THIN SHEEP FOREST HEALTH TREATMENTS
ENVIRONMENTAL ASSESSMENT
EA# OR-014-05-02

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAKEVIEW DISTRICT - Klamath Falls Resource Area

ABSTRACT: The following Environmental Assessment addresses the environmental effects associated with a variety of proposed treatments from the Thin Sheep forest health treatments. Proposed treatments include; commercial timber harvesting, road improvements, riparian habitat restoration, and fuels treatments.

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FREEDOM OF INFORMATION ACT AND RESPONDENT'S PERSONAL PRIVACY INTERESTS: The Bureau of Land Management is soliciting comments on this Environmental Assessment. Comments, including names and street addresses of respondents, will be available for public review at the above address during regular business hours. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

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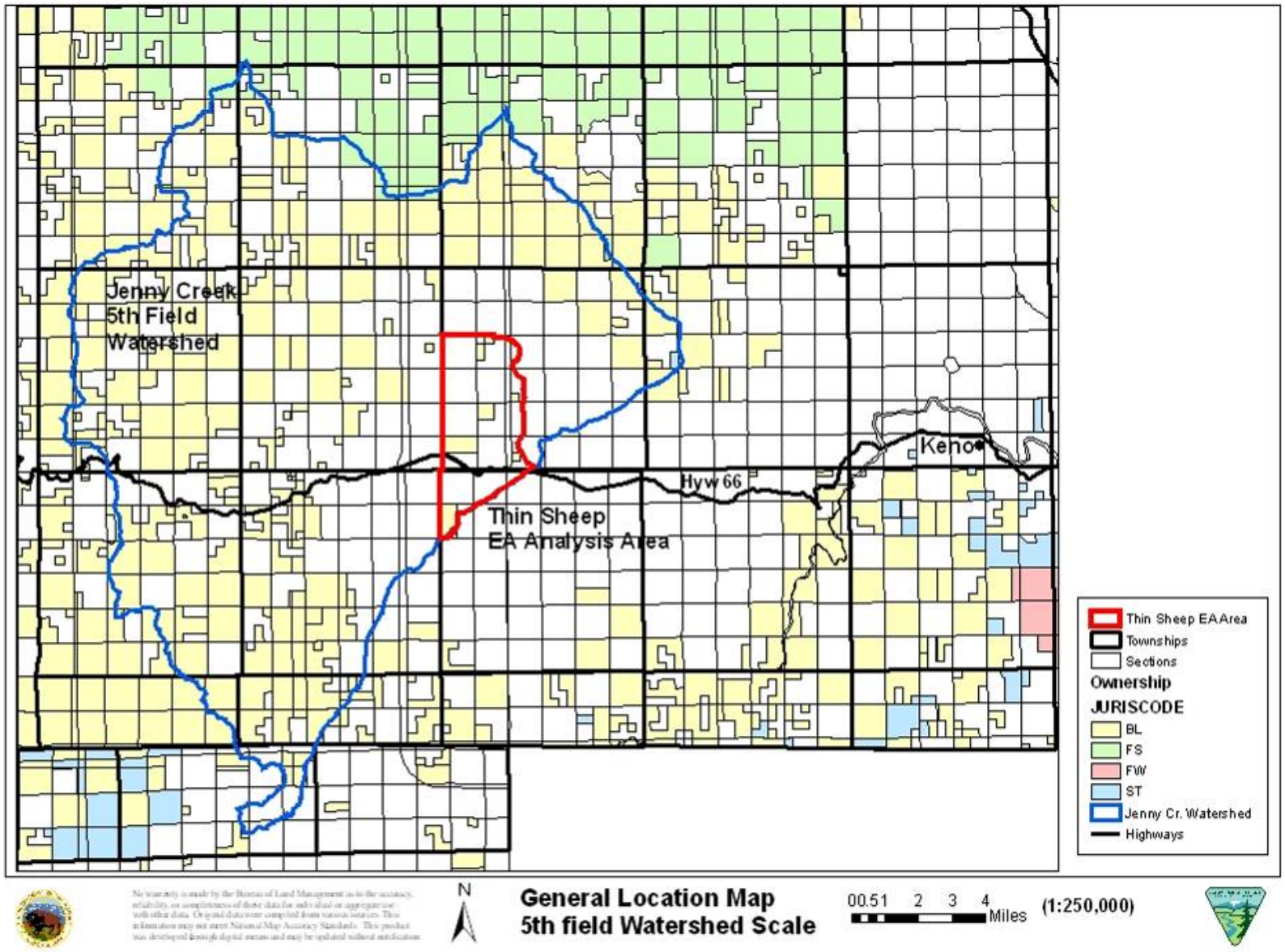
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CHAPTER 1 - INTRODUCTION

The Klamath Falls Resource Area (KFRA) Resource Management Plan (RMP) provides direction for managing lands on the western part of the Bureau of Land Management (BLM) Lakeview District. The Thin Sheep Forest Health Treatments environmental assessment (EA) will analyze the effects from proposed vegetation treatments and other management actions in and adjacent to the Thin Sheep project area on lands shown in Table 1 and the Location Map (Figure 1). Many of the stands in the proposed Thin Sheep area are multi-aged, multiple canopy stands. Many stands proposed for treatment have a residual large tree overstory component of ponderosa pine, sugar pine, Douglas-fir, incense cedar and white fir and a dense understory component. Past management practices in the area have included timber harvesting, fire suppression, slashbusting, grazing, and recreation.

Proposed Action

The following activities are included in the Proposed Action (see Chapter 2 for a detailed description):

Matrix vegetation treatments:

- Density Management Thinning - (Commercial Timber Harvest) - Approximately 700 acres
- Mixed Density Management and precommercial thinning (plantations) - Approximately 200 acres
- Fuel reduction (Post Harvest) in the Matrix through prescribed fire, hand piling and slash busting - Approximately 900* acres

Riparian Reserve Vegetation Treatments with Silvicultural Prescription applied:

- Density Management - Thinning (Commercial Timber Harvest) - Approximately 15 acres
- Other riparian restoration/thinning - Approximately 50 acres

Road Treatments:

- Road improvement (resurfacing) - Approximately 0.1 miles
- Road renovation (grading & brushing – road maintenance) - Approximately 8.5 miles
- Road closures (blocking) - Approximately 1.2 miles of roads
- Road obliteration - Approximately 0.3 miles
- New road construction - Approximately 0.1 miles

(*Note: these include the same acres treated with Density Management)

Location

The proposed Project area is located north of State Highway 66 and west of the town of Keno (refer to Table 1 and the General Location Map). All treatments proposed in this environmental assessment would occur exclusively on BLM-administered lands within the Klamath Falls Resource Area.

Table 1: Location of BLM-administered Lands within the Analysis Area

Proposed Treatment Area	Location		
	Township	Range	Section
Thin Sheep treatments	39S. 40S.	5E. 5E.	17,21,29,31,33 7

Purpose and Need for Action

Purpose

- Implement actions to meet the objectives of the RMP (discussed below).
- Achieve the desired future condition (discussed below).
- Improve the resiliency of residual trees from drought, insect, and disease.
- Produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses.
- Reduce the fuels hazards associated with high fuel loading and overstocking that makes these stands vulnerable to stand replacing wildfires.
- Improve riparian conditions.
- Reduce road density in the area while improving the condition of the remaining transportation system.

Need

Field observations and timber stand data show that the existing stands in the proposed project area are presently overstocked, with declining forest health (stand resiliency) and reduced annual growth. Some stands are already infected by insects and disease and need to be treated to stop the spread and decrease the loss of timber. (Note: Forest health in this EA is defined as the resiliency of the forest ecosystems to sustain themselves in the process of natural disturbances such as insect outbreaks and wildfires. A more detailed discussion of forest health is in the Jenny Creek Watershed Analysis (1994), pages 17-33, and in the KFRA 1994 Final Environmental Impact Statement (FEIS), pages 3-63 to 3-66.) Trees within densely stocked stands are more subject to stress and vulnerable to further attack by insects and diseases. There is a need to reduce the stocking to improve growing conditions (reduced competition for water, nutrients and light) and increase the vigor of the remaining trees on approximately 900 acres of dense, overstocked forested stands in the proposed area.

The RMP has allocated the lands being analyzed to Matrix and Riparian Reserves. The Matrix lands have RMP objectives to produce a sustainable supply of timber and other forest commodities as stated in the KFRA RMP and Oregon and California (O&C) Lands Act of 1937, which can be met by removing trees under commercial contract. Approximately 3.5 million board feet of timber would be harvested and sold.

There is a need to thin timbered stands to reduce fire hazard. Overstocked stands have more ladder and canopy fuels that result in an increased risk, in terms of greater fire intensity and resistance to control, in some forested areas.

Riparian Reserves are also densely stocked and vulnerable to stand replacing wildfires. There is a need to thin these stands to enhance riparian function and hydrologic conditions and reduce fire hazard.

Road density averages about 5 miles/square mile which exceeds the RMP objective. There is a need to reduce the road density in order to benefit wildlife and hydrologic function.

Desired Future Condition and RMP Objectives

Matrix Forest Stands

For Matrix forest stands, the RMP explains in detail the desired future condition and objectives of forested stands in the Matrix (See page 22 and pages E-8 to E-11). In general, the desired future condition of the Matrix forest landscape is a healthy, diverse, and productive forest that is resilient to natural disturbances (disease, drought, insects, and fire) and meets the following objectives:

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability (RMP page 22).
- Provide connectivity (along with other allocations such as Riparian Reserves) across the landscape for forest dependent plant and animal species (RMP page 22).

- Provide habitat for a variety of organisms associated with both late-successional and younger forests (RMP page 22).
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees (RMP page 22).

Page E-9 of the RMP discusses target stand conditions that over time would trend towards a forest composed of stands containing a variety of structure, trees of varying sizes and ages, and stands with an assortment of canopy configurations. Desired Species Composition (by percent conifer basal area), shown on Table E-1 of the RMP, is designed to improve stand resiliency. The Thin Sheep Forest Health Treatments silvicultural prescription was developed to meet these desired future conditions.

Riparian Reserves

In general, the desired future condition of riparian reserves is proper functioning condition of riparian areas (streams, wetlands, etc.) and healthy upland vegetation which contributes to meeting the following objectives:

- the Aquatic Conservation Strategies listed on page D-6 of the RMP
- reduced risk of future high intensity fires as well as insect infestations
- reduced sediment input to streams from natural disturbances and management actions

Roads

The RMP (pages D-13 to D-21) lists the Best Management Practices and objectives for managing roads in the KFRA. In general, the desired future condition for roads in the analysis area is a transportation system that meets the following objectives:

- provide suitable transportation facilities for management and recreational use
- ensure that the road investment is maintained and that roads and road use are not contributing to resource damage
- reduce road densities where feasible

Environmental Analysis and Decision Process

An interdisciplinary evaluation of the resources in the analysis area including wildlife, recreation, soils, fisheries, timber, cultural, hydrology, as well as other resources is documented in this environmental assessment (EA). The analysis is accomplished by examining the different resources in the analysis area and recommending a course of action that best meets the objectives outlined in the Klamath Falls Resource Area Resource Management Plan. The analysis area can vary in size depending on the different resources.

This Environmental Assessment is tiered to the Final - Klamath Falls Resource Area Resource Management Plan and Environmental Impact Statement, September 1994 (KFRA RMP EIS). The purpose of this EA is to assess the effects of the proposed treatments and to determine if the environmental effects associated with the proposed site-specific treatments are significant and/or greater than those already analyzed in the previous KFRA RMP EIS. If the effects are not significant or greater than analyzed in the KFRA RMP EIS, a Finding of No Significant Impact (FONSI) will be documented upon the completion of the analysis. In addition to providing analysis to determine whether or not an environmental impact statement is necessary, this EA will provide the public with information about the proposed treatments, describe the alternatives and the associated effects with each alternative, and assist the decision maker in selecting an alternative.

The KFRA Field Manager, as the responsible official, will decide whether or not to implement the Proposed Action and determine whether or not the proposed action is consistent with the RMP as well as other laws and regulations (i.e., the Endangered Species Act and Clean Water Act, etc.). The proposed

treatments or projects would span a 3-5 year period. Information obtained from biological surveys and consultation is included in the EA and will also be incorporated in the final Decision Record to this EA.

Public Input Summary and Issue Development

A scoping letter dated February 5, 2004 for the Klamath Falls Resource Area's portion of the Jenny Creek watershed was sent to the resource area timber sale EA mailing list of approximately 150 people. The letter explained the project proposal and asked the general public for comments. The resource area received comments from four individuals/ organizations. Due to litigation involving Northern Spotted Owl Critical Habitat in the northeast portion of the original analysis area, the decision was made to propose and analyze projects outside of this critical habitat. Thus, only the proposed Thin Sheep timber sale project area is analyzed here. A portion of the public comments received during the Jenny Creek scoping are considered applicable to this effort. The issues and concerns raised were considered in formulation of alternatives (Chapter 2), analysis of the alternatives (Chapter 3) and development of mitigation measures. Issue statements are paraphrased below and responses are provided as follows:

Issue: *High road densities in the area impact the hydrologic functions. Do not build new roads. Close and gate roads, especially off road vehicle routes, to reduce open road density.*

Response: The Thin Sheep Forest Health Treatments EA is tiered to the KFRA ROD/RMP which addresses and analyzes in detail: road use, construction, specifications and associated impacts (Appendix D, pages D13-D21). Page 46 (Table 24.1) of the 2005 Klamath Falls Resource Area Annual Program and Monitoring Report summarizes the road and transportation management progress in the KFRA since 1995 when the RMP was signed. There has been a net decrease in permanent existing roads and open roads in the KFRA since 1995 resulting in beneficial effects to wildlife and hydrological resources. Fewer total roads and fewer open roads generally result in decreased potential for sediment to be delivered to streams, decreased potential for water quality to be degraded, and decreased potential for wildlife to be disturbed. This proposed action is designed to further reduce the amount of existing open roads. The new construction of approximately 0.1 mile of permanent road is needed in order to close and fully decommission approximately 0.3 mile of an existing road. An additional 1.2 miles of road would be blocked to provide year-around closure.

Issue: *There is a great need for small diameter and pre-commercial thinning to open up overstocked stands, and reduce the opportunity for stand replacing wildfire to occur.*

Response: The BLM agrees that there is a need for small diameter products, and precommercial thinning is needed to reduce overstocked stands, improve forest health, and reduce the risk of stand replacing wildfires (See page 1 of EA, Proposed Action). As a result of this need, the KFRA has for a number of years been incorporating a number of specifications into their Timber Sale and Fuel Reduction contracts, and now in Stewardship Contracts to reduce stocking and fuel hazards. Proposed treatment areas are reviewed on a stand by stand basis to determine the best method to address the small diameter material. To address this issue, the KFRA has been implementing the following:

1. In a number of timber sale contracts (CHEW, Kakapo, Frosty One, Too Frosty, Muddy Tom, Grenada East, and Clover Hookup) the KFRA required the thinning and removal of trees 3"-7" DBH, concurrent with commercial density management thinning. The benefit of this specification in a timber sale contract is that it results in a single entry of mechanical equipment with the capacity to deal with this material. In addition to the thinning and removal of this material, the KFRA has required chipping or grinding of this small diameter material which is primarily destined for biomass and energy production.
2. A second method for addressing small diameter material has been the use of a slashbuster. The slashbuster has been able to not only thin 1"-6" DBH trees, but also masticate (grind up) coarse woody debris that has resulted from on-going mortality. The coarse woody debris that is ground up is that material above the Northwest Forest Plan and KFRA RMP standards for retention

(Appendix B). One benefit of the slash busting is that it can prepare the stand for a light intensity underburn to further reduce fuel loading and stand replacing fire risk.

3. Presently, the primary focus of stewardship contract treatments in forested stands is to treat small diameter stands. The objective is to not only thin the trees but remove the material as well so as not to contribute to the surface fuel loading. The Stewardship Contractor is working to develop a market for the biomass that the small diameter tree generates.
4. A final method that the KFRA has used to treat small diameter stands is by applying prescribed fire with low intensity underburns. Successfully meeting the numerous objectives is dependent upon multiple variables including implementing the burn within the right burning window to avoid excessive mortality. The KFRA has determined that in many cases, pretreatment of the overstocked stands is necessary before prescribed fire/ underburning can be used. That is why numerous timber sale EAs including the Thin Sheep EA addresses an array of treatments including; commercial timber harvesting, slash busting, prescribe fire, and submerchantable thinning.

For the Thin Sheep EA (page 1), the proposal does include implementing an array of these treatments to meet the overall objective of reducing fuel loading and the risk of a stand replacing fire.

Issue: *The coniferous forest mature/old-growth habitat component is being depleted at a rate that is likely irreplaceable over time.*

Response: The Thin Sheep EA proposes to implement a Density Management prescription with one of the objectives being to retain late successional stand attributes and structure through uneven-aged management. (See Desired Future Conditions and RMP Objectives, pages 2-3 of this EA). This prescription, the most common prescription used in the KFRA, meets the multiple purposes, needs, and objectives stated in EA (pages 2-3) while still addressing the issue of retaining mature/old-growth habitat. Figure 2 below reveals that most of the trees in the larger diameter classes are to be retained.

In addition, the Northwest Forest Plan Record of Decision (NWFP ROD) addressed the issue of mature/old-growth habitat from the much larger scale (approximately 24,400,000 acres). Approximately 80% of the Northwest Forest Plan area (See page A-5 of the NWFP ROD) is in some form of reserve with one of its primary objectives to retain mature/old-growth habitat. The Matrix portion (approximately 16%) of the Northwest Forest Plan was allocated for multiple resources including "timber harvest and other silvicultural activities" (See Page C-39 of NWFP ROD). The Thin Sheep Timber Sale and subsequent forest health treatment will occur primarily on Matrix lands (See Table 2 of EA), thereby complying with the NWFP ROD and KFRA RMP.

Issue: *There is an increased amount of early seral vegetation due to increased harvesting on private lands and decreased forest health and wildlife habitat from the exclusion of natural fire processes. Protect sensitive plants and late successional forest ecosystems.*

Response: The Thin Sheep Forest Health Treatment EA addresses all of the above issues. It is anticipated that only limited amounts of early seral vegetation will result from the Thin Sheep Timber Sale. This would occur primarily in the laminated root rot areas where the proposal is to remove the susceptible species; Douglas-fir and white fir (page 7 of EA). A basal area retention of 40 to 80 square feet per acre will still occur providing some older forest stand structure components. The KFRA is addressing forest health issues on BLM lands (See response above regarding small tree thinning). The BLM has no jurisdiction on private lands. The Oregon Forest Practices Act addresses management of private forest lands regarding forest health. Although the KFRA does suppress wildfires on BLM lands, it does have an aggressive prescribed fire / underburning program to reintroduce fire under controlled conditions into forested stands where fire occurred under natural processes. The Thin Sheep EA addresses sensitive plants including threatened and endangered species dependent upon late successional forest ecosystems in the EA (pages 12-22).

Issue: *Protect sensitive animal species and restore aquatic/fish habitat.*

Response: Surveys were conducted for Special Status Species and Project Design Features (Appendix B) have been incorporated into the project proposal to protect and maintain special status species and their habitat. The proposed project has one known great grey owl nest site. The nest site is protected with a 0.25 mile "no harvest" buffer, and the adjacent meadow habitat within the proposed sale area is protected with a 300 foot "no harvest" buffer (Appendix B). One northern goshawk nest is located within the proposed sale area. The nest site is buffered and there is a seasonal restriction on operations during the nesting period. Consultation was conducted with U.S. Fish and Wildlife Service (FWS) on the northern spotted owl. Although no spotted owl nest sites occur there is habitat classified as suitable habitat. The determination made by the BLM was that the proposed project "May Affect, but Not Likely Adversely Affect" northern spotted owls. The FWS concurred with this determination (1-10-06-I-0145). There is also a stipulation in timber sale contracts issued by the BLM (E-4 clause) that allows modifications to occur to the contract if and when a special status species is located during implementation of the project. Surveys were also conducted for both aquatic and terrestrial Survey and Manage mollusks. No Survey and Manage mollusks were found, therefore, no special protections were needed. Overall, the proposed project is designed to provide and protect special status wildlife by maintaining a multi-story structure of green trees (to provide nesting, foraging, and cover), provide snags, coarse woody debris (CWD), and a diversity of understory species (Appendix B).

The perennial streams within the project are buffered with a riparian reserve (Appendix B). The project does propose commercial thinning of 15 acres and an additional 50 acres of treatments of the riparian reserve to reduce the stand density and improve the resiliency of the remaining trees (EA, page 1). These proposed treatments are designed to meet the Aquatic Conservation Strategy, reduced risk of future high intensity fires as well as insect infestations, and reduce sediment input to streams from natural disturbances and management actions (EA, page 3).

Issue: *Reduce/eliminate livestock grazing. Exclude grazing in riparian areas.*

Response: The current level of livestock grazing has no measurable effect on timber or soil resources on public lands within the project area. Current monitoring information and Rangeland Health Standards Assessments that have been completed for the Dixie and Buck Mountain Allotments show that present levels of livestock grazing on public lands are appropriate to meet all five standards for Rangeland Health, including vegetative and soil resources. The KFRA ROD/RMP recognizes and provides for livestock grazing as a legitimate use of the public lands (page 62 and Appendix H). Most of the grazing use in the area is made on the intermingled, predominantly private lands in the lower elevations along Sheepy and Johnson Creeks to the east. These private lands are owned and leased for cattle grazing by U. S. Timberlands/Inland Fiber and are, therefore, not subject to management by the BLM.

