COLD ONION FOREST HEALTH TREATMENTS
ENVIRONMENTAL ASSESSMENT (EA) # OR-014-08-01

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 Cold Onion 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. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. 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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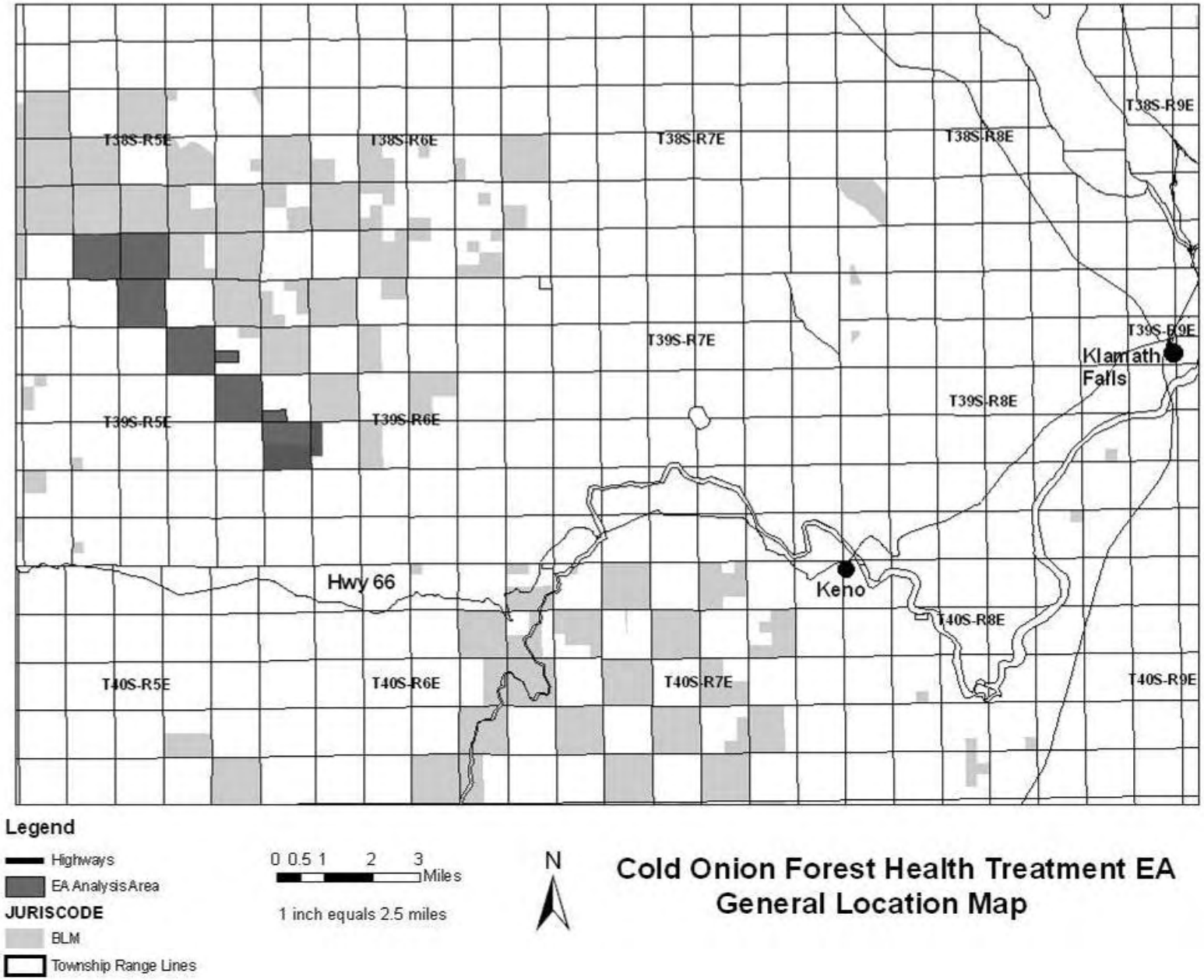
Figure 1 – General Location Map of the Project Area



CHAPTER 1 - INTRODUCTION

The Cold Onion Forest Health Treatments Environmental Assessment (EA) analyzes the effects of proposed vegetation treatments and other management actions in and adjacent to the Cold Onion project area on BLM lands shown in Table 1 and on the Location Map (Figure 1). Many of the stands in the proposed Cold Onion 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, hand piling and burning, grazing, and recreation.

The 2008 Klamath Falls Resource Management Plan (2008 RMP) provides direction for managing lands on the western part of the Bureau of Land Management (BLM) Lakeview District. At the time that the planning and analysis of these Cold Onion Forest Health Treatments was being completed, management of BLM lands was based on direction in the 1995 Klamath Falls Resource Area Resource Management Plan (1995 RMP). On December 30, 2008 the Record of Decision and Resource Management Plan (2008 ROD) was signed for the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (October, 2008) including the Klamath Falls Resource Area.

Revision of a resource management plan necessarily involves a transition from the application of the old resource management plan to the application of the new resource management plan. A transition from the old resource management plan to the new resource management plan avoids disruption of the management of BLM-administered lands and allows the BLM to utilize work already begun on the planning and analysis of projects. Since the planning and design for this project was initiated prior to the 2008 ROD, this environmental assessment contains certain project elements that are not the same as the management direction contained in the 2008 RMP.

The aspects of this project that are based on the 1995 RMP but are different from the 2008 RMP include:

- Matrix Lands – The 1995 RMP identified the West Side General Forest Management Area as Matrix with the primary direction to manage the forested lands under uneven-age/multiple canopy management harvest prescriptions. The 2008 RMP designates most of these West Side lands as an Uneven-Age Timber Management Area, again with the direction to utilize uneven-age management prescriptions. The differences as they pertain to this project proposal are likely imperceptible. This analysis and the proposed action will refer to Matrix lands as identified in the 1995 RMP.
- District Designated Reserves – Under the 1995 RMP, these reserves were designed to provide for and manage Northern spotted owl (NSO) nesting, roosting and foraging habitat. Management Direction for Northern spotted owl habitat is also provided for under the 2008 RMP in the Late-Successional Management Areas and Deferred Timber Management Areas guidelines. This analysis and the proposed action is to manage the District Designated Reserves as outlined in the 1995 RMP.
- District Designated Reserve Buffers – These are areas that are managed with a mix of objectives of both the Matrix and District Designated Reserves described above and outlined in the 1995 RMP. A comparable land use allocation is not found in the 2008 RMP. The District Designated Reserves are now part of the Deferred Timber Management Areas, Late Successional Management Areas, or Uneven-Age Management Areas under the 2008 RMP. the proposed action is to manage the District Designated Reserve Buffers as identified in the 1995 RMP which is reflected in the analysis.
- Riparian Reserves - The 1995 RMP included designation and management of riparian reserves. These reserves were designed to manage lands along streams and water bodies (designated with specific “buffer” widths around each water feature) to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection. The 2008 RMP established Riparian Management Areas with similar objectives,

although the 2008 RMP the buffer widths are generally narrower. This proposed action maintains the wider buffer widths of Riparian Reserves as identified in the 1995 RMP.

- Aquatic Conservation Strategy – The Aquatic Conservation Strategy (ACS) was a component of the 1995 RMP and included four components (riparian reserves, key watersheds, watershed analysis, and watershed restoration). In combination with application of pertinent Standards and Guidelines, the ACS was expected to move federal land management toward maintaining and restoring ecosystem health at watershed and landscape scales. Similarly, the 2008 RMP has management direction for riparian ecosystem health that is accomplished through management of riparian management areas. This analysis includes descriptions of the ACS objectives despite that not being required under the 2008 RMP.

The 2008 ROD anticipated these inconsistencies and projected they would not alter the analysis of effects at the scale of the associated final environmental impact statement. This project meets the requirements designated in the 2008 ROD for RMP transition projects because:

1. A decision was not signed prior to the effective date of the 2008 ROD.
2. Preparation of National Environmental Policy Act documentation began prior to the effective date of the 2008 ROD.
3. A decision on the project will be signed within two years of the effective date of the 2008 ROD Regeneration harvest would not occur in a late-successional management area or deferred timber management area.
4. There would be no destruction or adverse modification of critical habitat designated for species listed as endangered or threatened under the Endangered Species Act.

Note also that ROD or RMP page numbers referenced in this environmental assessment refer to the 1995 ROD and RMP.

Proposed Action

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

Matrix Vegetation Treatments

- Density management thinning (precommercial and commercial timber harvest) – approximately 1000 acres
- Broadcast under burning (prescribed fire) – approximately 900 acres
- Precommercial plantation thinning and yarding – approximately 260 acres
- Small commercial plantation thinning and yarding – approximately 180 acres
- Silvicultural Treatments (progeny site brushing and interplanting pine) - approximately 15 acres

District Designated Reserve Vegetation Treatments

- Density management thinning (commercial timber harvest) – approximately 30 acres
- Non-commercial thinning and fuels treatments – Up to 150 acres
- Hand piling and burning of existing slash – approximately 40 acres

Riparian Reserve Vegetation Treatments

- Density Management - Thinning (Commercial Timber Harvest) – Approximately 30 acres
- Broadcast under burning (prescribed fire) – approximately 34 acres (included in matrix vegetation treatments)
- Aspen restoration through thinning / piling and prescribed fire – approximately 100 acres

Road Treatments

- Road improvement (resurfacing) – Approximately 3.0 miles
- Road renovation (grading & brushing – road maintenance) – Approximately 14 miles
- Road closures (blocking) existing and potential – Approximately 19 miles

- Road obliteration – Approximately 0.7 miles
- Replace 2 culverts to facilitate fish passage and reduce sedimentation
- No new road construction

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
Cold Onion treatments	39S. 39S. 38S.	5E. 6E. 5E.	3, 11, 12, 13 18, 19, 20 28, 33, 34

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 fuel hazards associated with high fuel loading and overstocking that makes these stands vulnerable to stand replacing wildfires.
- Restore fire dependant processes and historic stand composition and structure.
- 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. Most of these stands are lacking the desired species composition described under the Desired Future Conditions section. (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, and Page E-8 of the KFRA RMP.) Some stands are being impacted by insects and disease and need to be treated to stop the spread and decrease the loss in commercial value of the timber. Trees within densely stocked stands are generally more susceptible to stress and vulnerable to further attack by insects and diseases. There is a need to reduce the density to improve growing conditions (reduce competition for water, nutrients and light) and increase the vigor of the remaining trees on approximately 1600 acres of dense, overstocked forested stands in the proposed area.

The RMP has allocated the lands being analyzed to Matrix, District Designated Reserve (DDR) 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.

There is a need to thin the smaller, non-merchantable trees as well as apply fire to the stands to reduce fire hazard and reintroduce fire into the ecosystem. The overstocked stands have excessive surface, ladder, and canopy fuels that result in an increased risk, in terms of greater fire intensity, severity, and resistance to

control. The southwest aspect makes this area especially vulnerable to wildfire, due to the drier fuels and increased afternoon fuel temperature.

The project is located within the Northern California Mixed Conifer Biophysical Setting, which is a Fire Regime I. This fire dependant ecosystem historically experienced primarily short-interval (10-20 yr) surface fires with occasional mixed severity- and replacement fires (30-100 yr intervals), (Agee 1993, Agee 1994, Kilgore 1973, McNeil & Zobel 1980, Skinner & Chang 1996, Taylor 1998). It generally has not experienced fire in at least 100 years, due to fragmentation, grazing, and fire suppression. Consequently, the project area is currently in Condition Class III.

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).

Page E-9 of the RMP discusses target stand, uneven-aged management 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 Cold Onion Forest Health Treatments silvicultural prescription was developed to meet these desired future conditions.

District Designated Reserves (DDR) and District Designated Reserve Buffers (DDRB)

The objective of the DDR is to protect and enhance conditions of late-successional and old growth forests, which serve as habitat for late-successional species including the northern spotted owl (ROD 1995 pp 18). These areas are not subject to scheduled timber harvest but harvest will be allowed to attain or maintain old growth characteristics (ROD 1995 pp 32). The desired future condition is to maintain a functional, interacting late successional and old growth ecosystem (ROD 1995 pp 18).

The DDRB is part of the timber management (matrix) land base and part of the regular timber harvest schedule but have many of the management objectives of the Designated District Reserves (ROD 1995 pp. 24). The objective is to protect and enhance conditions of late-successional and old growth forests, which serve as habitat for late-successional species including the northern spotted owl (ROD 1995 pp 23). Management in the buffers is designed to reduce the risk of natural disturbances (ROD 1995 pp 24). The desired future condition is to maintain a functional, interacting late successional and old growth ecosystem (ROD 1995 pp 23).

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 Strategy Objectives 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
- provide fish passage

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 comparing to 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 disclose the effects to 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 an approximate five year period. Information obtained from biological surveys and consultation is included in the EA and will also be incorporated in the final Decision Records for this EA.

Public Input Summary and Issue Development

A scoping letter dated October 15, 2007 for the Cold Onion Forest Health Treatment EA was sent to the resource area timber sale EA mailing list of approximately 110 people. The letter explained the project proposal and asked the general public for comments. The resource area received comments from four individuals / organizations. 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 will be addresses in the following sections of this EA.

Issues

Roads – upgrade existing roads; improve fish passage and stream crossings; avoid new road construction; and reduce road density
Vegetation – use variable density thinning in young stands; leave trees with old growth characteristics and trees over 20 inches DBH; retain and protect under represented trees and shrubs; maintain connectivity, habitat diversity and important ecological functions; manage to retain special status plants; and avoid spread of noxious weeds
Hydrology and Fisheries – follow Northwest Forest Plan (NWFP) guidelines for fisheries; retain adequate stream buffers; and follow the Aquatic Conservation Strategy to maintain water quality
Wildlife – avoid a “take” for the Northern Spotted owl; protect goshawks, other rare birds and old growth dependent species; avoid impacts to raptor nests; and retain snags and coarse woody debris (CWD)
Soils – minimize disturbance from tractor yarding and maintain soil integrity
Fuels – reduce fuels to lower the potential hazard and risk of wildfire
Range – reduce and/or remove livestock grazing
Other – the current watershed analysis may be inadequate; analyze cumulative impacts; and monitor the on the ground actions

Management Direction and Conformance with Existing Plans

This Environmental Assessment (EA) is tiered to the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (2008) including the Klamath Falls Resource Area. The proposed actions are consistent with the management direction and

guidance in the 2008 Record of Decision and Resource Management Plan (ROD/RMP) for the Klamath Falls Resource Area. The project design and recommendations for implementation are contained in the ROD/RMP and a number of other supporting documents including:

- 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.
- 2007 Final Supplement to the 2004 FSEIS (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) to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines.
- 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

Three 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, reduce fuel hazard conditions, restore fire dependant processes and stand composition and provide a sustainable supply of timber. Table 2 shows the specific design of the Proposed Action. A description of these actions follows:

Westside Matrix Forest Lands

Density Management/Variable Density: Commercial density management including understory, precommercial thinning would occur on approximately 1,000 acres of westside matrix lands. Generally, a variable density ranging from 80 to 180 square feet of basal area per acre will be retained in the Density Management Units, with the average stand basal area being 100 to 140 square feet per acre. Approximately 320 acres of density management would occur in DDRB, and higher densities averaging 160 square feet of basal per acre would be retained. 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). Figure 2 below illustrates the approximate stand composition (trees per acre) of various size classes that would remain after treatment (retention trees).

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).

Cruise & Volume Estimate Proposal: To help derive an accurate volume estimate, destructive sampling may be used, better known as 3P fall, buck and scale sampling. Sample trees will only be hand felled, less than 1% sample averaging less than one tree per acre. See Other Project Design Features for Sample Tree Felling In Appendix B.

Proposed Harvest Methods

Cable Logging: Approximately 100 acres is proposed to be skyline cable yarded due to slopes exceeding 35%. These areas have been analyzed and front end suspension of the logs being yarded is feasible. No yarding through Riparian Reserves will occur but tail holds for the skyline may be necessary across Riparian Reserves to obtain adequate deflection. (See Map of proposed cable and ground based harvesting units).

Ground Based Mechanized Harvesting: Approximately 900 Acres is proposed to be ground based yarded and trees less 28 inches DBH could be harvested mechanically within this area. Yarding would be done with rubber tire skidders or tracked machines on designated skid roads.

Reforestation: Patch Cuts and other non-stocked openings within the EA analysis area could be planted with native plant species following treatments.

