SOUTH GERBER FOREST HEALTH TREATMENTS
ENVIRONMENTAL ASSESSMENT
EA# OR-014-04-06

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

ABSTRACT: The following Environmental Assessment addresses the environmental impacts associated with a variety of proposed treatments in the South Gerber Analysis Area. Proposed treatments include; commercial timber harvesting, juniper woodland treatments, transportation system improvements, riparian habitat restoration, fuels treatments, stream enhancement work, and aspen stand enhancement.

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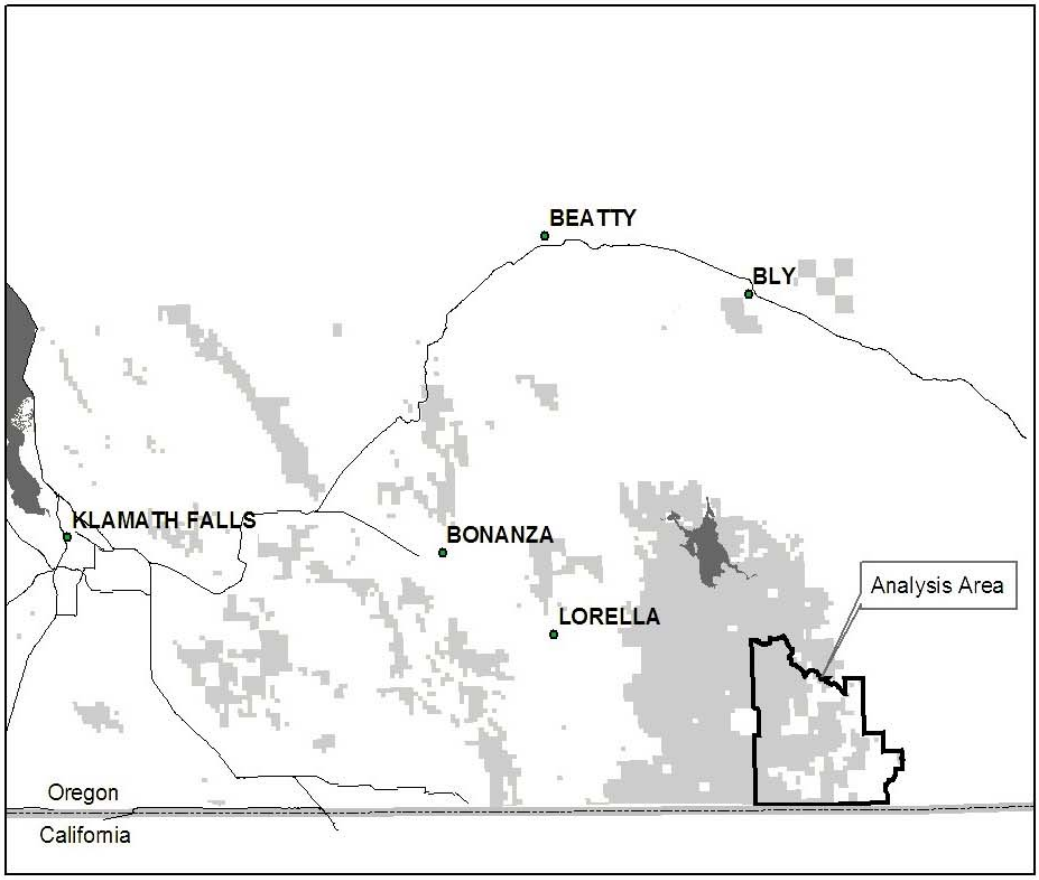
South Gerber Analysis Area - General Location



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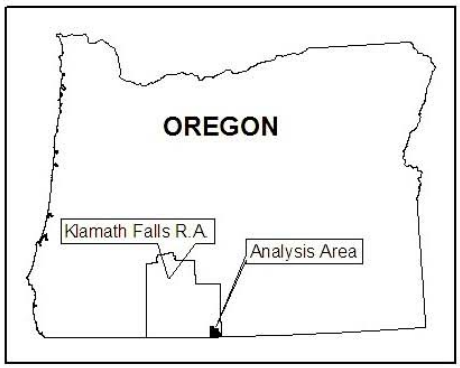
KFRA Land Jurisdiction

BLM USFS



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CHAPTER 1 - INTRODUCTION

Overview

The Klamath Falls Resource Area (KFRA) has established the South Gerber Analysis Area in which to evaluate an assortment of resource management opportunities on BLM land. An interdisciplinary evaluation of the resources in the analysis area is documented as part of this environmental assessment (EA), including wildlife, recreation, soils, fisheries, timber, cultural, hydrology, and other resources. The analysis results in development of a recommended course of action that best meets the objectives outlined in the KFRA Resource Management Plan (RMP).

Location

The South Gerber Analysis Area consists of approximately 33,000 acres of BLM, Forest Service (USFS), and private lands located southeast of Klamath Falls, Oregon (see General Location Map). Table 1 describes the approximate location and ownership status of land within the analysis area. All treatments proposed in this environmental assessment would occur exclusively on BLM-administered lands.

Table 1 - Ownership within the South Gerber Analysis Area

Land Ownership/Status	Location		Analysis Area	
	Townships	Ranges	Approximate acres	(% of area)
BLM Lands	39, 40, & 41S.	14½ and 15E.	21,300	(71%)
USFS Lands	40 and 41S.	15E.	2,400	(8%)
Private Lands	40 and 41S.	14½ and 15E.	9,300	(21%)
Total			33,000	(100%)

The analysis area is in the southeast portion of the largest block of public land in the KFRA, referred to as the Gerber Block, and almost entirely within the Upper Lost River 5th Field Watershed. There are portions of five 6th field watersheds within the analysis area boundary as shown in Table 2. However, the bulk of the analysis area is in two of these subwatersheds - the east half of Antelope Creek and north half of the Rock Creek watersheds.

Table 2 – Portions of 6th Field Watersheds within the South Gerber Analysis Area

Subwatershed Name	Total Acres	of Watershed in Analysis Area	Approximate Acres		% of Analysis Area by Subwatershed
			Total	BLM	
Antelope Creek	27,193	59%	15,940	13,000	48%
Rock Creek	31,738	47%	14,860	7,200	45%
E. Branch Lost River	17,249	4%	700	740	4.5%
Pitchlog Creek	15,453	9%	1,400	320	2.2%
Wild Horse Creek	17,140	0.1%	100	40	0.3%
Total			33,000	21,300	100%

Public Input Summary and Issue Development

An important source of information for this assessment is the *Gerber-Willow Valley Watershed Analysis*, which was completed in July of 2003. That document is a culmination of several years of data collection and analysis by an interagency (USFS and BLM) watershed analysis team and the Gerber Coordinated Resource Management Planning (CRMP) group for the entire area known as the Gerber Block, which encompasses the South Gerber Analysis Area.

In addition, a scoping letter dated February 5, 2004, was sent to the resource area timber sale EA mailing list of approximately 130 people. The letter explained the project proposal and asked the general public for comments. The resource area received comments from four individuals/organizations. These concerns are briefly summarized and addressed as follows:

Concern: Impacts to water quantity or quality in Gerber Reservoir or the Klamath River or Rogue River watersheds.
Response: Due to the distance of the analysis area from these waterbodies, no impacts are expected.

Concern: Protect sensitive plant and animal species (including Threatened and Endangered species).
Response: These species and their habitat requirements within the analysis area are addressed in this assessment.

Concern: Protect old growth habitat.
Response: Proposed treatments are designed to maintain late successional characteristics of stands within the analysis area and are addressed in this assessment.

Concern: Limit implementation of fuels treatments.
Response: Fuels reduction treatments for this assessment are limited to thinning/juniper removal and removing slash through prescribed underburning or piling and burning.

Concern: No new roads, avoid activity in roadless areas.
Response: None of the proposed activities take place in or adjacent to roadless areas. The proposed action includes minimal construction of new roads and obliteration/decommissioning of existing roads where needed to reduce the possibility of greater resource damage.

Concern: Reduce livestock grazing.
Response: The proposed action is limited to restoration in conjunction with forest health and road treatments. Livestock management actions are not within the scope of this EA, but are addressed on an allotment-specific basis through Rangeland Health Standards Assessments prepared and/or reviewed in conjunction with the Gerber-Willow Valley Watershed Analysis.

Issues

Issues brought forward during public scoping, in the watershed analysis process, or by the Klamath Falls Resource Area interdisciplinary team were used to assist in developing the Proposed Action, alternatives, mitigating measures, and project design features. These issues are summarized as follows:

- Areas of decreased forest health and wildlife habitat conditions exist as a result of past management activities, including the exclusion of natural fire processes.
- Alterations in the watershed have affected flow regimes and water movement, stream channel morphology, aquatic and riparian habitats, site productivity, and species viability.
- Altered soil conditions (erosion, compaction, road surfacing, changes in flood and fire regimes, etc.) from past management practices have contributed to reductions in vegetative productivity, soil water holding capacity, and water quality.

Purpose and Need for Action

The KFRA has a need to manage the South Gerber Analysis Area to meet land use plan objectives from the RMP and to implement recommendations from the Gerber-Willow Valley Watershed Analysis. The purpose of the proposed treatments is to assist in meeting that need. Objectives for "East Side Forest Matrix Lands", described in the RMP (page 26), are as follows:

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide connectivity between biological communities.
- Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.

Resource concerns and management recommendations identified in the *Gerber-Willow Valley Watershed Analysis* include:

- Past management has resulted in some overstocked stands that are at increased risk to fire, insect, and disease mortality. Treatments are needed to reduce forest health risk in portions of the analysis area. Opportunities exist to provide for timber production while improving stand growth and resiliency especially where stands are overstocked or have stagnated growth.
- Opportunities exist to enhance wildlife habitat by promoting restoration of historic species composition levels, including aspen stand restoration treatments.
- Some of the existing roads in the analysis area do not meet current or future transportation needs and/or are contributing to resource damage through erosion and sediment transport. Opportunities exist to better manage the road system and to improve watershed conditions through road obliteration, decommissioning, realignment, and improvement.
- Opportunities exist to improve the hydrologic functions and water quality in the analysis area through further implementation of watershed conservation and restoration projects.
- Past management has allowed juniper densities to increase in areas that were historically more open juniper woodlands or shrub-dominated communities causing a reduction in the abundance of native shrubs, forbs, and grasses. Juniper has also encroached into historically pine-dominated stands, aspen stands, and riparian areas. This encroachment has led to decreased forest health through increased stand competition, potential decrease in water yield, reduction in stand resiliency, and an increase in the potential for severe wildfire behavior.

