of the Interior
Bureau of Land Management
Roseburg District Office
777 NW Garden Valley Blvd
Roseburg, OR 97470

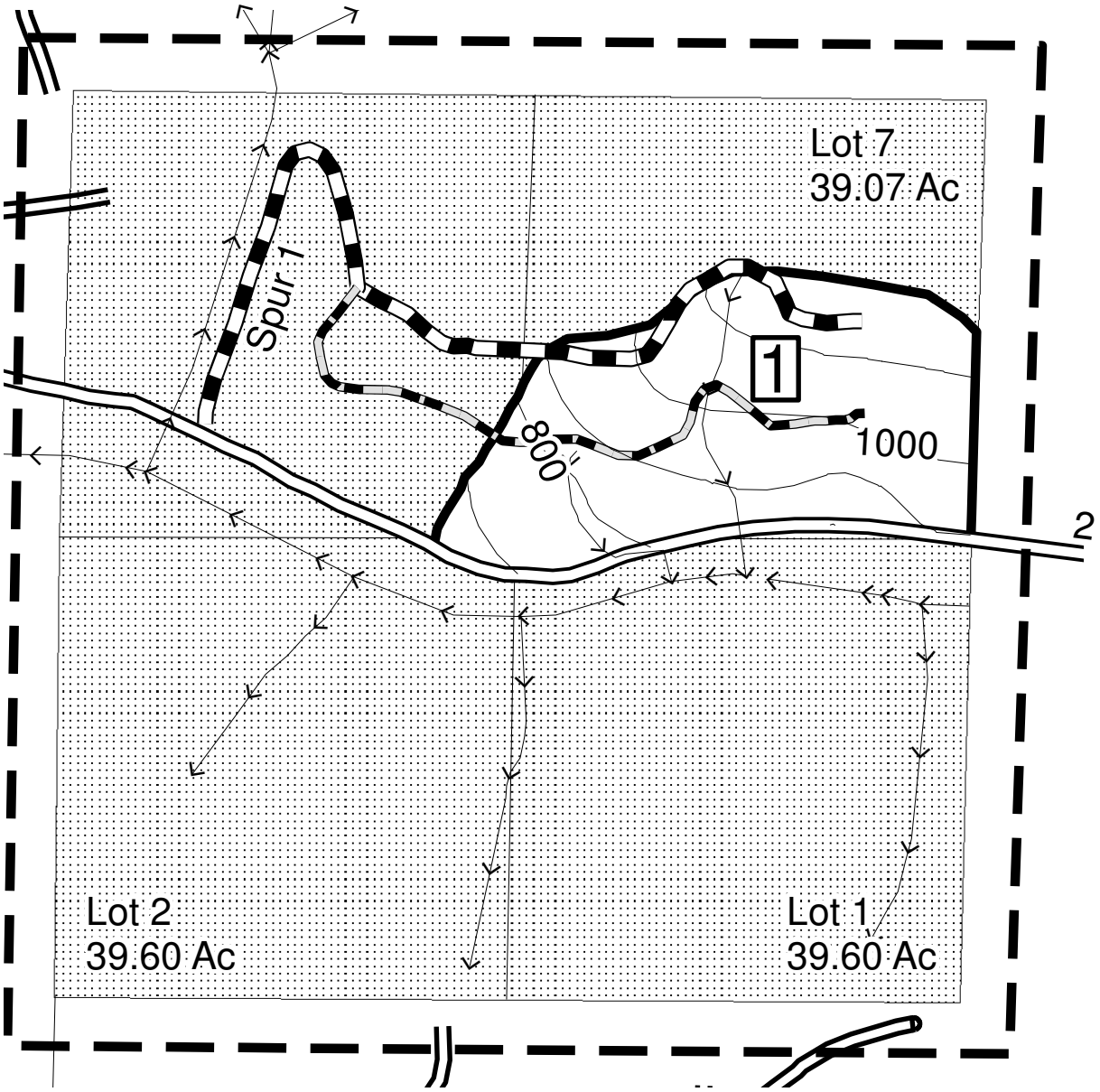
N W E S

U.S. Department of Interior
Bureau of Land Management

EXHIBIT "A"

Little Wolf Thrice DMS

District	Township	Range	Section	Meridian	Contract Number
ROSEBURG	*25S*	8W	3 & 10	*WILLAMETTE*	*OR-10-TS09-20*