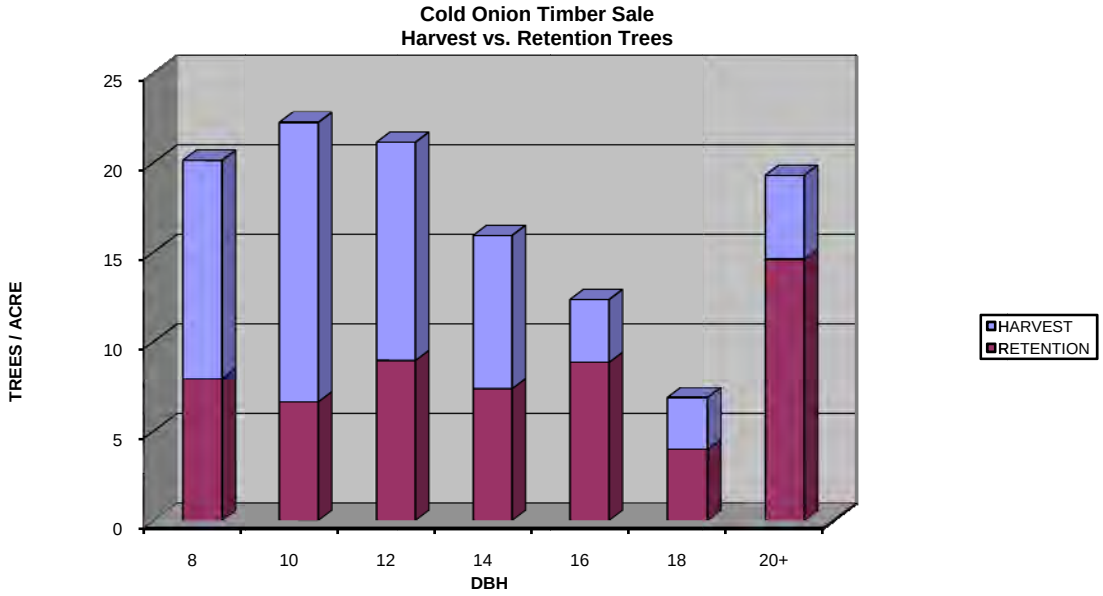
Table 2: Detailed Description of the Alternatives

Project Element	Proposed Action	Regeneration Harvest Alternative
Westside Matrix Forest Lands		
Density Management (commercial thinning) Harvest Method Cable Logging Ground Based Mechanized Harvesting	approximately 1000 acres approximately 100 acres approximately 900 acres	approximately 850 acres approximately 40 acres approximately 810 acres
Regeneration Harvest with planting Harvest Method Cable Logging Ground Based Mechanized Harvesting	0 acres approximately 0 acres approximately 0 acres	approximately 150 acres approximately 60 acres approximately 90 acres
Broadcast underburning (prescribed fire)	approximately 900 acres	approximately 960 acres
Small commercial plantation thinning and yarding	approximately 180 acres	approximately 180 acres
Precommercial plantation thinning and yarding	approximately 260 acres	approximately 260 acres
Burning or chipping on landing piles	entire analysis area	entire analysis area
Aspen restoration through thinning / piling and prescribed fire	approximately 100 acres	approximately 100 acres
District Designated Reserve		
Density Management (commercial thinning)	approximately 30 acres	approximately 30 acres
Non-commercial thinning and fuels treatments	approximately 150 acres	approximately 150 acres
Hand piling and burning of existing slash	approximately 40 acres	approximately 40 acres
Riparian Reserves		
Density Management (commercial thinning)	approximately 30 acres	approximately 30 acres
Other riparian restoration/thinning	approximately 100 acres	approximately 100 acres
Broadcast underburning (prescribed fire)	approximately 34 acres*	approximately 34 acres*
Road Treatments and Transportation Management		
Replace culvert	2	2
Road improvement (resurfacing)	approximately 3 miles	approximately 3 miles
Renovation (grading & brushing – road maintenance)	approximately 14 miles	approximately 14 miles
Road closures (Blocking)	approximately 19 miles	approximately 19 miles
Road obliteration	approximately 0.7 miles	approximately 0.7 miles
New road construction	0	0

District Designated Reserves

Density Management/Variable Density – Commercial density management would occur on approximately 30 acres within the District Designated Reserves (DDR). The treatment would be similar to the Matrix lands above except the basal area retained would be higher. Basal area retention will range from 120 to 200 square feet of basal area per acre with an average of 160. Non-commercial thinning and various fuels treatments would occur on up to 150 acres within the remaining DDR areas. Proposed treatments are compatible with the KFRA LSR Assessment, approved by the Regional Ecosystem Office on 9/27/2004, pages 30 and 52.

Figure 2 – Proposed Stand Composition (trees/acre) by Diameter Class (Proposed Action)
(developed from systematic random variable plots, approximately 1 plot for every 10 acres)



Riparian Reserves

Approximately 30 acres of commercial Density Management (DM) would occur in Riparian Reserves. 90 percent of this area would be cable yarded and only hand felling would occur. The other 10 percent would be ground based yarded on designated skid roads and cutting would be done both by hand and mechanically. The objective is to reduce the stand density in the Riparian Reserve and improve the resiliency of the remaining trees. Up to 100 acres of aspen restoration and thinning could also occur. This would be accomplished using a combination of prescribed fire and hand falling

Fuels Treatment

- Up to 260 acres would be precommercially thinned and yarded, and up to 180 acres of small commercial pine plantation would be thinned and yarded (See Map???). These are outside the area proposed for the commercial Density Management thinning treatment.
- Up to 900 acres may be underburned and /or piled and burned. This includes a portion of the Density Management thinning area.
- District Designated Reserve - The portion of the District Designated Reserve being treated commercially would be handpiled and burned.
- The remaining portion of the Density Management thinning area will be reviewed upon completion of the thinning to determine what single or combination of treatments will be implemented to further reduce fuels. Unless the thinning activities sufficiently reduce the fuel load, additional proposed treatments include thinning / piling and burning, and/or use of a low intensity under burn with prescribed fire to further reduce fuel hazards. This treatment would occur in the Matrix, District Designated Reserve and Riparian Reserve allocations. The objectives of the underburn prescribed fire would include consumption of >30% of the post-harvest fuel loading and mortality of <5% of all trees ≥8" DBH. The prescribed fire action includes preparation of the burn area, planned ignition, and minimal mop-up. Burn area preparation includes construction of fireline, improvement of existing trails, and scattering of existing fuel. A burn plan will be prepared specific to the objectives of this document, burning will be accomplished in accordance with the burn plan. Landing piles within the entire EA analysis area would be burned or chipped.

Roads and Transportation System

- Approximately 3.0 miles of road would receive additional surface rock (road improvement).
- Approximately 14 miles of road would be brushed, and graded, and the ditches and culverts cleaned (road renovation).
- Two culverts in Cold Creek and Onion Springs would be replaced to facilitate aquatic species passage, reduce sedimentation, and reduce failure risk.
- Approximately 19 miles of road would have year-around road blocks (15.7 miles of existing closures and 3.6 of additional closures) and 0.7 miles would be obliterated (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.

Regeneration Harvest Alternative

The Regeneration Harvest alternative is designed to meet the purpose and need of the EA by establishing a new healthy forest stand where an old decadent stand currently exists. Also to reduce fuel hazard conditions, restore fire dependant processes and stand composition, and provide a sustainable supply of timber. The RMP/ROD allows for up to 1,310 acres of regeneration harvest per decade in matrix stands that are older than 150 years. During the first 12 years under this plan (6/1995 to 9/2007) approximately 227 acres of regeneration harvest occurred. Table 2 shows the specific design of this alternative. A description of these actions is as follows:

Regeneration Harvest/Density Management/Variable Density

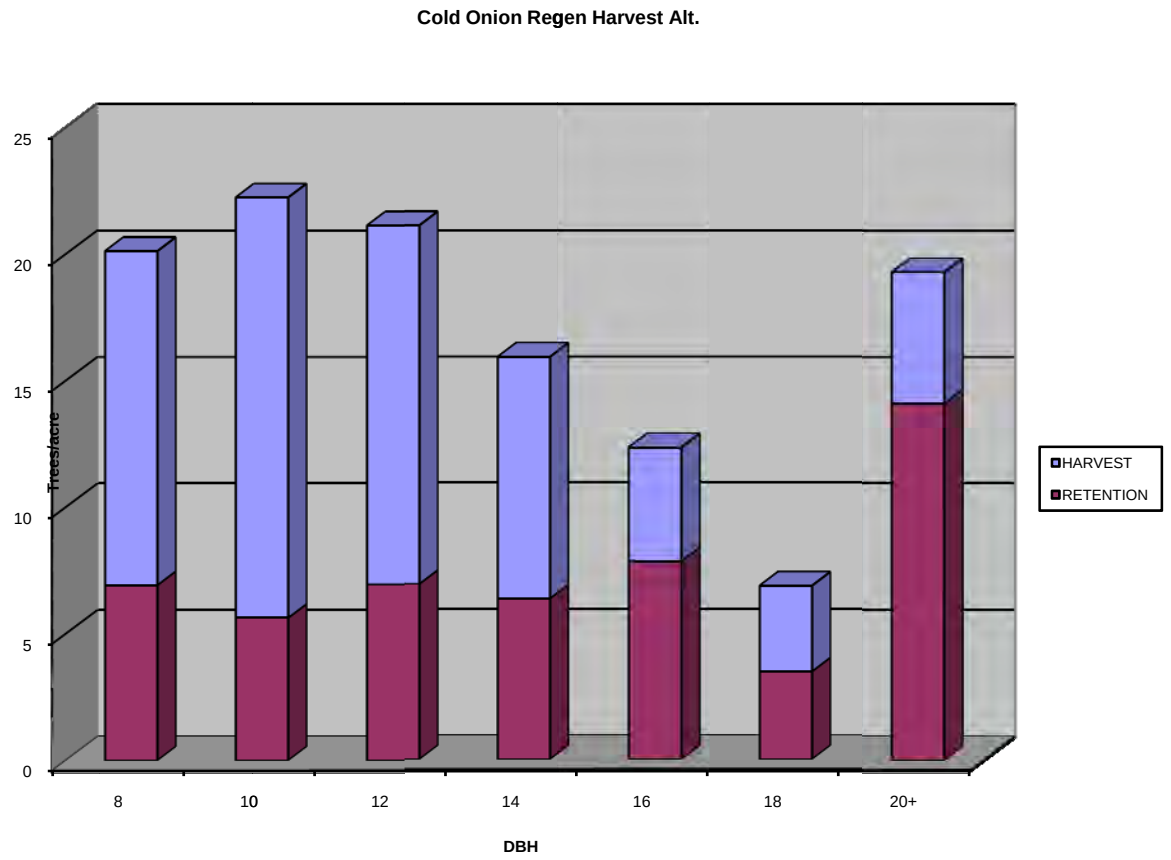
Regeneration harvest would occur on approximately 150 acres of westside matrix lands. This type of harvest would be designed to establish a new stand of trees under the 16-25 large green trees per acre which would be retained (RMP/ROD, Page 56). Generally, regeneration is established by planting following site preparation, although there sometimes are patches of suitable natural regeneration remaining after harvest. Figure 3 below illustrates the approximate stand composition (trees per acre) of various size classes that would remain after treatment (retention trees). Since the regeneration harvest only occurs on 15% of the proposed commercial treatment area, there is only a slight change in the overall stand composition as indicted by comparing Figures 2 and 3. Density Management would occur on approximately 850 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. To help derive an accurate volume, destructive sampling may be used, better known as 3P fall, buck and scale sampling. Less than 1% of the trees selected for harvest would be destructively sampled.

The proposed harvest methods are the same as in the proposed action only the silvicultural prescription applied to these acres differs. Approximately 60 acres of regeneration harvest and 40 acres of density management would be cable yarded, and 90 acres of regeneration harvest and 810 acres of density management would be ground base yarded.

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). Riparian reserve treatments would be the same as the Proposed Action.

The regeneration harvest units and other openings within the EA analysis area could be planted with native plant species following treatments.

Figure 3 – Proposed Stand Composition (trees/acre) by Diameter Class (Regeneration Harvest)



(Developed from systematic random variable plots, approximately 1 plot for every 10 acres.)

Fuels Treatment

Fuels treatments would be similar as to those described for the Proposed Action with the addition of broadcast under-burning 60 acres of regeneration harvest, in section 33, as site preparation for planting. The specific burning treatment would be determined based on the residual fuels remaining after the harvest. If the volume of residual fuels is high and burning would likely cause excessive mortality of the leave trees, then piling and burning would be utilized as the alternative treatment.

Actions in District Designated Reserves, Riparian Reserves and Roads and Transportation Systems would be the same as the Proposed Action.

No Action Alternative

Although the National Environmental Policy Act (NEPA) does not require analysis of a No Action alternative the effects of "No Action" is included here to identify future vegetative trends and be used as the baseline for cumulative effects. This alternative proposes no new management activities in the project area although there will be a continuation of the current management. Vegetation will continue to grow with no specific management actions applied, although fire suppression of potential stand replacing wildfires would occur. Recreational and administrative use of transportation facilities will continue. Management of private land, adjacent forest service managed land and adjoining BLM district lands within the watershed would continue. Activities proposed in and adjacent to the analysis area as analyzed in other NEPA documents would still occur.

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 Cold Onion 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. The prescribed fire treatments require mechanical pre-treatment to be successfully implemented without excessive mortality and containment issues.

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 (piling 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.

Alternatives Analyzed under the Western Oregon Plan Revisions

The alternatives analyzed in the October 2008 Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management, although reasonably foreseeable, are still in process and subject to change based on subsequent administrative remedies. They, therefore, provide insufficient information for meaningful consideration at this time (see *NAEC v. Kempthorne*, 457 F.3d 969, 979-80 (9th Cir. 2006) finding it lawful to consider the cumulative effects in the later broad-scale planning analysis).

Additionally, the purpose of this current proposal is to implement the existing Klamath Falls Resource Management Plan (RMP). This EA has been prepared to determine if any significant environmental effects of the proposal are expected or if effects are substantially greater than what has already been analyzed in the existing RMP's programmatic EIS. The EIS associated with the current Western Oregon Plan Revisions contains a cumulative effects analysis that incorporates these implementation actions (projected to occur under the existing plan as the "No Action" alternative, and possible ongoing actions carried forward into the action alternatives), in a manner appropriate to the land use planning scale. The Western Oregon Plan Revision EIS therefore serves as the appropriate vehicle for analyzing the cumulative effects of each land use alternative's management scheme. Any potentially cumulative effects of this proposal at the programmatic level that would be relevant to the proposed plan revision will be considered in that process.

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter summarizes the physical, biological, and socioeconomic environment of the Cold Onion 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 Record of Decision and RMP, and the Klamath Falls Resource Area RMP and FEIS (pages 3-3 to 3-79) and the Jenny Creek Watershed Analysis (pg 5 - 112). The analysis supporting this decision tiers to the 2008 Final Environmental Impact Statement for the Revision of the 1995 Klamath Falls Resource Area Resource Management Plan.

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). These past events are 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 therefore is also 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. 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 the 5th field watershed and 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 Cold Onion 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 2,000 acres of density management 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 Proposed on BLM lands in the Jenny Creek 5th Field Watershed

Treatment	Approximate Volume	Approximate Acres	Anticipated Year
Kent Oval Forest Health Treatment	4.0 MMBF	700	2011
North Frosty Forest Health Treatment	6.0 MMBF	1000	2012
Plateau Thin (Medford District)	8 - 10 MMBF	2100	2008 or 2009
Fuels treatments	None	4577	2008-2013

As mentioned above, management activities that could be implemented under the pending Western Oregon Plan Revisions are reasonably foreseeable. For information in the potential effects of these actions refer to the Western Oregon Plan Revision EIS.

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, white fir and Shasta red fir. Many of the stands have been selectively cut in the past leaving an array of trees sizes and ages. Tree sizes range to over 30"DBH. Tree ages range from one to over 200 years old. From the 1950's through 2000, most of these stands were entered once or more for selective thinning, mortality salvage, 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.

The BLM-administered lands within the proposed project area have been classified using the Standard Landscape method 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. Thinning and under burn treatments would be beneficial in reducing ladder fuels, surface fuels, increasing crown height and spacing, and shifting the species composition to fire adapted species. 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 fire mortality.

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

Vascular Plants – All BLM lands within the analysis area have been surveyed for special status vascular plant species. Portions of the area were surveyed in 2002, and the remainder of the area was surveyed in 2006. No Bureau sensitive vascular plants were found within the analysis area. Populations of green-flowered wild ginger (*Asarum wagneri*) were found within the area. Green-flowered wild ginger was a Bureau sensitive species at the time of the survey, but subsequent changes in the Oregon/Washington special status species lists removed green-flowered wild ginger from any of these lists.

Nonvascular Plants – Surveys of proposed analysis area for special status fungi species have not been conducted recently. Table 4 lists special status nonvascular plant species that are documented or suspected in the resource area. The range and habitat of these species is not well known. Extensive surveys under the former Survey and Manage program identified some habitat requirements for some of these species. Management of known sites, conservation assessment plans and ongoing data collection will help better identify potential habitat.

Table 4: Special Status nonvascular plant species that could occur in the project area

Taxa	Species	Special Status Category	Suspected or Documented
BR	*Chiloscyphus gemmiparus*	OR-SEN	S
BR	*Helodium blandowii*	OR-SEN	S
BR	*Pseudocalliergon trifarium*	OR-SEN	S
BR	*Schistidium clinclidodonteum*	OR-SEN	S
BR	*Tortula mucronifolia*	OR-SEN	S
BR	*Tritomaria exsectiformis*	OR-SEN	S
FU	*Boletus pulcherrimus*	SEN	D
FU	*Gomphus kauffmanii*	SEN	S
FU	*Otidea smithii*	SEN	S
FU	*Pseudorhizina californica*	SEN	D
FU	*Rhizopogon ellipsosporus*	OR-SEN	S
FU	*Sowerbyella rhenana*	SEN	S
LI	*Texosporium sancti-jacobi*	OR-SEN	S

OR-SEN (Bureau Sensitive-Oregon), SEN (Bureau Senstive-Oregon and Washington)

Noxious Weeds

All BLM lands within the analysis area have been surveyed for noxious weeds. Portions of the area were surveyed in 2002, and the remainder of the area was surveyed in 2006. The only noxious weed species found that are targeted for control by the resource area were three patches of St. John's wort (*Hypericum perforatum*) which were found along roadsides in the southwest quarter of Section 11.