Environmental Analysis and Decision Process

This Environmental Assessment (EA) 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 impacts of the proposed treatments and to determine if the environmental impacts associated with the proposed site-specific treatments are significant and/or greater than those already analyzed in the previous KFRA RMP EIS. If the impacts 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 impacts with each alternative, and assist the decision maker in selecting an alternative.

The KFRA Field Manager, as the responsible official, will decide whether or not to implement the Proposed Action and determine whether or not the proposed action is consistent with the RMP as well as other laws and regulations (i.e., the Endangered Species Act and Clean Water Act, etc.). The environmental analysis will be reviewed and one or more treatment-specific Decision Records (DRs) will be written prior to implementation of management actions. The proposed treatments or projects would span a 5-10 year period. Information obtained from biological surveys or other sources following the preparation of this analysis will be considered for mitigation as necessary in subsequent Decision Records to this EA.

Conformance with Existing Plans

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

- Klamath Falls Resource Area Resource Management Plan and Final Environmental Impact Statement (RMP/FEIS, September 1994) and Record of Decision (ROD, June 2, 1995).
- Klamath Falls Resource Area Fire Management EA#-OR014-94-09 (June 10, 1994).
- 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).
- Interim Water Quality Restoration Plan (WQRP) for Lands Administered by the BLM in the Gerber Reservoir Watershed and the Oregon Portion of the Upper Lost River Watershed (December 2003)
- Aquatic Conservation Strategy Supplemental Environmental Impact Statement/Record of Decision 2004 (ACS SEIS EIS/ROD – 2004)
- The Gerber-Willow Valley Watershed Analysis, completed in July of 2003, 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.
- The supporting science from the Interior Columbia Basin Ecosystem Management Project / Eastside Draft Environmental Impact Statement / May 1997 (ICBEMP).

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

Introduction to Alternatives

There are two alternatives analyzed in this environmental assessment. Below is a description of each alternative.

Alternative 1 – Proposed Action

Alternative 1 is a compilation of forest, juniper woodland, aspen, and riparian reserve treatments proposed for the South Gerber Analysis Area. These treatments would be designed to improve forest health and riparian habitat. Table 3 shows the array of treatments considered under the Proposed Action. A description of these actions is as follows:

Eastside Matrix Forest Lands

- Density Management (thinning) could occur on up to 4,000 acres of eastside matrix lands. This type of harvest would be designed to maintain large ponderosa pine (16" DBH or larger) while maintaining uneven-aged, multi-strata stand structure and reducing competition and stress to reserve trees (RMP/ROD, Page 56). Retain 40-120 square feet of basal area in the Density Management Units. Retain 1.4 snags per acre with a minimum DBH of 16", or largest available if less than 16" (RMP/ROD, Page 26-27). Retain fifty (50) linear feet of logs per acre greater than or equal to twelve (12) inches in diameter and eight (8) feet long (RMP/ROD, Page 26).
- Up to 200 acres of patch cuts within the Density Management units to address root rot areas, mistletoe pockets, insect caused mortality, and blowdown areas. Patch cuts would be limited to no more than five (5) acres in size and no more than fifteen (15%) of the density management unit. Retain 5 to 10 large green trees (>16" DBH) per acre in the patch cuts.
- Approximately 7.0 million board feet (MMBF) of timber would be harvested over the life of this EA.
- Cutting and removal of encroaching juniper adjacent to and within matrix forested lands.
- Appendix B of this EA includes the silvicultural prescription, including project design features and best management practices, for treatment of forested areas.
- Upon completion of harvesting, some treatment areas would be underburned in prescription to reduce fuel loading.
- Patch cuts would be replanted with pine and other native vegetation.

Juniper Woodlands

- Selective cutting of western juniper on up to 3,000 acres of juniper woodlands immediately adjacent to eastside matrix forest lands. Cut juniper trees would be piled and burned, sold for firewood, or yarded and sold as sawlogs, chips, or other products depending up public and market demand.
- Any residual slash would be piled and burned.
- Up to 1,000 acres of juniper woodlands would be replanted with bitterbrush and other native shrubs upon completion of burning.

Riparian Areas and Aspen Stands

- Up to 100 acres of aspen stand treatments would be implemented. This would primarily involve cutting and removing or piling and burning competing vegetation including conifers and shrubs within aspen stands. It could also include prescribed burning of certain aspen stands to promote aspen regeneration.
- Up to 700 acres of thinning of juniper and/or non-merchantable pine in riparian reserves could occur. Cutting would be done by hand and/or mechanically. The residual debris would be piled and burned. Where feasible, material would be sold for firewood.
- Up to 200 acres of commercial Density Management (thinning) would occur in riparian reserves. Cutting would be done by hand and/or mechanically. Where feasible, material would

be sold for firewood or sawlogs. The residual debris would be piled and burned or the stand would be underburned.

Other Restoration Work

- Precommercial thinning of submerchantable material on up to 300 acres.
- Road restoration projects including: improvement, decommissioning, obliteration, realignment, construction, seasonal closure, and maintenance. (Refer to Table 3.)

Alternative 2 - No Action

The National Environmental Policy Act (NEPA) requires analysis of a No Action alternative. This alternative proposes no new management activities in the planning area. Activities proposed in and adjacent to the analysis area and analyzed in other NEPA documents would still occur (i.e., juniper and fuel reduction treatments, prescribed burning, and planting of bitterbrush and mountain mahogany). Routine road maintenance, forest inventory, and fire suppression would continue to occur.

Other Alternatives Considered But Dropped From Analysis

Salvage Only Alternative - An alternative was considered that would have analyzed for Salvage Harvest Only in the South Gerber Analysis Area. This would involve the harvesting and removal of only scattered dead and dying trees throughout the analysis area. Salvage is discussed in the RMP (pages 55 and E-4). Annual mortality and blowdown in the resource area has occurred since initiation of the RMP in June of 1995. Moderate amounts of mortality are anticipated if drought conditions continue. In addition, the overstocking of some of the lower elevation mixed conifer stands is predisposing these stands to continual mortality. A portion of the Allowable Sale Quantity has come from the salvage of dead and dying trees on almost a yearly basis. A separate EA has been prepared to analyze the impacts of continuing to salvage scattered dead and dying trees from the entire Resource Area, including the South Gerber Analysis Area. Therefore, this alternative was dropped from further consideration.

Restoration Treatments Only Alternative – Another alternative was considered that would not propose any commercial timber harvest activity in the analysis area. Only restoration projects as proposed in Alternative 1 would be considered for implementation. This alternative was dropped from further analysis based on the understanding that environmental effects of implementing restoration treatments will be sufficiently discussed in Alternative 1 and the determination that a “Restoration Treatments Only” alternative would not fully meet the land use plan objectives or the purpose and need for the proposed action.

Table 3 – Detailed Description of the Proposed Action

Project Design Feature	**Units Proposed**
Eastside Matrix Forest Lands	
Commercial Timber Harvest	Up to 4,000 acres
Silvicultural Prescription DM=Density Management PC=Patch Cuts	DM – Up to 4,000 acres PC – Up to 200 acres (included in total above)
Estimated Canopy Closure Retention	DM Areas - acres >40% PC Areas - acres < 25%
Prescribed Fire - Underburning (Post-Harvest Treatment)	Up to 4,000 acres
Juniper Woodland Treatments	
Cutting and piling/burning or removing juniper	Up to 3,000 acres
Planting bitterbrush and other shrubs & tubing	Up to 1,000 acres
Riparian Reserves and Aspen Stands	
Aspen stand rejuvenation	Up to 100 acres
Hand cutting, piling, burning	Up to 700 acres
Mechanical juniper removal	Up to 500 acres
Density Management (thinning)	Up to 200 acres
Precommercial Thinning	
Precommercial thinning of submerchantable stands	Up to 300 acres
Road Treatments	
New road construction and realignment of existing roads	Up to 3 miles (1 mile currently identified)
Improvement (resurfacing, etc.)	Up to 10 miles and annual maintenance
Obliteration/ decommissioning	Up to 5 miles (1 mile currently identified)

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Introduction

A thorough description of the affected environment of all the resources in the analysis area can be found in the Klamath Falls Resource Area RMP/ROD and FEIS (pages 3-3 to 3-79) and the Gerber-Willow Valley Watershed Analysis (Step 3 – Current Conditions). This chapter is designed to focus on those specific resources that would be most impacted by the proposed action. In addition, it discusses the mitigation measures that will be implemented to minimize or avoid those impacts.

Upland Forest Vegetation - Affected Environment

Forests occurring in the proposed treatment area can be generally described as multi-aged, multiple canopy stringers of ponderosa pine with encroaching juniper and a dense understory component of small ponderosa pine. Ponderosa pine is the main commercial tree species, although stands may contain a minor component of incense cedar, white fir, and aspen. Other than scattered salvage of individual dead/dying trees, the forest stands in the analysis area have not been entered for harvest in the past twenty years. From the 1950's through the 1970's, most of these stands were entered once or more for light selective understory thinning. However, there are some stands where most of the larger overstory trees have been harvested and the residual stands consist primarily of small pole-sized and second growth timber.

Past management practices, including logging, grazing, and exclusion of fire, have modified the vegetation in the analysis area and resulted in high fuel loads and structural changes in the forest that increase the likelihood of stand-replacing intensity wildfires. Over much of the analysis area, at least one entry of prescribed fire (underburning) has been implemented to reintroduce fire into the ecosystem and to reduce fuel loads. Existing overcrowded stand conditions and competition for limited moisture with encroaching juniper continues to impact overall forest health in the pine stands. Crowded growing conditions stress the trees, suppressing growth and increasing vulnerability to insect and drought mortality.

Bark beetles, including mountain pine bark beetles that can infest and kill pine trees, are present in the forested stands of the proposed project areas. Small (less than one acre) patches of ponderosa pine have been killed and are currently being attacked by bark beetles. No large areas of infestation have been identified at this time. Juniper and small conifers are also encroaching on meadow and shrub plant communities.

Table 4 shows BLM allocations for lands in the South Gerber Analysis area. Non-forest lands include roads, lakes, and rangelands. Lands classified as forest are the commercial forest lands in the analysis area. The woodlands contain primarily stands of western juniper and intermixed, scattered ponderosa pine.

Table 4 - BLM Land Allocations in the South Gerber Analysis Area

Land Allocation	Acres*	Percent	Riparian Reserve Acres*	Percent
Non-forest	4,900	23%	870	48%
Forest (ponderosa pine)	4,100	19%	200	41%
Woodlands (juniper and ponderosa/juniper)	12,300	58%	650	11%
Totals**	21,300	100%	1,720	100%

*Riparian Reserve acres are included in the total acres (first column).
**Acreage figures for this table were calculated from the Geographical Information System (GIS).