Issue: *Use caution in implementation of fuels treatments.*

Response: Proposed treatments include several fuels reduction treatments that when used together will minimize activity-generated fuels and reduce fire severity and risks. Treatments include: removing tops and attached limbs of harvested trees to landings, lopping and scattering residual slash accumulations to break up fuel concentrations and arrangements, piling some slash concentrations for later chipping or burning, and finally, after harvesting is completed, concentrations of fuels such as slash, brush and small trees (ladder fuels) will be masticated (slash busted). Slashbusting will be used to reduce the flammability of accumulated fuels including any slash generated by timber harvest. The overall effect of the proposed action is expected to modify the present fuel condition class to closely resemble historic conditions thereby decreasing wildfire severity and risk and benefiting multiple resources.

Management Direction and Conformance with Existing Plans

This Environmental Assessment (EA) is tiered to the Klamath Falls Resource Area Resource Management Plan and Final Environmental Impact Statement (RMP/FEIS, September 1994) and Record of Decision (ROD, June 2, 1995). Management direction and recommendations for project design and implementation is contained in the RMP and a number of supporting documents listed below:

- Klamath Falls Resource Area Integrated Weed Control Plan EA (July 21, 1993).
- Range Reform FEIS (August 1995).
- Final Environmental Impact Statement, Vegetation Treatment on BLM Lands in Thirteen Western States (1991).
- 2004 Record of Decision Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Plans for Nineteen National Forests Within the Range of the Range of the Northern Spotted Owl – Decision to Clarify Provisions Relating to the Aquatic Conservation Strategy.
- 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the range of the Northern Spotted Owl.
- The Jenny Creek Watershed Analysis - Completed in October of 1994 provides both historic and current information on the different resources in the watershed and also provides a number of recommendations for resource protection and restoration opportunities.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

Two alternatives analyzed in this environmental assessment are described below.

Proposed Action

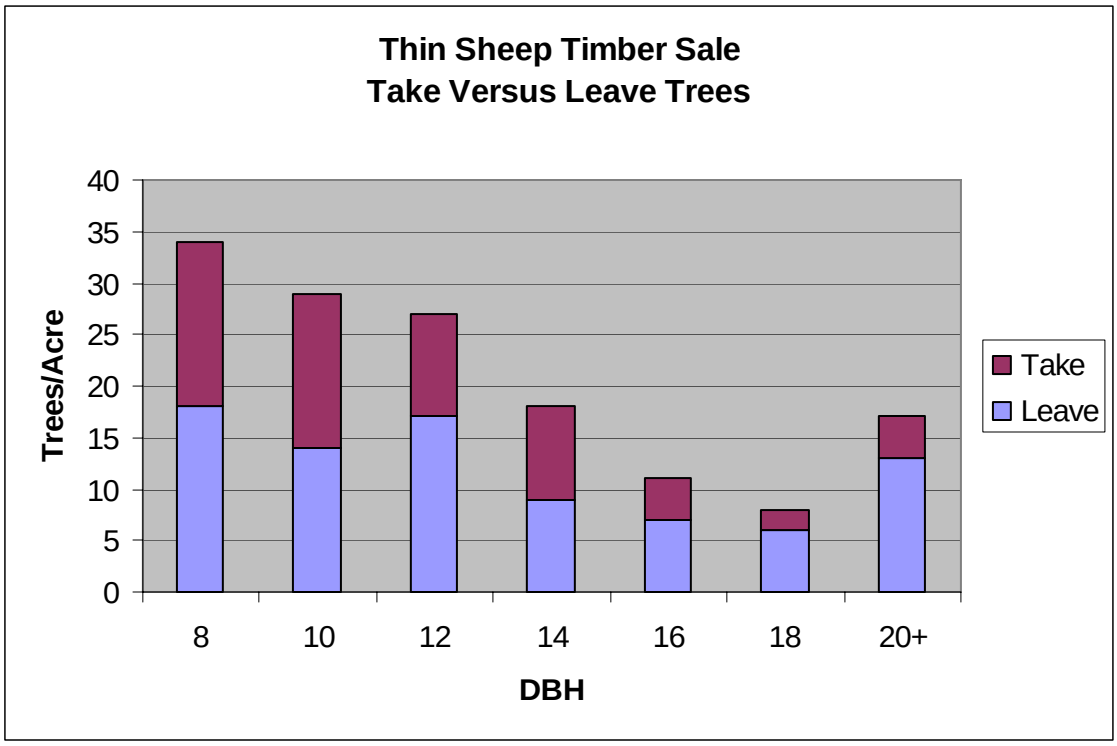
The Proposed Action is designed to meet the purpose and need of the EA by improving the health of forested stands and reduce fuel hazard conditions. Table 2 shows the specific design of the Proposed Action. A description of these actions is as follows:

Westside Matrix Forest Lands

Density Management/Variable Density – Commercial Thinning would occur on approximately 700 acres and precommercial thinning (mechanical and hand treatment) would occur on up to 200 acres of westside matrix lands. This type of harvest would be designed to maintain an uneven-aged, multi-strata stand structure and reduce competition and stress to remaining trees (RMP/ROD, Page 56). Generally, a variable density ranging from 40 to 160 square feet of basal area per acre will be retained in the Density Management Units, with the average being 80 to 120 square feet of basal area per acre. Figure 2 below illustrates the approximate stand composition (trees per acre) of various size classes that would remain after treatment (leave trees). Approximately 2.4 snags per acre will be retained with a minimum diameter at breast height (DBH) of 16", or largest available if less than 16" (RMP/ROD, Page 26-27). Approximately one hundred and twenty (120) linear feet of down logs per acre will be retained. Logs shall be greater than or equal to sixteen (16) inches in diameter and sixteen (16) feet long (RMP/ROD, Page 22).

Approximately 10 to 12 acres of laminated root rot *(Phellinus werii)* has been identified within the density management treatment area. A variable density thinning prescription would be implemented in the diseased areas to favor more disease resistant species; incense cedar and pines. This would result in retention of 40 to 80 square feet of basal area per acre in the diseased areas (approximately 20-40 resistant trees per acre). These areas would be replanted upon completion of harvesting with resistant species in understocked locations.

Figure 2 – Proposed Stand Composition (trees/acre) by Diameter Class after Treatment



Riparian Reserves

Approximately 15 acres of commercial Density Management (thinning) would occur in Riparian Reserves. Cutting would be done by hand and/or mechanically. The objective is to reduce the stand density in the Riparian Reserve and improve the resiliency of the remaining trees. The residual debris would be slashbusted, hand piled and burned, or under burned with a low intensity prescribed fire. Up to 50 acres of riparian/aspen restoration and thinning would occur. This would be accomplished using a combination of prescribed fire, hand falling, and/or mechanical harvesting. Any mechanical harvesting in the riparian/aspen restoration area would occur on top of at least 20" of snow.

Volume Harvested

In the Matrix, up to 3.5 million board feet (3.5 MMBF) of timber would be harvested in the proposed analysis area. In the Riparian Reserve, up to 100 thousand board feet (0.1 MMBF) of timber would be harvested. Appendix B of this EA includes the harvest prescription, project design features, and best management practices for treatment of forested areas.

Fuels Treatment

Upon completion of the Density Management Thinning, the project area will be reviewed to determine what single or combination of treatments will be implemented to further reduce fuels. The proposed treatments include; slash busting, hand piling and burning, and/or use of a low intensity under burn with prescribed fire to further reduce fuel hazards. This treatment will occur in both the Matrix and Riparian Reserve allocations.

Roads and Transportation System

- Approximately 0.1 miles of new road would be constructed.
- Approximately 0.1 miles of road would receive additional surface rock (road improvement).
- Approximately 8.5 miles of road would be brushed, and graded, and the ditches and culverts cleaned (road renovation).

- Approximately 4 year-around road blocks would be installed on spur roads to reduce open road by 1.2 miles.
- The Pokegama area seasonal road closure from November 20th to March 31st would continue (Refer to Table 2).

Best Management Practices (BMPs) described in Appendix D of the RMP and additional Project Design Features (PDFs) specific to the above described activities listed in Appendix B of this analysis will be implemented as part of the Proposed Action. Both the BMPs and PDFs are designed to minimize adverse effects on the natural and human environment, including: vegetation, soils, roads, wildlife, hydrology, cultural, visual, and recreation resources.

Table 2: Detailed Description of the Proposed Action

Project Element	Units Proposed
Westside Matrix Forest Lands	
Silvicultural Prescription Density Management (commercial thinning) Density Management (precommercial)	 DM – up to 700 acres DM-PCT – up to 200 acres
Fuel Reduction (Post Harvest) Slash Busting/ Prescribed Fire/Hand piling	 Up to 900 acres
Riparian Reserves	
Density Management (commercial thinning)	Up to 15 acres
Riparian/Aspen Restoration (combination of mechanical harvesting, slashbusting, and prescribe fire)	Up to 50 acres
Road Treatments and Transportation Management	
New Road Construction	Approximately 0.1 miles
Road improvement (resurfacing)	Approximately 0.1 miles
Renovation (grading & brushing – road maintenance)	Approximately 8.5 miles
Road closures (Blocking)	Approximately 1.2 miles
Road Obliteration	Approximately 0.3 miles
Maintain existing Pokegama Road Closure from November 20th – March 31st.	As existing
Volume	
Density Management (commercial thinning)	Up to 3.5 MMBF
Riparian Reserve Harvest	Up to 0.1 MMBF

No Action Alternative

The National Environmental Policy Act (NEPA) requires analysis of a No Action alternative. This alternative proposes no new management activities in the project area. Activities proposed in and adjacent to the analysis area and analyzed in other NEPA documents would still occur such as fuel reduction treatments, routine road maintenance, Pokegama seasonal road closure, forest inventory and surveys, and fire suppression. The selection of the No Action alternative would not change land allocations or the direction that the BLM has to manage these lands as Matrix. These lands will likely be considered for similar management in the future with or without the current proposed action.

Other Alternatives Considered But Dropped From Analysis

Fuels Treatment Only Alternative

An alternative was considered that would have only analyzed effects of fuels treatments in the Thin Sheep analysis area. This alternative would not fully meet the land use plan objectives or the purposes and

needs for the proposed action; primarily the need to produce a sustainable supply of timber and other forest commodities to support local and regional timber-related businesses.

Restoration Treatments Only Alternative

Another alternative considered was one that would analyze effects of implementing only the restoration treatments from the Proposed Action, primarily hazardous fuel reduction treatments (slash busting and prescribed burning) in the Matrix and Riparian Reserves with no commercial harvest. This alternative was dropped from further analysis based on the understanding that environmental effects of implementing restoration treatments will be sufficiently discussed in the Proposed Action. Additionally, the determination was made that a "Restoration Treatments Only" alternative would not fully meet the land use plan objectives or the purpose and need for the proposed action.

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter summarizes the physical, biological, and socioeconomic environment of the Thin Sheep Forest Health Treatments area and the consequences of the proposed actions. A detailed discussion on the affected environment and environmental consequences can also be found in the Klamath Falls Resource Area RMP/ROD and FEIS (pages 3-3 to 3-79) and the Jenny Creek Watershed Analysis (pg 5 - 112).

The affected environment reflects the existing condition that has developed from all past natural events and management actions within the project area (and/or 5th field watershed). It is a combination of natural and human caused fires, fire suppression, road building, timber harvesting, grazing, fuel reduction treatments, and the effects of recreational use. The current condition assessed for each affected resource is a result of all past natural events and management actions. It is therefore unnecessary to individually catalog all past actions in this EA. Such detail would be irrelevant to making a rational decision among alternatives. The important value of this EA is to assess and display for the deciding official the impacts of the alternatives on those resources as they exist today, to allow a determination if the resulting project effects and/or cumulative effects are either significant or are greater than those analyzed in the RMP EIS.

Resource values that are either not present in the project area, or would not be affected by any of the proposed alternatives are: floodplains, wilderness study areas (WSAs), areas of critical environmental concern (ACECs), research natural areas (RNAs), paleontological resources, prime or unique farmlands, wild and scenic rivers, lands, air quality, and minerals. There are no known hazardous waste sites in the analysis area. Minority and low income populations are considered. The RMP does not identify any energy sources in the vicinity.

Project/Analysis Area

This section is to clarify the Project Area and the different landscape scales that were used for analysis. As Figure 1 and Maps 1 & 2 (Appendix C) show, the proposed treatment units are interspersed amongst private lands and are spread apart six (6) miles. The Project Area includes the exterior boundary of the treatment area as shown on the Location Map (Figure 1). In describing the affected environment and environmental consequences, analysis was generally discussed at two different landscape scales. One scale, most frequently referred to as the analysis area, is the environment within or adjacent to the immediate vicinity of the Project Area. The other scale that is often used is the 5th field watershed scale (See Figure 1 – Blue outline of Jenny Creek 5th Field Watershed). This includes all lands, private and agency lands, that fall within a 5th field watershed. When describing cumulative impacts to hydrology, vegetation, and wildlife, the 5th field watershed, as well as the local project area, are used.

Design of This Chapter

This Chapter is designed to first describe the affected environment of a particular resource in its existing condition. There is then a discussion on the Environmental Consequences of each alternative. The No Action alternative is discussed first and includes a discussion of cumulative impacts anticipated regardless of implementing the Thin Sheep Forest Health Treatments and fuel reduction treatments. A number of other treatments (see below) are proposed in the 5th field watershed and are analyzed as part of the impacts.

Cumulative Actions Considered

Timber management in the last decade on BLM land has included approximately 1,300 acres of thinning and three to four million board feet (MMBF) of salvage in the watershed and similar treatments are expected. Stands throughout the Matrix allocation are expected to be selectively harvested approximately every 20 to 30 years, according to Klamath Falls Resource Area plans. Current timber management on the surrounding private land is more intensive and occurs on a larger scale. This management regime is expected to continue in the future. On many private lands, it is anticipated that residual vegetation will be reflective of early seral conditions and will meet pertinent state laws governing forest management practices. Table 3 lists treatments proposed for the foreseeable future on BLM lands in the watershed that will be considered in the following resource-specific cumulative impact discussions.

Table 3: Additional Treatments Currently Proposed on BLM lands within the Jenny Creek 5th Field Watershed

Treatment	Approximate Volume	Approximate Acres	Anticipated Year
Baldy Salvage Timber Sale	0.5MMBF	100	2006
Fuels treatments	None	4000	2006-2010

Vegetation - Affected Environment

Upland Forest

Forests occurring in the proposed treatment area can be generally described as multi-aged, multiple canopy forested stands of ponderosa pine, Douglas fir, sugar pine, incense cedar, and white fir. Many of the stands have been selectively cut in the past leaving an array of trees sizes and ages. Tree sizes range from 1"DBH to over 30"DBH. Tree ages range from one to over 200 years old. From the 1950's through the 1990's, most of these stands were entered once or more for selective thinning and overstory removals. There are some stands within the project area where most of the larger and older overstory trees have been harvested and the residual stands consist primarily of dense stands of small pole-sized and second growth timber ranging in diameter from 8"to 20" in diameter.

All BLM-administered lands within the proposed project area have been classified as being in Fire Regime 1, Condition Class III. In Condition Class III, fire regimes have been substantially altered from their natural (historical) range. The risk of losing key ecosystem components is high. Fire frequencies have departed from natural frequencies by multiple return intervals. Dramatic changes occur to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been substantially altered from their natural (historical) range. Forested areas within this condition are classified as most vulnerable to losing key ecosystem components due to wildfire. The primary stand characteristics for this classification are a high proportion of closed mid-seral stands and the high vulnerability to stand replacing wildfire due to existing fuel loads and densely stocked trees. Some slash busting and hand piling has been done in the project area (Sections 7, 29, and 31), to reduce fuel loads. Additional low intensity underburn treatments would be beneficial in reducing ladder fuels, surface fuels, and increasing crown height and spacing. In addition to the fire risk, existing overcrowded stand conditions and competition for limited moisture continues to affect the individual tree resiliency in these stands. Crowded growing conditions stress the trees, suppress growth, and increase vulnerability to insect mortality.

Western pine beetle and fir engraver beetle, present in the forested stands of the proposed project area, can infest and kill different species of pine and white fir. Small (less than one acre) patches of ponderosa pine have been killed and are currently being attacked by bark beetles. In addition, on-going mortality from fir engraver beetles throughout all white fir stands is occurring.

Approximately 10 to12 acres of laminated root rot (*Phellinus werii*) were discovered in Section 31. This unit is proposed for treatment using a density management prescription. The usual prescription for treating root rot consists of patch cuts to remove susceptible trees. However, due to the current stand composition of desirable species that are resistant to root rot (incense cedar, ponderosa pine, sugar pine, etc.), a variable density thinning prescription can be applied and a greater basal area and crown cover can be maintained. Approximately 20 to 40 trees per acre would be left after selective removal of susceptible species (Douglas fir and white fir) in the root rot affected area. Upon completion the thinning, the understocked areas would be replanted with resistant species beneath the residual overstory.

Plant communities in the EA analysis area are generally within those plant associations described by Hopkins (1979) for the Klamath Ranger District, Winema National Forest or by Atzet and McCrimmon (1990) for the Southern Oregon Cascade Mountain Province. For a complete list of these plant associations, along with a detailed description of other plant communities within the EA analysis area, reference pages 17-22 in the Jenny Creek watershed Analysis.

Special Status Plant Species (Survey and Manage, Bureau Sensitive, Assessment, and Tracking)

Vascular Plants

All BLM lands within the analysis area have been surveyed for special status vascular plant species. The area west of Parker Mountain in Section 7 was surveyed in 1996. The other areas in the analysis area were surveyed in 2004. One site of the mountain lady slipper orchid (*Cypripedium montanum*), a Bureau tracking and Category C Survey and Manage species, was documented in Section 17.

Nonvascular Plants

Surveys of proposed sale areas in Sections 17, 21, and 29 for special status fungi species were conducted in May 2005. No special status fungi species were found. Under the 2001 Survey and Manage ROD and subsequent Annual Species Reviews the Klamath Falls Resource Area does not have any species that require pre-disturbance surveys. The surveys done in the proposed sale area meet both the 2001 ROD and the special status species requirements. Surveys were conducted in May 2006 for *Tritomaria exsectiformis*, a Category B bryophyte species. See the compliance table in Appendix D for more information.

Noxious Weeds

All BLM lands within the analysis area have been surveyed for noxious weeds. The area west of Parker Mountain in Section 7 was surveyed in 1996. The other areas in the analysis area were surveyed in 2004. One population of St. John's wort (*Hypericum perforatum*) has been documented in Section 31 within the project area. This site has been monitored and treated annually, as needed, since it was discovered. A population of tansy ragwort (*Senecio jacobaea*) was previously known from Section 7 west of Parker Mountain. This population was treated annually, and recent inspections of the site have found no plants. Bull thistle (*Cirsium vulgare*) and mullein (*Verbascum thapsis*) were also noted in the area associated with soil disturbance.

Vegetation - Environmental Consequences

Upland Forest

No Action

This alternative would result in no immediate timber harvesting in the Project Area. An EA (#OR-014-02-03) was completed in 2002 which analyzed the effects of fuel treatments on the westside (including the project area). A combination of slash busting and prescribed burning would likely occur in the project

area within the next five (5) years, resulting in some fuel reduction. However, overstocked trees in the 8 to 20 inch diameter range (See Figure 2) are too large for slashbusting and would not be consumed in a low-intensity underburn prescription. Fire intensity sufficient to consume trees of this size would likely kill all trees in the stand and would be difficult to contain. Trees killed by fire but not removed will further increase the fuel loading when they fall down. Hand cutting and removal of live or dead trees would be cost prohibitive. Without some means to thin these trees, fuels treatments are not expected to be fully effective in reducing potential fire severity, creating a more resilient ecological condition, or initiating the increased growth response that results from thinning forested stands. Given the current successional trajectory, continued tree mortality from insects, disease, and competition for water and nutrients would occur. The resulting accumulation of dead material would create higher fuel loads and continued susceptibility to higher intensity wildfires.

Cumulative Effects of No Action

At the 5th field watershed scale, the greatest change in vegetation would likely occur on private lands. Industrial forest management objectives normally result in shorter rotations and generally a higher percentage of early seral habitat. Oregon Forest Practices law requires prompt reforestation which results in primarily ponderosa pine plantations fully stocked within five years. On BLM lands, vegetation changes at the watershed scale would be relatively indiscernible. Canopy closure from the dominant and co-dominant trees would be retained. Snag recruitment would continue. Most of the change would occur to the vegetation and residual slash near or on the ground from the proposed slash busting and underburning.

Proposed Action

Density Management thinning in combination with follow-up fuel reduction treatments (slash busting & light intensity under burn) as proposed, would continue to maintain connectivity and late successional habitat over time by retaining a high percentage of the healthier older/larger trees. The thinning would increase resiliency of the remaining trees by reducing the competition for limited resources, restore desired species composition to that describe in the RMP (page E-10), and also reduce the risk of stand replacement fire. Canopy closure in the more densely stocked stands would be reduced, but it is estimated that 50 percent or more of the existing canopy closure would be retained after treatment. Some larger (20+ inches DBH) trees would be harvested; however, most of the late seral structure and function would be maintained. The RMP directs that all size classes be managed. The silvicultural prescription directs culturing around high value, large old growth trees, particularly, older pines. The KFRA has, for a number of years, thinned around these high value trees to improve vigor. In many cases, the trees marked for cutting around these large, old trees are the more shade-tolerant white fir and range in diameter from 8” to 20” DBH. Therefore, a diameter limit is rarely used in prescriptions.