Vegetation - Environmental Consequences

Upland Forest

No Action

This alternative would result in no immediate timber harvesting in the Project Area. A combination of precommercial thinning / piling 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 thinning / piling and would not be killed in a low-intensity under burn prescription. Fire intensity sufficient to kill trees of this size would likely kill many trees in the stand and would be difficult to contain. Trees killed by fire but not removed will further increase the fuel loading. Hand cutting and piling / burning of live or dead trees would be cost prohibitive. Without some means to thin the larger than eight inch 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, which would in turn create early seral vegetation, high brush and more insect populations in the fire killed trees.

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 conifer 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 piling and burning.

Proposed Action

Density Management thinning in combination with follow-up fuel reduction treatments (thinning / piling & low-intensity underburn) 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 described 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 thinning 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.

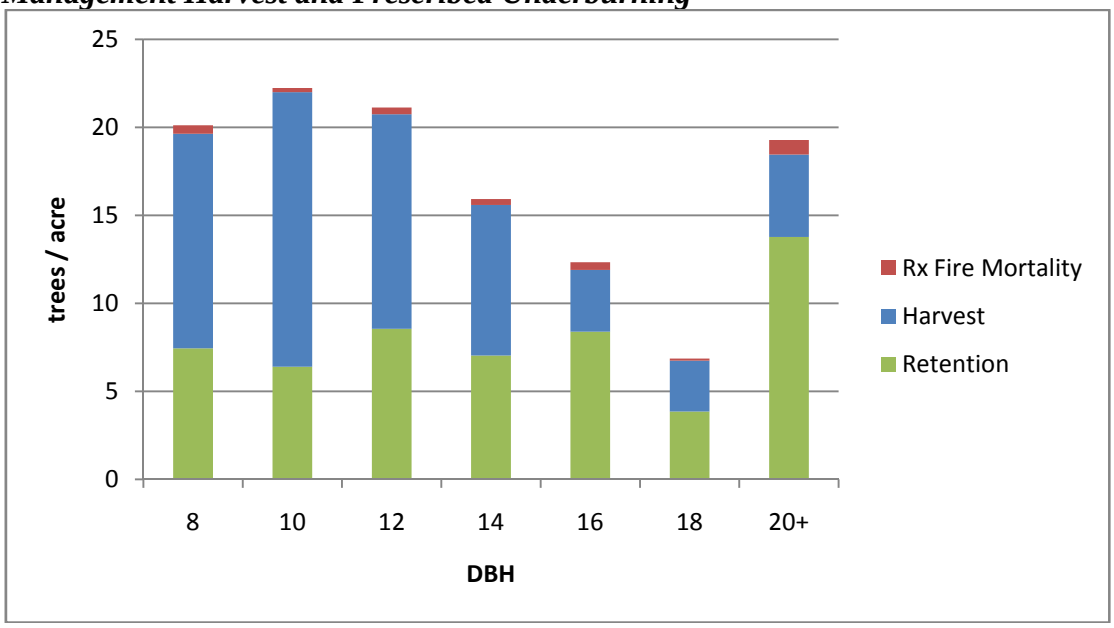
Monitoring of Northern spotted owl density and telemetry studies in the KFRA indicate post harvested stands are continuing to be utilized by the owls as primarily dispersal habitat. Effects from previously harvested sales on this side of the resource area have been monitored and reveal that in many post 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, 2002-2007).

Forest health would be improved in the treated areas resulting in a decreased risk of mortality due to disease, insects, wildfire, and competition. 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 underburning is expected to reduce fuel loadings and kill some vegetation. The desired fire behavior would include one-foot average flame lengths. Depending on a variety of environmental factors, the post-harvest arrangement and loading of fuels, and ignition pattern, the actual fire intensity may differ somewhat. Within the units proposed for underburning, the primary fuel model is expected to be similar to TL4 (small downed logs) after harvest activities are complete. This fuel model typically has a low rate of spread and low flame lengths. BEHAVE predicts flame lengths of less than one-foot in this fuel model, under the environmental conditions that would likely be prescribed in the burn plan. The FOFEM 5.7 (First Order Fire Effects Model) predicts 5% tree mortality (≥8" DBH) for the underburn. This model uses bark thickness and percent crown volume scorched as predictive variables. As reported in Hood *et al.* 2007, this model typically predicts mortality within ±20%. The objective for the prescribed fire would be to obtain <5% mortality of all trees ≥8" DBH estimated one year after ignition.

Figure 4 – Expected Stand Composition (trees/acre) by Diameter Class Following Density Management Harvest and Prescribed Underburning



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.

Destructive sampling could occur on less than 1% of the trees (no more than one (1) tree per acre), designated for harvest to help derive a more accurate volume. These trees would be felled and bucked prior to the sale, and then scaled for volume. The logs would then be yarded along with the other trees designed for cutting under the timber sale. The only additional impact of this activity would be the loss of the volume associated with these sample trees if the timber sale does not occur. There would be no discernible or measurable impact to the habitat or forest vegetation from falling less than one tree per acre in the units designated for harvesting.

Assessment of 15% Standard and Guide – The Northwest Forest Plan and the 1995 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 (February 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 approximately 2,000 acres 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 1999-2007). 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 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.

Regeneration Harvest Alternative

Regeneration harvest would occur on 150 acres, and 850 acres that would be treated under density management practices. The regeneration harvest treatment would require that 16-25 large green trees per acre be left for each prescription unit. This requirement reduces the impact to late successional dependent species by maintaining a certain amount of connectivity, crown closure, and residual structure. Post harvest, the following characteristics are expected to remain: all foraging habitat, some roosting habitat, some late successional habitat, and canopy closure of at least 50%. There may be an increase in organic debris on the forest floor in the form of slash accumulation, which may reduce germination of native vegetation for a time. However, follow up treatments of prescribed burns would eliminate the slash and allow for an increase in germination.

The density management thinned acres would have the same environmental consequences as mentioned above under the proposed action. Also the effects of the destructive sampling would be the same as in the proposed action.

Special Status Plant Species

No Action

Surveys found no populations of special status plant species. Therefore, no effect is expected.

Cumulative Effects of No Action

Surveys found no populations of special status plant species. Therefore, since no effect is expected, there are no cumulative effects.

Proposed Action and Regeneration Alternative

Surveys found no populations of special status plant species. Therefore, no effect is expected.

Cumulative Effects of Proposed Action

Surveys found no populations of special status plant species. Therefore, no effect is expected.

Noxious Weeds

No Action

The No Action alternative would not create the physically disturbed conditions under which many noxious weeds have a competitive advantage, nor would there be project activities that would have the potential to spread existing noxious weed populations. Impacts would occur only as described in other NEPA documents.

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 some noxious weeds 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 applied. 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 probable 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 the introduction and 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 treatment 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.

Regeneration Harvest Alternative

There will be higher light levels in the areas treated the regeneration harvest than the density management thinned areas. This may increase the likelihood of inadvertent introduction of invasive plant species.

Terrestrial Wildlife Species – Affected Environment

This section focuses on those species considered special status species and may be affected from management activities. These will include those species listed under the Endangered Species Act (ESA - listed, proposed and candidate species), those species listed under the BLM special status species policy as Bureau Sensitive, and land birds classified as Species of Concern by the U.S. Fish and Wildlife Service. Table 5 is a list of terrestrial wildlife species that may be affected and were considered during the analysis for this EA. For a list of other species and a description of their habitat that may occur in the proposed project area, refer to the 1995 Klamath Falls Resource Area FEIS (pages 3-37 to 3-41). A complete list of BLM Special Status Species that occur on the Lakeview District, Klamath Falls Resource may be found at http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy.

Table 5: Species associated with habitat types occurring in the project area potentially affected by proposed actions

Type	Common Name	Scientific Name	Status	Key Habitat Association within the KFRA	Comments
Bird	Northern Spotted Owl	*Strix occidentalis caurina*	Federally Threatened	Foraging- Mature/Late Successional Mixed Conifer Nesting – Mature/Late Successional Mixed Conifer	Surveyed –Five known nest territories within the analysis area. The EA Analysis Area is not within Designated Critical Habitat.
Bird	White-headed Woodpecker	*Picoides albolarvatus*	BLM Sensitive FWS BCC	Forging - Large Ponderosa Pine Nesting – Large Snags	Documented within the EA Analysis Area
Bird	Northern Goshawk	*Accipiter gentilis*	FWS BCC	Foraging -Mature Mixed Conifer Nesting – Mature Mixed Conifer	One historic nest territory within EA Analysis Area. Surveys conducted, no goshawks located.
Bird	Flammulated Owl	*Otus flammeolus*	FWS BCC	Foraging -Open Mixed Conifer Nesting - Snags	May occur in the Analysis Area
Mammal	Pacific Fisher	*Martes pennanti*	BLM Sensitive Federal Candidate	Mature complex mixed conifer forest	Historically occurred within the resource area
Mammal	Pallid Bat	*Antrozous pallidus*	BLM Sensitive	Roosting – Primarily caves, rocks but may use large snags	Documented in the EA Analysis Area
Mammal	Fringed Myotis	*Myotis thysanodes*	BLM Sensitive	Roosting – Primarily caves, rocks but may use large snags	May occur in the EA Analysis Area
Terrestrial Mollusk	Evening Fieldslug	*Deroceras hesperium*	BLM Sensitive	Moist forest in low vegetation, litter, debris, rocks	Surveyed -Documented within the Analysis Area
Terrestrial Mollusk	Crater Lake Tightcoil	*Pristiloma arcticum crateris*	BLM Sensitive	Moist to wet sites such as riparian areas, near springs, wetlands and mountain meadows.	Surveyed - no Crater Lake Tightcoil located
Terrestrial Mollusk	Chase Sideband	*Monadenia chaceana*	BLM Sensitive	Talus and rock slides, dry conifer and oak woodlands	Surveyed - no Chase Sideband located
Aquatic Mollusk	Pebblesnail	*Fluminicola Species*	BLM Sensitive	Aquatic mollusk found in cold springs and streams	Surveyed – Documented within the EA Analysis Area

FWS BCC – U.S. Fish and Wildlife Service Birds of Conservation Concern 2002
BLM Sensitive – Those Species considered By the Bureau of Land Management as a sensitive species
Federally Threatened – Those Species listed under the Endangered Species Act as Threatened

Threatened and Endangered Species

Northern Spotted Owl (*Strix occidenatlis caurina*) - Federally Threatened

The analysis area overlaps five northern spotted owl territories; four of these have been occupied in the past three years (Table 6). The proposed projects within the analysis area however would only affect three of these territories. Harvest activities will occur within the core area (High use area; .5-mile radius around nest site) and home range (1.2-mile radius around nest site) of the Hornbill territory; within the core area and home range of the Cold Creek territory; and within the home range of the Kent Peak territory. The Kent Peak was designated for a single owl in the early 1990's and since that time only a single detection (2000) has occurred in the core area since that time. It is believed that the territory is currently unoccupied and the latest surveys continue to support the assumption that this territory is not occupied. Therefore for this analysis, the Cold Creek and Hornbill spotted owl territories will be the only territories analyzed.

The Cold Creek and Hornbill spotted owl nest sites have an existing 100 acre District Designated Reserve (DDR) around the nest area. This DDR is buffered by approximately ¼ mile. Although the buffer area (DDRB) is still classified as matrix lands available for timber harvest the objective of the buffer is to protect and enhance late-successional habitat and old growth forest stands which serves as habitat for late successional species, including the spotted owl (USDI BLM 1995 pp 23).

The Cold Creek and Hornbill territories have been occupied over the past three years (Table 6). Cold Creek is currently occupied with a pair of spotted owls and the Hornbill site was last occupied with a single owl. Hornbill has been occupied with a single owl on and off over the past 10 years but the site has not had a pair or produced young since 1996.

Table 6: Status of Spotted Owl Territories over the past five years

Master Site No.	Hornbill	Cold Creek	Kent Peak
2007	NO	2	NS
2006	S	P	NS
2005	S	P	NO
2004	S	2	NO
2003	NO	S	NS

NO – Surveyed no owls detected; S – Surveyed Single Owl located; # - Number of fledglings; P- Pair of spotted owls; NS- Not Surveyed

Spotted Owl Populations within the South Cascades

The latest population trend information for the spotted owl indicates that the Southern Cascades demographic area population is considered stationary or stable (Lint 2005). The Klamath Falls Resource Area is within the Southern Cascades province and the population trends would be representative. Appendix E of the EA is a review and summary of key findings for spotted owl populations and trends from three recent publications that support this assumption.

Spotted Owl Suitable Habitat within Territories

Both the Hornbill and Cold Creek spotted owl territories are already limited in the amount of suitable habitat. The Cold Creek Territory has approximately 690 acres of available habitat within its home range and approximately 317 acres within its core area. Both of these habitat numbers show that habitat is very limited for this pair. The territory by U.S Fish and Wildlife standards is already below habitat deficit levels. Similarly the Hornbill territory also has limited habitat available. This territory is also considered habitat deficit within both its home range and its core nesting area. There is currently 525 acres within the home range and 258 acre of suitable habitat within the core area.

Table 7: Suitable and Dispersal Descriptions

Spotted Owl Habitat
*Category 1 Habitat (NRF): Comprised of coniferous forest stands that satisfy the full complement of daily and annual needs of the owl for nesting roosting, and foraging. These stands have a multi-layered canopy of several species of conifer trees with large trees in the overstory and an understory of conifers and/or hardwoods. Canopy closure exceeds 70%. There is a significant measure of decadence in the stand resulting in the occurrence of snags and broken topped live trees along with dwarf mistletoe infections. The forest floor has substantial accumulations of large down woody material in the form of fallen trees (USDI BLM 1994).
*Category 2 Habitat (NRF): Comprised of coniferous stands that provide roosting and foraging opportunities but may lack the necessary structure for consistent nesting or roosting. The roosting and foraging qualities are less than those described for Habitat 1 due to the reduced quality or complete absence of one or more of the components of Habitat 1 (for example the absence of large trees in the overstory, a reduced amount of down woody material on the forest floor, or a reduced canopy closure). Habitat 2 generally has less diversity in the vertical structure and has either limited or poorly defined multi-layer canopy structure. The understory may be somewhat open, allowing for owl movement and foraging. Canopy closure may not exceed 70% (USDI BLM 1994).
Dispersal Habitat: Comprised of Habitat 1 and 2 but also includes those other forested stands that allow spotted owl movement across the landscape. Generally canopy closure is 40% or greater (USDI BLM 1994).

*Category 1 and 2 equate to suitable habitat for the spotted owl.

Table 8: Approximate acres of suitable habitat within home range and core areas of spotted owl territories

NSO Territory	Home Range (1.2 mile radius)	Core Area (.5 mile radius)	Habitat Suitability
Cold Creek	690	317	Below Deficit Levels*
Hornbill	525	258	Below Deficit Levels*

* Deficit - The U.S. Fish and Wildlife Service define deficit levels to determine if sufficient habitat occurs within spotted owl territories. The thresholds for the home range and core areas are 1200 and 250 acres respectively. Territories below these thresholds are considered deficit in habitat for spotted owls.

Spotted Owl Suitable and Dispersal Habitat within Project Area

There are approximately 1520 acres of suitable (nesting, roosting, foraging) spotted owl habitat and 2,511 acres of dispersal within the proposed project area. Approximately 690 of suitable habitat (45%) and 190 acres of dispersal habitat (8%) will be treated through timber harvest and fuel treatments.

Suitable Habitat within the Klamath Falls Resource Area

There is approximately 16,635 acres of suitable habitat within the Klamath Falls Resource Area. Suitable Habitat was classified in 1994 during the development of the Klamath Falls RMP (USDI BLM 1995). Habitat loss has been tracked since that classification. Table 9 illustrates the amount of suitable habitat available for the spotted owl use.

Table 9: Amount of Spotted Owl Habitat within the Klamath Falls Resource Area 1994-2007

Project Name and Year	NRF Acres entered	NRF Acres Down Graded or Removed	NRF Acres Remaining	CHU NRF Acres Entered	CHU NRF Acres Down Graded or Removed	CHU NRF Acres Remaining
NFP ROD (1994)	0	0	21,600	0	0	11,120
Frosty One (1995)	418	418	21,182	418	418	10,702
Too Frosty (1995)	459	459	20,723	459	459	10,243
Kakapo Stew (1997)	270	270	20,453	0	0	10,243
East Grenada (1998)	589	51	20,402	0	0	10,243
Clover Hookup (2000)	1,003	1,003	19,399	0	0	10,243
Muddy Tom (2000)	897	897	18,502	0	0	10,243
Grenada West (2002)	833	0	18,502	0	0	10,243
Saddled Again (2002)	500	30	18,472	170	0	10,243
Slim Chicken (2002)	1,330	1,203	17,269	0	0	10,243
Upper Spencer (2003)	1,200	400	16,869	1,200	400	9,843
Matchbox (2004)	515	0	16,869	0	0	9,843
Chew (2004)	376	0	16,869	0	0	9,843
Walter's Cabin (2006)	100	0	16,869	0	0	9,843
Thin Sheep (2006)	460	0	16,869	0	0	9,843
Pleasant Valley Prescribed Burn (2007)	632	65	16,804	0	0	9,843
Buck Again (2007)	787	169	16,635	759	141	9,702

Spotted Owl Designated Critical Habitat

The project area was designated as part of a Designated Critical Habitat Unit OR-37 (USDI FWS 1992). The Final Rule revising Designated Critical Habitat issued by the U.S. Fish and Wildlife Service in August, 2008 changed the designation within the project area. As of September 12, 2008 the project area is no longer classified as Designated Critical Habitat for the Northern Spotted Owl (USDI FWS 2008). Therefore there will be no impacts to Northern Spotted Owl Designated Critical Habitat from the proposed project.