Table 5 below describes the existing canopy closure of forest land in the analysis area. Management activities, primarily the exclusion of periodic fire, have resulted in higher canopy closures due to overstocking of ponderosa pine and encroachment of western juniper. The Environmental

Consequences section discusses the potential changes in canopy closure resulting from the proposed treatments.

Table 5 - Approximate Canopy Closure of forest lands within the South Gerber Analysis Area

Crown Closure (forested areas)	Acres*	Percent
70-99%	1,685	41%
40-69%	2,219	53%
10-39%	202	5%
0-9%	13	1%
Totals	4,119	100%

*Acreage figures for this table were calculated from GIS.

Upland Forest Vegetation - Environmental Consequences

Alternative 1

Density Management treatments in combination with prescribed underburning, as proposed, would favor development of late successional characteristics over time by retaining a high percentage of the healthier older/larger trees, reducing competition, and restoring species composition to conditions more closely approximating an historic range of variability. Canopy closure in the more densely stocked stands would be reduced, but it is estimated that 40 percent or more of the existing canopy closure would be retained after treatment. There could be some loss of individual large trees; however, most of the late seral structure and function would be maintained.

Patch Cuts would result in removal of forest vegetation, primarily in small isolated areas already impacted by disease or insects. It is estimated that less than 25 percent canopy closure would be retained within patch cuts, which would be reforested. The project design feature to retain a minimum of 5 to 10 large green trees per acre in each patch cut would reduce the impact to species dependent upon late seral habitat by maintaining some connectivity, crown closure, and residual structure. Impacts from previously harvested sales 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 (KFRA Annual Program Summaries, 1999 through 2003). Patch cuts would add diversity to the stand, providing islands of early successional habitat. Prescribed fire in patch cut units is likely to be of low intensity and severity.

Forest health would be improved in the treated areas resulting in a decreased risk of mortality due to disease, insects, wildfire, and competition. Impacts to forest vegetation from implementation of this alternative would not exceed those analyzed in the KFRA FEIS.

Alternative 2

Alternative 2 would result in no change in the forest vegetation except that induced by on-going drought and insect related mortality as well as increased risk of loss to windthrow and stand replacing wildfire.

Special Status Plant Species - Affected Environment

All lands within the analysis area have been surveyed for special status plant species. The long-bearded mariposa lily (*Calochortus longebarbatus* var. *longebarbatus*), a Bureau tracking species, grows in meadows, including low areas or drainages within low sagebrush (*Artemisia arbuscula*) scablands. The meadows appear to be mostly edaphically produced; the seasonally wet, heavy soils may preclude trees. The meadows are generally within forests of ponderosa pine (*Pinus ponderosa*), lodgepole pine (*P. contorta*), and western juniper (*Juniperus occidentalis*). A draft species management guide for the long-bearded mariposa lily was developed in 1991 by Thomas Kaye of the Conservation Biology Program of the Oregon Department of Agriculture, in consultation with Bruce Rittenhouse and Steve Popovich, botanists on the Fremont National Forest. An Interim Conservation Strategy for the long-bearded mariposa lily on the adjacent Winema National Forest was developed and signed by the botanists, TES coordinator, and forest supervisor in 1995.

Baker's globe mallow (*Iliamna bakeri*), a Bureau sensitive species, commonly grows within plant associations which include western juniper, curlleaf mountain mahogany (*Cercocarpus ledifolius*), rabbitbrush (*Chrysothamnus nauseosus*), squaw carpet (*Ceanothus prostratus*), and sagebrush (*Artemesia tridentata*). Scattered or open ponderosa pine occurs on some sites. The preferred habitat consists of dry hilltop sandy soils with little or no overtopping canopy. Many of the known populations are associated with recent burns. Several known populations initially located on 5-10 year old burns appear to have flourished briefly and then declined or disappeared. A conservation assessment was written for Baker's globe mallow in January 2000 by Robert W. Wooly, a botanist with the Fremont National Forest. The conservation assessment provides a review of current information about the taxonomy, range, distribution, habitat, ecology, and status of Baker's globe mallow in Northern California and Southern Oregon.

Fringed campion (*Silene nuda* ssp. *insectivora*), a Bureau tracking species, is found in relatively deeper soils of the sagebrush-steppe habitat, often associated with vernal streams and washes. Fringed campion is frequently associated with western juniper and big sagebrush dominated plant communities. Known populations seem to indicate that this species is somewhat tolerant to disturbance.

Pre-disturbance surveys will not be completed for special status fungi but any sites with special status species found incidentally will be marked and buffered.

Special Status Plant Species - Environmental Consequences

Alternative 1

Under Alternative 1, known special status plant populations would be identified and appropriate protection measures would be implemented, therefore, negative impacts to these populations are not expected. Protection measures can include flagging and avoiding sites, flagging of buffers around sites, or unit boundary adjustments. In the unlikely event that populations of special status plant species are undetected by pre-project surveys, the use of mechanical equipment would have the potential to impact these populations.

Alternative 2

Alternative 2 is the no action alternative. No new ground disturbing activities are proposed, therefore direct impacts from project activities to special status plants would occur only as described in other NEPA documents.

Noxious Weeds - Affected Environment

Many noxious weed species have a competitive advantage over native species in areas where existing vegetation is disturbed. Within the Gerber/Willow Valley Watershed, human activities which have created disturbed conditions include timber harvest, grazing, and road construction. Consequently, noxious weeds have become established in a wide range of habitats, including riparian areas and wetlands, roadsides, campgrounds, rock pits, trails, forested and non-forested areas. These unwanted, introduced species have the potential to adversely affect species diversity, special status plant/animal species, range condition and forage production. Four species of noxious weeds have been documented on BLM lands within the analysis area. These species are bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), and Mediterranean sage (*Salvia aethiopsis*).

Bull thistle is present on disturbed sites throughout the analysis area. It is closely associated with physical disturbance, and can be the dominant species on extremely disturbed sites, such as landings, where it persists for approximately 5-10 years following disturbance. Mediterranean sage is known from only one site in the analysis area which has been monitored and treated as needed on an annual basis as part of the resource area's noxious weed management program.

Musk thistle occupies the most area within the analysis area, and has the second largest number of populations, some of which are large. Musk thistle is a biennial plant that aggressively invades

disturbed sites and can form dense stands which eventually crowd out desirable plants. This thistle is generally found in forested areas that have been logged or can be found in other areas associated with ground disturbance.

Canada thistle has the largest number of populations within the analysis area. Canada thistle has the capability to remain in relatively small populations for a number of years then increase exponentially. It is an aggressive colony forming perennial that reproduces by seed and by rhizomes that enable this plant to spread rapidly over large areas. This weed commonly invades riparian areas and has the capability to crowd out the native riparian flora, forming extensive underground rhizomes that are currently controllable only by translocated herbicides.

Noxious Weeds - Environmental Consequences

Alternative 1

Actions that result in ground disturbance could create conditions that favor the invasion of noxious weeds. The use of the mechanical equipment in Alternative 1 may create the disturbed conditions under which many noxious weeds have a competitive advantage. 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 for the prevention of the introduction of noxious weed seeds and plant parts would reduce the potential for the dispersal of these species into the project area (See Appendix B.).

The potential exists to spread known populations of noxious weeds as a result of project activities. Flagging and avoidance of these populations will reduce the potential to spread these noxious weeds. Alternately, project design features to mow noxious weed plants to the ground and wash vehicles before leaving these areas would also reduce the potential to spread noxious weeds (See Appendix B.).

Alternative 2

Alternative 2 (no action) 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.

Roads - Affected Environment

The BLM-administered lands in the analysis area have an average of approximately 2.6 miles of road per square mile. Approximately one quarter of the analysis area, including 14.5 miles of road, is affected by a seasonal road closure from November 1 through April 15 for wildlife protection and erosion reduction. Table 6 summarizes information about roads on BLM lands within the South Gerber Analysis area.

Table 6 – BLM Road Length/Density within the South Gerber Analysis Area (by 6th Field Watershed).

Watershed Name	Road Length (miles)		Road Density (mi/sq. mi.)	
	BLM	Total Length*	BLM	Total Area*
Antelope Creek	55	63	2.82	2.62
Rock Creek	30	69.6	2.66	3.0
Pitch Log Creek	0.61	2.29	1.24	1.0
East Branch Lost River	1.14	1.14	1.06	1.06
Wildhorse Creek	0	0.4	0	2.35
Total	86.75	136.43	2.59**	2.64**

*Including BLM

**Average based on analysis area acreage figures from Table 2.

All roads in the analysis area would be evaluated on a case-by-case basis to determine resource concerns and treatment benefits. As each restoration project or timber sale is designed within the analysis area, roads within the specific treatment area found to be adversely affecting natural resources

would be considered for decommissioning, obliterating, realignment, improvement, increased maintenance and/or seasonal closure. (Refer to Appendix C for a definition of road decommissioning and obliteration.) These treatments would be analyzed and documented in site specific Decision Records. Decommissioning or obliterating BLM roads that provide access to private lands would require alternate access and land owner concurrence. Table 3 identifies the maximum miles of road that may be proposed for closure, decommissioning, improvement, construction, or obliteration.

Roads - Environmental Consequences

Alternative 1

The overall goal of proposed road treatments would be to maintain or reduce road densities in the analysis area below 2.6 miles/square mile. New road construction in the South Gerber analysis area is proposed for two primary reasons:

- to provide access to timber sale units presently inaccessible
- to realign existing roads to allow obliteration of roads within Riparian Reserves.

Currently, one mile of new road is proposed for construction/realignment and one mile of existing road in the Holbrook Spring area is proposed for obliteration/decommissioning. Environmental impacts from new road construction would be minimal. Impacts from the proposed road realignment would be a short-term increase in sediment within the Riparian Reserve due to road obliteration, but would result in a long-term benefit as the Riparian Reserve begins to reestablish native vegetation and hydrologic function. Temporary roads would be decommissioned or obliterated as appropriate. Almost the entire length of new road currently proposed would be decommissioned, resulting in a net decrease of one half mile of road. Annual road maintenance and improvements to road drainage features would create minor soil disturbance, but would provide benefits to water resources by reducing inputs of water carried sediments from roads into stream channels. Best management practices (BMPs) listed in Appendix B would be followed in construction, realignment, and maintenance of roads.

Additional Mitigation

Potential additional mitigation could include exploring the economic and environmental feasibility of utilizing juniper and/or pine chips as a construction material for temporary spur roads. Using this method, a layer of wood chips would be laid on top of the ground with no blading or exposure of the native material. The chip surface would eventually decay and become part of the duff layer on the forest floor, effectively closing the road. It is expected that this method would cause less soil movement, compaction, exposure, and runoff than normal methods of temporary road construction.

For additional information on the effects of roads, see Riparian and Hydrology Sections of this environmental assessment. Road decommissioning or improvement work could be implemented as part of the timber sale contract or through a separate service contract using restoration funds.