Monitoring of Northern spotted owl density and telemetry studies in the KFRA indicate post harvested stands are continuing to be utilized by the owls. Effects from previously harvested sales on this side of the resource area have been monitored and reveal that in many post harvested stands, sufficient late seral habitat still remains to provide connectivity habitat and sustain species dependent on these habitat components as documented in the KFRA Annual Program Summary and Monitoring Reports published over the last five years (BLM, 1999-2005).

Forest health would be improved in the treated areas resulting in a decreased risk of mortality due to disease, insects, wildfire, and competition. The proposed variable density thinning of the root rot affected stands would help to curtail the spread of root rot by removing susceptible species and retaining resistant species. Effects to forest vegetation from implementation of this alternative would not exceed those analyzed in the KFRA FEIS.

The follow-up proposed fuel reduction treatments are designed to reduce the Condition Class to a Level II. The risk of a stand replacing fire would be reduced, thereby providing a greater assurance of maintaining desired habitat. The stand structure and species composition will be more similar to the California Mixed Conifer Potential Natural Vegetation Group.

Timber harvest treatments would be designed to primarily reduce stand densities. The density management thinning proposed is designed to maintain the structural and functional late-successional characteristics. As a result, the proposed treatments are expected to have little to no reduction of late-successional habitat within the area.

Assessment of 15% Standard and Guide
The Northwest Forest Plan and the KFRA RMP state federal agencies must retain on federal lands a minimum of 15 percent of the late successional forests within a fifth field watershed (RMP page 23). Guidance from the Regional Ecosystem Office (Feb. 3, 1998) indicates that the 15 percent standard and guide applies only to commercial forest lands. The proposed treatments will meet this criterion.

Cumulative Effects of Proposed Action
In the last decade, since the signing of the RMP in June of 1995, the KFRA has thinned, using a density management prescription, approximately 3,500 acres north of Highway 66. Approximately 1,300 acres has been treated in the Jenny Creek 5th field watershed. There has also been approximately three to four million board feet of salvage in this area. The general prescription has been to harvest approximately 30-35% of the basal area in the stand consisting primarily of the understory, poorer growing, suppressed, and intermediate trees with a lower percentage of co-dominant and dominant trees as Figure 2 reveals. The effects of these harvest treatments have been monitored and are documented in the Annual Program Summary and Monitoring Reports (BLM 1999-2005). In summary, the desired future conditions stated above have been met both at the project level and the landscape level. Monitoring has indicated that fire severity has been reduced on treated areas.

The effect of the Proposed Action, combined with future actions on federal and private lands, would result in no change in age or seral classification of stands on BLM lands within the watershed. Generally, the seral classification of BLM lands would remain as mid to late seral as the existing structural and functional composition of the stands would continue after treatment. As stated above, the greatest change in vegetation would likely occur on private lands with an increased percentage of early seral habitat.

Special Status Plant Species (Survey and Manage, Bureau Sensitive, Assessment, and Tracking)

No Action
No new ground disturbing activities are proposed, therefore, direct impacts from project activities to special status plants would occur only as described in other NEPA documents.

Proposed Action
The proposed unit boundary in Section 7 was modified to exclude a mountain lady slipper orchid site. No other populations of special status plant species were detected during pre-project surveys. Therefore, no impacts to this population are expected.

Cumulative Effects
At the project level, no cumulative effects to special status plant species are expected from either alternative because the one known site will be avoided. At the watershed level, the cumulative actions (thinning and prescribed fire) may indirectly have a positive affect on some species by creating habitat to which these species may be adapted. Neither alternative would cause cumulative effects on nonvascular cryptogams because no sites were found. Existing reserves, best management practices, and continued monitoring of known sites on the Klamath Falls Resource Area will help maintain the habitat for these species.

Noxious Weeds

No Action
Although the activities described in the proposed action would not occur, effects resulting from other proposed activities (including fuel treatments, road maintenance, etc.) would occur as described in NEPA

documents pertinent to those projects. These actions would result in some ground disturbance, creating conditions that favor the invasion of noxious weeds from outside the project area and contributing to the spread of noxious weed populations already present within the project area. BMPs and PDFs similar to those described for the Proposed Action would be implemented for any BLM project and would serve to reduce the potential for these impacts. A notable exception would occur in the event of a large-scale, high intensity wildfire. Under such circumstances, there may not be time to implement certain precautions to avoid spreading weed seeds (washing machinery before entering an area, etc.) and large areas may be stripped of vegetation creating a suitable environment for weed establishment.

Proposed Action

The use of the mechanical equipment may create the disturbed conditions under which many noxious weeds have a competitive advantage. Some temporary increase in the abundance of bull thistle and mullein may occur in the most disturbed areas. However, these species tend to decrease in abundance without continued physical disturbance and, therefore, are not targeted for active control actions within the resource area. The vehicles and machinery entering the project area to implement these treatments would increase the potential for the introduction of noxious weeds into the area from sources outside the project area.

Project Design Features to prevent the introduction of noxious weed seeds and plant parts into the project area would be implemented. Measures which have been shown to reduce or prevent the spread of noxious weeds include: washing vehicles and equipment before beginning work on the project, flagging and avoidance of known populations and/or mowing noxious weed plants to the ground, and washing vehicles before leaving areas containing noxious weeds (See Appendix B). It is assumed that cleaning the equipment will not remove 100% of the noxious weed seed, but the inclusion of the proposed design features into project operations would be consistent with Bureau Manual policy and Executive Order, would have a high probability of preventing, controlling, or reducing the spread of noxious weeds on BLM lands, and would prove to be a prudent step to take in reducing the need for costly weed eradication in the future.

Cumulative Effects

The cumulative effects of past, present and, future treatments in the watershed include disturbance of the soil and existing vegetation and increased potential for the introduction and spread of noxious weeds, whether or not the Proposed Action is implemented. The potential cumulative effect of any combination of treatments would likely result in an increase in the number of noxious weeds species and the areas occupied by noxious weed species. However, since the KFRA has developed and implemented PDFs and BMPs for weed prevention and soil protection, these measures have been demonstrated to be effective in reducing the introduction and spread of weeds. These measures (Appendix B) will continue to be implemented; therefore, noxious weeds are not expected to increase in distribution from the implementation of planned activities. Unplanned actions (i.e., large-scale, high intensity wildfire) could increase weed distribution.

Terrestrial Wildlife Species – Affected Environment

This section focuses on the wildlife species that are considered special status species and would potentially be affected by management activities. Included are those species listed under the Endangered Species Act (ESA - listed, proposed and candidate species), those listed under the BLM special status species policy and considered to be Bureau Sensitive or Bureau Assessment species, those Survey and Manage species listed under the 2001 SEIS and subsequent 2003 Annual Species Review, and landbirds listed on the U.S. Fish and Wildlife's "Birds of Conservation Concern 2002". All of these species will be considered in this EA process. For a list of other species and a description of their habitat that may occur in the proposed project area, refer to the Klamath Falls Resource Area FEIS (pages 3-37 to 3-41) and the Topsy Pokegama Landscape Analysis (pages 61-75).

Threatened and Endangered Species

The northern spotted owl (threatened) is the only species under the Endangered Species Act (ESA) that may be affected by the proposed project. The project area is entirely outside of northern spotted owl Critical Habitat designated by the USFWS. However, there is suitable foraging and dispersal habitat within the proposed project area that would be treated. All other ESA species considered for this EA are not present and would not be affected by the proposed project (Refer to Table 4). Those species not affected by the proposed project will not be addressed further in this document.

Table 4: ESA Listed, Proposed and Candidate Terrestrial Wildlife Species considered for this Analysis

Species	Scientific Name	Status	Designated Critical Habitat within project area	Species or habitat occur within the project area	May be affected by project
Canada Lynx	*Lynx canadensis*	Threatened	N/A	NO	NO
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	N/A	NO	NO
Northern Spotted Owl	*Strix occidenatlis caurina*	Threatened	NO	YES	YES
Pacific Fisher	*Martes pennanti pacifica*	Candidate	N/A	NO	NO
Yellow-Billed Cuckoo	*Coccyzus americanus*	Candidate	N/A	NO	NO
Oregon Spotted Frog	*Rana pretiosa*	Candidate	N/A	NO	NO
Mardon Skipper Butterfly	*Polites mardon*	Candidate	N/A	NO	NO
Species list derived from quarterly list issued by the U.S. Fish and Wildlife Service to the Klamath Falls BLM Office (2005).					

Northern Spotted Owl (*Strix occidenatlis caurina*) - Federally Threatened
No northern spotted owl individuals or nests have been discovered in or adjacent to the proposed project area. The closest known nest with a pair of owls is approximately 2.125 miles away from the edge of the analysis area. This territory (MSNO 2271) has been monitored/surveyed since 1994. In 2004, no adults were detected during surveys, however two fledglings were detected and one was banded. In 2005, one adult male was detected on May 12 and both the male and female were detected and determined to be non-nesting on May 20. In 2006, a male was detected on May 18 and May 30 near the 2004 nest site. As of late July of this year, nesting status was still unknown for this site.

The project area contains approximately 460 acres of suitable spotted owl nesting, roosting and foraging (NRF) habitat and 190 acres of the project is considered dispersal habitat (Table 5). No Designated Critical Habitat occurs within the project. Consultation with USFWS has been completed. Refer to the Consultation Section (Chapter 4) in this document. Refer also to Appendix E for a discussion of new information and findings for the northern spotted owl.

Mardon Skipper (*Polites mardon*) **–** Federal Candidate
The mardon skipper is a small non-migratory butterfly that is associated with meadows and grasslands. The adults feed on nectar producing herbaceous plants and the larvae feed on fescue (Potter, 2002). During summer of 2005, suitable habitat within the analysis area was surveyed for mardon skippers according to protocol (Potter, 2002). No mardon skippers were documented and this species will not be analyzed further in this document. In addition, no special status butterflies were documented during

surveys. In summer of 2006, the same meadows were revisited and no mardon skippers or special status butterflies were documented.

Table 5: Northern Spotted Owl NRF Habitat - Thin Sheep Timber Sale Units

Timber Sale Unit #	NRF Category 1 – Nesting Habitat	NRF Category 2 – Foraging Habitat	Dispersal Habitat	Acres
21-1	0	17	5	22
33-1	0	32	0	32
17-1	0	0	38	38
17-2	0	2	43	45
7-1	0	49	56	105
29-1	0	125	28	153
31-1	45	190	20	255
Total	45	415	190	650

Summary of Spotted Owl Suitable Habitat Components (RMP/EIS 1994 pp. 4-71 - 4-76)
Nesting, Roosting, and Foraging (NRF) Category 1 – Nesting Habitat: NRF Category 1 habitat is generally comprised of coniferous forests stands that satisfy the full complement of daily and annual needs of the owl for nesting, roosting and foraging. Canopy closure usually exceeds 70 percent.
NRF Category 2 – Foraging Habitat: NRF Category 2 habitat is generally comprised of coniferous forest stands that provide roosting and foraging opportunities for northern spotted owls, but may lack the necessary structure for consistent nesting or roosting. Canopy closure may not exceed 70 percent.
Dispersal Habitat – Dispersal Habitat generally consists of coniferous forest stands that permit movements of owls between nesting, roosting and foraging habitat. Canopy closure is generally at or above 40%.

Non-Listed Special Status Species (Survey and Manage, Bureau Sensitive and Bureau Assessment)

This EA will consider those species under the Special Status Species category of Survey and Manage that are listed as potentially occurring (S&M Protocol 2003) on the BLM Lakeview District, Klamath Falls Resource Area. This includes species from the 2001 SEIS and subsequent 2003 Annual Species Review.

Survey and Manage Species

Terrestrial Mollusks

Pre-disturbance terrestrial mollusk surveys were conducted for the proposed project. The following is a summary of habitats for the Survey and Manage Mollusks. The habitats are as described in the Survey Protocol for Survey and Manage Terrestrial Mollusk Species (2003) and Conservation Assessment for the Siskiyou Sideband (2005). Attached is a Survey and Manage compliance table for species status, protocol and survey information (Appendix D).

Siskiyou Sideband (*Monadenia chaceana*) – is a terrestrial snail usually found within 30 meters of rocky areas, talus deposits and in associated riparian areas. Areas of herbaceous vegetation in these rocky landscapes adjacent to forested habitats are preferred (S&M Protocol Ver. 3.0, 2003). It can, however, be associated with large wood in forested habitats where little rock is located (Conservation Assessment 2005).

Crater Lake Tightcoil (*Pristiloma arcticum crateris*) – is a terrestrial snail usually found in perennial wet situations in mature conifer forests, among rushes, mosses, and other surface vegetation or under rocks and woody debris within 10 meters of open water in wetlands, springs, seeps, and riparian areas, generally in areas which remain under snow for long periods in the winter (S&M Protocol Ver. 3.0, 2003).

Evening Field Slug (*Deroceras hesperium*) – is a terrestrial slug that has been reported to be associated with wet meadows in forested habitat in a variety of low vegetation, litter, debris and rocks. Surveys may be limited to moist surface vegetation and cover objects within 30 meters of perennial wetlands, springs, seeps, and riparian areas (S&M Protocol Ver. 3.0, 2003).

Aquatic Mollusks
Klamath Rim Pebblesnail (*Fluminicola* no. 3) – is found in small cold flows emanating from springs (Aquatic Mollusk Survey Protocol Ver 2.0, 1997).

Shasta Springs Pebblesnail (*Fluminicola* no. 16) – only occurs in springs and is usually found in the lower portions of larger springs among water cress mostly on pebbles and cobbles (Aquatic Mollusk Survey Protocol Ver 2.0, 1997).

All of these species were listed as Category B^4 (equivalent effort pre-disturbance surveys required) under the 2001 Survey and Manage ROD. Surveys were conducted in May 2006 in the Thin Sheep project area for these three terrestrial mollusk species as special status species. Surveys for the two aquatic mollusk species was conducted in June of 2006. They were conducted according to Survey and Manage Protocol (version 3.0 2003). No Survey and Manage mollusks were located during the surveys and therefore mollusks will not be analyzed further in this document. Refer to the Survey and Manage compliance table in Appendix D.

Great Gray Owl (*Strix nebulosa*)
Great gray owls forage in openings in forest stands or in meadow habitat adjacent to the forest edge, and generally use large broken top trees, as well as large platform nests (such as those constructed by red-tailed hawks, goshawk, ravens, etc.) for nesting structure. The great gray owl is considered rare or uncommon in Oregon, and is considered a Survey and Manage species under the Northwest Forest Plan. As such, surveys are required prior to any ground disturbing activities. Surveys for great gray owls according to the 2001 ROD protocol were conducted in 1999 and 2000 within the proposed project area. In 2005, units in the analysis area were once again surveyed for great gray owls. One active nest, with one juvenile was found. The timber harvest boundaries were adjusted to buffer the nest site. A 0.25 mile buffer was established around the nest tree and 300 ft meadow buffers were laid out adjacent to meadows on two sides of the nest stand in accordance with the 2001 Survey and Manage ROD (refer to the Survey and Manage compliance table in Appendix D).

Special Status Species (Bureau Sensitive and Bureau Assessment)
The BLM Special Status Species Policy designates special status species as Bureau Sensitive, Bureau Assessment, or Bureau Tracking. A brief description of these categories follows;
Bureau Sensitive – Generally these are species which are restricted in their range and have natural or human-caused threats to their survival.
Bureau Assessment – Species which are not presently eligible for official federal or state status but are of concern.
Bureau Tracking – This list is designed as an early warning system for species that may become threatened in the future.

It is the policy of BLM Districts to protect, manage, and conserve these species and their habitats such that any Bureau action will not contribute to the need to list any of these species. This EA will consider those Bureau Assessment and Bureau Sensitive Species that may be affected by the project. Bureau Tracking Species are not considered special status species for management purposes and will not be addressed in this EA.

Northern Goshawk (*Accipiter gentilis*) – Bureau Sensitive
Northern Goshawks are widely distributed in most forest types. The goshawk is generally associated with mature conifer stands and uses habitat similar to that of the northern spotted owl. The Klamath Falls Resource Area currently has 12 documented territories. Surveys, following the Survey Procedure for Northern Goshawk on National Forest Lands -1993 (USDA 2003), were conducted within the project boundaries in potential habitat in 2005. One active goshawk nest with two fledglings was documented within a Riparian Reserve buffer. This active nest site and another alternate goshawk nest that was found in the same unit will be protected with an appropriate buffer (RMP Page 38).

Flammulated Owl (*Otus flammeolus*) – Bureau Sensitive
The flammulated owl is a cavity nester highly associated with open ponderosa pine forests, but is also found in mixed conifer stands with ponderosa pine as a component (Marshall et al 2003). This is apparently due to the lepidopteran (moths and/or butterflies) prey species that are associated with this type of forest. This species is listed as Bureau Sensitive and considered rare on the Klamath Falls Resource Area with only one confirmed nest site and three general locations documented. No surveys have been conducted specifically for this species within the planning area. During systematic surveys for the great gray owl within the analysis area, no detections of the flammulated owl occurred.

White-headed (*Picoides albolavartus*) and **Black-Backed Woodpeckers** (*Picoides arcticus*) – Bureau Sensitive
The white-headed woodpecker is generally associated with ponderosa pine stands or mixed conifer stands with ponderosa pine as a dominant component and forage primarily on pine seeds and insects. They have been documented on BLM lands in the vicinity of the proposed action. Black-backed woodpeckers have been found in most types of mixed conifer stands, although rare on this Resource Area and across their range. Black-backed woodpeckers forage on insects, mostly on larvae of wood-boring beetles. They are generally found at higher densities in stands after a wildfire has occurred resulting in burned trees (snags) and associated beetles are abundant. Both species are associated with snags and need tree cavities for nesting. Both species could be present within the proposed project boundaries.

Bats - Townsend's Big-eared Bat (*Corynorhinus townsendii*) - Bureau Sensitive, Fringed Myotis (*Myotis thysanodes*) and Pallid Bat (*Antrozous pallidus pallidus*) - Bureau Assessment
Roosting habitat for Townsend's big-eared bats is typically associated with caves, old buildings, and rock structure (Verts and Carraway 1998). Surveys (Cross and Kerwin 1995) on the west-side of the resource area have documented the fringed myotis and pallid bats in similar habitat to that of the proposed project. Limited radio–tracking studies in southwestern Oregon have shown the fringed myotis to roost in trees, particularly snags (Cross and Walidien 1994a, 1995). The pallid bat was captured in areas that had large conifers, including ponderosa pines. Radio-tracking in Jackson County has shown that the species uses such trees for roost sites (Cross and Kerwin 1995). No Townsend's big-eared bats were located during this study. This species is highly associated with caves and old buildings and would be rare in areas without this roosting structure. There is a documented population in the Klamath River Canyon, approximately seven miles southeast of the project area. Because of the lack of suitable habitat in the proposed project area for the Townsend's big-eared bat, it will not be analyzed further.

Landbirds – Birds of Conservation Concern
For analysis purposes, the BLM considers those landbirds identified by the U.S. Fish and Wildlife Service (FWS) as bird species of concern in the most recent list, "Birds of Conservation Concern 2002" (USDI 2002). The only species considered for this analysis are those within the Birds of Conservation Region 5 (Northern Pacific Forests), which are found within the Resource Area and may be affected by the proposed action. Those species include the northern goshawk, white-headed woodpecker, flammulated owl, and olive-sided fly catcher. The goshawk, white-headed woodpecker and flammulated owl were discussed previously in the Bureau Special Status species section. The olive-sided flycatcher (a bureau tracking species) breeding habitat is associated with conifer forests often near streams, lakes, rivers, marshes, wet meadows or ponds (Marshall et al 2003).

Surveys for landbirds (primarily passerines) within the Topsy Pokegama Landscape Analysis area were conducted between 1998 and 2001. Although these surveys did not include this project area, they provide insight regarding use of similar habitats within potential treatment units. The habitat types that would be most directly affected by the proposed project include shrub habitats and the sapling/pole stages of forest habitats. Landbird species generally associated with these habitat types (based on Andehnan and Stock 1994; Saab and Rich 1997) that have been documented in the Topsy-Pokegama area are listed in Table 6. Other species associated with seedling/shrub and sapling/pole stages of coniferous forest that could occur

in the area, but have not been documented, include the common nighthawk, Calliope hummingbird, gray flycatcher, western bluebird, and mountain bluebird.