Barred Owls

Surveys for spotted owls have been conducted annually with the KFRA since 1990. Until 2002, the barred owl was only detected once or twice within the Resource Area. Since that time the barred owl has regularly been detected in the Resource Area and there are three spotted owl territories that are now known to be occupied by barred owls. Several other barred owl detections within known spotted owl territories have also occurred. Kelly et al (2003) reported that occupancy of spotted owls was significantly lower in the presence of barred owls. The detections of barred owls occurred during spotted owl surveys and it is likely that the full number and influence of barred owls within the KFRA has not been realized since systematic surveys for that species has not occurred. Based on the current trends it is likely that spotted owls will continue to be displaced or negatively affected by barred owls within the Resource Area. The Final Recovery Plan for the Northern Spotted Owl (USDI FWS 2008) identified the competition from barred owl as the most pressing threat to the spotted owl. Barred owls have not been detected within the territories of the proposed project to date although there has been detection in an adjacent territory.

Special Status Species (Bureau Sensitive and Birds of Conservation Concern)

The project area was surveyed for special status species including those formerly classified as Survey and Manage. As of 2007, the BLM removed the requirement to survey for species classified as Survey and Manage under the Northwest Forest Plan (USDI BLM 2007). Surveys were completed to protocol for the great gray owl, terrestrial mollusks and aquatic mollusks. No great gray owls were located during the surveys. The Evening Field Slug *(Deroceras hesperium*) and the aquatic Pebble Snail (*Fluminicola* sp.) were the only special status mollusks located during surveys.

Surveys (USDA 2003) were conducted for the northern goshawk in 2007 and 2008. No northern goshawk nests were located during these surveys. One historic nest location is located within the Hornbill DDR. The site is checked annually and no goshawks have been documented in the DDR since 1996.

Bat surveys were conducted within the project area and watershed (Cross and Kerwin 1995). Several bat species were detected including the pallid bat a BLM sensitive species. The fringed myotis another BLM sensitive species was not detected but has been documented in similar habitat to the proposed project area and is likely to occur within the project area.

The proposed project area does contain suitable habitat for other special status species including the white-headed woodpecker and flammulated owl. No surveys were conducted for these species but the white-headed woodpecker has been documented in the project area and it is assumed that the flammulated owl may use the project area.

The Klamath Falls Resource Area was surveyed for forest carnivores (Canada Lynx, Wolverine, Pacific Fisher and American Marten) in 1998-2001 including the Jenny Creek Watershed. Photographic bait stations were set up systematically throughout the resource area using Zielenski's protocol (Zielenski and Kucera 1995). The American marten was the only target species located during these surveys. No special status species were located during these surveys. The fisher historically occurred within the Jenny Creek Watershed but declined over the first part of the 20th century (USDI BLM 1995). There was a reintroduction attempt in the 1960's at Buck Lake in the adjacent Spencer Creek Watershed but that attempt was not considered successful. The fisher is listed as a Federal Candidate species and its current range is thought to be limited to two populations in Oregon, the Southern Cascade Mountains and the Siskiyou Mountains of Southwestern Oregon which does not include the Klamath Falls Resource Area (Aubry and Lewis 2003). Therefore impacts to the Pacific Fisher will not be analyzed further in this document.

Terrestrial Wildlife Species – Environmental Consequences

No Action

Northern Spotted Owls

No direct or indirect impacts to spotted owls are anticipated from implementation of the no action alternative within the proposed project area. This alternative would not disturb spotted owls or modify the current habitat conditions for the spotted owl. The Cold Creek and Hornbill spotted owl territories would continue to provide habitat at their current levels. No adverse affects to spotted owls within the proposed project area are anticipated under the No Action Alternative.

Cumulative Effects

To asses cumulative effects of the No Action Alternative to spotted owls this analysis will address those impacts to spotted owls within the Klamath Falls Resource area. Under the No action no timber sale or fuels treatments would occur within the proposed project area however there are several timber sales and fuels projects planned in the foreseeable future. For future timber sales (Table 3) within the Klamath Falls Resource area of the Jenny Creek watershed, the assumption is made that the current volume levels and similar harvest prescriptions to past timber harvest would occur during those sales. These sales (Table 3) would not affect the Cold Creek and Hornbill Territories but would affect three other spotted owl territories within the Jenny Creek watershed including the Kent Peak Territory. The Kent Oval and North Frosty Timber sales would adversely affect three spotted owl territories by reducing suitable habitat within those territories. The proposed sales are within the core area for all three territories. Currently two of the three territories are occupied by a pair of spotted owls. For

those occupied territories there would be affects from disturbance and habitat loss. Although no suitable habitat would be lost within the proposed project area under the No Action Alternative the other proposed timber sales would result in the loss of approximately 626 acres (Table 10) of suitable habitat within the Klamath Falls Resource Area.

Table 10: NSO Suitable Habitat within Foreseeable Timber Harvest

Treatment	Anticipated Year	Approximate Acres	Pre-Harvest Suitable Habitat Acres	Estimated Post-Harvest Suitable Habitat
Kent Oval Forest Health Treatment	2011	700	485	200
North Frosty Forest Health Treatment	2012	1000	941	600
Total	--	1700	1426	800

The proposed fuels projects may reduce some spotted owls suitable habitat although those projects are typically designed to maintain suitable and dispersal habitat. The proposed 4500 acres of fuels treatments, including those proposed for out years will reduce suitable habitat in areas but would maintain dispersal habitat throughout the treatment area. Seasonal restrictions (PDF's) would be implemented to reduce impacts from disturbance during the critical nesting period.

No dispersal habitat is planned to be downgraded under the No Action Alternative including the foreseeable timber harvests and fuel treatments. Therefore spotted owl dispersal habitat would be retained at the current levels within the matrix lands under the No Action Alternative.

Under the No Action Alternative up to three spotted owl territories within the Klamath Falls Resource Area would be adversely affected from foreseeable actions considered under this EA. Under the proposed action five territories would be adversely affected. All of these territories are within the lands classified as matrix land.

The No Action Alternative will continue to provide a mix of spotted owl dispersal and suitable habitat within the Jenny Creek watershed and Klamath Falls Resource Area that would allow spotted owls to move to and from the large blocks of late successional habitat reserves as designated under the Northwest Forest Plan (USDA/USDI ROD 1994). There are no Late Successional Reserves within the proposed project area or within the Klamath Falls Resource Area.

The No Action Alternative is also consistent with the Final Recovery Plan for the Northern Spotted Owl (USDI FWS 2008). The recovery plan is set upon similar principles of the Interagency Scientific Committee report (Thomas et al 1990) and the 1992 Final Draft Recovery Plan for the Northern Spotted Owl (USDI FWS 1992). These principles focused on managing large blocks of suitable habitat in designated conservation areas that could support self sustaining populations of 15-20 pairs of spotted owls and spacing these blocks and managing the areas between the blocks to permit movement of owls between blocks (USDI FWS 2007). The proposed project area is classified as matrix lands (areas between the large reserve blocks) and will provide a mix of spotted owl suitable and dispersal habitat providing connectivity for movement between reserve blocks.
The Klamath Falls Resource Area spotted owl banding program (1990-2008) continues to support this assumption. Dispersing spotted owls from the Klamath National Forest to the south, Rogue River National Forest and BLM Medford District to the West and the Fremont-Winema National Forests to the north continue to be documented on the KFRA as well as many unbanded spotted owls (Pers comm. Hayner, S., Wildlife Biologist 2008). Dispersing owls from the KFRA continue to be located on those same Forests and BLM Districts.

Special Status Species

For special status species, such as the white-headed woodpecker, flammulated owl, pallid bat, fringed bat, evening field slug and the fluminicola spp. the No Action Alternative would not directly impact these species. No disturbance and no immediate impact to their habitat would occur.

The white-headed woodpecker and flammulated may be negatively impacted in the long-term within the proposed project area due to their association with ponderosa pine and the projected loss of that habitat. Both species are associated with mature ponderosa pine or mixed conifer stands with a ponderosa pine as a dominant component. The conversion of ponderosa pine dominated stands to white-fir and other shade tolerant species has been identified as a detriment to the white-headed woodpecker and flammulated owl and their habitat (Altman et al 2000). The No Action Alternative would not provide treatments that would benefit ponderosa pine and the conversion to a climax white-fir stand would continue therefore reducing habitat quality for these species.

The pallid and fringed bat habitat would not be affected by the No Action alternative. Habitat conditions would remain the same and no loss of habitat would occur. Both species are strongly associated with rocks and caves for day roosting but have been shown to use snags as well (Verts and Carraway 1998). Pallid and Fringed bat day roosts structure would be affected by the No Action Alternative. Foraging habitat would also not be affected.

The Evening Fieldslug is associated with perennially wet meadows in forested habitats; microsites include a variety of low vegetation, litter and debris; rocks may also be used as refugia. (Burke 2000, Duncan 2005). This is consistent with the detections found within the project area; they were located within the riparian reserves adjacent to streams. The No Action Alternative would not affect the known sites within the project area. The existing riparian reserves would maintain current microsite conditions for these species. The No Action is consistent with the management recommendations for this species (PDF's)

The aquatic pebblesnail is located within the project area and found within Cold Creek and Onion Springs. The No Action alternative would not affect water quality or flow and therefore there would be no effect on this species.

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 under the Endangered Species Act. 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 of the No Action Alternative when considered with the others on both public and private lands within the Jenny Creek Watershed would not adversely affect the overall populations of special status species considered for this EA and would not contribute to the need to list these species under the Endangered Species Act. The PDF's and Standards and Guidelines ensure that habitat components necessary for these species are maintained during implementation of projects.

Proposed Action

Northern Spotted Owls

Under the proposed action there would be both direct and indirect impacts to spotted owls within two nest territories. Both the Cold Creek and Hornbill territories will be affected from loss of habitat and disturbance.

Timber harvesting (including 3P sampling), timber hauling, fuels treatments and road obliterations may all require heavy equipment, chainsaws and large vehicles that increase high levels of noise into the environment. Spotted owls are susceptible to disturbance from human caused activity (Delaney et al 1999) especially during critical periods in the nesting season. Activity in and around the nest patch may increase the chances for nest failure. During the nesting season seasonal restrictions within a ¼-mile of the nest site from March 1st – September 30th will reduce those impacts to nesting spotted owls (PDF's). Outside of the nesting season the disturbance would still occur on individual adult owls but it is reasonable to assume they can move away from the area and avoid injury. However owls moved from roost locations during the day time are more susceptible to

predation. Since both sites have been occupied over the past three years it is likely that up to two pairs of spotted owls will be negatively affected by disturbance from the proposed action.

Spotted owl suitable habitat within both territories is currently considered deficit by the U.S Fish and Wildlife Service definitions for spotted owl habitat. Both the provincial home range (1.2 mile radius around nest) and core areas (.5 mile radius around nest) are already below habitat thresholds (Table 11).

Table 11: Approximate Acres of Suitable Habitat within the Home Range and Core Areas of Spotted Owl Territories affected by the Proposed Project

NSO Territory	Home Range Before Harvest	*Home Range After Harvest	Core Area Before Harvest	*Core Area After Harvest
Cold Creek	690	356	317	181
Hornbill	525	363	258	161

*The acres of suitable habitat after harvest are estimates based on past prescriptions and current stand conditions.

Dugger et al (2005) work has shown that loss of habitat especially close to the nest (core area) can be detrimental to owls (both survival and reproduction) especially if non-habitat exceeds 50% within the core area. Both the Hornbill and Cold Creek will drop below 50% suitable habitat within the core area after treatment. The proposed action will down grade approximately 334 acres of Suitable Habitat to Dispersal Habitat within the Cold Creek Home Range and approximately 136 acres within the Core Area (Table 11). For the Hornbill Territory suitable habitat will be downgraded to dispersal habitat by 162 acres within the Home Range and the majority of those acres (92) will occur within the Core Area (Table 11).

No habitat currently classified as dispersal would be downgraded from the proposed action. The reduction of suitable spotted owl habitat will primarily occur through timber harvest. The proposed fuels projects may downgrade some spotted owl suitable habitat although those projects are typically designed to maintain suitable and dispersal habitat (See PDF's). Those areas that both fuels treatments and timber harvest occur on the same acres will likely be reduced to dispersal habitat due to the loss of the structural complexity of the forest stand as well as the loss of overall canopy closure. The proposed action will continue to maintain canopy closures on average that exceed 40% and provide for dispersing owls. Post harvest stand exams (APS 1999-2004) in similar stands with similar prescriptions to the proposed action have supported this assumption.

Therefore the proposed action will be detrimental for both survival and reproduction of the Cold Creek and Hornbill spotted owls from loss of habitat and disturbance.

The latest evaluation on the status and trends of the spotted owl has shown that the population within the South Cascades is considered stationary (Anthony et al 2004, Lint 2005). The proposed project area is within this province. The loss of these two spotted owl territories is considered to be negligible towards the overall population. The Klamath Falls Resource Area is currently in consultation with the U.S. Fish and Wildlife Service to meet the Endangered Species Act requirements for the proposed action.

Cumulative Effects

Up to five spotted owl territories within the Klamath Falls Resource Area would be adversely affected from the proposed action and those foreseeable actions (Table 3) considered under this EA. All of these territories are within the lands classified as matrix land.

The Proposed Action Alternative will continue to provide a mix of spotted owl dispersal and suitable habitat within the Jenny Creek watershed and Klamath Falls Resource Area that would allow spotted owls to move to and from the large blocks of late successional habitat reserves as designated under the Northwest Forest Plan (USDA/USDI ROD 1994). There are no Late Successional Reserves within the proposed project area or within the Klamath Falls Resource Area.

The Proposed Action Alternative is also consistent with the Final Recovery Plan for the Northern Spotted Owl (USDI FWS 2008). The recovery plan is set upon similar principles of the Interagency Scientific Committee

report (Thomas et al 1990) and the 1992 Final Draft Recovery Plan for the Northern Spotted Owl (USDI FWS 1992). These principles focused on managing large blocks of suitable habitat in designated conservation areas that could support self sustaining populations of 15-20 pairs of spotted owls and spacing these blocks and managing the areas between the blocks to permit movement of owls between blocks (USDI FWS 2007). The proposed project area is classified as matrix lands (areas between the large reserve blocks) and will provide a mix of spotted owl suitable and dispersal habitat providing connectivity for movement between reserve blocks.

Special Status Species

White-headed Woodpeckers

There is potential for loss of woodpecker reproduction if harvesting or fuels treatment activities occur during the nesting season. Some nest structure could be lost or disturbance near the nest site could result in nest failure.

The white-headed woodpecker is typically associated with open ponderosa pine or mixed conifer stands dominated by ponderosa pine (Marshal et al 2003). Considering the fragmented habitat and the relatively large home range needed in fragmented habitat it is likely the white-headed woodpecker is scarce within the project area and the watershed. In fragmented habitat the home range for a white-headed woodpecker is approximately 130 acres (Altman B. 2000).

The proposed treatments would remove some trees that add to the suitable habitat for these species, primarily dead-top trees. However the majority of the harvesting would remove white-fir trees with an emphasis on ponderosa pine retention. Ponderosa pine snag retention and green tree retention guidelines (Appendix B) would maintain foraging and nesting habitat for these species (Bull et al 1990 as cited in Marshal et al 2003, Altman B. 2000).

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 would continue to promote larger ponderosa pine trees in the stand which may benefit the white-headed woodpecker (Altman B. 2000). These woodpeckers use larger (>16") snags, dead-top and heart rot live trees for their nesting structure (Marshal et al 2003). The cumulative effect on white-headed woodpecker habitat of this proposed action when added to other known future actions is very small.

Flammulated Owl

The flammulated owl is typically associated with ponderosa pine stands exhibiting an open understory with patches of dense thickets for roosting. The owl typically uses larger >20" snags (Bull et al 1990 as stated in Marshal et al 2003) as nesting habitat and the open understory or adjacent grassy. Dense thickets of young ponderosa pine are used for day time roosts. No flammulated owls have been found in the analysis area during surveys and planning activities.

The proposed action would maintain current nesting structure by maintaining the available snags (PDFs – Appendix B) and providing green tree retention for future snags. The proposed action is designed to retain the large ponderosa pine and remove predominantly white-fir. This would benefit the flammulated owl by retaining the larger ponderosa pine and providing an open understory (Marshal et al 2003).

If the species is present within the project area there is potential for loss of reproduction if harvesting occurs during the nesting season (April – August). Some nest structure could be lost or disturbance near the nest site could result in nest failure. Daytime activities associated with the proposed project may disturb some nesting and foraging sites, but only in the short-term for the duration of harvest and fuel treatment activities. The cumulative effect on habitat of this proposed action when added to known future actions is very small.