Alternative 2

Alternative 2 would result in no new road construction and no short term soils impacts. Annual road maintenance and improvements to road drainage features would provide benefits to water resources by reducing inputs of water and sediments from roads into stream channels. Benefits of decommissioning roads in riparian reserves would be forgone. Additional road treatments would occur only as described in other NEPA documents.

Soils - Affected Environment

The Gerber-Willow Valley Watershed Analysis (pages 23-24) rated most of the soils in the analysis area as having low to moderate surface erosion and compaction susceptibility. Potential for soil compaction and erodibility varies with soil types. The analysis area is relatively level. Slopes range from 0 to less than 35 percent with most less than 10 percent. (Refer to Table 7 below.) Generally speaking, more gradual slopes have lower surface erosion potential. A more detailed discussion of soil issues and concerns for the affected environment are addressed in the KFRA RMP and the Gerber-

Willow Valley Watershed Analysis. The following excerpts from the watershed analysis describe factors contributing to reduced soil compaction susceptibility in the analysis area: *"Gerber's land area is dominated by Basalt, andesite, and tuff geologic materials, which release shrink-swell clays as they weather to soils. The soils have cobblestone and gravel stone clay loam surface layer."* (Page 3) *"Shrink-swell clay soils, which are common in Gerber, have a self-plowing recovery with wetting that improves the recovery rate from traffic or compaction."*(Page 24)

Winter snow depths in the analysis area range from 0 to 5 feet. Snow logging is not a feasible option due to the lack of a consistent or reliable base of snow in excess of 20 inches deep in the analysis area. The repeated freezing and thawing action in this region that contributes to the lack of consistent snow pack also contributes to the shrink-swell recovery from compaction discussed above.

Table 7 – Soil Types, Slopes, and Acres for BLM and Private Land within the Analysis Area.

MUID*	Soil Name	Percent Slope	Associated Vegetation	Acres
310A	Extremely cobbly-Dranket-Norcross complex	0-10%	Aspect/Low Sage Soils	2,802
312A	Norcross-Dranket complex	0-8%	Low Sage Soils	1,139
320A	Pankeybasin loam	1-2%	Low Sage Soils	288
330B	Casebeer-Norcross-Dranket complex	1-8%	Low Sage Soils	143
331B	Norcross-Dranket-Casebeer very cobbly loam	0-6%	Low Sage Soils	1,847
335B	Norcross-Casebeer complex	1-10%	Low Sage Soils	800
340A	Norcross, thick surface-Casebeer complex	0-4%	Low Sage Soils	865
342A	Casebeer very stony loam,	0-4%	Low Sage Soils	652
343A	Jennett loam,	0-1%	Wet Soils	25
344A	Norcross-Boulder Lake-Jennett complex,	0-1%	Low Sage/Wet Soils	114
350B	Woolencanyon-Notchcorral-Wonser complex,	0-8%	Mesic soils	1,024
360B	Devaul-Norcross complex,	2-15%	Big Sagebrush/Low Sage Soils	650
400C	Schnipps cobbly loam,	6-20%	Noncommercial Forest	185
500C	Mound-Royst-Rock outcrop complex,	10-30%	Commercial Forest/ Noncommercial Forest	69
510B	Schnipps-Norcross complex,	2-15%	Noncommercial/Low Sage Soils	2,468
515B	Bumpheads, high precipitation-Mound Norcross complex,	1-10%	Noncommercial Forest/Wet/Low Sage Soils	1,832
517B	Bumpheads-Mound-Norcross complex,	1-10%	Noncommercial Forest/Wet/Low Sage Soils	5,106
520B	Mound-Benhall complex,	2-20%	Commercial Forest	2,153
525C	Mound cobbly loam,	15-30%	Commercial Forest	758
530B	Benhall-Mound complex,	0-15%	Commercial Forest	120
532B	Tallboy gravelly loam, 0-15%	0-15%	Noncommercial Forest	432
540C	Schnipps-Mound complex,	2-30%	Noncommercial/ Commercial Forest	1,340
542B	Grohs-Carrbutte complex,	2-30%	Mesic Soils	3,247
543B	Carrbutte stony loam,	2-15%	Mesic Soils	148
560C	Drakce-Dranket complex,	4-35%	Aspect/Low Sage Soils	393
600A	Boulder Lake-Hippyjim silty clay loam,	0-1%	Wet Soils	528
602A	Boulder Lake silt loam, 0-1%	0-1%	Wet Soils	8
610A	Hippyjim silty clay loam,0-1%	0-1%	Wet Soils	1,158
615A	Olene-Boulder Lake complex, 0-1%	0-1%	Wet Soils	135
999	Water	0-1%		47

*Map Unit Identification Number

Soils - Environmental Consequences

Alternative 1

Implementing Alternative 1 could result in some detrimental soil conditions. Detailed definitions of detrimental soil conditions can be found in Appendix C. Detrimental soil conditions include soil displacement, creation of adverse cover conditions, and detrimental soil compaction (defined as 15% increase in soil bulk density). Overstocked forest conditions can contribute to increased potential for erosion, especially where there is a risk of stand replacing wildfire (crown fires). Well developed forest openings, resulting from thinning and small patch cuts as proposed in this alternative, reduce these risks by allowing establishment of shrub and grass understory which is more resistant to erosion (Gerber-Willow Valley Watershed Analysis, page 24).

Most harvesting operations on the resource area are done using mechanized ground based equipment. This involves grapple skidders and a mechanical harvester that has a sawhead at the end of a 20 foot hydraulic arm. The use of a mechanical harvester normally results in a greater area of ground disturbance since it is not confined to skid roads. The mechanical harvester generally leaves the skid trails to cut and bunch trees designated for cutting. A mechanical harvester reportedly causes less soil compaction since it exerts fewer pounds per square inch of force/pressure than other ground-based harvesting machinery (tractors and skidders). In addition, because the mechanical harvester has a 20 foot radial arm, it is able reach into stands and extract trees without having to drive up to every tree. Since use of a mechanical harvester is becoming the industry standard and is the most economical choice for density-management treatment of forest stands and juniper woodlands, the resource area has implemented monitoring to determine the areal extent of soil disturbance and changes in soil bulk density in representative ground disturbing projects to evaluate soil health.

Four other timber sales have been monitored in the KFRA since the implementation of the RMP. Results to date indicate that detrimental soil disturbance ranged from 5%-16% on three sales and on one sale, the soil disturbance slightly exceeded the 20 percent standard. The Mortar Coyote catchment area is located in the vicinity of Keno Springs and Goodlow Mountain within the Gerber Block. Although it is north of the South Gerber Analysis Area, the Mortar Coyote catchment area has similar soils and topographic conditions. Results of a soil compaction study conducted there show current compaction conditions due to forest management activities is 14%, which is less than the 20% guideline for adverse soil conditions (Gerber-Willow Valley Watershed Analysis, page 25).

Mitigation

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

- Use of existing newly designated skid trails, marked in advance for logging operators to confine soil disturbance.
- Seasonal restrictions to limit logging operations to the dry season to prevent compaction, puddling, and erosion.

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

Slash that is left on the project area from manual treatments will serve to reduce surface soil erosion and sedimentation. Future prescribed burning of treated areas, as part of this alternative, should result in a mosaic of burned and unburned areas which should not result in significantly increased erosion in the analysis area. (Maurer, 2001)

Should conditions suitable for logging over frozen ground or snow occur (the snow pack persists and the area remains accessible), soil disturbance in treatment areas would be further minimized. The

KFRA recently completed a timber sale, Clover Hookup (2002), where the entire sale was logged over 20 inches of snow. Monitoring indicated almost no disturbance to the surface organic layer.

Alternative 2
No soil disturbing treatments would be implemented under this alternative, but would occur only as described in other NEPA documents. The risk of stand replacing wildfire and resulting increased erosion in overstocked forests would not be reduced, and would continue to increase as live and dead fuels (biomass) continue to accumulate.

Riparian Resources - Affected Environment

Lentic Riparian Resources

BLM-administered land in the South Gerber Analysis Area has springs, wet meadows, and riparian areas associated with naturally occurring lentic riparian areas, or still-water habitats. There are several small reservoirs in the analysis area. Some occur in areas that once functioned as wetlands and playas, but most occur in areas that were generally upland in nature. These small reservoirs have a localized effect on watershed function, tending to *"...dampen, rather than eliminate flood peaks… Some reservoirs may be capable of capturing smaller flood peaks, such as those caused by high intensity precipitation events or melt of short-lived snowpacks."* (Gerber-Willow Valley Watershed Analysis, page 30). There are nine springs within the Antelope Creek subwatershed and 4 within the Rock Creek subwatershed on public land, within the analysis area. Of those springs, the major ones are Bug Spring, Jennette Spring and Alkali Spring in the Antelope Creek watershed. The total area of Riparian Reserves for lentic riparian areas is approximately 250 acres. Proper Functioning Condition surveys have not yet been completed for these riparian areas. Informal surveys suggest that they are generally Properly Functioning. Some areas are bisected by, or are downslope from, roads which may affect flow routing.

Lotic Riparian Resources

Lotic riparian areas are a category of riparian-wetland habitat associated with running water, such as streams and flowing springs. There are approximately 5.4 miles of perennial streams in the analysis area, which are associated with springs and/or wet meadows that provide year-round discharge. The total area of Riparian Reserves for lotic riparian areas is approximately 318 acres. Perennial streams include Antelope Creek, Rock Creek, and Gwinn Spring Creek. Ephemeral and intermittent streams are more common in the analysis area (approximately 30 miles) and are found where surface and subsurface flow collects from a sufficiently large drainage area.

Vegetation communities with riparian characteristics are found along portions of the perennial and intermittent streams in the area. Wet meadows and deciduous plant communities occur adjacent to streams in sections 3, 7, 8, 9, 17, 18, and 20 of the Rock Creek subwatershed and in sections 1, 2, 3, 6, 25, 34, and 35 of the Antelope Creek subwatershed. There are a few small aspen stands scattered across the analysis area. Some of these stands are declining due to invasion by conifers (juniper, white fir, ponderosa pine), livestock grazing of aspen suckers, and fire suppression. Current fuel loads in aspen are typically so heavy that fire severity may be well beyond pre-settlement levels and result in aspen mortality rather than stimulate regeneration.
For a further description of lotic riparian resources in the analysis area, refer to the Gerber Willow-Valley Watershed Analysis.

Some of these riparian areas have been affected detrimentally by past management activities including exclusion of fire, logging activity, road construction, and historic grazing practices. Ongoing effects include compaction and loss of site potential, loss of riparian vegetation and stream shading, and loss of vertical and lateral streambank stability. Between 1994 and 1997, Proper Functioning Condition surveys were completed on three perennial streams within the analysis area. (See Table 8.) Restoration opportunities could have a strong beneficial effect on streams that are currently Functional At-Risk.