Table 6: Landbirds associated with seedling/shrub and sapling/pole habitats that have been documented in the project area and their population trends

Landbird Species	Population Trend	Seedling/Shrub Association	Sapling/Pole Association
American robin	Stable	X	X
Cassin's finch	Stable		X
Cassin's vireo	Uncertain		X
Chipping sparrow	Significant Decline		X
Dark-eyed junco	Moderate Decline	X	X
Dusky flycatcher	Uncertain	X	
Fox sparrow	Moderate Decline	X	
Green-tailed towhee	Stable	X	
Hermit thrush	Uncertain		X
House wren	Possible Increase	X	X
Nashville warbler	Possible Increase	X	
MacGillivray's warbler	Moderate Decline	X	X
Mourning dove	Moderate Decline		X
Olive-sided flycatcher	Significant Decline		X
Pine siskin	Significant Decline	X	X
Spotted towhee	Significant Increase	X	
Townsend's solitaire	Significant Increase	X	X
Western tanager	Uncertain		X
Western wood-pewee	Uncertain		X
Yellow-rumped warbler	Stable		X
Partners in Flight Handbook on Species Assessment & Prioritization, Panjabi, 2001			

Other Wildlife Species

Ungulates

Roosevelt elk (*Cervus elaphus*) use this area year-round, with much higher concentrations during the summer months. Elk populations have expanded in the area since the animals were first noted 20 years ago (KFRA APS – 2005, pages 103-104). Elk probably moved into the area partially in response to favorable forage to cover ratios that resulted from past and current logging practices. The Johnson Prairie area contains a fairly expansive meadow system which provides ample grass forage throughout much of the year. Lodgepole/riparian thickets within the project areas riparian reserves have been shown to be locally very important for elk calving.

Raptors

Several raptors (birds of prey) that are not considered special status species migrate through, and may nest within, the analysis area. Hawk species include the red-tailed (*Buteo jamaicensis*), Cooper's (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*). The Cooper's and sharp-shinned hawk are closely associated with coniferous forest but use riparian areas readily for hunting. One active Cooper's hawk nest was located during goshawk surveys in preparation for this analysis. The nest tree will be retained along with a small buffer (approximately one acre) of trees around the nests to protect the structure of the immediate nest stand during any proposed activity. Although, the RMP provides for buffers up to 15 acres for some management activities around known and future activity centers (KFRA ROD/RMP 1995 pp. 34), a buffer larger than one acre is not necessary to maintain habitat for the Cooper's hawk nest in this situation. Monitoring has shown that the proposed density management treatment around the buffer continues to provide suitable habitat for these species by retaining relatively high canopy closure and a mix of younger and older trees. Effects on Cooper's hawks from the proposed project will not be

assessed further in this document. All of the above species primarily forage on birds and small mammals. The northern goshawk (*Accipiter gentilis*) is discussed under special status species. Owl species that may occur in the proposed project area include the great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), northern pygmy owl (G*laucidium gnoma*), northern saw-whet owl (*Aegolius acadicus*) and western screech owl (*Otus kennicottii*). The northern spotted owl (*Strix occidentalis caurina*), flammulated owl (*Otus flammeolus*) and great gray owl (*Strix nebulosa*) are discussed under special status species.

Terrestrial Wildlife Species – Environmental Consequences

Threatened and Endangered Species

Northern Spotted Owl

No Action

In regard to the following discussion, although there would be no direct detrimental impacts from implementing the No Action alternative, the risk of a catastrophic (stand-replacing) wildfire would remain high in areas with high fuel loads or with overstocked understories that are prone to stress-induced mortality. Were a large high intensity wildfire to occur, there would be widespread losses of large green trees, existing snags, thermal refugia and hiding cover. In addition, overall canopy closure would be slightly reduced by on-going mortality from primarily bark beetles.

With the No Action alternative, there would be no immediate effects to the NRF or dispersal habitat. For NRF habitat, canopy closure would remain high in the short-term, snag density would continue to increase overtime (disease, insects, defects, etc.) and nesting opportunities may increase within this stand. In dispersal habitat these stands would continue to provide connectivity between those stands of suitable habitat. Spotted owl habitat (NRF and dispersal) however would continue to be at an increasingly higher risk of stand replacing wildfire, insects and disease which in the long-term may result in the degradation or complete loss of this habitat.

Proposed Action

No spotted owl nest territories or Designated Critical Habitat occur within the project boundary. Because of this, no direct effects on spotted owls from the proposed project are anticipated. The closest nest on the KFRA is approximately 2.125 miles away from the northeast corner of the unit in Section 17. There is, however, approximately 460 acres of habitat within the project identified as suitable habitat under the KFRA RMP. Suitable habitat has those characteristics that could support a spotted owl and is considered to have the nesting, roosting and foraging components needed for owls. Modification (thinning) of this habitat will likely degrade the habitat in the short-term (reduce canopy closure, lower snag recruitment, reduce course woody debris (CWD), and reduce understory vegetation) but should provide for some long-term benefits by promoting and accelerating growth of larger green trees, larger snags and recruitment of CWD needed for owls and their prey (woodrats and northern flying squirrels). Figure 2 (above) displays the projected composition of green trees of all sizes that would result from the proposed treatment. Snag retention guidelines and CWD requirements for this project would minimize those short-term impacts. In addition, due to past mortality in the project area and on-going mortality, existing levels of CWD and snags are already higher than the RMP minimum standards in many places. The 190 acres of the area classified as dispersal habitat and would be maintained as dispersal habitat after the proposed treatments.

Fuels treatments (prescribed fire or mechanical reduction) following immediately after the proposed thinning may further reduce components necessary for owl habitat. However, these treatments would have a beneficial impact by reducing hazardous fuels. Stand structure (multistory stand, CWD and snags) is an important characteristic within the owl habitat to maintain nesting and foraging habitat. Removing these features of the stand structure may limit habitat suitability for owls. Project Design Features (PDFs) for fuels reduction that maintain a diversity of snags, CWD, understory trees and shrubs would minimize impacts, maintain the habitat as suitable, and reduce hazardous fuels (see Appendix B).

Under the proposed action, the greatest impacts to individual nest sites would occur as a result of disturbance during the nesting and fledgling periods. These impacts would be of short duration, but could

cause nest sites to be abandoned during project activities. If a nest site were located during project implementation, both buffering the nest area and temporarily halting operations adjacent to the site until the nestling(s) have fledged would reduce these impacts.

Impacts to owl species would be similar to those experienced by other raptor species, although alteration of habitat may impact the prey base. Owls rely heavily on small mammal populations. It is expected that a diversity of plant species and patches of shrubs would be left to act as cover and habitat structure that will reduce the overall impacts to the prey base.

Under the proposed action, a restriction on the operating season from March 1 to July 31 within one-quarter mile of active spotted owl nest sites would be required. The dates may be subject to change upon consultation with the BLM wildlife biologist. This operating restriction would minimize impacts to nesting spotted owls from implementation of the proposed action.

Cumulative Effects

Assessing cumulative effects to wildlife is difficult due to the scale, range of the species, distribution, life history and habitat. For this assessment the extent of the analysis considered will vary by species but will primarily be focused on the extent of the Klamath Falls Resource Area boundaries, including private lands and that portion of the species range that falls within those boundaries.

The most efficient way to address cumulative effects on spotted owls and spotted owl habitat is to look at habitat within the KFRA and the effects on spotted owl habitat over time. Since there are no direct effects anticipated on spotted owls (no nest territories in the project area), the suitable habitat within the project is the main issue. In 1994, when the NWFP was implemented the KFRA had an estimated 21,600 acres of suitable habitat. In 2005, there are approximately 16,900 acres of suitable habitat still remaining. The reduction in habitat is primarily from timber harvest. Development (in-growth) of suitable habitat has not been assessed for consultation purposes at this time although in-growth of suitable habitat has occurred during the first 10 years of the implementation of the Northwest Forest Plan.

The proposed sale has approximately 460 acres of spotted owl suitable habitat that will remain suitable habitat after the proposed project (see USFWS Concurrence Letter, July 17, 2006). The habitat may be degraded in the short-term but in the long-term it should benefit from the thinning and fuels reduction. Habitat that is currently classified as dispersal habitat will remain dispersal habitat and provide connectivity to owls moving within the resource area. The additional fuels reduction work within spotted owl habitat in the proposed project will not detrimentally affect spotted owl habitat and in the long-term will provide more fire resilient habitat.

The principal change in habitat for owls around the resource area has occurred on private lands. The majority of the private lands within the west-side of the KFRA boundaries have been harvested, are considered early seral habitat, and would not be considered suitable nesting habitat or often even dispersal habitat. The overall affect of this type of harvest practice on spotted owls within the resource area is unknown at this time.

Non-Listed Special Status Species (Survey and Manage, Bureau Sensitive and Bureau Assessment)

No Action

The status quo will maintain current habitat in the short-term for the woodpeckers, bats and flammulated owls by continuing to provide snags and green trees. This management will continue to provide habitat but will lack the benefit of thinning to promote larger trees. Also there will continue to be a risk of habitat loss from wildfire, disease and insect outbreak. Severe wildfire would be detrimental to all the special status species assessed in this document other than the black-backed woodpecker. The black-backed woodpecker is often associated with snags created from wildfires and the insects that are generated from this type of disturbance. Insect outbreaks are beneficial to both of the special status woodpecker species.

Proposed Action

Great Gray Owl

Under the proposed action, impacts to local populations of these species would likely be low. Daytime activities associated with the proposed project may disturb some nesting and foraging sites, but these impacts would occur only in the short-term. In general, snags would not be removed. In areas of dense shrubs, thinning would potentially increase foraging opportunities by providing openings in which to hunt. Leaving pockets and islands of shrubs would assist in maintaining the prey base.

Applying seasonal restrictions in known great gray owl territories would minimize impacts from disturbance. Currently, there is one known great gray owl nest site within or near the affected areas. A restriction on the operating season from March 1 to July 31 within one-quarter mile of the activity center or nest site would be in effect. The dates may be subject to change upon consultation with the BLM wildlife biologist. This operating restriction would minimize impacts to great gray owls. The retention of a high percentage of larger green trees (Figure 2) would benefit the great gray owl in the future by providing potential nest sites.

Northern Goshawk

Under the proposed action, the greatest impacts to individual nest sites would occur as a result of disturbance during the nesting and fledgling periods. These impacts would be of short duration, but could cause nest sites to be abandoned during project activities. These impacts are mitigated however, under the proposed action that limits operation to outside the nesting season. If a new nest site were located during project implementation, the contract E4 clause would be invoked to both buffer the nest area and temporarily halt operations adjacent to the site and would reduce these impacts.

Under the proposed action, impacts to potential northern goshawk habitat would be similar to that of the northern spotted owl. A seasonal closure would be implemented near active nest sites during times of goshawk nesting activity (RMP, page 38).

Flammulated Owl

The flammulated owl is associated with pine dominated, open mixed conifer stands. There would likely be some short-term disturbance from the proposed action and some potential nesting structure may be removed. The proposed action would have some long-term benefit to flammulated owl habitat by providing more openings and providing more foraging opportunities (these owls forage primarily on moths) while still maintaining nesting structure. The owl is a cavity nester and the snag retention guidelines will assure that snags are maintained to provide for nesting habitat.

White-headed and Black-Backed Woodpeckers

The two special status woodpeckers that may occur within the project area are associated with ponderosa pine and mixed conifer stands. The proposed treatment will remove some trees that add to the suitable habitat for these species, primarily dead-top trees. However, snag retention guidelines that are based upon the NWFP Standards and Guidelines will maintain foraging and nesting habitat for both of these species. Green tree retention will also provide foraging for both species. No existing snags are planned to be cut unless required for safety (OSHA requirements). This would protect and maintain snag habitat that is currently available. Thinning will continue to promote larger trees in the stand which will also benefit both woodpeckers. Both use larger (>16") snags, dead-top and heart rot live trees for their nesting structure. Under the proposed action, impacts to local populations would be minimal. Daytime activities associated with the proposed project may disturb some nesting and foraging sites, but only in the short-term.

Fringed Myotis and Pallid Bats

These species may occur in the project area although they are generally associated with caves, mines or rock crevices. The fringed myotis and pallid bat are sometimes found using cavities in snags as roosts. Although some cavity roosts areas may be lost, the snag retention guideline will maintain sufficient snags

to provide for roosting structure (see Snag Retention Guidelines in Appendix B). There would likely be some short-term disturbance to these species within the project but this would end at the completion of project activities.

Under the proposed action, short-term disturbance of individuals being pushed from snags or thickets may occur. These disturbances however would have a short duration and overall would have minimal impacts to the species. The existing snag retention levels (see Appendix B) will be sufficient to meet the needs of both species (RMP/ROD, Page 26-27).

Landbirds

Eleven of the 20 species that may occur within the project area are associated with riparian/shrub habitats (Table 6). Of these, four have declining population trends according to The Partner's in Flight Handbook on Species Assessment and Prioritization. Six of the 15 bird species that are associated with the sapling/pole habitat and may occur in the analysis area have declining population trends (Panjabi 2001).

The proposed action may result in short-term detrimental disturbance to landbirds that utilize riparian shrubs for breeding, although only a small percentage of the riparian reserve will be "lightly" treated (see Appendix B for riparian reserve PDFs). Species that utilize pole/sapling habitat within treatment units may also be affected by disturbance. If the proposed action takes place during the breeding season for these birds (May through July), there would be direct losses of reproduction for those species associated with these habitat types. Normal operations typically take place after June 1, and logging activities during periods of sufficient snow is encouraged (see Appendix B for soil PDFs). This is normally when snow depths are in excess of twenty (20) inches in depth.

The proposed action would change the character of microhabitats within and adjacent to treatment units. Pole/sapling habitat types would be directly affected, while riparian/shrub types would be indirectly affected by changes in microclimate and spatial arrangement of adjacent habitats.

There would be a small amount of loss of breeding habitat for passerine bird species that utilize conifer trees in the < 7" dbh size class. The trees that would be removed are primarily small diameter trees with a limited amount of foliage and suitability for nesting. Responses to this change could include displacement, adaptation, or reduction in local populations. Detrimental impacts would be reduced by the implementation of no-cut buffers, thermal (wildlife) clumps, and other PDFs (such as riparian reserve guidelines).

Thinning of small diameter trees would result in conditions that would favor the growth of forbs, grasses and shrubs. Increased understory diversity would be favorable to bird species that are dependent upon shrub habitats associated with forest. However this habitat is not limiting in the KFRA. Over the long term, effects of the proposed action on the suitability of the sapling/pole forest for nesting are not expected to be significant. The thinning and fuels reduction treatments would have a beneficial impact in the long term to these landbird species by reducing the risk of a stand replacing fire that could eliminate all habitat in the project area, particularly the small sapling and poles less than 7 inches DBH that are most vulnerable to fire.

Cumulative Effects

It is the policy of the BLM to protect, manage, and conserve special status species and their habitats such that any Bureau action will not contribute to the need to list any of these species. For special status species such as woodpeckers, owls, and bats the primary habitat components needed are large snags, large green trees and CWD. The standards and guidelines in the NWFP, additional guidelines in the KFRA RMP, and the project design provide for these habitat components to ensure that these actions do not further the need to list these species. The cumulative effects for this project and others on both public and private lands within the KFRA would not adversely affect the populations of special status species on public lands on the resource area and will not contribute to the need to list these species. Project design

features, BMPs and Standards and Guidelines ensure that habitat components necessary for these species are maintained during implementation of projects.

Other Terrestrial Wildlife Species

No Action

Under the no action alternative, no direct disturbance to species or habitat will occur. Other projects and human activities may potentially affect elk or raptors.

Proposed Action

Ungulates

Under the proposed action, disturbance from the project may have a short-term direct effect on individual elk. Disturbances during the calving time frame (generally, May 1 through June 15) would have the greatest potential to have detrimental effects on individuals, especially the young. Such disturbances would have a short duration and overall would have minimal impacts to the species. Elk calving and deer fawning has been observed within riparian areas in two of the project units. Both of these areas are within riparian reserves and have been set aside.

The removal of thickets of small trees would result in a short-term loss of forage and hiding cover for big game. These species are especially reliant on shade cover during the summer months as refugia from heat and insects. Leaving clumps of vegetation for hiding cover and foraging is essential in order to limit impacts to elk. The thinning of white fir thickets would create areas for rejuvenation of vegetation that may create new foraging opportunities. Reduced stand densities would lead to improved air circulation and create cooler areas for ungulates. It would also reduce fuels hazards and reduce the risk of high-intensity wildfire.

The removal of small trees may also reduce hiding cover, especially in areas near roadways where increased pressure from hunting may occur. Leaving a strip of small trees and shrubs along open roads (and other roads where needed) as stated in Appendix B (see NRF PDFs) and blocking roads will assist in minimizing pressures from traffic and road-side hunters. In plantations, thinning of trees will encourage grass, forb and shrub health and growth; therefore increasing the quality of ungulate foraging habitat.

Raptors

Under the proposed action, the greatest impacts to individual nest sites would occur as a result of disturbance during the nesting and fledgling periods. These impacts would be of short duration, but could cause nest sites to be abandoned during project activities. If a nest site were located during project implementation, both buffering the nest area and temporarily halting operations adjacent to the site would reduce these impacts.

Impacts to owl species would be similar to those experienced by other raptor species, although alteration of habitat may impacts the prey base. Owls rely heavily on small mammal populations. Leaving a diversity of species and patches of shrubs to act as cover and habitat structure should reduce the overall impacts to the prey base.

Impacts to the northern goshawk (*Accipiter gentilis*), northern spotted owl *(Strix occidentalis caurina*), flammulated owl (*Otus flammeolus*) and great gray owl (*Strix nebulosa*) are discussed under special status species.

Soils - Affected Environment

Soils in the project area are summarized in Table 7. The soils on hillslopes adjacent to headwater streams and streams occupying confined valleys within the analysis area are comprised primarily of the Woodcock-Pokegama complex. These deep, well drained soils formed in colluvium derived from andesite (composite between basalt and rhyolite) and volcanic ash. Permeability is moderate, and the potential for runoff and erosion is moderate to high. These soils are susceptible to compaction by

mechanical equipment during wet periods (USDA SCS 1993). Soils within and adjacent to watercourses occupying relatively unconfined valleys within the analysis area are primarily comprised of the Klamath series soil type. These soils are very deep, poorly drained soils on flood plains. They formed in alluvium derived dominantly from volcanic ash, andesite, and basalt. Permeability is slow for this soil series. Due to gentle slopes, runoff is slow, and the hazard of water erosion is slight. These soils are frequently flooded for long periods in the spring. These soils are susceptible to compaction of the surface layer during seasonal wetness. It is likely that compaction would occur to greater depths if ground-based mechanical treatments were implemented during seasonal wet periods (USDA SCS, 1993).

Table 7: Acres and Soil Types in the Thin Sheep EA Analysis Area

Acres	Soil Type
521	KLAMATH SILT LOAM, 0 TO 1 PERCENT SLOPES
5103	POKEGEMA-WOODCOCK COMPLEX, 1 TO 12 PERCENT SLOPES
74	WOODCOCK STONY LOAM, 35 TO 55 PERCENT SOUTH SLOPES
1176	WOODCOCK-POKEGEMA COMPLEX, 12 TO 35 PERCENT NORTH SLOPES
720	WOODCOCK-POKEGEMA COMPLEX, 12 TO 35 PERCENT SOUTH SLOPES

Soil issues and concerns for the affected environment are addressed in the Upper Jenny Creek Watershed Analysis (pages 7-8 and 84-85) and the KFRA RMP (pages 28 to 30 and Appendix D). The two soil disturbance issues of greatest concern are (1) reduction of surface and subsurface organic matter reserves (humus) and (2) compaction. Repeated use of ground-based logging equipment (tractors and skidders) has, in some places, displaced or compacted soils and contributed to the reduction of soil organic matter reserves. Past harvesting has primarily occurred on the more gentle slopes and skid trails presently exist. In contrast, much of the steeper ground has not been entered due to the complexity of selective cutting on steeper slopes.

Winter snow depths in the area typically range from three to ten feet of snow. Feasibility and impacts of requiring snow logging to minimize soil disturbances are discussed in the environmental consequences section. In addition, post treatment monitoring of completed sales has been done and is discussed in the environmental consequence section below.

Soils - Environmental Consequences

No Action

No soil disturbing treatments would be implemented under this alternative, but would occur only as described in other NEPA documents. The risk of stand replacing wildfire and resulting increased erosion would continue to increase as live and dead fuels (biomass) continue to accumulate.

Proposed Action

Implementing the type of activities outlined for the Proposed Action typically can result in detrimental soil impacts, primarily soil compaction and displacement, from the ground based operations. Based upon past monitoring, these impacts would occur primarily on the landings and the main skid trails into the landings. Detrimental soil impacts include soil displacement, creation of adverse cover conditions, and detrimental soil compaction (defined as 15% increase in soil bulk density). These impacts were analyzed for in the RMP FEIS (pages 4-11 to 4-18).

Most harvesting operations on the resource area are done using mechanized ground based equipment, particular when harvesting small diameter trees (<20”DBH). This involves grapple skidders and a mechanical harvester that has a sawhead at the end of a 20 foot hydraulic arm. The use of a mechanical harvester normally results in a greater area of ground disturbance since it is not confined to skid roads. The mechanical harvester generally leaves the skid trails to cut and bunch trees designated for cutting. A mechanical harvester reportedly causes less soil compaction since it exerts fewer pounds per square inch of force/pressure than other ground-based harvesting machinery (tractors and skidders). In addition, because the mechanical harvester has a 20 foot radial arm, it is able reach into stands and extracts trees

without having to drive to every tree. Since use of a mechanical harvester is becoming the industry standard and is the most economical choice for small diameter density-management thinnings of forest stands, the resource area has implemented monitoring to determine the areal extent of soil disturbance and changes in soil bulk density in representative ground disturbing projects to evaluate soil health.