Fringed Myotis Bat and Pallid Bat

These species may occur in the project area although they are generally associated with caves, mines or rock crevices. The fringed myotis are sometimes found using cavities in snags as roosts (Cross and Kerwin 1995). Weller (2001) found that the fringed myotis using snags switched roost areas often and did not show strong site fidelity as previously shown with other roost substrate. Snags typically used by fringed myotis are typically greater than 24 inches diameter at breast height and taller than 45 feet (Weller 2001). No snags are proposed to

be harvested in the proposed action unless required for safety. The snag retention guidelines would maintain current snags and the green tree retention would provide for future roosting structure (Appendix B). Snag monitoring on past timber harvest on BLM lands have consistently shown that snag retention guidelines have been met and snags are well distributed within the watershed (BLM APS 1999, 2002).

Under the proposed action, short-term disturbance could push individuals from snags or thickets. These disturbances however would have a short duration and overall would have minimal impacts to the species. The existing snag and green tree retention levels (PDFs, Appendix B) would be sufficient to meet the needs of both species.

Evening Field Slug

Evening field slug is associated with wet meadow habitat and was found within the proposed project area within the riparian reserves and most within 30 meters of the stream. The proposed timber harvest and fuels reduction projects would not alter the micro site habitat for the evening field slug within the riparian reserves. The PDF's as described in Appendix E will maintain this species at its known sites and therefore the proposed action would therefore have no effect on the known sites. For those outside of the riparian reserves the microsites may be altered and this could result in the loss of habitat and individuals. Overall the proposed project will not have an appreciable negative effect on the evening field slug population or habitat.

Pebble Snail

Similar to the Evening field slug the riparian reserves will buffer the aquatic habitat found within Cold Creek and Onion Springs. Specific threats identified in the conservation assessment (Mothey and Furnish 1998, Duncan 2005) for this species include water pollution, water diversion, dam construction and excessive sedimentation. The proposed project includes a 160 ft no cut buffer and an additional 160 limited entry buffer along Cold Creek and 160 ft no harvest buffer around Onion Springs. This will protect both water quality (excessive sedimentation) and direct impacts from the proposed timber harvest and fuels treatments. However the proposed culvert replacement on Cold Creek may have direct impacts on individuals since they are attached to the culvert and use the culvert and surrounding stream as habitat. Sedimentation may also have a short term negative effect on individuals found near the culvert. Project Design features such as erosion control, sedimentation traps and removing the snails from the culvert and placing individuals upstream would minimize the impacts to the local population. The erosion control structures and sedimentation traps would minimize excessive sedimentation. The sedimentation increase would be a short-term impact that would cease after the project is completed. Although some individuals would be lost during the culvert replacement, removing those attached to the culvert and placing them up stream would minimize those losses and not appreciably diminish the population within Cold Creek.

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 under the Endangered Species Act. 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 of this project when considered with the others on both public and private lands within the Jenny Creek Watershed would not adversely affect the overall populations of special status species considered for this EA and would not contribute to the need to list these species under the Endangered Species Act. The PDFs and Standards and Guidelines ensure that habitat components necessary for these species are maintained during implementation of projects.

Regeneration Harvest

Northern Spotted Owls

The impacts from disturbance and suitable habitat loss would be similar to the proposed action. Both alternatives would be detrimental to survival and reproduction of the Cold Creek and Hornbill spotted owls.

The difference between the Proposed Action and the Regeneration Harvest Alternative is the amount of spotted owl dispersal habitat loss. For the Regeneration Harvest Alternative the amount of habitat downgraded to non-habitat would equate to the amount that is regenerated (150 acres). Although the guidelines for regeneration harvest require that 16-25 large trees per acre are left within the regeneration harvest units it is likely that the canopy closure for these units will not meet the 40% canopy closure standard for spotted owl dispersal habitat. Therefore this habitat will no longer be classified as suitable or dispersal habitat rather it will be classified as non-habitat.

Special Status Species

For the Evening Field Slug, *Fluminicola* sp, Fringed Myotis Bat, and Pallid Bat there would be similar impacts as those described in the proposed action. There would be direct impacts from disturbance especially during the breeding season for the bat species. Additionally the snag retention guidelines are the same for the proposed action and the regeneration harvest alternative therefore maintaining current roosting habitat for the bat species. One key difference is snag recruitment within the regeneration harvest units. Within those units snag recruitment has been altered due to the limited green tree retention.

Also similar to the proposed action there would be minimal to impact to the Evening field slug and *Fluminicola* sp due to the PDF's and their habitat within the riparian reserves.

For the White-headed woodpecker and the flammulated owl the difference would be to the habitat within the 150 acres of regeneration harvest. Within those acres there would be less benefit to the flammulated owl and white-headed woodpecker as described above and an increase in loss of key structure that is used by both species; large ponderosa pine for both and for the flammulated owl thickets for roosting.

The cumulative effects of Regeneration Alternative when considered with the others on both public and private lands within the Jenny Creek Watershed would not adversely affect the overall populations of special status species considered for this EA and would not contribute to the need to list these species under the Endangered Species Act. The PDFs and Standards and Guidelines ensure that habitat components necessary for these species are maintained during implementation of projects.

Soils - Affected Environment

The U.S.D.A. Natural Resources Conservation Service (NRCS) classifies soils into map units including one or more dominant soil map unit components and inclusions. Soil map unit components may be designated based on the soil series, slope, aspect and texture modifier. Soil series are soils grouped together with similar pedogenesis (soil formation), soil chemistry, and physical properties. Six different map units have been identified in the treatment area consisting of four different soil series designations (Table 12).

Table 12: Soil types and characteristics of the Cold Onion proposed treatment area

Map unit symbol	Soil type	Rutting hazard	Fire damage potential	Erosion hazard potential	Area (acres)	Slope (%) and aspect
135E	Oatman cobbly loam	Severe	low	moderate	167	12-35% N
136E	Oatman cobbly loam	Severe	low	moderate	1184	12-35% S
138C	Oatman-Otwin complex	Moderate to Severe	low	slight	334	0-12%
147C	Pokegema-Woodcock complex	Severe	low	slight	57	12-35% N
204E	Woodcock-Pokegema complex	Severe	low	moderate	210	12-35% N
205E	Woodcock-Pokegema complex	Severe	low to moderate	moderate	2131	12-35% S

The Oatman series consists of very deep to deep, well drained soils found on volcanic cones and ridges with a typical texture of very gravelly loam and slopes 0 to 65 percent. Oatman soils formed in glacial deposits and rock fragments are andesite, scoriaceous cinders and basalt. The Otwin series consists of moderately deep, well drained soils with a typical texture of stony sandy loam found on plateaus with slopes of 0 to 12 percent. Otwin soils formed in colluvium and residuum weathered from andesite and volcanic ash. The Pokegema series consists of deep and very deep well drained soils found on plateaus with a typical texture of loam on 1 to 35 percent slopes. Pokegema soils formed in mudflow deposits containing andesitic rocks and ash. The Woodcock series consists of very deep and deep well drained soils found on mountains and plateaus with a typical texture of stony loam and slopes of 1 to 60 percent. Woodcock soils formed in colluvium and mudflows from glacial deposits derived from volcanic rocks and ash.

Fire damage potential

The NRCS Fire Damage Potential rating was used to assess damage to nutrient, physical and biotic soil characteristics by fire. The rating evaluates potential impacts of prescribed fires or wildfires intense enough to remove the duff layer and consume organic matter in the surface layer. The ratings are calculated based on the texture, content of rock fragments, and organic matter in the surface layer, thickness of the surface layer, and slope. “Low” ratings indicate fire damage is unlikely, little or no maintenance is needed, and soil physical and chemical properties are expected to remain in good condition. “Moderate” indicates fire damage may occur as one or more soil properties could become less than desirable (i.e. organic matter may be burned and essential nutrients become deficient). Soils with a moderate Fire Damage Potential rating will likely need some maintenance to decrease detrimental affects to soil physical and chemical properties. “High” indicates fire damage can occur as one or more soil properties could become less than desirable and mitigating detrimental affects to soil physical and chemical properties would require special design, extra maintenance, and costly alterations (soil survey staff).

Damage to organic matter increases as the duration of soil heating increases. Destruction of organic matter affects many physical and chemical soil properties including nitrogen and microorganisms in the litter and soil. Organic matter improves soil aggregation and structure by binding individual soil particles together and creating large pores which allow better water penetration and aeration. Organic matter provides exchange sites for cations and when destroyed by fire, plant nutrients are released and become highly available for plant growth. Intense fires would be expected to release larger quantities of plant nutrients from the litter and plants than those of low intensity (Christensen, 1973). Nitrogen is the nutrient most likely to limit plant growth in wildland soils. Sixty-two percent of the nitrogen content of pine needles and litter can be lost during combustion (Debell and Ralston, 1970). The loss of nitrogen is partially compensated by the increased availability of the nitrogen remaining after the fire, yet nitrogen and other nutrients can be lost from the site in smoke, by erosion or leached through the soil before they can be used.

Soil heating during wildfires and prescribed burns may be similar for dry soil conditions, or when climatic conditions are conductive to rapid burning. When soil and litter are moist, less soil heating occurs. Organic matter in the soil, litter, or standing brush will ignite when heated to 427 degrees C (Gaylor, 1974).

Soil Erosion

Ruts can form as a result of the operation of forestland equipment, begin to concentrate soil runoff and increase soil erosion. Soils in the project area have been rated for Soil Rutting hazard based on depth to a water table, rock fragments on or below the surface, the Unified soil classification, depth to a restrictive layer, and slope. A rating of "slight" indicates the soil is subject to little or no rutting, "moderate" indicates rutting is likely, and "severe" indicates ruts form readily.

The removal of significant areas of vegetative cover by fire increases flood peaks and erosion rates in mountain watersheds thereby increasing flood and erosion damage. Plant nutrients in the surface layer are removed as erosion occurs leaving a soil of low fertility. Loss of soil surface layers reduces soil water retention and limits vegetation growth. Hill slope hydrology changes following a fire, partly because of altered soil structure and water repellency. These hydrologic changes affect the erosion and sedimentation response of burned landscapes at all spatial scales (Sugihara et. al., 2006).

Soil erosion potential was determined using NRCS Erosion Hazard ratings and rates of erosion were calculated using the Forest Service Water Erosion Prediction Project (WEPP) model Fuel Management Erosion Analysis (FUME). Erosion Hazard ratings indicate the hazard of soil loss from off-road and off-trail areas when disturbance activities expose 50 to 75% of the soil surface. Erosion Hazard ratings are calculated using the soil erosion K factor and slope (soil survey staff). The soil erosion K factor quantifies the soil condition or susceptibility to erosion and is the average soil loss in tons acre^{-1} per unit area for a particular soil with 50-75% unvegetated surface area with an arbitrarily selected slope length of 72.6 ft and a slope steepness of 9%.

A “slight” Erosion Hazard rating indicates erosion is unlikely under ordinary climatic conditions; “moderate” indicates some erosion is likely and erosion-control measures may be needed; “severe” indicates erosion is very likely and erosion-control measures are advised; and “very severe” indicates significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

The FSWEPP FUME analysis includes a computer interface to estimate background erosion rates of fuel management activities, and predict erosion associated with mechanical thinning, prescribed fire, and the road network. The interface uses the WEPP model to predict background sediment yields from hill slopes and road segments to the stream network and erosion rates from wildfire, prescribed fire, and thinning operations (Elliot, 1999). Five representative hill slopes in the prescribed burn proposed treatment area were chosen to predict amounts of sediment that could potentially erode to streams (Table 13 and Map 5). Hill slope measurements were recorded in the field and calculated using contour maps. The model assumes 85% vegetation cover for prescribed fire and 30% cover for wildland fire. Present vegetation in the watershed area averages about 95% cover and the road density was estimated at 2.5 miles of road per square mile of watershed. Values input to the model include the climate, soil texture, topography, road density, wildfire return interval (15 years) and prescribed fire cycle (15 years).

Table 13: Predicted average annual hill slope sedimentation calculated using WEPP FUME

	Surface	Slope (%)			Hill slope segment distances (feet)			Ave. annual hill slope sedimentation (ton/mi2/year)			
Soil Map Units	texture	Top	Middle	Toe	Total	Treated	Buffer	Undisturbed	Wildfire	Rx Fire	Thinning
205E, 204E	loam	25	25	27	1500	1340	160	0	72	3.4	0.3
138C, 205E	loam	21	20	22	1300	300	1000	0	60	0	0
138C, 205E, 204E	loam	16	21	22	1500	940	560	0	78	0	0
136E, 205E	loam	21	18	18	1500	1340	160	0	51	1.7	0
205E	loam	15	15	15	1500	1340	160	0	39	1.7	0
Average								0	60	1.4	0.1

Predicted erosion rates of thinning, prescribed fire, and wildfire are calculated for the year of the occurrence then averaged over the return period of the event. The background sedimentation rate from the hill slope can be estimated without roads as the sum of erosion from undisturbed forest plus erosion from wildfire. Modeled erosion values predict erosion to plus or minus 50%. On modeled hill slopes, background erosion rate values range from 20 to 108 ton/mi^2/year (50% of 39 and 150% of 78). Erosion rates resulting from thinning with use of heavy equipment have been estimated to be between 0 and 0.5 ton/mi^2/year. Assumptions could be made that thinning, prescribed fire, or both will eliminate wildfire from the watershed, thus reducing the wildfire sedimentation value, or that treatments will lead to a less severe wildfire and the prescribed fire sedimentation rate from the table could be substituted for the wildfire erosion rate.

Roads are considered the principal cause of accelerated erosion in forests throughout western United States (Harr and Nichols 1993). The presence of roads can increase the frequency of slope failures compared to the rate for undisturbed forest by hundreds of times (Sidle and others 1985). Loss of soil productivity occurs when roads are compacted and established. A loss of soil occurs when concentrated water creates a gully or other erosional feature where it leaves the road. Potentially, sediment could enter a watercourse after leaving a road. The FSWEPP Road analysis was used to predict (within +/-50%) runoff and sediment yield from compacted skid trails, roads, and landings (Table 14). Characteristics of the road were specified in terms of climate, soil and gravel addition, local topography, drain spacing, road design, and surface and ditch condition. Amounts of sediment reaching a channel were modeled for six skid trail lengths.

Table 14: Predicted runoff and sediment yield from skid trails, roads, and landings

Skid trail length (ft)	Buffer gradient (%)	Buffer length (ft)	Sediment from road (lb)	Sediment into channel (lb)
1000 ft	25%	160 ft	1412	24
800 ft	25%	160 ft	1129	19
200 ft	21%	160 ft	166	0
300 ft	15%	160 ft	249	0
1000 ft	21%	300 ft	1055	0
500 ft	15%	300 ft	214	0

Soil compaction

Soil compaction negatively affects physical and chemical properties thereby decreasing soil fertility. Compaction can increase bulk density and reduce plant root penetration, soil water holding capacity, and plant growth. Decreasing the soil pore space can decrease the size, reach, and extent of root systems. Destroying the soil structure can decrease water infiltration and increase runoff rates. As oxygen decreases in the soil, microbial respiration may be limited and severe compaction may disrupt root metabolism and cause the soil to become anaerobic. Soils with a range of soil particle sizes (i.e. fine sandy loam) are generally more susceptible to compaction than soils with a more uniform particle size distribution. Generally, the risk of compaction tends to increase with increasing moisture content and the greatest sensitivity to compaction occurs at moisture

contents near but below field capacity (O'Neill 2005). For example, on the west shore of the Lake Tahoe Basin in a mixed conifer forest no significant compaction was found on coarse sandy loam soils when driven on with a Caterpillar 320C excavator with low-ground-pressure (37.9 kPa or 5.5 psi) triple cleat grousers (Hatchett, 2006). Studies have found thickly mulched litter layers may offset any increased erosion potential resulting from limited soil compaction occurring. Compaction is more likely to occur when bare ground is driven over. Other forest management practices using heavy metal tracked machinery has been found to cause detrimental levels of soil compaction. Compaction is a main limitation affecting timber production on each of the map units within the treatment area.

Soils - Environmental Consequences

No Action Alternative

The no action alternative would result in no immediate timber harvesting, thinning and prescribed fire fuels treatments, and no road improvements in the project area. Higher fuel loads and susceptibility to higher intensity wildfires will likely result from the no action alternative. Compaction will not increase net overall effects, including soil erosion and a decrease in soil fertility caused by a wildfire, could be more detrimental than minor amounts of compaction from the proposed action. The Fire Damage potential rating is low and moderately low for soils in the project area. If a wildfire were to burn through the project area, fire damage may occur as one or more soil properties could become less than desirable. A wildfire would likely remove more vegetative cover then a prescribed fire of lesser intensity and soil erosion will increase.

Given the increased rates of erosion related to wildfire events which could eventually impact the project area, this No Action Alternative has greater potential impacts to both the project area and the surrounding landscape than does the proposed action.