Table 8 – Summary of Proper Functioning Condition (PFC) ratings on public land in the analysis area.

Subwatershed Name	Total Stream Miles	PFC		FAR-N*		NF**	
		Miles	%	Miles	%	Miles	%
Antelope Creek	6.1	3.9	64%	0.6	10%	1.6	26%
Holbrook Spring	0.4	0	-	0	-	0.4	100%
Rock Creek	2.3	0.7	30%	-	-	1.6	70%
Total	8.8	4.6	52%	0.6	7%	3.6	41%

*FAR-N = Functional at Risk – No Apparent Trend - at least one riparian attribute/process causes high probability of degradation with relatively high flow event.
**NF = Non-functional – riparian conditions clearly inadequate to ensure the values of properly functioning streams.

Channel processes and hydrologic functions of riparian areas have been affected by roads (Table 9). Hydrologically connected road drainage features (including low water crossings, ditch relief culverts, water bars, broad-based dips, lead-off ditches, and non-engineered drainages) have the potential to affect riparian reserves. Some roads can intercept and redirect runoff into streams. Where roads cross or are immediately adjacent to streams, they may cause diversion of natural flow paths. If peak flows are increased by management actions, channels can downcut and widen. This leads to increased stream energy (due to less interactions with floodplain areas) and may cause water quality degradation.

Table 9 – Miles of road on BLM administered land within the analysis area by subwatershed.

Subwatershed	**Road miles within Riparian Reserves**
Antelope Creek	2.2
E. Branch Lost River	0
Pitch Log	0.005
Rock Creek	1.47
Total	3.675

*Data from 2002 BLM/USFS Road Inventory Data

Riparian Resources - Environmental Consequences

Alternative 1

Approximately 200 acres of riparian density management treatments would occur. These treatments would promote development and maintenance of late seral structure by thinning overstocked stands and removing juniper trees that compete for moisture and nutrients with larger trees. Snag densities would be maintained that meet the RMP/ROD direction (RMP/ROD, Page 26-27). Some soil disturbance would occur from mechanical equipment operations. The no-mechanical-equipment buffers are expected to trap any sediment that could reach adjacent water ways and maintain microclimates adjacent to streams and wetlands. The riparian influenced microclimates generally do not extend very far out from the water course and the microclimate conditions where timber harvest will occur are more characteristic of upland conditions. The Density Management prescription proposed for the uplands is not expected to impact Riparian Reserves.

For timber harvest and yarding activities that occur within Riparian Reserves, implementing the Project Design Features and Best Management Practices listed in Appendix B (such as: operating over snow or frozen ground, limiting activities to the dry season, and minimizing skid trails/yarding corridors) would limit detrimental impacts to riparian resources. If yarding corridors cross Riparian Reserves, they will be designed and used consistent with Timber Harvest Best Management Practices (as described in the KFRA ROD/RMP page F-22). Although ephemeral streams would not be buffered, sites where skid trails cross ephemeral channels would be spaced at least 300 feet, and no skid trails would be located in the bottom of draws where surface runoff or subsurface flow could collect.

New landings or permanent roads would be constructed within Riparian Reserves where construction or re-alignment of road segments would allow obliteration of other, more impacting, road segments or where no other options exist. Construction of roads or landings would be designed using PDFs and

BMPs listed in Appendix B. Proposed road treatments include obliteration, re-alignment, and improvement of roads that impact Riparian Reserves. Currently, almost one mile of road along the perennial and ephemeral portions of Holbrook Spring Creek is proposed for permanent decommissioning. This action will move the stream toward Proper Functioning Condition.

Up to 100 acres of aspen stands/patches would be treated. The treatments are designed to stimulate regeneration of aspen and prevent the eventual loss of these stands due to the advancement of successional processes in the absence of disturbance. Proposed treatments would include a combination of some or all of the following: removal of encroaching juniper and pine, selective removal of portions of stands or individual aspen trees, mechanical scarification, and protection from livestock grazing until aspen suckers are well established. Mechanical treatments would be allowed in aspen stands only during periods when detrimental soil impacts would not likely occur.

Overall, proposed treatments in the Riparian Reserves are expected to accelerate the development of late seral characteristics and improve forest health by reducing competition, removing diseased trees, and reducing the risk of future catastrophic wildfires. In the long-term, these treatments would contribute to restoration of canopy closure, stream shading, habitat connectivity, and recruitment of large woody debris (LWD). These treatments would be designed to achieve desired vegetation characteristics and limit detrimental impacts to soils, vegetation, and water quality.

The intent of the Proposed Action (Alternative 1) is to protect and restore the function of the forest ecosystems in the South Gerber Analysis Area. The proposed forest health treatments would be consistent with the Aquatic Conservation Strategy (ACS) objectives. In addition, ACS would be further met through the application of the PDFs (Appendix B) and RMP Standards and Guidelines (S&Gs) intended to protect the aquatic resources as described in this EA. A final determination of ACS consistency will be made based on the specific actions described within individual Decision Records for this EA.

Alternative 2

Treatments within Riparian Reserves would occur only as described in other NEPA documents. Impacts associated with roads located within Riparian Reserves would continue to occur. The composition and character of forest stands adjacent to streams would not be altered at this time. The risk of catastrophic wildfires would not be reduced within overstocked stands, which could result in extensive mortality within Riparian Reserves and reducing the future supply of LWD and stream shade. The occurrence and health of existing aspen patches would continue to decline.

Hydrology - Affected Environment

The analysis area is almost exclusively within the Upper Lost River 5th Field Watershed. There are small portions within the Gerber Reservoir and North Fork Willow Creek 5th Field Watersheds. (Refer to Table 2 for a description of 6th field watersheds within the analysis area.) The climate of this area is characterized as a relatively dry area with cool temperatures and snowfall in the winter and hot and dry conditions in the summer. Annual precipitation for the area ranges from 14 inches in the lowlands to 30 inches in the higher elevations, and comes primarily as snowfall (Gerber-Willow Valley Watershed Analysis, page 1). The hydrology of these watersheds is driven by snow melt and the year-round surface water source is provided by springs.

Streams flow through rocky canyons and narrow or wide wet meadows. The perennial streams on public land in the project area are Rock Creek, Antelope Creek, and Gwinn Spring Creek. The rest of the streams are intermittent or ephemeral in duration. There are several perennial springs in the project area as well. Specific information regarding the number of springs, miles of perennial and intermittent streams, and proper functioning condition surveys is discussed in the previous **Riparian Resources – Affected Environment** section.

Vegetation strongly influences evaporation, snow accumulation, and melt dynamics. Vegetative communities adjacent to streams in many riparian areas have been affected by increased juniper and ponderosa pine encroachment as a result of past livestock grazing and fire suppression. These overstocked conditions can result in reduced infiltration rates, reduced overland flow, as well as reduced water yield. However, monitoring to date has indicated infiltration rates still remain relatively high due to soil characteristics (Gerber-Willow Valley Watershed Analysis, page 27).

Road density in the project area is approximately 2.6 miles/square mile. Road densities by watershed are listed in Table 6 (see **Roads – Affected Environment** section). Some roads are natural surface roads and not maintained on an annual basis. There are primitive roads in the project area, some of which show signs of erosion. Detailed information regarding the hydrology of the project area is in the Gerber-Willow Valley Watershed Analysis (pages 25 to 31).

Hydrology - Environmental Consequences

Alternative 1

Land management actions can affect numerous aspects of the watershed hydrologic cycle, including evapotranspiration, interception, snow melt patterns, and infiltration (Berris and Harr, 1987). Generally, reduced canopy closure can lead to decreased evapotranspiration, increased runoff and discharge from springs, and increased peak flows, especially in early winter (Chamberlain et al., 1991). Effects of timber harvest may persist for more than 25 years following treatment (Harr, 1976; Jones and Grant, 1996; Jones, 2000). Effects of timber harvest on streamflow in the analysis area could include higher water yields, higher peak flows, and earlier peak flows with little or no impact on baseflows. These effects can persist until harvested areas are "hydrologically recovered" - that is, until the effects of timber harvest on evapotranspiration, interception, and snow dynamics are no longer evident. Based on post-treatment monitoring results for similar treatments, sufficient canopy closure and basal area would be retained in density management treatment units and riparian reserves to prevent or minimize effects to streamflow. Impoundments (reservoirs) and diversions in the analysis area tend to dampen flood peaks.

Density Management

These treatments would, in the long-term, generally maintain forest composition and canopy closure. In the short-term, these treatments would reduce canopy closure. Resulting decreases in evapotranspiration could make more soil water available for streamflow and may cause slightly increased early winter water availability. Due to the porous soils and generally gradual slopes, it is not likely that increased early winter water availability will cause increased peak flows. The prescribed reduction in the amount of vegetation should still fully utilize the available water and there should not be excess for changing the hydrologic processes.

Patch Cuts

In addition to affecting evapotranspiration rates, patch cuts would cause increased snow accumulation and consequently soil water storage and the timing and magnitude of runoff events. Removing trees and creating openings affects snow dynamics in various ways, depending on the size of openings. Small openings (less than five acres in size or about one to three tree heights across) can increase snow accumulation by reducing canopy interception and influencing local wind patterns and reduce rates of snow melt by affecting radiation gains and losses (Troendle 1982; Baker 1988). Larger openings do not induce increased snow accumulation and can result in more rapid snowmelt due to increased solar radiation and increased rain-on-snow potential (Kattelman et al. 1983). Thinning has the same general effect as small openings, though the magnitude of potential increases in water yield are directly related to the amount of basal area removed (Troendle and King 1987). Proposed patch cuts would cause increased snow accumulation. This could result in delayed snow melt (depending on spring weather conditions) that would make more water available for streamflow during the later spring and early summer, although the difference may not be measurable.

Riparian Reserve Density Management Treatments
Treatments within reserves would be designed to maintain and restore forest composition, canopy closure, and late seral characteristics. These treatments would cause immediate reductions in canopy closure but would favor the long-term maintenance or restoration of hydrologic processes. These treatments will occur over a limited area and will generally not involve creation of large openings, thereby making it unlikely that hydrologic processes will be impacted in the short term.

Effects of Non-Commercial Treatments in Riparian Reserves
Proposed noncommercial treatments would reduce the juniper component in the proposed areas and reduce competition for aspen and pine. Two beneficial effects resulting from these treatments would be reduced potential for extensive high intensity wildfires and reduced competition for nutrients and water around aspen and residual pines.