Slashbusting is implemented to restructure fuel loadings by reducing the amount of ladder fuels. Often slashbusting is done following a timber sale in preparation for underburning. Slashbusting is done with a mechanical harvester machine fitted with a different head attachment that mows or grinds smaller material. Soil impacts from Slashbusting are similar to that of the mechanical harvester. The resource area has established studies to monitor the effects on soils and vegetation that result from projects where timber harvest is combined with slashbusting and/or prescribed fire. KFRA RMP soil disturbance and compaction standards (described below) apply to both slashbusting and timber sale operations. When both activities take place on the same piece of ground, the additive detrimental disturbance must still meet those standards. Soil disturbance and compaction and vegetative response are being monitored to ensure that the KFRA RMP standards are being met. (See KFRA Annual Program Summary and Monitoring Reports - 1999 to 2005.)

Mitigation

The Klamath Falls RMP Best Management Practices are designed to limit detrimental soil disturbance to less than 20% of the total acreage within an activity area (Page D-11 and D-23 of the RMP). To minimize soil disturbance, the most common BMPs required are:

- Confine soil disturbance through use of designated skid trails, marked in advance.
- Seasonal restrictions to limit logging operations to the dry season to prevent compaction, puddling, and erosion.
- Cable yarding will be used when average slopes exceed 35 percent.
- Use of existing designated skid trails, marked in advance for logging operators to confine soil disturbance.
- When reasonably feasible, require operations when snow depths exceed twenty (20) inches in depth.

If detrimental soil impacts exceed 20 percent of the total acreage within an activity area, the BMP guidelines (KFRA RMP, page D11) state that impacts will be mitigated with treatments such as tilling or seeding.

Slash that is left on the project area from manual treatments will serve to reduce surface soil erosion and sedimentation. Future prescribed burning of treated areas, as part of this alternative, would be designed to create a mosaic of burned and unburned areas which would also reduce erosion and sedimentation in the analysis area. (Maurer, 2001)

Because the analysis area is located at an elevation that normally receives sufficient snowfall, it is feasible to require snow logging if the snow pack persists and the area remains accessible. If snow logging is required, logging costs would be higher but soil disturbance would be minimized. The KFRA recently completed a timber sale, Saddled Again (2004-2005), where the entire sale was logged over 20 inches of snow. Observations indicated that disturbance to the surface organic layer was virtually undetectable.

Cumulative Effects

Monitoring information, collected to date, regarding the effectiveness of BMPs on minimizing soil compaction and disturbance indicates that cumulative effects to soil resources would not exceed the RMP standards for detrimental soil conditions (ROD, page D-11). Treatments would continue to be implemented during the summer months (June-October) when soils are dry and least susceptible to compaction. Snow logging will be used when possible. Logging on snow or frozen ground has been shown to reduce compaction to soils (Smith and Wass 1976, Mecleod 1998 Krzic 2004). On-going monitoring to measure soil compaction and recovery will assure that impacts to soil are within the RMP standards and are mitigated by appropriate measures when needed.

Roads - Affected Environment

Current road densities on BLM land in the project area are approximately 5.0 miles of BLM road per square mile due to the small design of this sale area and the associated terrain (Table 8). The RMP objective is to reduce road density to 1.5 miles per square mile. All roads within the proposed treatment area in Section 7 are located in the Pokegama road closure and are seasonally closed from November 20th to March 30th. This road closure is a cooperative agreement (February 1991) among BLM, Pacific Power and Light (PP&L), Timberland Resource Services, and Oregon Department of Fish and Wildlife. This agreement, which encompasses all ownerships in the closure area, remains in effect. Objectives of the Pokegama road closure are to reduce road damage and soil erosion and to protect wildlife habitat during critical periods. Roads within Sections 17, 21, 29, 31, and 33 are not within any formal road closure area but access is typically limited during the winter months due to snow depths.

Table 8: Road Density in Thin Sheep Project Area (BLM ownership)

	Drainage Density (miles of stream per square mile)	Road Density (miles of road per square mile)	Number of Stream Crossings (per mile of road)	Miles of Road within 100 feet of streams
Thin Sheep EA Area	1.8	5.0	1.2	0.75

Roads - Environmental Consequences

No Action

Road maintenance would continue periodically. This would involve grading and spot rocking depending upon annual road maintenance needs and funding. The Pokegama seasonal road closure would remain in effect. The blocking of 1.2 miles of spur roads as described in the Proposed Action would not occur, resulting in more open road during permitted use periods (i.e. April 1 – November 19th). There would be no improvement of existing road surfaces or drainage features and no change to current potential for input of sediment into streams.

Proposed Action

There will be a net decrease in permanent road densities because 0.3 mile of road obliteration is proposed and 0.1 mile of new road construction is proposed. The Pokegama seasonal road closure will remain in effect. There will, however, be additional proposed year round road blockages of 1.2 miles of spur roads with a subsequent decrease in the amount of open roads during the period when the seasonal closure is not in effect. This will help to meet RMP objectives to decrease road density. There would be only 3.7 miles of BLM roads open year around in the analysis area (Table 9). Improvements in road drainage facilities and an additional 0.1 mile of surfacing would provide a benefit to water resources by reducing potential inputs of sediments from roads into streams. Surfaced roads generally produce less sediment erosion than unsurfaced, dirt roads. Effects from the proposed action in regards to roads would not exceed those addressed in the RMP/FEIS.

Table 9: Pre- and Post-treatment Road Density in Thin Sheep Project Area (BLM ownership)

		Pre-treatment (Road Miles)		**Post-treatment (Road Miles)**	
Section	Acres	Open Year Around	Seasonal Closure	Open Year Around	Seasonal Closure
17	120	0.0	-	0.0	-
21	40	0.0	-	0.0	-
29	160	1.3	-	1.0	-
31	320	3.5	-	2.7	-
33	40	0.4	-	0.0	-
7	320	-	2.7	-	2.7
Total		5.2	2.7	3.7	2.7

Cumulative Effects

The KFRA continues to strive to reduce open road density and environmental effects associated with roads and road use during implementation of projects proposed in the foreseeable future. A combination of BLM and private checkerboard ownership and subsequent access agreements with adjacent landowners reduces BLM's flexibility in managing road densities. At the landscape level, the Proposed Action would provide an incremental improvement over the status quo. Over time, the expected cumulative effect of incremental improvements from each project is to reduce road density in the watershed. At the project area level, year round closure of 1.2 miles of road affects over 15 percent of the existing BLM roads.

Hydrology - Affected Environment

The Thin Sheep Forest Health Treatments analysis area is located in the Jenny Creek 5th Field Watershed in the Upper Klamath River Sub-basin. The analysis area comprises 7,614 acres of the watershed, while the proposed project area is 900 acres. A portion of the Jenny Creek Watershed, the Johnson Creek 6th Field Subwatershed, is a Tier 1 Key Watershed (RMP, pp. 2-4). Nearly all of the 4.5 miles of perennial streams, 11.2 miles of intermittent streams, and 10.6 miles of ephemeral streams in the analysis area are on private lands (Map 1 in Appendix C). The drainage density is 1.8 miles of stream per square mile of analysis area. The streams that are near roads on BLM land in the analysis area are ephemeral drainages. There are 1.2 stream crossings per mile of road and 0.75 miles of road within 100 feet of streams on BLM land in the analysis area. Further details on roads are included "Roads" section of this document.

In the proposed project area, there are no perennial streams, 0.52 mile of intermittent streams, and 1.74 miles of ephemeral streams (Map 1 in Appendix C). Intermittent streams in the proposed project area have riparian vegetation adjacent to stream channels and in the associated meadows. Most of the ephemeral streams are in draws and have water flow only during high precipitation events. Vegetation beside ephemeral streams is similar to the adjacent upland forest communities, with sparse to no riparian vegetation and overstocked stands (See "Vegetation" section of this document). Wetlands are present along the lower portions of Sheepy Creek and in Johnson Prairie.

Riparian Reserves along intermittent streams and wetlands in the proposed project area would be established according to RMP guidelines. The range of riparian reserve widths varies from two site potential trees for intermittent fish bearing streams, to the outer edges of the riparian vegetation around wetlands less than one acre in size (Appendix B). The vegetation in riparian reserves is comprised of both riparian and upland forest communities. Overall, the riparian areas have a variety of sedges, rushes, grasses, and wetland plant species, streambanks are well-vegetated, and floodplains are inundated regularly. A short reach within Sheepy Creek has unstable banks and sinuosity is decreasing. The upland forest vegetation is overstocked due to past fire exclusion and harvesting practices. In their present state, the upland areas of the Riparian Reserves are as vulnerable to stand replacement wildfires and insects as the adjacent upland matrix lands.

The average percent shade on Johnson and Sheepy Creeks in the analysis area ranges from 43% to 71%. The data shows that average shade was: 43% for the East Fork of Johnson Creek; 54% for the main stem of Johnson Creek; 71% for the West Fork of Johnson Creek; and 66% for Sheepy Creek. Shade survey sites are located upstream of the proposed project area, however there is no site specific shade data in the proposed project area (Map 1 in Appendix C). Since these shade surveys were completed (2003), riparian thinning treatments have been implemented in some of the same areas in which the data was taken. However, according to the analysis completed in the Johnson/Sheepy Riparian Reserve Vegetation Treatments EA (EA OR 014-02-04), reduced overstory shade would only occur in the outer portion of the riparian reserves. In addition, in the short-term the reduced shade would be mitigated by enhanced growth of residual trees and regeneration of understory trees and shrubs. Thus, current values for percent shade in surveyed areas are expected to be slightly reduced from the 2003 percent shade values. In the long-term, percent shade is expected in increase as competing vegetation with overstory trees is reduced.

The stream segments that have been reviewed through Proper Functioning Condition (PFC) surveys on BLM land in the analysis area include Johnson Prairie and Sheepy Creek. These surveys were completed in 1997. Johnson Prairie Creek was in proper functioning condition and Sheepy Creek was functional-at risk with an upward trend.

Hydrology - Environmental Consequences

No Action

The effects from the "no action" alternative would include those resulting from the combination of fuel treatments and road maintenance activities that are expected to occur in the proposed project area in the next five years. Since no immediate timber harvesting would occur, there would be no soil disturbance from ground-based logging equipment. Soil compaction and erosion could be expected from slash busting and prescribed burning. Vegetation that has become established on some existing roads and skid trails would not be disturbed by mechanized equipment and would continue to enhance the capture and infiltration of water. Routine road maintenance (grading and spot rocking) would still occur periodically, yet are designed to minimize sediment input into stream channels. Road resurfacing, blocking, and obliteration described in the Proposed Action would not occur and current potential for input of sediment into streams would not be addressed.

The composition and character of forest stands adjacent to streams would not be altered. Stream shade would remain effectively unchanged unless a stand replacement wildfire occurred. The risk of stand replacing wildfire would remain unchanged in overstocked stands, which could result in extensive mortality within Riparian Reserves. This would reduce stream shade, and could increase erosion and deliver sediment input to streams. Although the future supply of large woody debris (LWD) to stream channels would be reduced if a stand replacing fire occurred, there would be an increase in the amount of LWD recruitment into stream channels in the short-term.

Proposed Action

Potential effects on water resources resulting from the Proposed Action would include compaction and erosion from ground-based logging equipment. Soil compaction can reduce water storage and capacity, decrease infiltration, and increase overland flow. Negative effects from ground-based logging equipment would be expected adjacent to intermittent streams, in wetlands and meadows, wherever soils are wet in the spring. However, adverse effects from compaction would be limited by snow logging or logging during the dry season which are standard Best Management Practices for the KFRA.

Soil compaction and displacement can cause erosion and increase sediment inputs to stream channels. Where erosion occurs, ephemeral drainages on steep slopes would potentially transport sediment downstream. Areas especially susceptible to erosion are sites where slopes are 35% or greater. The overall risk of erosion causing sediment inputs to streams is minor, however, since the majority of the proposed project area has gentle slopes and slow runoff and much of the Riparian Reserves will not be treated. Less than one percent of the proposed project area is steep with slopes ranging from 35% to 40%. Best Management Practices (BMPs) require cable yarding and restricted use of mechanized equipment on slopes greater than 35%. Implementation of additional BMPs and PDFs (e.g. avoiding placement of skid trails and landings in areas that may collect and divert surface runoff) will aid in minimizing negative effects from compaction and erosion (refer to Appendix B for all BMPs and PDFs to be implemented).

Treatments in Riparian Reserves would have short-term adverse effects on existing vegetation in these areas. Existing vegetation aids in capture and infiltration of water which affects the release of this water in stream channels. Use of existing roads and skid trails within the Riparian Reserves could remove most of the vegetation established on these routes since their last use. Vegetation would be affected by machinery passing over the routes, and surrounding vegetation could be affected by soil displacement from the roads and trails. This could cause a reduced amount of water capture and infiltration in the short-term. Adverse effects from loss of vegetation are likely to occur until the disturbed sites are re-vegetated. Applying PDFs, such as reseeding of roads and trails after project completion, would

minimize adverse effects on the vegetation on the routes and to the immediate surrounding vegetation. The long-term positive effects on the vegetation community from overstory thinning and reduction of fuel loads would outweigh these short-term negative effects.

Thinning and fuels reduction treatments in Riparian Reserves could have a beneficial effect on the amount, rate, timing, and duration of surface flow in stream channels. Since the vegetation and soil conditions affect these attributes of water flow, treating Riparian Reserves would create more stable stand conditions, including improving resiliency of remaining trees. This would result in flows more similar to reference conditions. Treating overstocked stands could allow more water to flow in intermittent stream channels since there would be less transpiration from trees in the stand. By thinning the overstocked Riparian Reserves, site productivity could improve as more water is captured, stored, and released in stream channels and drainages. Adherence to BMPs and PDFs (Appendix B) would minimize adverse effects of harvest activities on the riparian resources.

The existence of roads could have a negative effect on water quality if sediment enters streams due to soil disturbance on roads. The streams where roads cross or are near streams are especially susceptible. Approximately nine percent of the existing roads on BLM land within the proposed project area are within 100 feet of an ephemeral stream, and there are approximately 1.2 road crossings per mile of road (Table 8 and Map 2 in Appendix C). There would be 0.1 mile of new road constructed in the analysis area; however, it would be closed after use for the Proposed Action. Sediment could also enter streams from road maintenance activities, and from hauling activities adjacent to streams. Sediment entering the streams could have a negative effect on water quality, but implementing BMPs and PDFs (Appendix B) would minimize sediment inputs, thus reducing the probability of adverse effects.

The proposed road improvements, renovations, closures, and obliteration could result in beneficial effects to water quality in stream channels. In addition to these road treatments, the Pokegama Road Closure would continue to be implemented (See "Roads" section). Improving water drainage off roads and eliminating traffic would aid in reducing sediment inputs from roads into stream channels. Further, since there is a minimal amount of new road construction and this road would be blocked after, there would be a low potential to adversely affect groundwater recharge and aquifer function due to additional roads.

The Proposed Action is consistent with the objectives for Riparian Reserves and the Aquatic Conservation Strategy (ACS) in the KFRA RMP and would not prevent or retard attainment of any of the ACS objectives in the long term (RMP, pages 7-8).

1. The Proposed Action would 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.
2. The Proposed Action would maintain the existing spatial and temporal connectivity within and between the Jenny Creek and Klamath River-Iron Gate Reservoir Watersheds.
3. The Proposed Action would maintain and restore the physical integrity of the aquatic system.
4. The Proposed Action would maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
5. The Proposed Action would maintain and restore the sediment regime under which this aquatic ecosystem evolved.
6. The Proposed Action would have no effect on in-stream flows.
7. The Proposed Action would maintain the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. The Proposed Action would maintain and restore species composition and structural diversity of plant communities in riparian areas and wetlands.

<u>Cumulative Effects</u>

Cumulative effects from the Proposed Action are expected to be minimal at the watershed scale because the analysis area comprises a very small percentage of the watershed. Proposed project treatment areas comprise approximately 0.5% of the Jenny Creek 5th Field Watershed (Map 2 in Appendix C). In

addition, impacts to Johnson Prairie and Sheepy Creek from the proposed treatments would not produce downstream effects on Johnson Creek or Jenny Creek.

In the KFRA portion of the watershed, timber management in the last decade has included approximately 1,300 acres of thinning and harvesting of three to four million board feet of salvage. Stands throughout the Matrix allocation are expected to be selectively harvested approximately every 20-30 years, according to KFRA plans. In the Ashland Resource Area, Medford District portion of the watershed, timber management in the last decade has included approximately 3,360 acres of treatment. Most of these treatments were selective cuts, salvage, thinnings, and shelterwood cuts. A majority of the Jenny Creek Watershed within the Ashland Resource Area was designated as the Cascade Siskiyou National Monument in 2000, according to national monument management parameters. A limited amount of timber management is planned to occur in this area. Current timber management on the surrounding private land is more intensive and occurs on a larger scale than on BLM lands. Most of the private lands are managed on a shorter harvest rotation, perpetuating early seral habitat. This management regime is expected to continue in the future.

The Proposed Action would aid in reducing the likelihood of a future stand replacement fire event within the 5th field watershed in the long term (See "Hydrology-Environmental Consequences" section of this document.) This would help to establish a more stable and resilient ecological condition in the watershed. Combined with timber management on the Ashland Resource Area and on surrounding private lands, the Proposed Action contributes to reducing overstocked stand conditions, and thus the risk of stand replacement fire.

No incremental increase in negative cumulative effects from new road construction in the current road network would occur. The 0.1 mile of new road construction would be closed after use. In addition, there are 1.6 miles of road proposed to be obliterated or permanently closed. Positive effects from road improvements and renovations proposed for 8.6 miles of road would occur.

Measurable cumulative effects from the Proposed Action are not expected at the watershed scale. The analysis area consists of a very small proportion of the Jenny Creek Watershed. Further, the timber management on KFRA lands in the analysis area adds a minimal effect to overall timber management when combined with activities on surrounding private lands. The slight decrease in upland forage that is expected in the first one to two years following timber harvest could lead to a short term increase in livestock/wild horse grazing in the riparian areas. In the mid-term (2-10 years), the increase in palatable upland forage would draw grazing animals away from the riparian areas and result in less use than these areas currently receive. However, at the watershed scale, these fluctuations would not be measurable. At the watershed scale, management on KFRA and private lands would aid in reducing stand replacement fire events and improving ecological conditions.

Aquatic Species and Habitat – Affected Environment

There are no Federal or state threatened, endangered or candidate aquatic species known to occur in the or immediately downstream of potential treatment units. Within the Jenny Creek watershed, Jenny Creek redband trout and Jenny Creek smallscale sucker are known to occur (Jenny Creek Watershed Analysis 1994). Both species (actually subspecies of Klamath River forms) are genetically isolated from other closely related forms by Jenny Creek Falls, a natural upstream migration barrier near the confluence of the Klamath River. Both species are listed Bureau Sensitive (BLM Manual 6840, ONHP 2001). Other fish species potentially present within the project areas are listed in Table 10.

Past management practices, including streamside timber harvest and removal of large woody debris (LWD) from the stream channel, have reduced instream LWD and affected sediment transport processes in the project reaches (Jenny Creek Watershed Analysis 1994, pages 36, 42, 43). Additionally, recent flood events (25 to 50 year return intervals) have pushed much of the existing LWD out of the stream into areas where it no longer interacts with the channel to provide high quality habitat.

Table 10: Fish species suspected or known to be present in or directly adjacent to the project planning areas.

Common Name	Scientific Name	Present or Suspected (P/S)
Sculpin sp.	*Cottus* sp.	S
Jenny Creek redband trout	*Oncorhynchus mykiss* ssp.	P
Jenny Creek smallscale sucker	*Catostomus rimiculus* ssp.	S
Klamath Speckled Dace	*Rhinichthys osculus*	P
Lamprey sp.	*Lampetra* sp.	S
Fathead minnow (introduced)	*Pimephales promelas*	S

Potential limiting factors for redband trout in the area include lack of large woody debris, reduced stream shading, lack of pool habitat, and low summer base flows. Large woody debris recruitment potential is diminished due to past harvest. Two fish-bearing streams were identified adjacent to treatment units in the analysis area: Johnson Creek and Sheepy Creek.

Johnson Creek
Extensive fish distribution surveys have not been conducted in the affected drainages. Observations of fish use were conducted in stream reaches adjacent to the proposed units where fish presence (Jenny Creek redband trout and Klamath speckled dace) was documented. No complete barriers to migration were noted during the field review. However, lack of surface flow in late summer and early fall (during some years) seasonally limits the distribution of fish species within the upper portions of this drainage and the smaller tributaries in the analysis area.

Sheepy Creek
Sheepy Creek is a tributary to Johnson Creek. The section of Sheepy Creek adjacent to Section 29 was surveyed visually for fish presence in August of 2005. Klamath speckled dace and Jenny Creek redband trout were documented although the stream had stopped flowing and was a series of disconnected pools. No complete barriers to migration were noted during the field review. However, lack of surface flow through the proposed treatment area in late summer and early fall (during some years) seasonally limits the distribution of fish species.

Aquatic Species and Habitat – Environmental Consequences

No Action
Under a No Action alternative, there would be no ground disturbing effects of sedimentation or increase in road related sediment inputs due to increased levels of road use and maintenance. Indirect and cumulative impacts associated with current watershed conditions identified in the affected environment section will continue to occur.