Proposed Action

Nutrient, physical and biotic soil characteristics

Thinning treatments decrease amounts of fuels and should decrease the likelihood of a wildfire burning large portions of the treatment area. Decreasing amounts of fuels will decrease effects of fire damaging soil. Surface temperatures will be less intense, and less of the duff layer and soil organic matter will be consumed. Prescribed fire could damage the soil depending on the intensity and residence time of material burning. Soils within the proposed treatment area have low and moderately low Fire Damage Potential ratings indicating fire damage is unlikely, little or no maintenance is needed, and soil physical and chemical properties are expected to remain in good condition. (Refer to Fire Damage Potential Map in the project record.) Burned slash piles with larger diameter material could generate intense heat for a longer amount of time. Depending on soil moisture and burning conditions, damage may occur to soil under these piles. Overall, potential effects to soil from proposed thinning and prescribed fire fuels treatments will be significantly less than if a stand replacing wildfire occurred.

Soil Erosion

The Soil Erosion hazard potential is rated as slight to moderate in the proposed treatment area and could increase as a result of the operation of forestland equipment during timber harvest, and mechanical thinning treatments. (Refer to Soil Erosion Hazard Potential Map in the project record.) For these treatments which may cause 50 to 75% of the surface to be exposed in some areas, such as on landings and skid trails, 92% of the soils within the proposed treatment area have a severe rutting hazard (Refer to Soil Rutting Hazard Potential Map in the project record.) Soil rutting hazard ratings are high because soils in the proposed treatment area are of low strength. The formation of ruts may vary depending on the slope and amount of vegetation remaining (or slash covering areas driven over with heavy machinery). Under the proposed action, 180 acres would be precommercially thinned with 1,180 acres thinned commercially. The precommercial thinning could be done with a slashbuster or hand thinned. Areas thinned at the same time as commercial treatments would require fewer passes through the treatment area then if a slashbuster were also used. Thinning with a slashbuster in timber harvest areas may overall cause additional soil disturbance and hand thinning treatments would not significantly increase soil damage.

When disturbance activities result in areas with 50 to 75% of the surface exposed, 90% of soils in the proposed treatment area have moderate erosion hazard ratings and 10% have slight erosion hazard ratings. On hill slopes

with prescribed fire treatments, erosion rates could reach 5.1 ton/mi^2/year (150% of highest prescribed fire WEPP FUME value). On skid trails within the proposed harvest area, sediment leaving skid trails could reach 2.1 tons (for a 1000' long skid trail with 25% slope) and up to 36 lbs. could reach a stream channel. Proposed thinning treatments in which slash is hand piled decreases the use of heavy machinery and soil disturbance.

If vegetation cover decreases below 85% following prescribed burning, 1.7 to 5.2 ton/mi^2/year sediment could reach stream channels. Prescribed burning will likely increase soil erosion depending on the intensity of the prescribed burn, percent cover of remaining vegetation, and length of vegetative buffer between the treatment and stream channel.

Roads throughout the project area are currently in good condition with minor amounts of sediment leaving the road and entering stream channels. Snow covers these roads most of the winter and erosion is minimal as large rain events are infrequent. Proposed road brushing and grading treatments will likely improve road drainage and decrease amounts of sediment leaving the road and entering stream channels. Ditch and culvert cleaning road treatments will likely remove sediment that may otherwise reach a stream channel. Proposed road obliteration treatments will decrease the area of bare soil thereby decreasing erosion.

Soil compaction

Compaction is a main limitation affecting timber production on soils within the proposed treatment area (soil survey staff) and these soils are either very friable (soil unit breaks upon very slight force between fingers) or friable (soil unit breaks upon slight force between fingers) indicating susceptibility to compaction. Harvest and thinning equipment should have rubber tires/rubber track or have a low surface pressure rating and operate when the soil is dry. Heavy machinery should not be used if a handful of soil, when squeezed in hand, remains in a ball when the hand is opened. Prescribed burning and burning slash piles should not affect soil compaction. Under the proposed action, obliterated roads will be ripped, decreasing compaction and improving soil physical conditions for vegetation growth.

Regeneration Harvest Alternative

Under the regeneration harvest alternative approximately 150 acres will be harvested more intensively and 60 more acres will receive broadcast underburning treatment than under the proposed alternative. Potential effects will be similar or less than treatments as described in the Proposed Action Alternative. As 150 acres are harvested more intensively with heavy machinery and 60 more acres broadcast burned, more soil area will likely be compacted, susceptible to erosion, and damaged by broadcast underburning. Overall, potential effects to soil from the Regeneration Harvest alternative treatments will be significantly less than those associated with a wildfire.

Cumulative Effects

In the last decade, the KFRA has thinned, using a density management prescription, approximately 3,500 acres north of Highway 66. Approximately 2,000 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. These previous timber harvest operations created skid trails and landings that have mostly regenerated and are no longer a source of accelerated erosion. It is likely some compaction may have occurred during previous timber harvest operations and if skid trails and landings are reused compaction may increase further. The effects of these harvest treatments have been monitored and are documented in the Annual Program Summary and Monitoring Reports (BLM 1999-2005). Monitoring has indicated that fire severity has been reduced on treated areas.

Roads throughout the project area will continue to be a source of erosion. If road maintenance continues and wet season use is minimal, they will continue to be a minor source of erosion.

Unauthorized off highway vehicle (OHV) activity could create routes that would be a source of erosion. Currently there are no user created routes and illegal OHV use is expected to be very minimal as law enforcement continues and temporary roads are obliterated.

Additional Mitigations

The monitoring information, collected to date, regarding the effectiveness of BMPs on minimizing soil compaction and disturbance (BLM APS 1999-2006) 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 least susceptible to compaction. Snow logging would be allowed and encouraged when feasible. Logging on snow or frozen ground has been shown to reduce compaction to soils (Smith and Wass 1976, Mecleod 1998, Krzic 2004). Ongoing monitoring to measure soil compaction and recovery will assure that effects on soils are within the RMP standards and are mitigated by appropriate measures when needed.

Some projects have shown that subsequent work or on-the-ground activity becomes necessary if timber salvage or planting is needed. While these actions are not anticipated at this time, it is possible that these increased impacts on soils could occur. If these types of actions are necessary, soils conditions will be evaluated and subsequent soil maintenance may be prescribed that could include tilling, seeding, and erosion control measures.

Transportation - Affected Environment

Current road densities on BLM land in the density management project area are approximately 4.3 miles (1.9 miles of open roads) of BLM road per square mile (Table 15). The RMP objective is to reduce road density to 1.5 miles per square miles. Access on roads within the analysis area is typically limited during the winter months due to snow depths.

Table 15: Road Density in Cold Onion 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
Cold Onion Project Area	1.5	4.3 (1.9 miles open rd.)	0.6	0.8

Transportation - 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 obliteration of up to 0.7 miles of spur road as described in the Proposed Action would not occur. 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 and Regeneration Harvest Alternative

There will be a net decrease in permanent road densities because up to 0.7 mile of road would be obliterated. Currently approximately 15.7 miles of road are blocked by gates or some other means. Some of the gates and barricades are not functional. These will be repaired or replaced and subsequently decrease the amount of open roads. Also up to approximately 3.6 miles of additional roads could be blocked with new gates or barricades. This will help to meet RMP objectives to decrease road density. The final decision on the amount of road to close will be described in the Decision Record of this EA. The remaining BLM roads in the analysis area are seasonally restricted due to the amount of snow during the winter. Improvements in road drainage facilities and an additional 3.0 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.

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.

Hydrology - Affected Environment

The Cold Onion 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 4,086 acres of the watershed. The drainage density is 1.5 miles of stream per square mile on BLM lands in the analysis area. There are 0.6 stream crossings per mile of road and 0.8 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 2.1 miles of perennial streams, 1.8 miles of intermittent streams, and 3.5 miles of ephemeral streams (Map 4 in Appendix C). Intermittent streams in the proposed project area have riparian vegetation adjacent to stream channels and in the associated meadows. The ephemeral streams are in draws and have water flow only during high precipitation events and for short durations. Vegetation beside ephemeral streams is similar to the adjacent upland forest communities, with sparse to no riparian vegetation and often overstocked stands (See "Vegetation" section of this document).

Riparian Reserves along perennial and 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 perennial and 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 and deciduous shrubs, grasses, and wetland plant species, streambanks are well-vegetated. Floodplains are very narrow in the analysis area due to the steepness of stream in this area. Some of the upland forest vegetation in the analysis area is overstocked due to past fire exclusion and harvesting practices. In their present state, the upland areas of the Riparian Reserves have similar vulnerability to stand replacement wildfires and insects as the adjacent upland matrix lands.

Hydrology - Environmental Consequences

No Action

The effects from the "no action" alternative would include those resulting from general routine 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. 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. 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 15 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.

Regeneration Harvest Alternative

Regeneration harvest requires increased amounts of mechanical utilization as opposed to the proposed action. This could potentially increase the compaction in upland habitat adjacent to riparian reserves. Additionally, localized runoff rates could increase in proportion to the amount of open canopy structure. Two areas proposed

for regeneration harvest border riparian reserves along Cold Creek and Cold Onion Springs drainage. Increased compaction in combination with removal of upland vegetation could increase runoff rates to these drainages.

Cumulative Effects

Cumulative watershed effects from the Proposed Action are expected to be minimal at the watershed and project level scales because the analysis area comprises a very small percentage of the watershed and includes mostly density management timber harvest activity. Proposed project treatment areas comprise approximately 0.5% of the Jenny Creek 5th Field Watershed (Map 4 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 2,000 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 compared to overall timber management for the entire watershed. 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

The project area includes 6.5 total miles of streams (Table 16).

Table 16: Stream segment totals (miles) in Cold Onion Project Area (BLM ownership)

Stream Type	Total Length (miles)
Fish Bearing Perennial	0.82
Non Fish Bearing Perennial	2.78
Intermittent	0.65
Ephemeral	2.27

Perennial
Cold Creek is a perennial, fish-bearing stream that runs through Section 3 of the project area. Electro-shocking done in October 2007 (Hamilton/Ross), verified the existence of Jenny Creek redband trout populations in Cold Creek within the project area. Due to limiting factors, such as low temperatures and steep gradient typical of headwater environments, redband trout would be naturally the only fish species within the project area able to endure in this type of habitat. Field observations identified a culvert along the Cold Creek drainage located within the northwest quadrant of Section 3 (T39S, R5E) as a possible migration barrier. Cold Creek within the project area maintains sufficient habitat, shade, Large Woody Debris (LWD), and riparian vegetation to support a healthy population of redband trout. Canopy cover and LWD are provided by mixed conifer and aspen stands.

Onion Springs provides perennial flow into Onion Springs Drainage. Canopy cover in the drainage consists of riparian grasses/vegetation, mixed conifer, and aspen stands. A culvert located in Section 13 (T39S, R5E) is in need of maintenance due to lack of proper drainage. Culvert failure in this section could result in an influx of sediment into the stream which drains into the upper reach of Sheepy Creek. Although Sheepy Creek is outside of the project area, the lower reach of this creek supports populations of redband trout and speckled dace.

Extensive fish distribution surveys have not been conducted in the affected drainages. Site visits were conducted in perennial stream reaches within the proposed units; no fish were noted within these streams. 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. (See Table 17 for present and suspected fish species.)

Intermittent/Ephemeral
Intermittent and ephemeral streams account for almost half of the total drainage miles within the project area. These channels are important contributors of surface waters to downstream habitat in the Jenny Creek watershed during spring runoff.

There are no Federal or state threatened, endangered or candidate aquatic species known to occur in 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).

Table 17: 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)
Jenny Creek redband trout	*Oncorhynchus mykiss* ssp.	P
Jenny Creek smallscale sucker	*Catostomus rimiculus* ssp.	S
Klamath Speckled Dace	*Rhinichthys osculus*	S
Lamprey sp.	*Lampetra* sp	S
Sculpin sp.	*Cottus* sp	S

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. If a stand replacing wildfire were to occur likely negative effects on aquatic species could include, loss of canopy shading, negative impacts on water quality due to higher than normal nutrient concentrations in soil adjacent to the stream, and sedimentation.

Aspen stands would continue to be suppressed by mixed conifer stands, suppressing development of riparian diversity and reducing large wood recruitment. Conifer growth in overstocked stands adjacent to streamside areas would continue to be suppressed, reducing long term stream shading and large wood recruitment. 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) allows understory development. This type of development will contain a simplified size and age class stand structure and is not typical of late succession stand characteristics. Late seral stand characteristics in riparian areas allow for many benefits to streams including, channel stability and complexity, large wood contributions and nutrient recycling.

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. Along Cold Creek, a160 foot no entry buffer (one site potential tree height) will be established. The trees in this buffer account for nearly all stream shading and contribution of LWD entering the aquatic environment. The adjacent 160 feet within the riparian reserve will be treated in order to develop a structure more typical of late succession stand characteristics and reduce the potential of a stand replacing fire. Management actions within the KFRA RMP states: Neither conduct nor allow timber harvest, including fuel wood cutting, in Riparian Reserves, with the exception of the following: Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives (KFRA RMP, pages 13-14).

Additionally, this applies to proposed aspen treatment areas within the proposed project. Aspen treatments involve the removal of mixed conifer to promote aspen growth. Aspen are more suited and valuable to riparian habitat due to their tolerance of wetted areas, rapid growth rate, and ability to regenerate from sprouts following events such as fire or logging. Conifer within the riparian reserve will be hand fell to reduce ground disturbance, therefore reducing the previously mentioned negative effects to aquatic habitats. Downed wood within proposed aspen treatments will remain on the ground.

Implementation of project design features (PDF'S) in Appendix B is expected to mitigate impacts of fuel treatments within the proposed project area. Objectives of fuels treatments within riparian reserves (RRs) are: protection of vegetation and soils from catastrophic fire, (including overhead canopy for stream shading); restoration of riparian areas to the potential natural community for the site; increased productive vigor vegetation within the riparian areas; and retention and protection of LWD and overhead cover for stream function and aquatic habitats. The use of low impact yarding techniques is proposed for use in some timber sale 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. Ignition of prescribed fire is restricted depending on topography, distance to stream, ignition methods, and fuel moisture as defined in Appendix B, designed to prevent negative impacts to aquatic habitat such as introducing chemicals into streams and protecting riparian vegetation and canopy cover.

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, which is critical in order to provide aquatic species habitat and channel stability and complexity.

By following guidelines set by the KFRA RMP PDF's, no substantial detrimental impacts to fisheries resources are expected to occur as a result of water temperature from streamside shade reduction or peak/base flow alterations from stream channel alterations caused by the proposed action.

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).

- The proposed project 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.
- The proposed project would maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
- The proposed project would maintain and restore the physical integrity of the aquatic system, including shorelines, banks and bottom configurations.
- The proposed project would maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical and chemical integrity of the system and benefits survival, growth, reproduction and migration of individuals composing aquatic and riparian communities.
- The proposed project would maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate and character of sediment input, storage and transport.
- The proposed project would maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient and wood routing. The timing, magnitude, duration and spatial distribution of peak, high and low flows must be protected.
- The proposed project would maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.
- The proposed project would maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
- The proposed project would maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

Regeneration Harvest Alternative

Regeneration harvest alternative would be subject to the same restrictions outlined in the proposed action alternative. Regeneration harvest requires increased amounts of mechanical utilization as opposed to the proposed action. This could potentially increase the compaction in upland habitat adjacent to riparian reserves. Two areas proposed for regeneration harvest border riparian reserves along Cold Creek and Cold Onion Springs drainage. Increased compaction in combination with removal of upland vegetation could increase surface water velocity in route to these drainages, increased velocity increases surface waters ability to erode and increase sediment load into streams. Project design features (Appendix B) discuss proper yarding techniques, use of skid trails, and replanting which can mitigate potential for erosion and compaction. By following guidelines set by the KFRA RMP PDF's, no substantial detrimental impacts to fisheries resources are expected to occur from the proposed action.

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 aquatic species.

Grazing Management - Affected Environment

Livestock

The proposed treatment areas are within small portions of the Buck Lake (#0104) and Buck Mountain (#0103) livestock grazing 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 Topsy-Pokegama Landscape Analysis, July 1996 (Buck Mountain allotment)and the Spencer Creek Pilot Watershed Analysis, August 1995 (Buck Lake allotment). In addition, Rangeland Health Standards Assessments were completed in 2000 for both grazing allotments; these assessments may also be referenced for more information on livestock grazing. Additional information is found in the KFRA RMP/FEIS, KFRA ROD/RMP and Rangeland Program Summary.

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 and Regeneration Harvest Alternative

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 lower elevation lands to the north and west. The lands to the west are predominantly privately owned and leased for cattle grazing by Inland Fiber Group, LLC. The lands to the north are a mix of BLM and private lands.

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 (Buck Lake & Buck Mountain), the July 1996 Topsy-Pokegama Landscape Analysis, and the Spencer Creek Pilot Watershed Analysis, August 1995. 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, to the southeast of the project boundary, 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 Cold Onion timber Sale, 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 such as the Applegate Trail. 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

The project area has been completely surveyed and there are no known sites. Under the no action alternative, known there would be no ground disturbing activities and no impact to cultural resources.

Proposed Action and Regeneration Harvest Alternative

All proposed treatment areas have been surveyed for cultural resources using BLM Class III survey methods, minus portions of Section 19, which is a large brushfield. Because this section is identified as an area to be treated by underburning, Section 19 will be surveyed post burn activities to identify any cultural sites that were previously unidentifiable due the dense vegetation. No archaeological sites were found within the proposed treatment areas that were examined. Prior to project implementation, the project lead shall meet with the KFRA Lead Archaeologist to ensure that additional site information has not come to light since the preparation of this document.