In the short-term, noncommercial treatments will reduce evapotranspiration rates, interception, and infiltration, thereby increasing the potential for runoff generation and hillslope erosion (DeBano et al., 1996). Ground disturbance associated with mechanical noncommercial treatments could cause detrimental impacts to runoff routing. Implementing appropriate BMPs (see KFRA ROD/RMP pages F-26 to F-31) and PDFs (Appendix B) would minimize detrimental hydrologic effects of noncommercial treatments and prescribed burning. Noncommercial treatments would not occur within timber sale units and are not likely to directly compound the effects of timber harvest on hydrologic processes.

Road Treatments
Some construction of new permanent roads would occur to facilitate decommissioning of roads within riparian reserves or when no other options are available. Implementation of appropriate road construction BMPs (KFRA ROD/RMP pages F-13 to F-21) will mitigate road impacts. Road improvements would include resurfacing, installing or retrofitting road drainage features to reduce the delivery of runoff from roadside ditches directly into stream channels, and upgrading roads to accommodate heavy traffic. Road realignment and improvement would reduce delivery of road runoff and sedimentation to streams. These actions would reduce the connectivity of roads and streams, thereby reducing transportation management effects on peak flows. Outsloping of roads would effectively eliminate diversion and concentration of runoff and subsurface flow. Skid trail rehabilitation work would reduce the probability that runoff would be routed directly to streams.

Currently one mile of road along the Holbrook Spring Creek channel is proposed for permanent decommissioning. Decommissioning or obliteration of roads within riparian reserves would reduce overall road densities and delivery of road runoff into streams. Surfacing of dirt roads would reduce the likelihood of wheel ruts forming, thereby ensuring that roadside ditches and road drainage features function as intended and would reduce road surface erosion.

Decommissioning roads in Riparian Reserves would likely create short-term increases in sediment delivery to streams. However, the long-term effects would be reduced erosion and sediment delivery to streams; decreased compaction and increased infiltration. By removing these roads, impacts to peak flows and channel-forming processes will be reduced. Establishment of shrubs and trees would eventually restore the hydrologic function of obliterated roads.

<u>Alternative 2</u>
This alternative would have no direct effect on evapotranspiration rates and water yield, except those caused by implementation of actions as described in other NEPA documents. Road runoff contributing to stream channels would continue unabated and human-caused impacts to peak flows would not be addressed. Were a wildland fire to burn through the analysis area, fuel loading might be such that fire intensity would be higher under this alternative than Alternative 1, with subsequent large increases in runoff. Were they to occur, large wildfires would likely have a greater and longer lasting impact on hydrologic processes than would the proposed action (DeBano et al., 1996).

Water Quality – Affected Environment
The primary water quality concern in the Antelope Creek and Rock Creek subwatersheds is summer temperature. This is due primarily to a change in the riparian vegetation type and condition and reduced summer flows (Gerber-Willow Valley Watershed Analysis, page 42). Antelope Creek, from mile 2 to 3, is listed on the Oregon Department of Environmental Quality's 303 (d) list for high summer temperatures. There are no other 303 (d) listed streams in the area. Fine sediment, primarily associated with road drainage features, can detrimentally affect aquatic habitat complexity and integrity. Ongoing restoration projects have begun to address these concerns. Detailed information regarding the quality and quantity of water resources in the analysis area can be found on pages 25 to 49 in the Gerber-Willow Valley Watershed Analysis.

Water Quality - Environmental Consequences
Alternative 1
Vegetation treatments, road use, and road treatments could cause sediment and nutrients to be mobilized and delivered to stream channels. Proposed road treatments could create a minor short-term increase in sediment production, but would improve water quality in the long term by reducing riparian road mileage and road-stream connections. Decommissioning (including natural decommissioning), rather than obliteration, of one mile of road along the Holbrook Spring Creek channel will reduce the short term impacts to water quality.

The width of riparian reserves and buffers would be sufficient to protect stream channels and wetlands from direct adverse changes to water temperature caused by timber harvest activities. Treatments within riparian reserves may reduce stream shading but would move the vegetation to a more appropriate and desired ecological type and condition. Such treatments generally will occur along intermittent streams that do not flow during the period when water temperature is a concern. Stream shading would increase as a result of road decommissioning and obliteration within riparian reserves. Slight increases in water yield and/or baseflows, were they to occur, would also help reduce water temperatures.

Direct and indirect impacts to water quality would likely be relatively minor. Implementing appropriate BMPs (see KFRA ROD/RMP pages F-11 to F-13) and PDFs would reduce the likelihood of adverse impacts (see Table 10).

Table 10 - Potential Affects on Water Quality and Proposed Mitigation Measures

Management Action	Potential Effect	Mitigation
- Haul traffic on roads that cross or are in close proximity to streams - Yarding across streams or Riparian Reserves	- Soil disturbance - Sediment could directly enter streams	- Delineate riparian reserves - Avoid hauling during wet weather - Maintain or improve haul roads - Implement riparian reserve, timber harvest, and soil protection BMPs
- Road maintenance, renovation and obliteration activities, and hauling activities	- Soil disturbance - Indirect sedimentation to streams	- Implement riparian reserve, timber harvest, soil protection, and road management BMPs - Avoid hauling during wet weather - Maintain or improve haul roads - Place slash on skid trails subsequent to timber harvest
- Mechanical vegetation treatments	- Soil disturbance - Indirect sedimentation to streams	- Implement riparian reserve, timber harvest, soil protection, and road management BMPs
- Timber harvest near or within riparian reserves - Yarding within riparian reserves - Non-commercial treatments within riparian reserves	- Reduced stream shading as a result of reduced canopy closure	- Delineate riparian reserves -Establish "no-cut" areas adjacent to perennial streams -Implement riparian reserve BMPs

Alternative 2
There would be no soil disturbance under this alternative other than that which could occur as described in other NEPA documents. Over-stocked conditions in riparian reserves would continue with reduced water yield and increased potential for stand replacing wildfire resulting in loss of stream shading and delivery of sediment into stream channels.

Aquatic Wildlife Species – Affected Environment

Present Condition of Aquatic Species and Habitat

The Gerber Reservoir and Upper Lost River 5th Field watersheds support a cadre of native and exotic fish species. Native fish in these two watersheds include the Lost River sucker, shortnose sucker, largescale sucker, Klamath redband trout, sculpin, and lamprey. These species are not believed to be present within the analysis area. A small introduced population of Lahontan cutthroat trout is present in the Willow Valley Reservoir, which is 2 miles to the east of the analysis area boundary and 3 miles east of any proposed treatment. Exotic species including brown bull head, yellow perch and largemouth bass have been stocked into various ponds and reservoirs across the Willow Valley and Gerber Watersheds including those within the analysis area.

The USDI - Bureau of Reclamation (USBR) conducted fish surveys with electro-shocking equipment in Rock Creek in September 1990 from 1/4 mile up from the mouth of Rock Creek and at the Willow Valley (Stateline) road (Buettner, personal communication, 2001). The USBR again surveyed Rock Creek in 1999. These surveys captured perch and speckled dace at the Willow Valley (Stateline) road site and largemouth bass, green sunfish, speckled dace, and marbled sculpin near the mouth. No sucker or trout species were found during these surveys. The USBR survey work supports the conclusion that no suckers or trout species are currently present within the Rock Creek portion of the analysis area.

Native fish species present within the analysis area include Klamath speckled dace and tui chub. Speckled dace are the most common and widely distributed fish species in the analysis area based on field review (Table 11). Tui chub were observed on one occasion in Rock Creek at the 41-14E-13 road crossing and are expected to be found further upstream; however, data on their upper extent is not available. Yellow perch, an exotic warm water fish, have been observed to use Rock Creek at least up to Section 9.

Table 11 – Known fish distribution (stream miles) on BLM administered lands within the analysis area.

Stream or spring	Speckled Dace	Tui Chub	Yellow Perch
Bear Valley Canyon	3.05	**	**
Holbrook Spring	0.6	**	**
Rock Creek	3.44	0.21*	2.45
Rock Creek Spring	0.53	**	**
Alkali Spring	0.94	**	**
*Tui Chub were observed at the 41-14E-13 road crossing, but likely are distributed up stream farther.			
** None observed.			

Lost River and shortnose suckers are listed as endangered under the ESA, as amended (53 FR 27130 - 27134). None of the subwatersheds that include the analysis area are designated as critical habitat for the endangered suckers (DOI Fish and Wildlife Service 1994); however shortnose suckers do use the lower portions of Antelope Creek within the Upper Lost River watershed (Scoppettone and Buettner, 1995) and the lower portion of Pitchlog Creek, within the Gerber watershed. Pitchlog Creek downstream of the analysis area has been proposed as critical habitat. Accessibility to the Pitchlog subwatershed segment of the analysis area is unlikely due to the alterations of the stream channel downstream of the analysis area including Bear Valley reservoir. Access from the East Branch Lost River to the analysis area by suckers and native trout has been completely blocked by the construction of Willow Valley reservoir.

The Klamath redband trout is listed as a state sensitive species and is a species of concern to the BLM (ONHP 2001, BLM Manual 6840). There are no redband trout within the analysis area. Population data is not available for speckled dace or tui chub within the analysis area. Densities of speckled dace observed throughout the analysis area suggest their population numbers are relatively high.

Springs, such as Holbrook Springs, likely provide important refuge areas to fish species during dry periods in the analysis area. Native and non-native species may also potentially be restocked from upstream sources, from reservoirs and ponds. Most the reservoirs within and near the analysis area are stocked with exotic fish for sport fishing purposes.

Field review identified a barrier to fish migration in the analysis area consisting of a culvert on Antelope Creek on road 41-14E-11, which is a potential seasonal barrier due to the drop from the culvert to the stream (~2.5 feet) and should be looked at for upgrade, and Antelope Creek Reservoir, which presents a barrier when its water level is not full.

Habitat is crucial to abundance and distribution of aquatic species. The Northwest Forest Plan (NFP) and KFRA RMP identified the Aquatic Conservation Strategy (ACS) as a means of maintaining and/or restoring the ecological health of watersheds, providing a scientific basis for protecting the aquatic ecosystem and enabling planning for sustainable resource management. The Gerber-Willow Valley Watershed Analysis indicated habitat conditions to be in moderate condition, limited by past management practices and impoundments/diversions.

Based on stream proper functioning condition (PFC) surveys, the majority of Antelope Creek is properly functioning. The majority of Holbrook Spring Creek is functioning at risk due to past timber harvest activities, historic grazing management practices, and road placement. The source of Holbrook Spring is on private property, but most of the riparian area associated with the spring on BLM administered land is now fenced to exclude livestock. There is a road that runs right up the middle of the exclosure. The upper portion of Rock Creek is rated as non-functional due to water diversions that route water to reservoirs on private land. *"Due to these diversions, this section of the creek lacks a consistent flow of perennial water to sustain an adequate population of riparian vegetation necessary for streambank protection… The lower section of the creek was rated as being in proper functioning condition."* (Gerber-Willow Valley Watershed Analysis, page 270)

Aquatic Wildlife Species – Environmental Consequences

Alternative 1

Implementation of this alternative with the application of the identified mitigation and appropriate BMPs and PDFs are expected to minimize short term impacts to aquatic resources (Appendix B). In the long-term, restored and/or maintained riparian forest stand health would be anticipated to maintain, protect and restore aquatic resources.