Overstocked areas in Riparian Reserves would remain at an elevated risk for stand replacing wildfire and the resulting negative effects on aquatic species loss of canopy shading, higher than normal nutrient concentrations, and sedimentation. Conifer growth in overstocked stands adjacent to streamside areas would continue to be suppressed and result in a lower short term Large Wood Debris recruitment potential. Overstocked stands in the Riparian Reserves would maintain largely uniform age/size and species distributions until shade tolerant tree establishment and/or natural mortality (either chronic or catastrophic) allow understory development. This type of development will contain a simplified size and age class stand structure and is not typical of late successional stand characteristics.

Proposed Action
Aquatic species and habitats in the timber sale planning area could be affected to the extent that hydrologic regimes of tributary streams are altered by ground disturbance and road use (see Hydrology section). If ground disturbances (compaction, vegetation removal, loss of duff/organic layer, and increased road use) act in combination to increase the magnitude of peak runoff events, negative effects

on aquatic species from streambank erosion, higher than normal nutrient concentration, and sedimentation are to be expected. Implementing the project design features in Appendix B is expected to mitigate effects on aquatic species to levels analyzed in the KFRA RMP and FEIS. Additionally, due to low gradient harvest unit slopes, adherence to Best Management Practices, low total stream miles adjacent to harvest units, and relatively light harvest prescriptions, any direct effects to aquatic environments are expected to be minor or insignificant.

Mature, large, canopy-forming trees within one site potential tree height (160 feet) of the stream contribute nearly all of the potential stream shading and large-diameter wood entering the aquatic environment (USDA USDI 2001). Long-term impacts to the aquatic environment could be beneficial under the proposed alternative if the objectives of increased residual tree growth, increased vigor and abundance of desired tree species, and reduced risk of catastrophic fire are realized.

The retention of trees in larger size-classes would provide the majority of potential future LWD available to the stream channel. Some trees would be directionally felled towards stream channels within units adjacent to streams that are identified as lacking adequate LWD. This would help ensure that instream LWD volumes are adequate in the short- to medium-term.

The proposed Riparian Reserve treatment will reduce stem densities, increasing average tree diameter, and potentially increasing species diversity. As the treated stand ages, ecosystem processes consistent with old-growth stands will begin to evolve, including LWD recruitment regimes, where trees would fall into the stream channel at a variable rate. This would provide the streams with a variety of size, species, and decay classes of LWD. More steady rates of LWD recruitment from large, desirable tree species would improve habitat complexity and increase the amount of persistent pool habitat in the long term (Sullivan et al, 1987). Pools provide high quality rearing habitat for redband trout.

Canopy closure after treatment would be dependant on existing vegetative features and the extent of treatment unit. Canopy closure would be retained in the area immediately adjacent to the stream and would diminish upslope. As noted in the Hydrology section of this analysis, minor, slightly beneficial, changes to water temperature and streamflow regimes are expected to occur as a result of project implementation. Therefore, no substantial detrimental impacts to fisheries resources are expected to occur as a result of water temperature or peak/base flow alterations caused by the proposed action.

The use of low impact yarding techniques is proposed for use in some units. Yarding would be seasonally restricted to periods when soil moisture is low or when snow depths are adequate to protect soil resources. These limitations would minimize the potential for ground disturbance and sediment delivery to stream channels. During yarding activities, directionally falling trees away from designated no-cut buffers would be expected to prevent impacts to stream channels.

Cumulative Effects

Indirect and cumulative impacts could potentially include increased sediment delivery to streams from road surfaces and ditchlines during hauling operations. As discussed in the Hydrology section, potential increases in sediment delivery due to hauling would be small, and would not be expected to significantly affect special status fish species.

Grazing Management - Affected Environment

Livestock

The treatment areas lay within small portions of the Dixie (#0107) and Buck Mountain (#0103) allotments. Cattle grazing is permitted within the proposed treatment areas, though most of the treatment areas receive little if any grazing due to steep slopes, thick timber, and/or limited herbaceous growth. A complete description of the grazing activities in these allotments, including current use levels, historical use, allotment boundaries, etc. is found in the July 1996 Topsy-Pokegama Landscape Analysis and Medford's Jenny Creek Pilot Watershed Analysis. Additional information is found in the KFRA

RMP/FEIS, KFRA ROD/RMP and Rangeland Program Summary. In addition, "Rangeland Health Standards Assessments" were completed several years ago for both grazing allotments; these assessments may also be referenced for more information on livestock grazing.

Wild Horses

The proposed project area just touches the northwestern corner of the Pokegama Wild Horse Herd Management Area (HMA) in the vicinity of Parker Mountain. Wild horses would be rarely encountered in the treatment area but have been historically known to leave the unfenced herd area and could possibly be found in other portions of the analysis area. Relatively recent wild horse removals in and adjacent to the HMA (1996 & 2000) have reduced this small herd enough so that horses have not been noted in the analysis area in recent years.

Grazing Management - Environmental Consequences

No Action

Implementation of the No Action Alternative would have no affect on livestock management, wild horses, or forage production.

Proposed Action

Harvesting activities as described in the proposed action would have a small, mid-term (2 to 10 years) positive effect on livestock/wild horse grazing due to an increase of palatable, herbaceous plant species that would be more abundant once some of the over story trees are removed. There could be a short-term (1 to 2 years) negative effect on forage amounts due to the ground disturbing impacts of the timber harvesting machinery. Observations of the grazing use in the proposed activity area by BLM range personnel have indicated that cattle & wild horses make little use of the majority of these BLM administered lands in the proposed project area. Most of the grazing use in the area is made on the intermingled, predominantly private lands in the lower elevations along Sheepy and Johnson Creeks to the east. These private lands are owned and leased for cattle grazing by Timber Resource Services.

A much more detailed description of potential impacts, including the cause and effect relationships between grazing, timber harvest activities, vegetation community structure, and forage production is found within the Rangeland Health Standards Assessments for both grazing allotments (Dixie & Buck Mountain), the July 1996 Topsy-Pokegama Landscape Analysis, and the Medford's Jenny Creek Pilot Watershed Analysis. Additional information is also found in the Klamath Falls Resource Area Resource Management Plan/EIS, Record of Decision, and Rangeland Program Summary.

Cumulative Effects

Cumulative effects in the short term (less than 2 years), include a slight decrease in available forage for livestock and wild horses. The long-term cumulative effects of vegetation treatments in the area will be to improve ecological condition and provide an increase in palatable herbaceous plant species, especially in overstocked areas with little understory now.

Cultural Resources – Affected Environment

Native American use of the area spans many millennia. The area is within a larger territory ceded to the United States in 1864 by the Klamath Tribes. Along with the Klamath and Modoc, Shasta and Takelma peoples likely utilized this area as well. The Klamath River Canyon, although not considered within the analysis area, is located about 10 miles southeast of the Thin Sheep Timber Sale area. The Klamath River Canyon is extremely rich in archaeological and historical resources and presumably served as one corridor for entry into the analysis area by both prehistoric and historic inhabitants. To date, archaeological and ethnographic research has demonstrated a significant and apparently year-round use of the Klamath River Canyon by prehistoric groups. Upland use, which corresponds more closely with the Thin Sheep Timber Sale area of analysis, was apparently associated with seasonal rounds conducted for subsistence needs.

Historically (post-1846), after the establishment of the Applegate Trail, the project area was used primarily for logging and ranching. Logging began in the1860s with a few small enterprising sawmills. The industry boomed in the early twentieth century both in and around the project area after the introduction of railroads on the Pokegama Plateau. Weyerhaeuser arrived in 1923 and began constructing logging roads. Early historic towns and mills in the region include Snow, Pokegama, and Dixie. This region was also crossed by numerous early and important travel routes including the Applegate Trail, Southern Oregon Wagon Road, Topsy Road, and Ward Road. Today logging and ranching continue to be significant in the area.

Additional information about cultural resources in the analysis area may be found in various overviews of the history and prehistory of the region (Beckham 2005, Follansbee and Pollack 1978, Mack 1991, and Spier 1930).

Cultural Resources – Environmental Consequences

No Action

Under the no action alternative, the known archaeological site would continue to be protected from ground disturbing activities. Treatments proposed in the future would be reviewed for cultural resources on a case by case basis and adverse effects will be avoided.

Proposed Action

All proposed treatment areas have been surveyed for cultural resources using BLM Class III survey methods. One archaeological site is known within the proposed treatment areas. A site form for this site has been forwarded to the Oregon State Historic Preservation Office (SHPO). The site will be avoided by creating a buffered area encompassing the identified resource, and the stands will not be treated within the buffer. Thus, no adverse effects to cultural resources are anticipated as a result of this alternative.

Cumulative Impacts

Under all action alternatives, the potential to encounter, or disturb, subsurface archaeological deposits appears limited based on regional survey results and the nature of disturbances anticipated. Protection measures (flagging and avoidance, buffers, and boundary adjustments) implemented for past actions have been effective in preventing impacts to cultural resources and will continue to be used to avoid impacts for current and future activities.

Recreation Resources - Affected Environment

The analysis area provides opportunities for dispersed recreation such as hunting, fishing, off-highway vehicle driving, camping, sightseeing, snowmobiling, and mountain biking. Nearby recreation facilities with some level of development include Topsy campground and an extensive network of forest roads. Private timber land roads provide access off of Highway 66 to the Johnson/Sheepy Creek area and BLM land parcels.

The analysis area currently receives light dispersed recreation use most times of the year. A potential recreation site in Section 31 (Greensprings Highway) was identified for development in the RMP/ROD. The proposed National Applegate Historic trail traverses private land between Section 29 and 31 within the analysis area.

For additional information about recreation resources in the analysis area, reference the Jenny Creek Watershed analysis, pages 173 through 179. For general information about recreation in the area, refer to the Klamath Falls RMP/ROD pages 47-53, and RMP maps 2-8 and 2-10.

Recreation Resources - Environmental Consequences

No Action
Opportunities to pursue recreation resources are expected to continue unchanged under this alternative.

Proposed Action
Only temporary, minor disruption to recreational users would occur during treatment activities. Short-term disturbances to recreationists from log truck traffic, equipment noise, dust and smoke associated with treatment activities would be expected. A positive recreation benefit of treatment activities could occur through the increased availability of firewood and enhanced mushroom gathering opportunities.

The impacts associated with the proposed selective harvest or thinning, riparian treatments and fuel reduction as described in the Proposed Action would not exceed or even approach those described in the Klamath Falls Resource Area Final RMP (pages 4-104-108). Closing short spur roads would have minimal effect on recreationists; some positive and some negative depending on the nature of the activities in which they participate. Although approximately 1.2 miles of the existing roads would be closed, road density per square mile would remain relatively high and recreationists would still be able to access much the same as before. The type of timber harvest proposed for Section 31 would maintain the potential for recreation development of the Greensprings Highway site. See Appendix B for suggested Project Design Features and Mitigation related to recreation resources.

Cumulative Effects
Cumulative effects from either alternative are expected to be negligible, except in the event of a large scale wildfire that would significantly affect recreational use.

Visual Resources - Affected Environment

The BLM has a basic stewardship responsibility to identify and protect scenic values on public lands. This is accomplished through the Visual Resource Management (VRM) program. Through this program, all BLM lands are inventoried and managed in specific VRM classes. The analysis area contains lands that are managed under the following BLM Visual Resources Management (VRM) Classes:

VRM Class II: Within the analysis area, the west portion of Section 31 and all but the SE corner of Section 7 are within the VRM class II area. VRM Class II management objectives are for low levels of change to the characteristic landscape. Management activities may be seen but should not attract attention.

VRM Class III: All of the BLM Section 33 lands are within the VRM Class III area. Management objectives for VRM Class III are to manage for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer.

VRM Class IV: The remainder of the analysis area not listed above is comprised of VRM Class IV lands. Management objectives for VRM Class IV are to manage for moderate levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention.

For additional information about scenic resources in the analysis area, refer to the Klamath Falls RMP/ROD pages 43-44, and RMP maps 2-5.

Visual Resources - Environmental Consequences

No Action
Current scenery will remain unchanged except for gradual changes as the stands age and additional trees die from insects and disease. No short term effects on visual resources would be expected, however there

is a greater likelihood of widespread insect mortality and catastrophic fire, which would greatly affect long term scenic resources.

Proposed Action
Proposed treatment activities would have minimal negative effects on visual resources. Maintaining an uneven-aged, multi-strata stand structure and reducing competition and stress to reserve trees, will reduce the impact to visual resources.

Long-term management of visual resources within the analysis area will likely be positively affected by proposed treatments, riparian reserve thinning, and follow-up prescribed fire activities. These treatments will reduce the risk of catastrophic wildfire and continued insect and disease related mortality within the project areas.

Some additional project design features (listed in Appendix B) have been proposed to reduce the visual effect of harvesting along major roads, within VRM class II areas and within 1/4 mile rural housing.

Cumulative Effects
Cumulative effects from either alternative are expected to be negligible, except in the event of a large scale wildfire which could drastically alter visual resources.

Socioeconomics – Affected Environment

The proposed action lies within an area that is used by a variety of the public for recreation, hunting, fishing, mushroom gathering, as well as other uses. The project area has provided a sustained supply of timber for processing in the surrounding communities including; Klamath Falls, Yreka, and Medford. Some timber has gone as far as Redding or Glide for processing. For every million board feet of timber harvested and processed in Oregon, approximately 10 jobs are generated, 8 in the lumber and plywood industry and 2 in the logging industry (Charnley, S., ed. – In press).

In addition to the timber value, the Klamath County Economic Development Association (KCEDA) has recently completed a biomass study to determine the feasibility of constructing a small sawlog mill and wood residue biomass plant in Klamath County (Continental Resource Solutions, Inc. 2004). The objectives would be to increase the utilization of smaller diameter material and logging residue typically burned in the forest. Additional benefits as indicated in the study would be employment opportunities within the county associated with biomass utilization as well as hazardous fuel reduction on thousands of acres of forest land. The proposed project will make available for utilization biomass material that typically is not processed for lumber or veneer. This could result in additional employment.

Socioeconomics – Environmental Consequences

No Action
The No Action alternative would affect local businesses primarily dependent upon forest products. Based upon the assumption above that for every 1 million feet of timber harvested, 10 jobs are generated, approximately 20 jobs either locally or within the community that processes the timber could be impacted. The No Action alternative should not result in any detectable socioeconomic change in regards to recreational uses. Hunting, fishing, and other recreational uses are expected to continue at the present level regardless of the No Action or Proposed Action.

Proposed Action
The proposed action would remove approximately 3.5 million board feet of timber (3.5 MMBF) and result in approximately 20 related jobs. The local area processes a considerable amount of timber and the proposed action is only a small percentage what is processed annually. The RMP states that the annual sale quantity for the Klamath Falls Resource Area from Matrix lands is approximately six million board feet (6MMBF). Processing facilities are dependent upon a stable, sustainable, and reliable supply of

timber. Continual litigation of timber sales on federal lands has decreased the stability of a sustainable supply. The cumulative effects of this instability are closures of processing facilities and the corresponding loss of jobs. Although private timberlands supply much of the present demand for timber, some of the present forest industrial infrastructure is dependent upon a sustainable supply of timber from federal lands. Timber Harvest from public lands in Klamath County has dropped from 312,149 MBF (67.6% of the total) in 1986 to 37,745 MBF (18.2% of the total) in 2002 (Continental Resource Solutions, Inc. 2004).

The Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act) (43 U.S.C. § 1181a, et seq.) provides the legal authority for the management of O&C lands by the Secretary of the Interior. The O&C Act requires that the 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 purposed of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, providing recreational facilities*…" The proposed action helps meet the objectives of the act by providing for needs identified above.

Other Considerations - Environmental Consequences

No direct or indirect disproportionately high or adverse human health or environmental effects to minority or low income populations are expected to result from implementation of either alternative. There would be no impact from implementation of either alternative on existing or potential development of energy sources.

CHAPTER 4 – CONSULTATION

Endangered Species Act (ESA) Consultation

Consultation with the U.S. Fish and Wildlife Service has been completed. A biological assessment dated June 28, 2006, addressed the actions proposed in the Thin Sheep Forest Heath Treatments EA. A determination of "May Affect, Not Likely to Adversely Affect" was made by the BLM for the northern spotted owl. A "No Effect" determination was made for all other listed species. The FWS concurred with this determination (concurrence letter July 17, 2006; 1-10-06-I-0145).

Tribal Consultation

This project has been presented to and discussed with members of The Klamath Tribes during regular bi-monthly consultation meetings.

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Appendix A – Bibliography

Agee, J.K., 1993. Fire Ecology of Pacific Northwest Forest. Island Press, Washington, D.C., 493 pages.

Andehnan, S.J. and A. Stock. 1994. Management, Research and Monitoring Priorities for the Conservation of Neotropical Migratory Landbirds that breed in Oregon. Washington Natural Heritage Program, Washington Department of Natural Resources, Olympia, Washington.

Atzet, Thomas and L.A. McCrimmon, 1990. Preliminary Plant Associations of the Southern Oregon Cascade Mountain Province. USDA Forest Service Pacific Northwest Region, Siskiyou National Forest.

Beckham, Stephen Dow, 2005. Upper Klamath River Canyon of Oregon and California: Historical Landscape Study. Manuscript on file at Bureau of Land Management, Klamath Falls Resource Area, Klamath Falls, Oregon.

Charnley, S., ed. [In press]. Northwest Forest Plan: the first ten years. Rural communities and economics. Gen. Tech. Rep. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Continental Resource Solutions, Inc., 2004. Biomass Feed Stock Assessment Site Identification Environmental and Financial Feasibility Study Critical Flaw Analysis. Klamath County Economic Development Association, Klamath County, Oregon.

Cross, Stephen P. and Anthony E. Kerwin 1995. Unpublished Report. Survey of Bats and Their Habitats in the Winema National Forest and the lakeview District BLM (Klamath Falls Resource Area) in 1994. Dept. of Biology . Southern Oregon State College. Ashland, OR.

DeBano, L.F., Folliott, P.F., Baker, M.B. Jr, 1996. Fire severity effects on water resources, in Proceedings of a Symposium held March 11-15, 1996, Tucson, Arizona. U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO, p. 77-84.

Follansbee, Julia A. and Nancy L. Pollock, 1978. Prehistory and History of the Jackson-Klamath Planning Unit: A Cultural Resources Overview. Manuscript on file at the Klamath Falls Resource Area, Bureau of Land Management.

Harr, R. D., 1976. Hydrology of small forest streams in western Oregon. USDA Forest Service Gen. Tech. Rep. PNW-GTR-55. 15 pages.

Hopkins, William E. 1979. Plant Associations of South Chiloquin and Klamath Ranger Districts – Winema National Forest. USDA Forest Service, Pacific Northwest Region, R6-Ecol-79-005.

Krzic, M., H. Page, R.F. Newman, and K. Broersma. 2004. Aspen regeneration, forage production, and soil compaction on harvested and grazed boreal aspen stands. BC Journal of Ecosystems and Management 5(2):30–38. URL: www.forrex.org/jem/2004/vol5/no2/art4.pdf

Mack, Joanne M., 1991. Upper Klamath River Canyon Prehistory. In Klamath River Canyon Prehistory and Ethnology, edited by Richard C. Hanes, pp. 1 – 110. Bureau of Land Management, Cultural Resource Series No. 8.

Marshall, D.B., M.G. Hunter, and A. L. Contreras (eds.). 2003. Birds of Oregon – A general reference. Oregon State University Press, Corvallis, Oregon.

Maurer, D. 2001. Free and Easy 2 Forest Management Project. Grants Pass Resource Area, Grants Pass, Oregon. EA Number OR-110-0015. Environmental Consequences Section, Resource: Soils and Water.

McLeod, A.J. 1988. A pilot study of soil compaction on skid trails and landings in the Prince George Forest Region. In Degradation of forested lands: Forest soils at risk. Proceedings, 10th B.C. Soil Science Workshop, February 1986. J.D. Lousier and G. Still (editors). B.C. Ministry of Forests, Victoria, B.C. Land Management Report No. 56.

Oregon Natural Heritage Program (ONHP). 2001. Rare, Threatened and Endangered Plants and Animals of Oregon. 101 pp. URL: http://www.abi.org/nhp/us/or/index.htm

Potter, A. 2002. Habitat Description and Survey Method Guidelines for Mardon Skipper. Washington Department of Fish and Wildlife, excerpted from: Mardon Skipper Range and Distribution in Washington in Relation to State and Federal Highways with a Habitat Description and Survey Method Guidelines, a report to the Washington Department of Transportation.

Saab, V. and T. Rich. 1997. Large-scale conservation assessment for neotropical migratory landbirds in the Interior Columbia River Basin. USDA Forest Service General Technical Report PNW-GTR-399, Portland, Oregon.

Smith, R.B. and E.F. Wass. 1976. Soil disturbance, vegetative cover and regeneration in clearcuts in the Nelson Forest District, British Columbia. Canadian Forest Service, Pacific Forest Research Centre, Victoria, B.C. BC-X-151.

Spier, Leslie, 1930. Klamath Ethnography. University of California Publications in American Archaeology and Ethnology, Volume 30, University of California Press, Berkeley, California.

Sullivan, K., T.E. Lisle, C.A. Dolloff, G.E. Grant, and L.M. Reid. 1987. Stream Channels: The link between forest and fishes. Pp-39-97 in Streamside Management; Forestry and Fishery interactions, E.O. Salo and T.W. Cundy eds. 1987. University of Washington, Institute of Forest Resources, Contribution No. 57. 467 pp.