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. However, if buried materials become exposed during project activities, it is recommended that the project work stop and the Klamath Falls Resource Area Lead Archaeologist be notified immediately to implement mitigation measures to prevent further disturbance.

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 project area and BLM land parcels.

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 and Regeneration Harvest Alternative

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 and wildlife viewing opportunities.

The impacts associated with the proposed selective harvest or thinning, regeneration harvest, 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. The most likely affected recreation users would be hunters who would lose some existing access for hunting along roads and for game retrieval. Although approximately XX additional miles of the existing roads would be closed, and 0.7 miles of additional road would be obliterated, road density per square mile would remain adequate and recreationists would still be able to access much the same as before. 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) Class:

VRM Class III: All of the BLM lands within the proposed treatment area 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.

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 and Regeneration Harvest Alternative

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. The Regeneration Harvest Alternative would have a greater negative effect on visual resources than the Proposed Action. However, the impacts would not exceed or even approach those described in the Klamath Falls Resource Area Final RMP (pages 4-97-100). The viewshed, especially on private timber lands, is altered from pre-timber harvest conditions. Generally, viewsheds that are noticeably altered can be further modified with less adverse visual effect than viewsheds with little or no visible alteration.

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.

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 50 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 and Regeneration Harvest Alternative

These alternatives would remove up to 6 to 9 million board feet of timber (MMBF) and result in approximately 60 to 90 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.

CHAPTER 4 – CONSULTATION

Endangered Species Act (ESA) Consultation

Consultation with the U.S. Fish and Wildlife Service is in progress as required under the Endangered Species Act, as amended. A biological assessment was drafted addressing the actions proposed in the Cold Onion Forest Heath Treatments EA. A determination of "May Affect, Likely to Adversely Affect" was made by the BLM for

the northern spotted owl. Two northern spotted owl territories would be adversely affected from the proposed project. The project area does not contain and would not affect Designated Critical Habitat therefore a "No Effect" determination was made on Designated Critical Habitat. A "No Effect" determination was made for all other listed species.

Cultural Resources Consultation

Perry Chocktoot, Director of Culture and Heritage for The Klamath Tribes, was consulted on this project at the KFRA bi-annual tribal consultation meeting on December 14, 2007.

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APPENDIX A – BIBLIOGRAPHY

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

Agee, James K. 1994. Fire and weather disturbances in terrestrial ecosystems
of the eastern Cascades. In: P. F. Hessburg (ed.) Vol. 3 of Eastside forest ecosystem health assessment. General Technical Report PNW-GTR-320. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station.

Altman, Bob. 2000. Conservation Strategy for Landbirds of the East Slope of the Cascade Mountains in Oregon and Washington. Oregon-Washington Partners in Flight. June 2000. 131pp.

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.

Anthony et al. 2006. Status and trends in Demography of Northern Spotted Owls, 1985–2003. Wildlife Monographs. 48pp.

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.

Aubry, K., and J.C Lewis. 2003. Extirpation and reintroduction of fishers (Martes pennanti) in Oregon: implications for their conservation in the Pacific states Biological conservation Volume 114, Number 1, November 2003 , pp. 79-90(12)

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.

Bull, E. L., A. L. Wright, and M. G. Henjum. 1990. Nesting Habitat of Flammulated Owls in Oregon. Journal of Raptor research 24:52-55

Burke, Thomas. 2000 (Revised Duncan, Nancy 2005). Conservation Assessment for Deroceras hesperium, Evening Fieldslug. USDI/USDA 16pp. An unpublished document and can be found at http://www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs/20050900-moll-evening-fieldslug.doc

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.

Christensen, Norman L. 1973. Effects of fire on factors controlling plant growth in *Adenostoma* Chaparral. Ecol. Monogr. 54(1):29-55

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.

Courtney et al 2004. Scientific Evaluation of the Status of the Northern Spotted Owl Report. Sustainable Ecosystems Institute Portland Oregon. 508pp.

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.

Debell, D.S. and C.W. Ralston. 1970. Release of nitrogen by burning light forest fuels. Soil Science Society of America Proceedings 34:936-938.

Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater, and M.H. Hildegard Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Wildlife Management 63:60-76.

Elliot, William J., "Rock: Clime, Rocky Mountain Research Station Stochastic Weather Generator," U.S.D.A. Forest Service, Rocky Mountain Research Station, Moscow Forestry Sciences Laboratory, December 1999, http://forest.moscowfsl.wsu.edu/cgi-bin/fswepp/fume/fume.pl

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.

Gaylor, Harry P "Wildfires-prevention and control", Prentice-Hall Co., 1974. Bowie, Maryland.

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

Harr, R.D. and R.A. Nichols. 1993, "Stabilizing forest roads to help restore fish habitats: A Northwest Washington example". Fisheries. Vol.18, no. 4.

Hatchett, B. et al. "Mechanical mastication thins Lake Tahoe forest with few adverse impacts", California Agriculture, 2006. 60:2

Hayner, S. 2008. Personal Communication on spotted owl banding program results from 1990-2008.

Hood, S. M.; McHugh, C.; Ryan, K. C.; Reinhardt, E.; Smith, S. L. 2007. Evaluation of a post-fire tree mortality model for western US conifers. International Journal of Wildland Fire. 16: 679-689.

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.

Kilgore, Bruce M. 1973. The ecological role of fire in Sierran conifer forests: Its application to national park management. Quaternary Research 3: 496–513.

Kelly, E.D. E.D. Forsman, and R.G Anthony. 2003. Are Barred Owls Displacing Spotted Owls?. Condor. 105:45-53 Oregon State University. Corvallis, OR

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

Lint, J. 2005. Northwest Forest Plan –the first 10 years (1994-2003): status and trends of northern spotted owl populations and habitat. Gen. Tech. Rep. PNW-GTR-648. Portland, OR:U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 176pp.

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.

McNeil, R. C.; Zobel, D. B. 1980. Vegetation and fire history of a ponderosa pine–white fir forest in Crater Lake National Park. Northwest Science 54:30–46.

Monthey, Roger 1998. (Duncan, Nancy Revised 2005) Conservation Assessment fro Fluminicola n. sp.1 Klamath Pebblesnail. USDI/USDA. An unpublished report and can be found at; http://www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs/20051029-flxx1-final.doc

O'Neill, K. P. et al., "Soil as an Indicator of Forest Health: A Guide to the Collection, Analysis, and Interpretation of Soil Indicator Data in the Forest Inventory and Analysis Program" 2005. Gen. Tech. Rep. NC-258. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station.

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

Pers Comm Klamath Falls Resource Area Biologists 1990-2008.

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.

Sidle, R. C., Pearce, A. J., and O'Loughlin, C.L., 1985, "Hillslope stability and land use", American Geophysical Union, Water Resources Monograph Series 11

Skinner, Carl N.; Chang, Chi-Ru. 1996. Fire Regimes: Past and Present. Sierra Nevada Ecosystem Project: Final report to Congress, Vol. II, Assessments and scientific basis for management options. Davis: University of California, Centers for Water and Wildland Resources: 1041-1069.

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.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/ accessed [5/2/2008].

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

Sugihara, N. G., Wagendonk, J.V, Shaffer, K.E., Fites-Kaufman, J., and Thode, A.E. "Fire in California Ecosystems", University of California Press, 2006.

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.

Taylor, Alan H. 2000. Fire regimes and forest changes in mid and upper
montane forests of the southern Cascades, Lassen Volcanic National Park, California, U.S.A. Journal of Biogeography, 27: 87–104.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. Report of the Interagency Scientific Committee to address the conservation of the northern spotted owl. Unpublished interagency document. 458 pp.

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), August 1995. Spencer Creek Pilot Watershed 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, Bureau of Land Management (BLM). July 2007. Record of Decision To Remove the Survey and Mange Mitigation Measure Standards and Guidelines from Bureau of Land Management Resource Management Plans within the Range of the Northern Spotted Owl. Portland, OR 42pp.

USDI, Bureau of Land Management (BLM). October 2008. Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management

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

USDI Fish and Wildlife Service. 2007. Endangered and Threatened Wildlife and Plants; Proposed Revised Designation of Critical Habitat for the Northern Spotted Owl (*Strix occidenatlis caurina)* 50 CFR Part 17. June 12th, Vol. 72, Number 112.

USDI Fish and Wildlife Service. 2008. Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). Region 1 Portland, OR 142 pp.

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

Weller, T.J., and C.J. Zabel. 2001. Characteristics of fringed myotis day roosts in northern California. Journal of Wildlife Management 65:489-497.

Zielenski, W. and T. Kucera 1995. American Marten, Fisher, Lynx, and Wolverine: Survey Methods for Their Detection. USDA Forest Service General Technical Report PSW GTR-157

Whiteaker, Lou. Personal communication. July 29, 2008.

APPENDIX B – APPLICABLE 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 mixed conifer thin to an average of 120 square feet/acre
- For stands which are predominantly Ponderosa Pine and Douglas Firthin 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.

Regeneration Harvests

- For older, decadent and even-aged stands to establish a new stand.
- Retain 16-25 large green trees per acre, primarily the healthiest trees and the desirable species.
- Similar species selection priority and thermal clump retention as above.
- Following harvest these stands would most likely receive some type of site preparation (under burn or pile and burn) followed by planting of desirable species.

3P Fall/Buck/& Scale Sampling

Project Design Features of the Proposed Action For Sample Tree Felling:

- Sample tree felling would occur as part of the timber cruising process, prior to issuance of the sale decision, but after completion of: planning and analysis by an interdisciplinary team, all site inventories (for example, wildlife, botany, and cultural resources), and sale layout and preparation. In the event that a unit or sale is not logged (for example, if sale of the timber is unsuccessful), any felled trees would remain on site; otherwise, felled sample trees would be yarded during the harvest operations of the timber sale.
- Sample trees would only be felled within the proposed sale units detailed above and illustrated on attached maps. Only trees selected for harvest would be felled; these trees would be randomly selected and would be bucked to standard, merchantable lengths for direct measurement of volume and evaluation of condition and value. Sample trees:

  Shall be limited to an average of one tree per acre or less,
  Shall be limited to gas-powered chainsaws or hand tools,
  Shall not include any road or trail construction,
  Shall not include the use of ground based equipment or other manner of timber yarding
  No sample trees would be felled in riparian reserves

- Sample tree felling would be one of the last activities completed during the preparation of timber sales.

- If, during implementation of the proposed action, any BLM Special Status Species are found that were not discovered during pre-disturbance surveys, felling would be suspended until further review by BLM specialists is completed and application of any necessary measures applied.
- If, during implementation of the proposed action, a raptor nest is found in a tree identified for removal, felling would be suspended until further review by area specialists could be completed and any necessary measures applied.
- If, during implementation of the proposed action, any cultural resources are found that were not discovered during pre-disturbance surveys, felling would be suspended and appropriate measures would be implemented before felling would be resumed.
- Where felling of a sample tree would be contingent upon the felling of snags greater than or equal to 20 inches diameter at breast height, the sample tree would not be felled.

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 and 50 feet for fish-bearing stream channels.
- For vegetation treatments within Riparian Reserves, limit the use of mechanical equipment to the outer one-half of the Riparian Reserve.
- 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.
- 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 Cold Onion Analysis area, the site potential tree height was determined to be 160 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 (using liquid petroleum products) 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. Recommend that pumping be restricted to Onion Springs pump chance since this is a non-fish bearing perennial water source.

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: bald eagle, northern spotted owl, northern goshawk, osprey, and special status species. Seasonal restrictions for specific species can be found on pages 231-240 of the KFRA FEIS.

Nesting Areas
Protect nesting areas as describe on page 38 of KFRA RMP.

For units adjacent to or containing spotted owls or 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 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.

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.

Noxious Weeds
- Require cleaning of all equipment and vehicles prior to moving on-site to prevent spread of noxious weeds.
- 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.

Cultural Resources
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. Sites identified during survey, as well as any known sites found in previous surveys, will be buffered, flagged and avoided to prevent impacts.

Visual Resources

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.
- During any winter harvesting operations, all subcontractors working in the Contract Area shall be advised of snowmobile traffic.

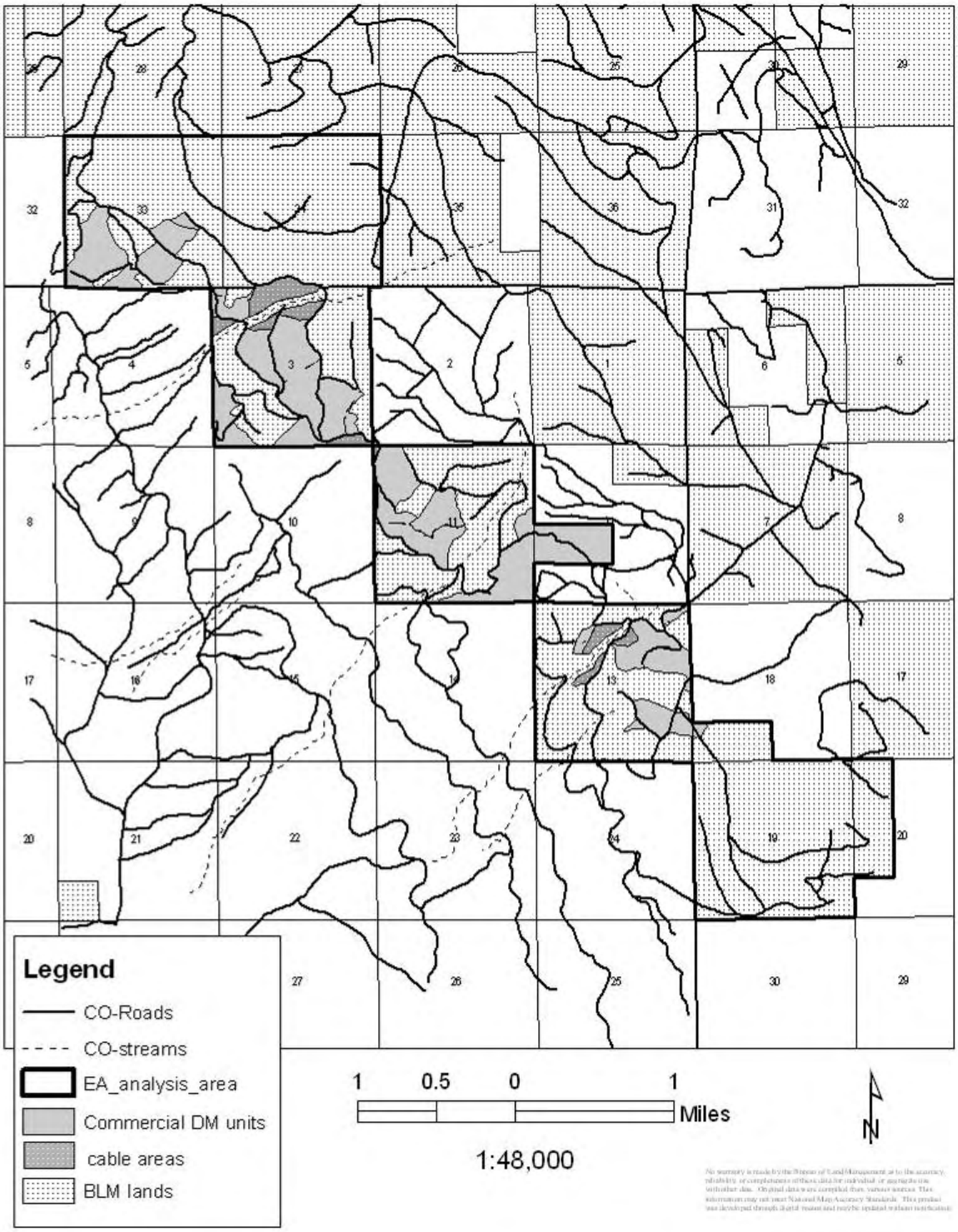
Culvert Replacement

- For fish bearing streams, Follow Oregon Guidelines for Timing of In-Water Work, July 1 to September 15.
- Disturbance and vegetation removal will be minimized to the greatest extent possible.
- All disturbed areas will be restored as closely as possible to pre-disturbance contours upon project completion
- Any vegetation removed as part of the project will be left on site at disturbed areas to aid in sediment retention.
- Project activities will be conducted in a manner to ensure that turbidity levels do not exceed ten percent of the pre-activity levels on perennial streams. Short-term violations for required in-stream construction work are acceptable.
- Install turbidity control structures (coffer dam or silt curtain) immediately downstream of in-stream restoration work areas. Remove these structures along with accumulated sediment following completion of turbidity generating activities.
- Culvert replacement design for fish bearing streams shall provide upstream and downstream fish passage for all life stages of fish. This will require coordination with the fisheries biologist to determine the species, maximum velocities and other features that are necessary to obtain fish passage.
- Excavated materials shall be kept out of live streams unless it is designed to be placed there (i.e. riprap, etc.).
- Sediment producing materials will not be left within the 100 year flood plain any longer than necessary to construct the facility. Place excavated material above the flood prone area and cover or place a berm to avoid its reentry into the stream during high flow events. Once the construction is complete fill material will be removed and properly disposed of in upland areas. If a flood is anticipated during the construction period, the fill shall not be placed within the 100-year floodplain.
- Culverts and other stream crossings shall be designed to accommodate the 100-year flood.
- Limit the amount of streambank excavation to the minimum necessary to ensure stability of enhancement structures.
- Install grade control structures (e.g., boulder vortex weirs or boulder step weirs) where excessive scour would occur.
- If the stream is running, water shall be diverted away from excavation areas to reduce turbidity, provide continuous flow for aquatic life, and eliminate saturation of the crossing fill as it is excavated. Provide isolation from flowing water during excavation. A small diversion pool would be built upstream and stream flow is piped or pumped around the worksite and discharged into the stream below the worksite.
- Any soil disturbance adjacent to stream channels shall receive mulch coverage with weed free straw or masticated brush and trees, or erosion control matting to reduce sheet erosion. Mulch generated during the clearing phase of the work shall be used to the maximum extent practicable.
- Fish and sensitive invertebrate species (pebble snails in Cold Creek) shall be salvaged from the excavation area and placed upstream of the culvert prior to construction activities. A block net placed upstream and downstream of work area may be required to prevent fish from moving into the project area during construction.
- Pumps shall be screened with a intake screen sufficient to prevent trout fry from entering or becoming impinged suction pipe.