Streams in the treatment areas are generally small in size and intermittent in nature. On these small streams, trees and brush within the "no entry" (no entry for machines) buffer provide the majority of shading and stability. Locating mechanical treatments outside the no-entry buffers, and implementing recommended PDFs (Appendix B), would minimize compaction and soil displacement which potentially could contribute to surface erosion reaching the stream channel. Application of manual non-commercial treatments located within the "no-entry" buffer are designed to control stocking, reestablish and manage stands and acquire desired vegetation characteristics to meet ACS objectives, and are not expected to negatively affect the aquatic resources in the short-term.

Road construction, realignment, and obliteration/decommissioning could result in a short-term increase in sedimentation reaching stream channels by removing cover vegetation and exposing loose soil to ditchline and surface run-off. Minimal impacts from surface erosion, ditchline runoff, and sediment transport to stream channels are expected with appropriate applications of project design features (Appendix B). No negative effects to the aquatic environment are anticipated from the proposed road

improvements. It is anticipated that road improvement, realignment, decommissioning, and obliteration would improve the aquatic habitat in the long-term by reducing sediment delivery from roads.

This project is determined to have "No Affect" on Lost River suckers or shortnose suckers or their Critical Habitat. The project has "No Affect" on suckers in the Gerber Reservoir Watershed because their upper extent is over 6.25 stream miles away from the project area (Gerber-Willow Valley Watershed Analysis, map 3-1 page 385). Activities occurring in riparian areas will not create fine sediments, flow problems or other potentially harmful physical changes that could affect the Lost River or shortnose suckers or their habitat in the lower section of Pitch Log Creek. Additionally, the project would have "No Affect" on suckers in the Lost River because the proposed treatment areas are over 6.5 stream miles away from the Lost River in the Antelope Creek subwatershed and over 10 miles away in the Rock Creek subwatershed (Gerber-Willow Valley Watershed Analysis, map 3-1 page 385). Furthermore, the Willow Valley Reservoir and several wetlands on Rock Creek would trap and/or prevent sediment from reaching suckers downstream.

Alternative 2

There would be no stand manipulation management, road construction, road renovation and upgrading, road closures, or road decommissioning as part of this action. Impacts to the aquatic resources from existing chronic source areas would be expected to continue to occur. Indirect and cumulative impacts based upon the current watershed conditions and environmental baseline would also be expected to continue to occur. Road densities, vehicular access, and road conditions within the subwatershed would not change as part of the No Action Alternative.

Terrestrial Wildlife Species –- Affected Environment

A description of wildlife species that may be found within the proposed project area and their habitats is located in the Gerber-Willow Valley Watershed Analysis (Step 3, pages 95-108). Management guidelines, seasonal restrictions, wildlife buffers, wildlife habitat objectives, and species specific actions are located in the Klamath Falls Resource Area RMP/ROD (pages 3-37 to 3-41).

The analysis area supports a diversity of mammal and bird species generally associated with various ages of ponderosa pine forest, sagebrush steppe, juniper woodlands, and high desert riparian areas. Upland game birds, songbirds, woodpeckers, raptors, mule deer, elk, bats, and various small mammals have all been documented in the analysis area. Special Status Species are covered in the Special Status Species Section.

Terrestrial Wildlife Species –- Environmental Consequences

Alternative 1

Disturbance from machinery and other human activities associated with Alternative 1 may have direct impacts to local wildlife populations. During activities there is potential for loss of individual animals, especially young, due to direct mortality from the proposed activity. This loss would be very localized and have minimal to no impact to local populations. Timing of disturbance (spring, summer, winter, or fall) would dictate the degree of negative impacts to local populations. Spring activities during the reproductive season would have a greater risk resulting in nesting or reproductive failure. Generally, moisture restrictions limit access for heavy equipment into the proposed project area until later in the spring or early summer. Disturbance later in the nesting season would minimize impacts to nesting birds. Overall, impacts from human disturbance would be considered a short-term effect and would cease after treatment activities were completed. Seasonal restrictions and nest site buffers (see Appendix B) would also reduce these impacts to wildlife.

Density management units will maintain and improve overall health of the stands and reduce the risk of stand replacing wildfires within forested habitat. Project Design Features that maintain multi-structure stands, CWD, snags, and understory vegetation are described in Appendix B. Maintaining these characteristics and stand components would maintain the foraging, cover, prey base and nesting habitat necessary for supporting wildlife populations as described in the RMP. Thermal clumps (see Appendix

B) will also be designated to maintain diversity within the treated stands. They are generally designated by a resource specialist and placed in areas to maintain habitat diversity. These areas generally range from ¼ to 5-acre size patches of habitat. Thermal clumps provide diversity within the stand as well as hiding, roosting, escape cover and thermal qualities for wildlife.

Patch cut and regeneration harvest areas would reduce overall canopy closure and create openings and more edge. This will result in the loss of thermal cover and nesting and roosting habitat for species preferring a more closed canopy in these areas. Generally, these areas are lacking in understory vegetation and this type of treatment creates early successional habitat. This translates into foraging habitat for big game as well as foraging and nesting habitat for species dependent upon early successional habitats for those life functions.

Prescribed fire treatments would reduce the fuels and therefore reduce the risk of stand replacement fire intensity and possible loss of mid to late successional forest habitats and stand components. Some shrub habitat and understory vegetation used by wildlife would be lost within the proposed treatment area. This could result in a temporary loss of thermal, hiding, nesting and escape habitat. However, shrubs and understory vegetation recovers from disturbance relatively quickly as compared to recovery of forest stands and late successional stand components. Designing treatments that result in a mosaic of burned and unburned areas would minimize the loss of habitat and rejuvenate vegetation. Habitat modifications from fuel treatments would be considered short-term impacts and the shrub component would re-vegetate within a few years after treatment.

Alternative 2

The No Action Alternative would have no direct impacts to wildlife or their habitat. However, not conducting proposed management activities in the planning area would reduce habitat quality over time for many species. Due to the prevalence of overstocked stands and heavy and annually increasing fuel loads, this alternative would increase the risk of large scale, stand-replacing wildfire and loss of important wildlife habitats and habitat features. This alternative would also fail to address the chronic, on-going, small scale loss of wildlife habitat features to insect and diseases. This alternative would do nothing to reverse or even address the large scale problem of juniper encroachment into sagebrush steppe, shrublands, and forest stands. The scope, scale, and rate of this encroachment are outside the range of natural variability. The detrimental effects on wildlife habitat and other ecosystem functions as a result of this encroachment would continue under Alternative 2.

Not harvesting timber would be less disturbing to wildlife in the short-term. However, overall forest health would most likely continue to decline. Many of the stands planned for harvest are currently overstocked and fuel loads are high. Prescribed fire alone may not be an effective tool to simultaneously reduce the current fuel loads and maintain forest wildlife habitat and late successional stand components.

Special Status Wildlife Species – Affected Environment

Threatened and Endangered Species

Bald Eagles - (*Haliaeetus leucocephalus*)

Under the Endangered Species Act, the U.S. Fish and Wildlife Service (FWS) lists the bald eagle as Threatened in Oregon. There is an historic bald eagle nest in T.41S, R.141/2E, Section 2, near the south end of Antelope Reservoir. This nest site was last occupied by eagles in 1994. The nest blew out and has not been rebuilt, but the site has been monitored every year since then. If the site becomes occupied, by either osprey or bald eagles, during the implementation period of the project, a seasonal restriction on log hauling and other potentially disturbing activities within ¼ mile, or as much as ½ mile line of sight, would be required.

Sage Grouse - (*Centrocerus urophasianus*)

There are no known sage grouse in or adjacent to the proposed project area. There are six historic lek sites in the Gerber Block, situated well to the west of the proposed project area. For over ten years

now, all historic lek sites have been monitored regularly with no evidence of activity and there have been no documented sightings of sage grouse in the Gerber Block.

Northern Spotted Owl - (*Strix occidentalis caurina*)
The northern spotted owl was listed as Threatened under the Endangered Species Act in 1990. The proposed project area is well outside of the known and suspected range of the Northern Spotted Owl and provides no suitable habitat for this species.

Canada Lynx - (*Lynx canadensis*)
The lynx is listed as Threatened within its range under the Federal Endangered Species Act. In 1999, a lynx habitat analysis was conducted for the KFRA using interagency guidelines, as recommended by the interagency Lynx Science Team, to determine if lynx habitat existed within the Lakeview District of the BLM. That effort included the South Gerber analysis area. Following the criteria for identifying and mapping suitable lynx habitat, no lynx habitat exists within the Lakeview District. Due to this analysis and its findings, the potential impacts to the Canada lynx from this action will not be analyzed further in this document.

American Peregrine Falcon - (*Falco peregrinus*)
There are no known or suspected Peregrine falcon sites within or adjacent to the proposed project area. There are no high potential nest sites within the proposed project area. Implementation of either alternative would have no effect on this species.

Northwestern Pond Turtle - (*Clemmys marmorata*)
There are no known pond turtle populations in the proposed project area. Based on KFRA records, the project area appears to be outside of (east of) the range of distribution of this species. Implementation of either alternative would have no effect on this species.

Other species of Concern
Great Gray Owl - (*Strix nebulosa*)
The great gray owl is listed as a Bureau Tracking Species in Oregon, and is likely to occur in the proposed project area. However, no nests have been documented. No pre-disturbance surveys or special management actions are required for this species. However, any nest trees located in the Resource Area are protected by the Migratory Bird Treaty Act. The proposed treatments in Alternative 1 would be beneficial to this species because it forages in open areas with grassy understories and nests in adjacent forest stands. The snag retention guidelines in Alternative 1 would ensure that some potential nest trees are protected.

White-headed Woodpecker - (*Picoides albolarvatus*), **Black-backed Woodpecker -** (*Picoides arcticus*), **Pygmy Nuthatch -** (*Sitta pygmaea*), and **Flammulated Owl -** (*Otus flammeolus*)
Systematic surveys have not been conducted for any of the above species. The white-headed and black-backed woodpecker, pygmy nuthatch, and flammulated owl have been documented or thought to occur in the planning area.

Northern Goshawk - (*Accipiter gentilis*)
The northern goshawk is considered a bureau sensitive species by the BLM and is highly associated with mature forests. Pre-disturbance goshawk surveys are being conducted.