Tuttle, Merlin D. 1997. America's Neighborhood Bats. Revised Edition. University of Texas Press. Austin, Texas.

USDA USDI 1994. U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management, 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. Portland, OR.

USDA USDI 2001. U.S. Department of Agriculture-Forest Service and U.S. Department of Interior-Bureau of Land Management (USFS and BLM). 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the range of the Northern Spotted Owl.

Survey Procedure for Northern Goshawk on National Forest Lands -1993 (USDA 2003),

USDI, Bureau of Land Management (BLM), 1991. Final Environmental Impact Statement, Vegetation Treatment on BLM Lands in Thirteen Western States.

USDI, Bureau of Land Management (BLM), July 21, 1993. KFRA Integrated Weed Control Plan EA (# OR-014-94-09). Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Bureau of Land Management (BLM), June 10, 1994. KFRA Fire Management EA (# OR-014-94-09). Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Bureau of Land Management (BLM), September 1994. Final KFRA Resource Management Plan and EIS (RMP FEIS). Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Bureau of Land Management (BLM), June 2, 1995. KFRA Resource Management Plan (RMP) Record of Decision (ROD) or (KFRA RMP/ROD). Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Bureau of Land Management (BLM), 1994. Jenny Creek Watershed Analysis. Medford Resource Area, Medford, Oregon.

USDI, Bureau of Land Management (BLM), June 1996. Topsy/Pokegama Landscape Analysis. Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Bureau of Land Management (BLM), 1999-2004. Annual Program Summary and Monitoring Reports (1999 to the present). Klamath Falls Resource Area, Klamath Falls, Oregon.

USDI, Fish and Wildlife Service (FWS), 2002. "Birds of Conservation Concern 2002". U.S. Fish and Wildlife Service, Portland, OR.

Verts, B.J. and L.N. Carraway. 1998. Land Mammals of Oregon. University of California Press, Berkeley/Los Angeles/London. 668 pages.

Appendix B – Summary of Best Management Practices and Project Design Features

Appendix D of the RMP (pages D1-D46) describes the Best Management Practices (BMPs) that are "designed to achieve the objectives of maintaining or improving water quality and soil productivity and the protection of riparian-wetland areas". Best management practices are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level (D-1, Appendix D, RMP). In addition to BMPs that focus on water quality and soil production, the interdisciplinary team also develops Project Design Features (PDF) with the objective of meeting other resource goals. For instance, the PDFs listed below under Wildlife and Vegetation are designed to meet resource objectives associated with these resources and not necessarily water quality. In addition, the PDFs listed under Recreation and Visual Resources are designed to meet objectives stated in the RMP for these respective resources. The list below is not an exclusive list of BMPs or PDFs for the Thin Sheep Forest Health Treatments. It is a list of the BMPs and PDFs that the interdisciplinary team found to be most pertinent for the proposed action. All of Appendix D as well as the Annual Program Monitoring Reports are used when developing the final operational specifications for a treatment.

Upland Forest Vegetation - Harvest Prescription

Density Management Harvests

- For uneven-aged stands, maintain a multi-strata stand structure.
- Thin around large old growth trees to improve vigor and reduce hazardous fuels risk.
- For stands with a basal area over 200 square feet/acre, thin to an average of 120 square feet/acre
- For stands with a basal area less than 200 square feet/acre, thin to an average of 90 square feet/acre.
- Generally retain the most dominant or co-dominant tree that is full crowned, vigorous, and disease free.
- Species selection priority: Sugar pine (highest), Douglas-fir, Ponderosa pine, Incense cedar, White fir (lowest).
- Retain (no thinning) isolated thermal clumps to provide variability in spacing and structure.

Roads

- The BMPs listed in Appendix D of the RMP provide standard management practices that are to be implemented.
- Seasonally restricting renovation activities is recommended to eliminate sediment transportation to streams.
- Installing drainage dips in accordance with RMP BMPs to reduce surface and ditchline run-off is recommended.
- Surfacing roads in accordance with RMP BMPs *(Roads C-1-8)* is recommended for all naturally surfaced roads not proposed for decommissioning or closure, to allow use during all seasons and is expected to minimize erosion from the road surfaces.
- Direction from the RMP ROD for Key Watersheds includes reducing road mileage and a no net increase in road mileage. Restoration of forest productivity including full decommissioning of roads within the Riparian Reserves upon completion of the project is recommended.
- Minimal or no grading of the existing roads will be done to maintain the existing ground cover and vegetation and to decrease sediment movement.
- Re-decommission roads that have been decommissioned but are opened for commercial treatments, non-commercial treatments, or prescribed fire use.
- When obliterating or fully decommissioning roads, remove road drainage features and fill in ditches, place slash and woody material on the road surface subsequent to ripping, and ensure that the road closure is adequate to ensure that vehicle access is eliminated.

- When obliterating or fully decommissioning roads within Riparian Reserves, plant native trees subsequent to road removal.

Soil Resources

- Limit detrimental soil conditions to less than 20 percent of the total acreage within the activity area. Use current soil quality indicators to monitor soil impacts. Sites where the 20 percent standard is exceeded will require treatment, such as ripping, backblading or seeding.
- To protect riparian areas, soil resources, and water quality while limiting erosion and sedimentation to nearby streams and drainages, do not allow logging operations during the wet season (October 15 to May 1).
- Limit mechanical cutting and yarding operations to periods when the soil moistures is below 20 percent at a six inch depth. Even lower soil moisture levels are preferable on fragile soils.
- Permit logging activities during this time period if frozen ground or sufficient snow is present. This is normally when snow depths are in excess of twenty (20) inches in depth.
- To protect soil resources and water quality, close unsurfaced roads during the wet season (October 30 to June 1) unless waived by authorized personnel.
- Residual slash will be placed upon skid trails upon completion of yarding.
- Avoid placement of skid trails in areas with potential to collect and divert surface runoff, such as the bottom of draws and ephemeral drainages.
- Retain and establish adequate vegetative cover in accordance with RMP BMP's to reduce erosion.
- Retain enough small woody (dead and down) material to sustain soil nutrients. See RMP BMP's for specifications. In ponderosa pine forest land, 9 tons per acre of duff and litter (approximately ½ inch deep).
- Seed and/or mulch exposed and disturbed soil surfaces with native seed when seed is available.
- Cable yarding and restricted use of mechanized equipment is required on slopes that are greater than 35 percent.
- Construct fireline by hand on slopes greater than 35 percent.
- Hand pile and burn within 100 feet of Riparian Reserves.

Hydrology & Riparian Reserve Treatments

Timber Harvest

- Delineate Riparian Reserve widths as described in the RMP (pg F-8, ROD pgs C-30 to 31). Refer to Table B-1 below.
- For understory vegetation treatments within older, multi-age stands within Riparian Reserves, delineate "no-cut" buffers along stream channels and wetland areas. No-cut widths would be 20 foot on each side of non-fish bearing stream channels and wetlands.
- Existing landings and roads within Riparian Reserves would be used only if replacing them with landings and roads outside the Riparian Reserves would result in greater overall disturbance to the Riparian Reserve or water quality.
- Avoid placement of skid trails and landings in areas with potential to collect and divert surface runoff such as the bottom of draws and ephemeral drainages.
- Harvest/treatments methods that would disturb the least amount of soil and vegetation (yarding over snow or frozen ground, limiting activities to the dry season, pulling line to each tree, and minimizing skid trails) would be used in the Riparian Reserves. Use of the 20-foot radial arm on the mechanical harvester to reach toward the boundary line of Riparian Reserves would occur wherever possible.
- Thin to a higher basal area (100-160 square feet per acre), favoring larger trees for shading and removing competing conifers around dominant pines.
- Consider retaining some downed logs for instream structural enhancement projects.

- No new permanent roads will be constructed within Riparian Reserves (except where construction or re-alignment of short road segments allows obliteration of longer road segments within Riparian Reserves).
- Yarding/skidding corridors that pass through Riparian Reserves will be designated prior to project implementation, will have a minimum spacing of 300 feet and be oriented perpendicular to streams, will have minimal relative slope, and will be revegetated following project implementation (as needed). Stream crossings will be selected at stable, naturally armored locations or will be armored with slash before being used as a corridor.
- Use of existing roads and landings within Riparian Reserves will be reviewed and approved by the Klamath Falls Resource Area interdisciplinary team.
- Mechanical treatments would be allowed in aspen stands only during periods when detrimental soil effects would be least likely to occur.

Table B-1: Riparian reserve types and widths from the KFRA RMP

Riparian Reserve Type	Reserve Width (for each side of streams/wetlands)
Fish-bearing streams	At a minimum, the reserve width will include: ▪ Slope distance equal to the height of two site potential trees (240 feet); or, ▪ The stream channel and the area extending to the top of the inner gorge; or, ▪ The area extending to the outer edges of riparian vegetation; or, ▪ The 100-year floodplain; or, ▪ The extent of unstable or potentially unstable areas, whichever is greatest.
Perennial non-fish-bearing streams and Intermittent (seasonal) non-fish-bearing streams and Constructed ponds and reservoirs and Wetlands greater than one acre	At a minimum, the reserve width will include: ▪ Slope distance equal to the height of one site potential tree (120 feet); or, ▪ The stream channel (or waterbody/wetland) and the area extending to the top of the inner gorge; or, ▪ The area extending to the outer edges of riparian vegetation; or, ▪ The 100-year floodplain (for streams) or the extent of seasonally saturated soil (for waterbodies and wetlands); or, ▪ The extent of unstable or potentially unstable areas, whichever is greatest.
Wetlands less than one acre and Unstable or potentially unstable areas	At a minimum, the reserve width will include: ▪ The wetland and the extent of seasonally saturated soil; or, ▪ The area extending to the outer edges of riparian vegetation; or, ▪ The extent of stable or potentially unstable areas, whichever is greatest.
Lakes and natural ponds	At a minimum, the reserve width will include: ▪ Slope distance equal to the height of two site potential trees (240 feet); and, ▪ The body of water or wetland and the area to the edges of riparian vegetation; ▪ The extent of seasonally saturated soil; ▪ The extent of unstable or potentially unstable areas; whichever is greatest.
Springs	Reserve widths vary according to the size of the associated wetland (see above).
*A site-potential tree is defined as the average maximum height of the tallest dominant trees (200 years old or more) for a given site class. In the Thin Sheep Forest Health Treatments project area, the site potential tree height was determined to be 140 feet.	

Fuels Reduction (Post-harvest)

Mechanical fuels treatments in Riparian Reserves:

- Treatment methods that would disturb the least amount of soil (yarding over snow or frozen ground, limiting activities to the dry season, pulling line to each tree, and minimizing skid trails) would be used in the Riparian Reserves.
- No ripping, piling, or mechanical site preparation (except for designated skid trails crossings, roads, or yarding corridors) would occur in Riparian Reserves.
- A no-mechanical-entry spacing for treatments would occur from the natural topographic break to the edge of the riparian area within the Riparian Reserve. In areas where a topographic break is not evident the following guidelines would be implemented: On perennial, intermittent, and/or fish bearing streams with slopes less than 20%, a 25-foot no entry buffer would be established from the edge of the riparian area and on slopes greater than 20%, a 50-foot no entry buffer would be established from the edge of the riparian area. In wetland areas, a 50-foot no entry buffer would be established from the edge of the riparian area.
- Stream crossings will be designated prior to project implementation, will have a minimum spacing of 300 feet and be oriented perpendicular to streams, will have minimal relative slope,

and will be revegetated following project implementation (as needed). Stream crossings will be selected at stable, naturally armored locations or will be armored with slash before being used as a corridor.
- Hand treatments would be recommended within the no-mechanical-entry zones in order to meet fuel management objectives.

Ignitions within Riparian Reserves:
- Ignition of broadcast fires should not occur within a minimum of 50 feet from the stream channel within the Riparian Reserves. The specific distance for lighting fires within the RR will depend on topography, habitat, ignition methods, and fuel moisture.
- Ignition line location nearest the stream should be based on topography and ignition methods and should be sufficient to protect water quality, CWD, and stream overhead cover. No ignition of CWD directly touching the high water mark of the stream, or of CWD that may be affected by high flows, should occur. Where there is thick vegetative cover that extends out from the stream, ignition lines should be located in the forest stand, away from the stream.
- Ignition lines near large open meadows, associated with the stream channels should be located at the toeslope above the meadow elevation as much as possible to protect meadow vegetation.
- Increased ignition spacing from the stream should occur when igniting fuels on the lower end of the window of moisture content to protect CWD and overhead cover components.

Roads and temporary fire trail access in Riparian Reserves:
- Use of existing roads and landings within the RR will be reviewed and approved by the resource advisor.

Streamside pumping sites:
- Pumping on small streams should not reduce the downstream flow of the stream by more than half the flow.
- If possible avoid the construction of temporary pump chances, when necessary use temporary plastic dams to create chances and remove these dams when not actively pumping.
- All pumping located on fish bearing streams must have a screen over the intake to avoid entrainment of small fish.
- Recommend that pump intake be suspended near the thalweg (deepest/highest quantity of flow) of the stream. Avoid placing pump intakes on the substrate or edges of the stream channel.

Post-fuels treatments for access roads and temporary fire trails:
- Install drainage dips, or water bars, in accordance with RMP BMPs to reduce surface run-off.
- A layer of duff (average of ½ inch after final burn) will be retained to protect soil from erosion during the wet season.
- Mulch and seeding or other methods of soil stabilization are to be applied to any exposed soil surfaces prior to the wet season to reduce surface erosion.
- Surfacing roads in accordance with RMP BMPs *(Roads C-1-8)* is recommended for all naturally surfaced roads not proposed for decommissioning or closure.
- Design blockages (close or decommission) upon completion of treatments to minimize non-authorized use of roads and trails within treatment areas.
- Place residual slash on trails upon completion of mechanical treatments.

Aspen Restoration
- Mechanical treatments would only be allowed in aspen stands during periods when detrimental soil effects would be least likely to occur.
- Consider leaving downed trees in aspen treatment areas as a natural exclosure for deer and elk and livestock.
- Leave conifers along cut banks from past logging activity for stability.

Wildlife Terrestrial Species

Snag Retention
Approximately 2.4 snags per acre will be retained with a minimum diameter at breast height (DBH) of 16", or largest available if less than 16" (RMP/ROD, Page 26-27).

Coarse Woody Debris (CWD)
Approximately one hundred and twenty (120) linear feet of down logs per acre will be retained. Logs shall be greater than or equal to sixteen (16) inches in diameter and sixteen (16) feet long (RMP/ROD, Page 22).

Seasonal Restrictions
Seasonal restrictions will be required where the following wildlife species are actively nesting: northern spotted owl and special status species. Seasonal restrictions for specific species can be found on pages 2-31 through 2-39 of the KFRA FEIS. For active northern goshawk nest sites, apply a seasonal restriction from April 1st – August 30th.

Nesting Areas
Protect nesting areas as described on pages 34 and 38 of KFRA RMP. For the great gray owl, a .25 mile no harvest buffer will be established around a nest tree and a 300 foot no harvest buffer will be laid out adjacent to meadows near the nest stand, as directed by the 2001 ROD for Survey and Manage species.

For units adjacent to or containing NRF habitat:

- Burn prescriptions will require proper fuel moisture and atmospheric conditions so adequate large woody debris will be retained for prey habitat.
- General objective for burn would be to create a mosaic of burned and unburned habitat in the unit to maintain some habitat for prey production.
- In NRF habitat maintain visual screening along open roadways to minimize disturbance.
- In northern spotted owl NRF habitat, maintain the understory structure by retaining a diversity of the sub-merchantable understory conifer trees (Douglas -fir, white-fir, sugar pine, cedar, ponderosa pine). In mechanical treatment areas this would be done by site-specific designs described in the individual task orders.
- During prescribed fire activities the overall objective is to create a mosaic of burned and unburned areas. Ignition techniques and pull back on smaller trees may also be used to maintain the understory structure.
- Retain untreated areas ranging from ¼ acre to 5 acres (thermal or wildlife clumps) within the treatment units to provide diversity for wildlife.
- During prescribed fire activities create a mosaic of burned and unburned areas to maintain a diversity of species and age classes of understory vegetation.
- Maintain habitat connectivity and corridors.
- In NRF habitat maintain a diversity of understory shrubs (islands of undisturbed shrubs), while still reducing the continuity of the fuel.

Noxious Weeds

- Require cleaning of all equipment and vehicles prior to moving on-site to prevent spread of noxious weeds. Also, if the job site includes a noxious weed infestation, require cleaning of all logging and construction equipment and vehicles prior to leaving the job site. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts could be accomplished by using a pressure hose to clean the equipment.
- Mow noxious weeds in the immediate area of yarding operations to ground level prior to seed development.
- Conduct monitoring activities related to proposed treatments as described in the Klamath Falls ROD

- Road graders used for road construction or maintenance would grade towards any known noxious weed infestations. If no good turn around area exists within one half mile that would allow the operator to grade towards the noxious weed infestation, then the operator would leave the material that is being moved within the boundaries of the noxious weed infestation.

Special Status Species

Provide snag mitigation measures for White-headed Woodpecker, Black-backed Woodpecker, Pygmy Nuthatch, and Flammulated Owl. Increase snag retention requirements from 1.9 to 2.5 snags per acre.

Cultural Resources

- Follow procedures for cultural protection and management outlined in the KFRA ROD/RMP (page 43), and protect identified sites by buffering.
- In accordance with guidelines and directives in the Klamath Falls Resource Area RMP, BLM regulations, and the National Historic Preservation Act, areas not included in previous archaeological surveys will be surveyed before any ground-disturbing action is undertaken.

Visual Resources

Maintain scenic quality as follows along the access roads leading to the west portion of Section 31 and all but the SE corner of Section 7 (within the VRM class II area) and along State Highway 66:

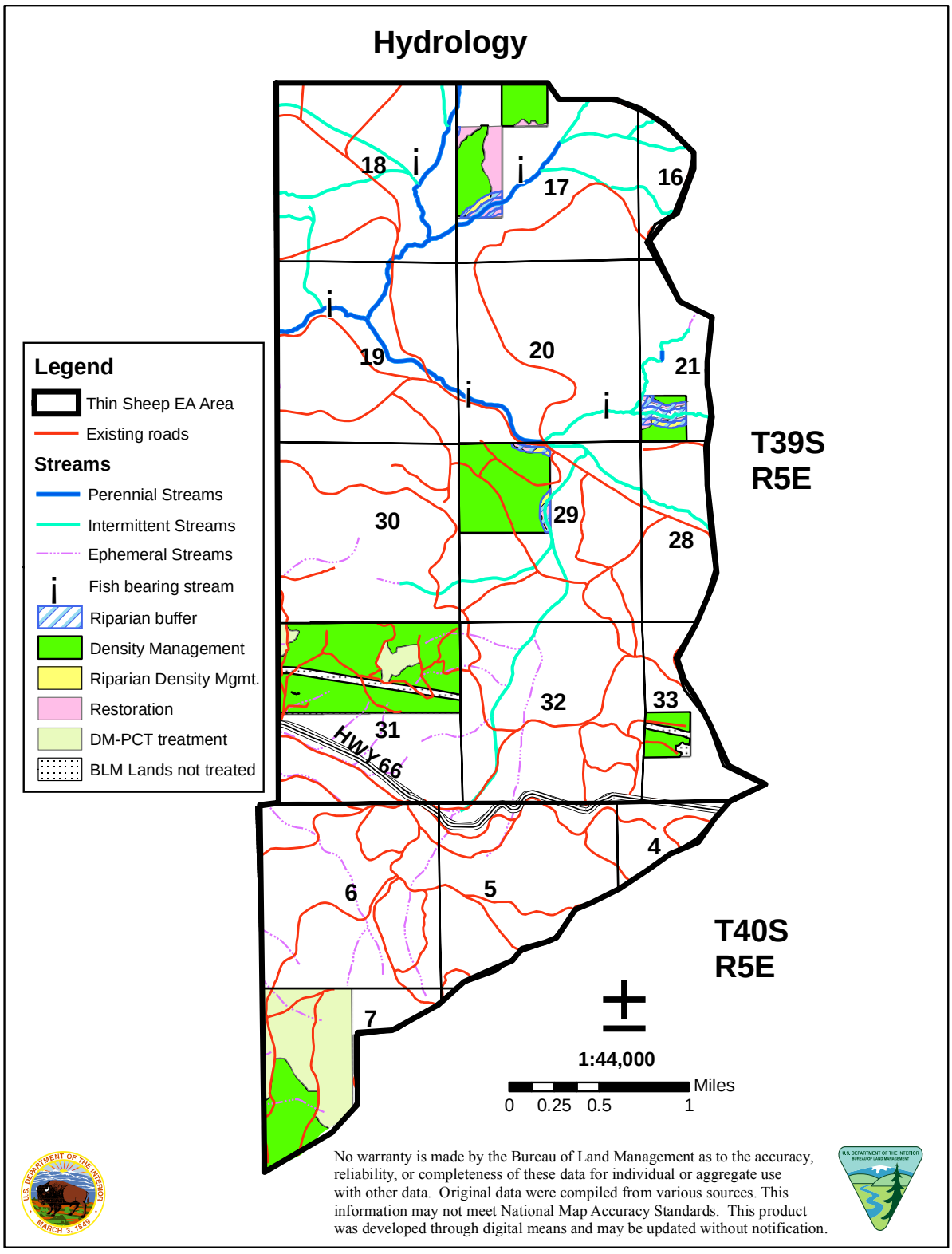
- Retain a variety of size classes of trees including large Ponderosa pine, Douglas fir and Incense cedar
- Small (hand) piles of slash dispersed for firewood gathering
- Avoid large landings/log decks, obvious skid trails and minimal ground disturbance near these major roads.
- Mechanical shearing and chainsaw cutting of small trees should be done as close to ground level as practical, to reduce negative visual impacts.
- Where possible, maintain visual screening along roadways.
- Within existing and potential recreation sites, concentrated recreation use areas, or Special Areas, implement the following design features to reduce visual effects from harvesting:
- Cut stumps close to ground (less than 4 inches).
- Disperse small (hand) piles of slash for firewood use.
- Minimize use of tree marking paint on trees identified for harvest.
- Do not create large landings.
- Minimize number of skid trails and amount of ground disturbance
- Minimize damage to residual trees through careful timber falling.
- All treatments will meet appropriate Visual Class objectives specified in the KFRA ROD/RMP (page 44).