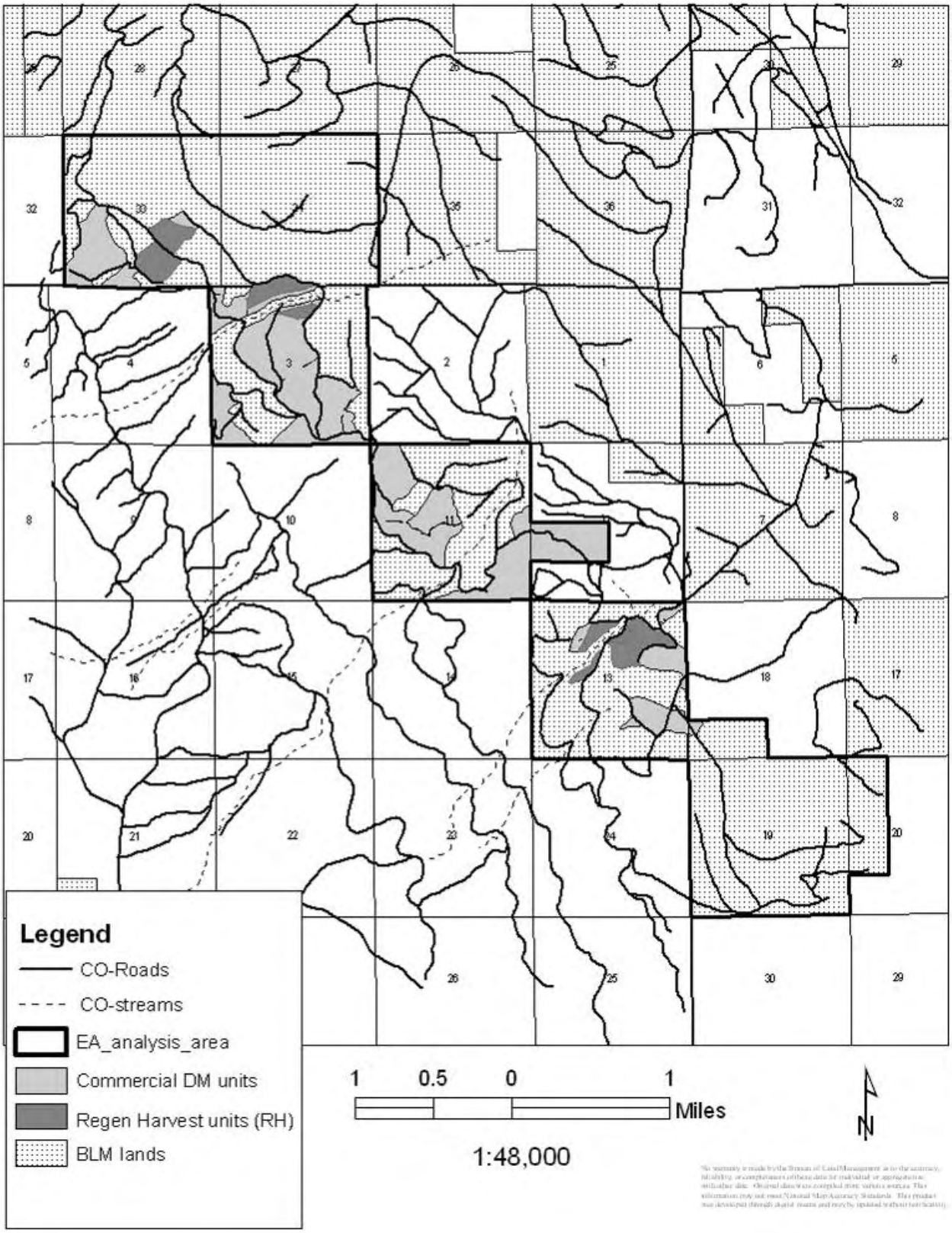
- All equipment refueling and maintenance will occur 100 feet outside of the distance from running water. All equipment will remain on the roads at all times and not use the meadows for storing supplies, turning, or parking areas.
- Inspect and clean heavy equipment as necessary prior to moving on to the project site, in order to remove oil and grease, noxious weeds, and excessive soil.
- Inspect all mechanized equipment daily for leaks and clean as necessary to help ensure that toxic materials, such as fuel and hydraulic fluid, do not enter the stream. Equipment will not be stored in stream channels when not in use.
- Develop and implement an approved spill containment plan that includes having a spill containment kit on-site and at previously identified containment locations. Spill Containment Kit (SCK): All operators shall have a SCK as described in the SPCC plan on-site during any operation with potential for run-off to adjacent water bodies. The SCK will be appropriate in size and type for the oil or hazardous material carried by the operator.

APPENDIX C – MAPS

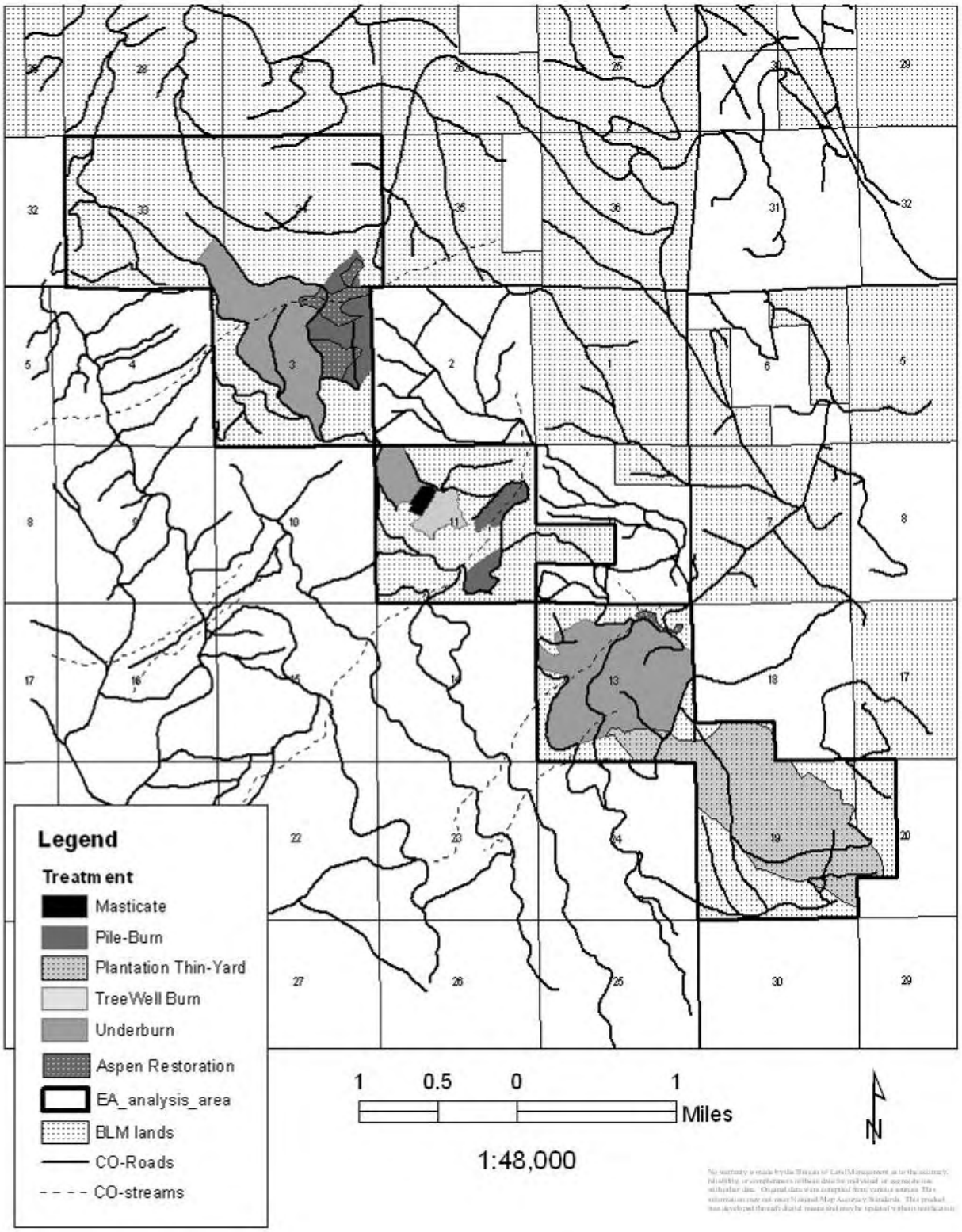
Map 1 – Proposed Action - Commercial DM units



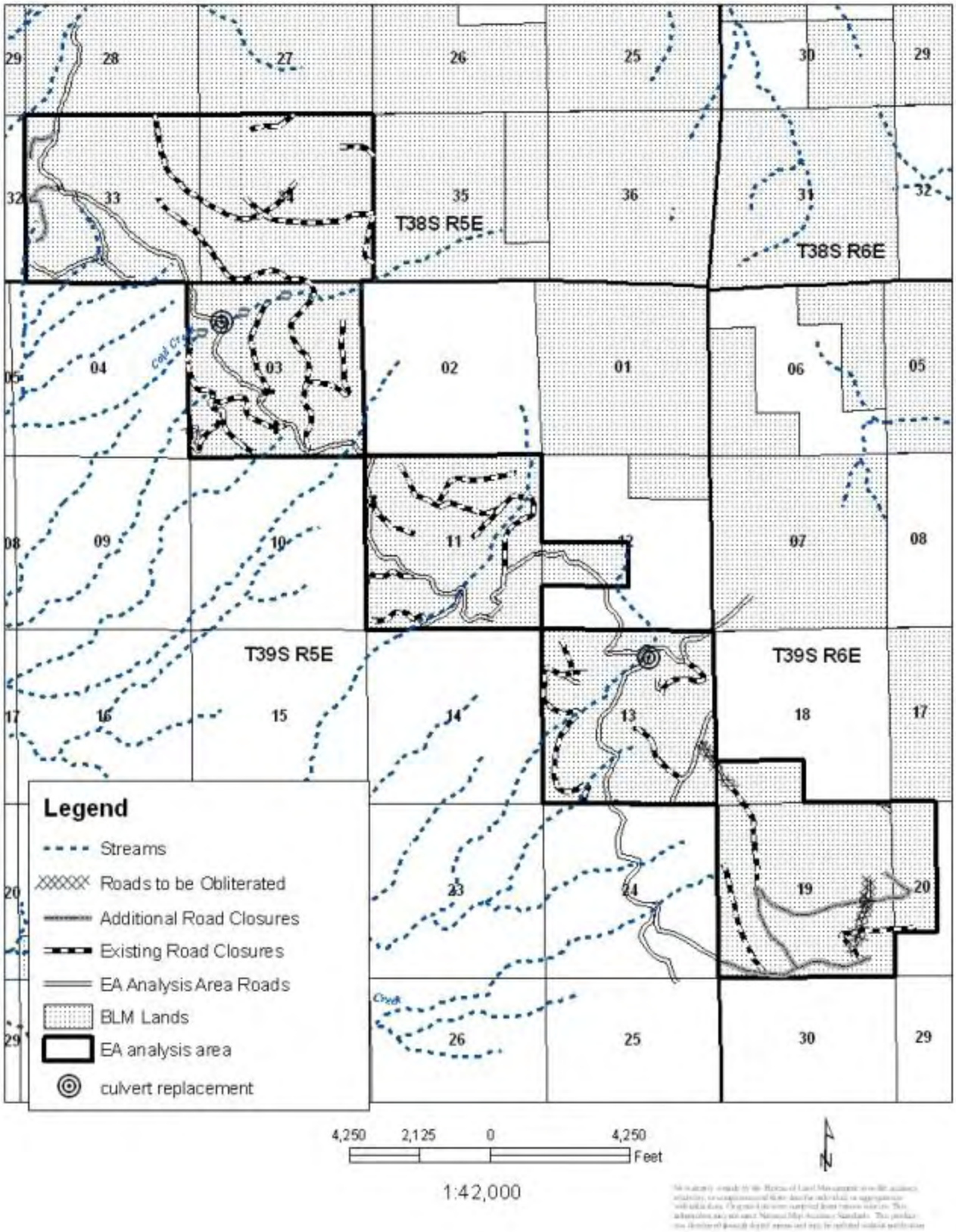
Map 2 – Proposed Regeneration Harvest Alternative



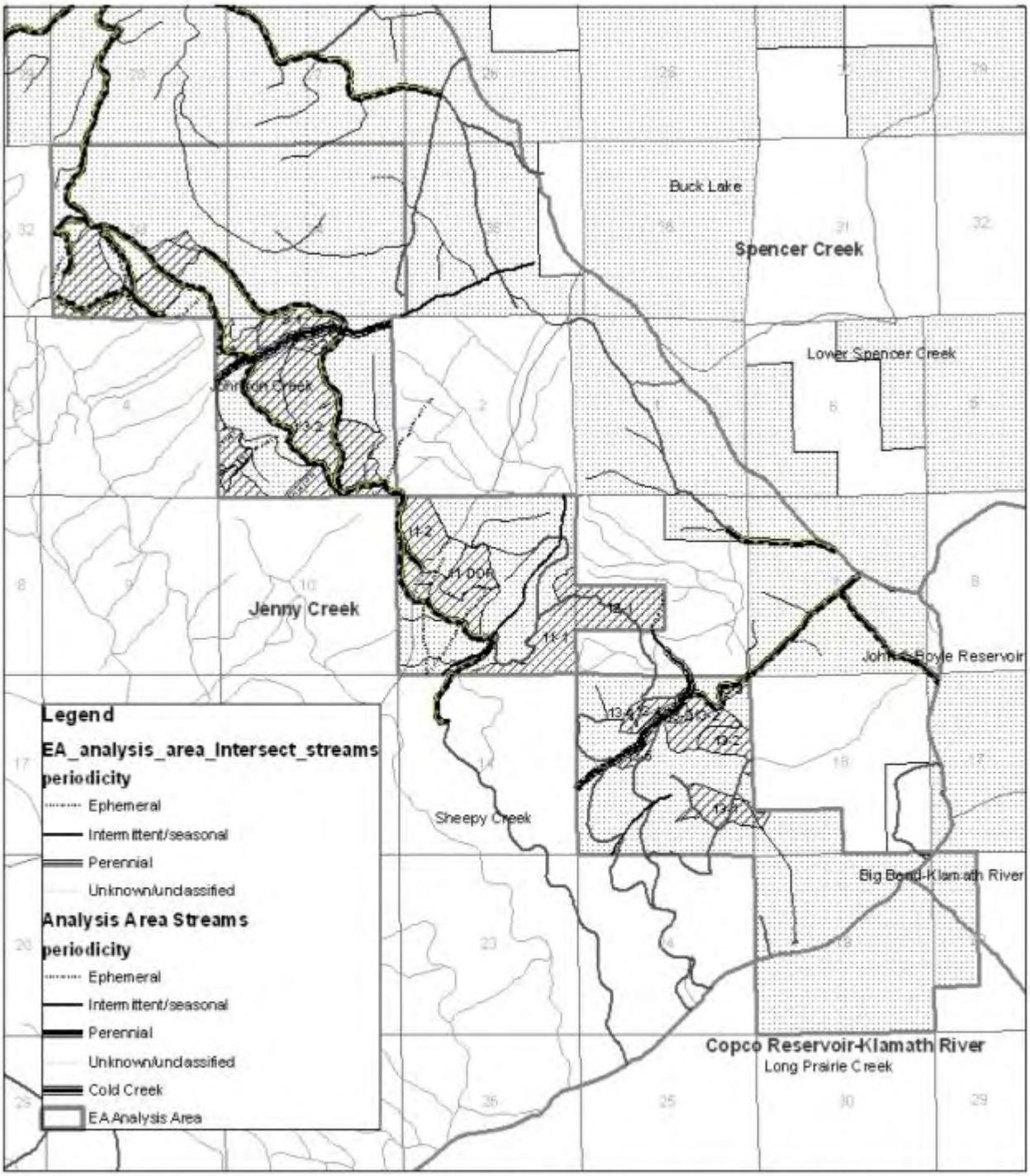
Map 3 – Proposed Fuel Reduction and Restoration treatments



Map 4 – Proposed Road Management



Map 5 –Streams and Watershed Boundaries



Cold Onion Forest Health Treatment EA Hydrology

0 0.25 0.5 1 Miles

1 inch equals 0.745872 miles

N

APPENDIX D – REVIEW AND SUMMARY OF KEY FINDINGS FOR 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).