LEGEND

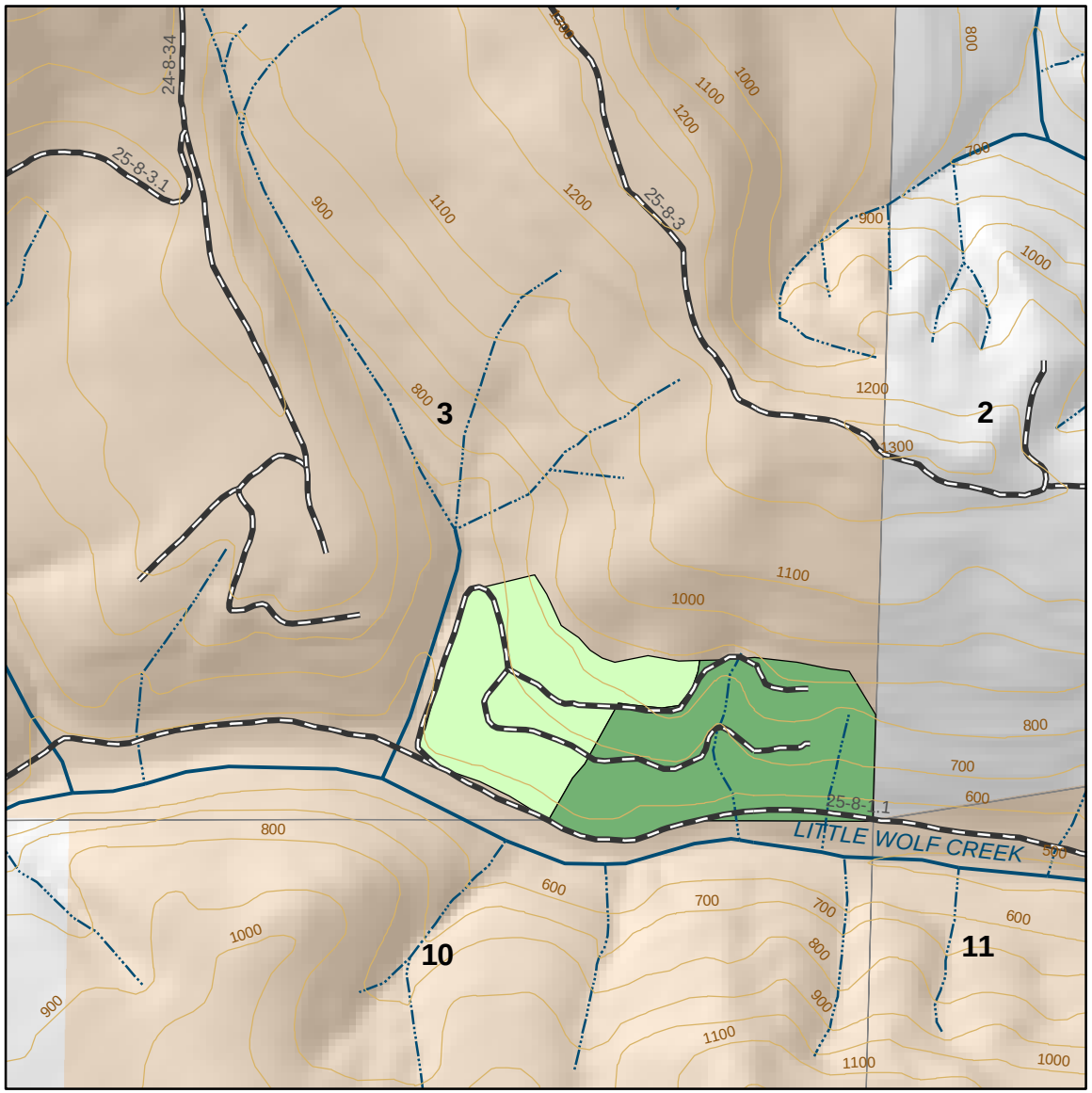
- Harvest Area - Cable Yarding
- Reserve Area
- Roads Previously Decommissioned
- Existing Road
- Roads To Be Renovated
- Boundary of Cutting Area
- Boundary of Contract Area
- Stream

1:6,000

1 inch = 0.09 miles

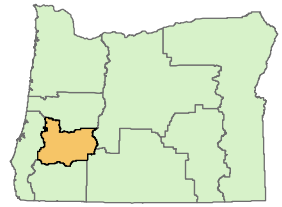
1,000 500 0 1,000 Feet

Little Wolf Density Management Study Area



T. 25 S., R. 8 W.,
Section 3 and 10
W.M. Oregon, USA

Roseburg District
02/22/2005



Treatment

- Control Area
- Rethinning Areas
- Contours (100 feet)
- Road
- Perennial Stream
- Intermittent Stream

BLM Administered Lands

- BLM O&C Land

K

United States Department of the Interior
Bureau of Land Management
Roseburg Distict Office
777 NW Garden Valley
Roseburg, Oregon 97470

1:10,500

0 250 500 1,000 1,500 2,000 2,500 Feet

This map is for Internal Review only.