Recreation Resources

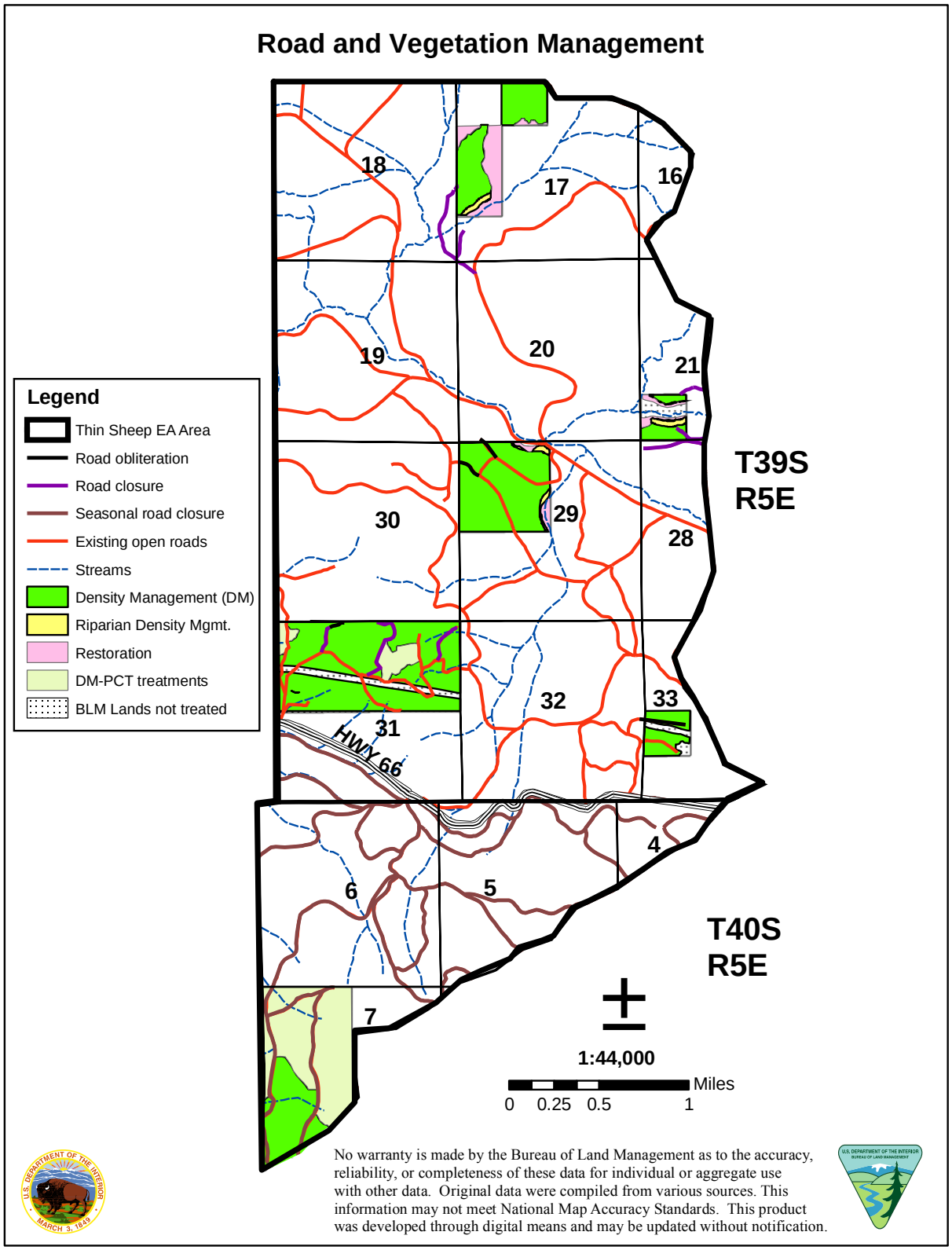
- Ensure that purchaser signs haul routes to alert recreationists to truck traffic in the area. Highway flaggers may be needed to warn traffic along Highway 66 of operations.
- Ensure that dust abatement and frequent grading occurs on haul routes, especially near more popular recreation areas such as Topsy campground and access to the upper Klamath River, or other parking/staging areas.
- Coordination between snowmobile operations and winter time harvesting operations will be done annually.
- In addition, the haul route shall be signed to caution users that log truck traffic is occurring along the road.
- During any winter harvesting operations, all subcontractors working in the Contract Area shall be advised of snowmobile traffic.

Appendix C – Project Maps

Map 1 – Hydrology of the Project Area



Map 2 – Proposed Road and Vegetation Management



Appendix D – 2001 ROD Compliance Review (Survey & Manage Wildlife and Botany Species)

2001 ROD Compliance Review: Survey & Manage Wildlife and Botany Species

Environmental Analysis File
Lakeview District BLM – Klamath Falls Field Office

Project Name: Thin Sheep **Prepared By:** Molly Juillerat and Rob Roninger
Project Type: Forest Health Treatments **Date:** March 22, 2006
Location: T39S R5E Sec.17, 21, 29, 31, 33; T40S R5E Sec.7 S**&M List Date:** December 29, 2003

Species listed below (Table D-1) were compiled from the 2003 Annual Species Review (IM 2004-034) and include those vertebrate and non vertebrate wildlife and non vascular and vascular botanical species whose known or suspected range includes the Klamath Falls Resource Area according to the protocols listed below. There are no known sites for Category B, D, E, and F species.

- *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants Version 2.0 (December 1998)*
- *Management Recommendations for Survey and Manage Lichens Version 2.0 (*March 2000),
- *Natural History and Management Considerations for the Northwest Forest Plan Survey and Manage Lichens Based on Information as of the Year 2000* (USDA Forest Service R6-NR-S&M-TP-03-03 2003). *Survey Protocols for Survey and Manage Category A & C Lichens in the Northwest Forest Plan Area Version 2.1* (2003),
- *2003 Amendment to the Survey Protocol for Survey and Manage Category A and C Lichens Version 2.1* (2003),
- *Survey Protocols for Survey and Manage Component 2 Bryophytes Version 2.0* (1997),
- *Survey and Manage Protocols Protection Buffer Bryophytes 2.0* (1999),
- *Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan (*PNW-GTR-476 October 1999), and *Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan* (PNW-GTR-572 January 2003).
- *Survey Protocol for the Great Gray Owl within the Range of the Northwest Forest Plan v3.0* (Jan. 2004),
- *Survey Protocol Aquatic Mollusk Species From the Northwest Forest Plan Version 2.0* (Oct. 1997),
- *Draft Survey Protocol for Terrestrial Mollusk Species From the Northwest Forest Plan Version 2.0* (1997), and the
- *Survey Protocol for S&M Terrestrial Mollusk Species v3.0* (Feb. 2003).

Statement of Compliance. Pre-disturbance surveys and management of known sites required by protocol standards to comply with the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines* (as the 2001 ROD was amended or modified as of March 21, 2004) were completed for the Thin Sheep Timber Sale and Fuels Treatment. The Thin Sheep Timber Sale and Fuels Treatment also complies with any site management for any Category B, D, and E species as identified in the 2001 ROD (as modified): no sites of any of these species (B, D, E) is present in the planning area.

Based on the survey results, there are currently 2 known sites of Survey & Manage species that require management within the project area. Therefore, based on the preceding information (refer to Table D-1 below) regarding the status of surveys for Survey & Manage wildlife species and the results of those surveys, it is my determination that the Thin Sheep Timber Sale and Fuels Treatment complies with the provisions of the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines* (as the 2001

ROD was amended or modified as of March 21, 2004). For the foregoing reasons, this contract is in compliance with the 2001 ROD as stated in Point (3) on page 14 of the January 9, 2006, Court order in Northwest Ecosystem Alliance et al. v. Rey et al.

_____*D.K. Hoffheins*_____ _____8/1/06_____

Don Hoffheins, Acting Field Manager Date
Klamath Falls Field Office

Table D-1: Survey & Manage Wildlife and Botany Species.

Species	S&M Category	Survey Triggers			Survey Results			Site Management
Species	**S&M Category**	**Survey Triggers**			**Survey Results**			**Site Management**
		Within Range of the Species?	**Project Contains Suitable habitat?**	**Project may negatively affect species/ habitat?**	**Surveys Required?**	**Survey Date**	**Sites Known or Found?**	
Vertebrates								
Great Gray Owl (*Strix nebulosa*)[1]	A	Yes	Yes	Yes	Yes	March-July, 1999 Feb.-June, 2000	1	.25 mile meadow buffer 300 ft. nest tree buffer
Mollusks								
Siskiyou Sideband (*Monadenia chaceana*)[2]	B	Yes	Yes	Yes	Yes	April/May, 2006	0	N/A
Crater Lake Tightcoil (*Pristiloma arcticum crateris*)[3]	A	Yes	Yes	Yes	Yes	April/May, 2006	0	N/A
Evening Fieldslug (*Deroceras hesperium*)[4]	B[4]	Yes	Yes	Yes	Yes	April/May, 2006	0	N/A
Fluminicola no. 3 [5]	A	Yes	Yes	Yes	Yes	June, 2006	0	N/A
Fluminicola no. 16 [5]	A	Yes	Yes	Yes	Yes	June, 2006	0	N/A
Vascular Plants								
Cypripedium fasciculatum	C	**Yes**	Yes	Yes	Yes	June/2004	0	N/A
Cypripediium montanum	C	**Yes**	Yes	Yes	Yes	June/2004	1	Excluded from unit
Bryophytes								
Tritomaria exsectiformis [6]	B	**Yes**	Yes	Yes	Yes	May 2006	0	N/A

[1] Pre-disturbance surveys for great gray owls are required since there is suitable nesting habitat within the project area. The required habitat characteristics of suitable habitat include: (1) large diameter nest trees, (2) forest for roosting cover, and (3) proximity [within 200m] to openings that could be used as foraging areas (Survey Protocol for the Great Gray Owl within the range of the Northwest Forest Plan v3.0, January 12, 2004). Surveys for the great gray owl were conducted in 2003 using the 1995 protocol and in 2004 using the new protocol, both designed to meet Survey and Manage standards including the 2001 Survey and Manage Standards and Guidelines. Survey protocols used were "Great Gray Owl Survey protocol (1995)", and "Survey protocol for the Great Gray Owl within the Range of the Northwest Forest Plan (2004)." No great gray owls were located.

[2] Equivalent-effort pre-disturbance surveys are required for the Siskiyou Sideband (IM-OR-2004-034). (Survey Protocol for S&M Terrestrial Mollusk Species v3.0, 2003). Timber harvest that results in an average 40% canopy is

usually considered detrimental to local populations (pg 11 Conservation Assessment for *M. chaceana* 2005). The planned action would maintain canopy closure an average of 40% or greater in potential habitat for *M. chaceana*. High priority habitat for *M.chaceana* on the KFRA are rocky outcrops, riparian and seepy areas (Nancy Duncan personal communication, 2005). Surveys were completed in June of 2006 and no sites were found within the project area.

[3] Suitable habitat for the Crater Lake tightcoil is "perennially wet situations in mature conifer forests, among rushes, mosses and other surface vegetation or under rocks and woody debris within 10 meters of open water in wetlands, springs, seeps and riparian areas…" (pg. 43, Survey Protocol for S&M Terrestrial Mollusk Species v3.0, 2003). Within the project, suitable habitat is confined to the stream-side areas that are contained within Riparian Reserves. Surveys were completed in June of 2006 and no sites were found within the project area.

[4] The evening field slug's range was extended to include the KFRA in March 2003 (pg 2 and 3 2002 Annual Species Review and Appendix A, page 32 - Survey Protocol for S&M Terrestrial Mollusk Species v3.0, 2003). The evening field slug is "associated with perennially wet meadows in forest habitats, suitable habitat may be considered to be limited to moist surface vegetation and cover objects within 30m of perennial wetlands, springs, seeps and riparian areas." (pg. 8, Conservation Assessment for *Deroceras hesparium*, Evening field slug, September 2005 Nancy Duncan) Surveys were completed in June of 2006 and no sites were found within the project area.

[5] *Fluminicola* sp no. 3 and no. 16 are found in cold seeps and springs (Aquatic Mollusk Survey Protocol Version 2.0 October 1997). Surveys were completed in June of 2006 and no sites were found within the project area.

[6] *Tritomaria exsectiformis* is a Category B species that requires Equivalent Effort surveys only if the project is within old growth. The Thin Sheep project area does not meet old growth (>180 year stand) but it has some old growth components. Therefore surveys were done in defined suitable habitat; "low volume, perennial water flow at or near springs and seeps, along very gentle topographic gradients." (pg. 3 Conservation Assessment for Tritomaria exsectiformis Harpel and Dewey July 2005) No sites were found.

Appendix E – Key Findings for the Northern Spotted Owl

Review and Summary of Key Findings Regarding the Northern Spotted Owl

The most important conservation concerns addressed in the reports are: 1) the precipitous NSO population declines in Washington, and declining trends in the three northern Oregon demographic areas, as described by Anthony et al. 2004; and 2) the three major current threats identified by Courtney et al. (2004), i.e., lag effects from prior harvest of suitable habitat, habitat loss due to wildfire in portions of the range, and competition from Barred Owls.

Anthony et al. (2004) indicated that NSO populations were doing poorest in Washington, with precipitous declines on all four study areas. The number of populations that declined, and the rate at which they declined, were noteworthy (Anthony et al. 2004). In northern Oregon, NSO population declines were noted in all three study areas. The declines in northern Oregon were less than those in Washington, except in the Warm Springs study area, where the decline was comparable to those in Washington (Anthony et al. 2004). The NSO has continued to decline in the northern portion of its range, despite the presence of a high proportion of protected habitat on federal lands in that area. Although Courtney et al. (2004) indicated that population declines of the NSO over the past 14 years were expected; they concluded that the accelerating downward trends on some study areas in Washington where little timber harvest was taking place suggest that something other than timber harvest is responsible for the decline. Anthony et al. (2004) stated that determining the cause of this decline was beyond the scope of their study, and that they could only speculate among the numerous possibilities, including competition from Barred Owls, loss of habitat from wildfire, timber harvest including lag effects from prior harvest, poor weather conditions, and defoliation from insect infestations. Considering the fact that the NSO is a predator species, Anthony et al. (2004) also noted the complexities of relationships of prey abundance on predator populations, and identified declines in prey abundance as another possible reason for declines in apparent survival of NSO.

In southern Oregon and northern California, NSO populations were more stationary than in Washington (Anthony et al. 2004). The fact that NSO populations in some portions of the range were stationary was not expected within the first ten years, given the general prediction of continued declines in the population over the first several decades of Northwest Forest Plan (NWFP) implementation (Lint 2005). The cause of the better demographic performance on the southern Oregon and northern California study areas, and the cause of greater than expected declines on the Washington study areas are both unknown (Anthony et al. 2004). Courtney et al. (2004) noted that a rangewide population decline was not unexpected during the first decade, nor was it a reason to doubt the effectiveness of the core NWFP conservation strategy.

Lint (2005) indicated that loss of NSO habitat did not exceed the rate expected under the NWFP, and that habitat conditions are no worse, and perhaps better than expected. In particular, the percent of existing NSO habitat removed by harvest during the first decade was less than expected. Courtney et al. (2004) indicated that models of habitat growth suggest that there is significant ingrowth and development of habitat throughout the federal landscape. Courtney et al. (2004) also noted that management of matrix habitat has had a lower impact on NSO populations than predicted. Owls are breeding in substantial numbers in some matrix areas. The Riparian Reserve strategy and other habitat management guidelines for the matrix area appear to preserve more, better, and better-distributed dispersal habitat than earlier strategies, and there is no evidence to suggest that dispersal habitat is currently limiting to the species in general (Courtney et al. 2004). Anthony et al. (2004) noted declining NSO populations on some study areas with little harvest, and stationary populations on other areas with consistent harvest of mature forest. No simple correlation was found between population declines and timber harvest patterns (Courtney et al. 2004). Because it was not clear if additional protection of NSO habitat would reverse the population trends, and because the results of their study did not identify the causes of those trends, Anthony et al. (2004) declined to make any recommendations to alter the current NWFP management strategy.

Reductions of NSO habitat on federal lands are lower than those originally anticipated by the Service and the NWFP (Courtney et al. 2004). The threat posed by current and ongoing timber harvest on federal lands has been greatly reduced since 1990, primarily because of the NWFP (Courtney et al. 2004). The effects of past habitat loss due to timber harvest may persist due to time-lag effects. Although noting that it is probably having a reduced effect now as compared to 1990, Courtney et al. (2004) identified past habitat loss due to timber harvest as a current threat. The primary current source of habitat loss is catastrophic wildfire (Courtney et al. 2004). Although the total amount of habitat affected by wildfires has been small, there is concern for potential losses associated with uncharacteristic wildfire in a portion of the species range. Lint (2005) indicated that the NWFP recognized wildfire as an inherent part of managing NSO habitat in certain portions of the range. Courtney et al. (2004) stated that the risk to NSO habitat due to uncharacteristic stand replacement fires is sub-regional, confined to the dry eastern and to a lesser extent the southern fringes of the NSO range. Wildfires accounted for 75 percent of the natural disturbance loss of habitat estimated for the first decade of NWFP implementation (Courtney et al. 2004). Lint (2005) cautioned against relying solely on the repetitive design of the conservation strategy to mitigate effects of catastrophic wildfire events, and highlighted the potential to influence fire and fire effects through active management.

Anthony et al. (2004) indicated that there is some evidence that Barred Owls may have had a negative effect on NSO survival in the northern portion of the NSO range. They found little evidence for such effects in Oregon or California. The threat from Barred Owl competition has not yet been studied to determine whether it is a cause or a symptom of NSO population declines, and the reports indicate a need to examine threats from Barred Owl competition.

The synergistic effects of past threats and new threats are unknown. Though the science behind the NWFP appears valid, new threats from Barred Owls, and potential threats* from West Nile Virus and Sudden Oak Death may result in NSO populations in reserves falling to lower levels (and at a faster rate) than originally anticipated. Courtney et al. (2004) distinguish between operational threats (perceived as currently negatively influencing the status of the NSO) and potential threats (factors that could become operational threats in 15-20 years, or factors that may be threatening the NSO currently and for which the extent of the threat is uncertain). If they occur, such declines could affect NSO recovery (Courtney et al. 2004). According to Courtney et al. (2004), there exists a potential for habitat loss due to Sudden Oak Death in the southern portion of the range, however the threat is of uncertain proportions. In addition, Courtney et al. (2004) indicated there is no way to predict the impact of West Nile Virus, which is also identified as a potential threat. The reports do not provide supporting analysis or recommendations regarding how to deal with these potential threats. Courtney et al. (2004) concluded that the risks currently faced by the NSO are significant, and their qualitative evaluation is that the risks are comparable in magnitude to those faced by the species in 1990.

According to the USFWS (November 2004), the current scientific information, including information showing declines in Washington, northern Oregon, and Canada, indicates that the NSO continues to meet the definition of a threatened species. Populations are still relatively numerous over most of the species' historic range, which suggests that the threat of extinction is not imminent, and that the subspecies is not endangered even in the northern part of its range where greater than expected population declines were documented (USFWS, November 2004). The USFWS (November 2004) did not consider the increased risk to NSO populations due to the uncertainties surrounding Barred Owls and other factors sufficient to reclassify the species to endangered at this time.

In summary, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with Barred Owls, and habitat loss due to wildfire were identified as current threats; West Nile Virus and Sudden Oak Death were identified as potential new

threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding Barred Owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time. The reports did not include recommendations regarding potential changes to the basic conservation strategy underlying the NWFP; however they did identify opportunities for further study.

The full reports are accessible on the internet at the following addresses:
Courtney et al. 2004: http://www.sei.org/owl/finalreport/finalreport.htm
Anthony et al. 2004: http://www.reo.gov/monitoring/trends/Compiled%20Report%20091404.pdf
USFWS, Nov. 2004: http://www.fws.gov/pacific/ecoservices/endangered/recovery/5yearcomplete.html
Lint, Technical Coordinator, 2005: http://www.reo.gov/monitoring/10yr-report/northern-spotted-owl/documents/owl_text%20and%20tables.pdf

* Courtney et al. (2004) distinguish between operational threats (perceived as currently negatively influencing the status of the NSO) and potential threats (factors that could become operational threats in 15-20 years, or factors that may be threatening the NSO currently and for which the extent of the threat is uncertain).