In the event that special status raptor nests are found in the project area during the implementation phase of the project, the protection provisions detailed in the RMP/ROD would be applied in order to protect and manage the site for the species.

Bats -
There are at least eight species of bats known or suspected to occur in the proposed project area (2004 KFRA Bat Survey data from Gerber Block). Some species are primarily associated with rock substrate

for roosting. Others are associated with foliage. Most species of bats in the area make at least some use of snags for roosting. Large pine snags with sloughing bark, and snags with cavities and woodpecker holes are known to be especially important roosting substrate for a variety of bat species. All bat species in the area are dependant on water sources for drinking and foraging. Some of the largest known concentrations of roosting bats in the Gerber Block are in or on manmade structures such as buildings and bridges.

Mule Deer *(Odocoilius hemionus)* **–**
The proposed project area is deer winter range and also receives year-round use by a few resident deer as well. The timber stringers in this area serve as thermal cover and hiding cover. The importance of winter thermal cover has been debated by mule deer researchers lately and it is now believed that thermal cover is much less important to mule deer energetics than previously thought (Lutz et al, 2003).

Elk (*Cervis canadensis*) **-**
The numbers of elk using the south east portion of the Gerber Block and the proposed project area in general are increasing. The rate, reason, and patterns of this increase are not well understood. BLM employees regularly see elk in parts of the proposed project area in the spring and early summer and the area is seeing increased use by elk hunters in the fall. These are relatively recent phenomena occurring over the last few years, and are anecdotal information suggesting increases in elk numbers. Oregon Dept. of Fish and Wildlife biologists concur with the conclusion that elk populations are increasing in this area.

Incidental Species -
A turkey vulture (*Cathartes aura*) roost is located in T.41S, R.141/2 E, Section 11. Evidence at the site indicates very heavy use by many individuals for an extended period of time. This is a comparatively rare ecological feature and is the only one known on the Klamath Falls Resource Area. The two roost trees and all dominant trees within one tree length would be reserved from harvest.

An active large raptor nest (possibly a red-tailed hawk) is also located in T.41S, R.141/2 E, Section 11. The nest tree and all dominant trees within 1 tree length would be reserved from harvest.

Mollusks
Terrestrial: Evening Field Slug - (*Deroceras hesparium*), **Crater Lake Tightcoil** - (*Pristoloma arcticum crateris*), and **Chase Sideband** - *(Monadenia chaceana*)
Aquatic: Klamath Rim Pebble Snail – *(Fluminicola n. sp.3 and 11)*
These mollusk species are considered Bureau Sensitive species by the BLM and are associated with riparian areas. Only one terrestrial mollusk (*Deroceras hesparium*) and one aquatic mollusk (*Fluminicola* n. sp. 3) have been found on the resource area during extensive surveys in the last eight years. All of these species are associated with riparian habitats and have been found only on the westside of the resource area. *Deroceras hesparium* have been found under down woody debris along perennial streams in the Cascade Crest. *Fluminicola* species have been found in clear cold springs and streams. Populations of these species could potentially occur in riparian areas within the project area. Riparian areas will be assessed to determine whether or not they contain habitat for these species. If suitable habitat is present, it will be surveyed before ground disturbing activities begin.

Special Status Wildlife Species – Environmental Consequences
Threatened and Endangered Species
Bald Eagles
Alternative 1
Planned habitat modifications would have minimal impacts on bald eagles. Any new nest territory located within the planning area would be buffered and seasonal restrictions would be in place to avoid disturbance caused by human activity. By reducing fuels and competing vegetation to promote growth and survival of large pines, the proposed action would have long term beneficial impacts to bald eagles.

Under the proposed action, seasonal restrictions and buffers (see Appendix B) around nest sites would reduce potential impacts from hauling or other human disturbances to bald eagles adjacent to the planning area.

Consultation
Pursuant to the Endangered Species Act, the proposed project was evaluated and a "No Effect" Determination was made for potential impacts to bald eagles.

Alternative 2
The No Action Alternative would have no direct impacts on bald eagles. Avoiding management activities could have long-term impacts to forest health. Accumulation of fuels and increased stand density could put potential nest trees at risk from a stand-replacing wildfire or disease. Extreme stand density also limits tree growth. Consequently, this alternative would result in limited growth of potential nest trees for eagles.

Other Species of Concern
Great Gray Owl
Alternative 1
The proposed treatments in Alternative 1 would be beneficial to this species because it forages in open areas with grassy understories and nests in adjacent forest stands. The snag retention guidelines in Alternative 1 would ensure that some potential nest trees are protected.

Alternative 2
The no action alternative, in the short-term would have minimal impact on these species, but benefits from proposed treatments in Alternative 1 would not be realized.

White-headed Woodpecker, Black-backed Woodpecker, Pygmy Nuthatch, and Flammulated Owl
Alternative 1
The effects to the above species would be low. Project Design Features would protect and maintain sufficient habitat for these species to persist at lower, but stable, population levels. Disturbance created under this alternative would have some short-term adverse impacts, but these would cease after the proposed project ended.

Alternative 2
The no action alternative, in the short-term would have minimal impact on these species, but long-term affects may not be beneficial to their habitat. Not conducting forest health and fuels treatments would eventually increase fuel loads to levels at which a stand replacing fire is much more likely to occur.

Northern Goshawk
Alternative 1
Overall habitat for wildlife would be maintained or continue to improve on most of the public lands after implementation of the proposed project. Adherence to habitat management guidelines, seasonal restrictions, buffers, BMPs, and regulations within the KFRA RMP/ROD, would reduce the risk of impacts to wildlife populations and their habitats.

Alternative 2
The no action alternative, in the short-term would have minimal impact on these species, but long-term effects of not treating vegetation may result in negative impacts to their habitat. Not conducting forest health and fuels treatments would eventually increase fuel loads to levels at which a stand replacing fire is much more likely to occur.

Bats –

Alternative 1

It is anticipated that the treatments proposed under this alternative and the application of the proposed snag protection guidelines would result in the maintenance of sufficient habitat to support bat populations at or near current levels. The types of snags preferred by bats are generally too decayed to be merchantable, thus they are not likely to be cut as part of the timber sale unless they present a hazard to loggers. Some large snags that could serve as bat roosting habitat could be lost during burning operations, however, specific measures are taken during burning operations in order to prevent large snags catching fire and burning. Burning usually creates some snags that, if allowed to decay, eventually develop characteristics that make them useful to bats.

Alternative 2

It is anticipated that Alternative 2 would have no immediate effect on these species. Over time, increased mortality of large trees either due to stand density induced stress or wildfire would likely result in increased roosting habitat. However, depending on the decay rate of the dead trees and the growth rate of the residual trees, the increase may be a relatively short term pulse of snag creation followed by a period of time when few large snags are available because dense stands do not produce large trees as fast as more open stands. Large live trees are a prerequisite for large snags. Bat populations in the Gerber block are probably limited more by availability of water and forage than by the numbers of suitable roosting opportunities, so a short term increase in snag numbers may not translate into a proportional increase in bat populations.

Mule Deer –

Alternative 1

In this area, the timber grows on the most productive soils, and will dominate the sites to the detriment and exclusion of many forage species. Creating openings in these stands or even thinning that reduces the canopy closure would allow light to penetrate to the forest floor and allow grass, forbs and shrub forages to develop. Reducing the density of trees would also reduce competition for water between trees and forage species. Treatments in mule deer winter range would provide ideal habitat by creating patches of high quality forage in close proximity to thermal cover and hiding cover. The proposed treatments would reduce canopy cover and reduce the existing shrub layer within the treated stands in the short term. However, canopy closure in the stands is anticipated to be generally greater than 50% when the treatments are completed in the pine stands. In areas where invading junipers are removed the post-treatment canopy closure is anticipated to be much less than 50%. This low level of canopy closure in the juniper invaded areas should be considered as restorative of the grass/forb/shrub layers. Mule deer can do well with sub optimal thermal cover if there is sufficient forage available to meet energetic demands. The reduction in canopy closure is anticipated to be more than offset by an increase in succulent forage that develops post treatment. Also, canopy closure will immediately start to increase as residual trees respond to the thinning treatments with increased crown growth. Given the small percentage of the overall landscape that is proposed for treatment, it is not anticipated that hiding cover will be compromised to the point of reducing winter range carrying capacity. Allowing sunlight to the forest floor, and reducing competition for water would result in an overall increase in available forage and in forage quality in the treated areas. The proposed removal of juniper would also greatly benefit shrubs, forbs and grasses. Overall, the proposed treatments are anticipated to improve mule deer winter range in the long term.

Alternative 2

Under this alternative juniper and small pine would continue to invade shrublands adjacent to timber stands, thus reducing forage availability and quality. Timber stands would continue to accumulate ground fuels and ladder fuels. Left untreated, the timber stands and the thermal cover they provide would be at greater risk of loss to stand replacing fire. If they experience crown fire, these stands will not provide thermal cover for decades. The shrub component of the ecosystem would continue to grow decadent, less productive, and the leaves of some shrub species would continue to grow out of reach of deer.

Elk -

Alternative 1

There is some speculation that recent land management actions in and near the proposed project area such as wide spread juniper removal and prescribed under-burning of timber stands are making the area more suitable to elk populations. The proposed project would continue these types of operations and would result in treatment of some areas not previously subject to treatments. Based on the site specific anecdotal information on elk populations from the project area, and what is known about elk habitat relationships it is anticipated that the proposed treatments would be beneficial to elk, and that the populations in this area would continue to increase.

Alternative 2

The benefits to elk habitat and population numbers anticipated under Alternative 1 would not be achieved under this alternative. This is not to say that the population would not continue to increase up to a point, but rather that additional habitat benefits would not occur and that as the beneficial effects of past treatments in the area "wear off" the area's potential to support elk populations would probably decrease.

American marten *(Martes Americana)* **-**

There are no records of American marten occurring in the proposed project area. The forested habitat is not contiguous or well connected, and is largely atypical for the species. It is unlikely that a breeding population occurs in the proposed project area. It is possible that juveniles dispersing from populations at higher elevation, more forested parts, of the watershed pass through or temporarily reside in the project area; however there is no data supporting this possibility.

Alternative 1

It is anticipated that Alternative 1 would have no effect on this species. In the event that marten are present but as yet undiscovered in the project area, it is anticipated that the Riparian Reserve protection and snag and down wood retention standards in this alternative would be sufficient to protect any such population.

Alternative 2

It is anticipated that Alternative 2 would have no effect on this species.

Sage Grouse

Alternative 1

It is anticipated that Alternative 1 would have no effect on this species. In the event that sage grouse are present but as yet undiscovered in the project area, it is anticipated that the proposed treatments would have a beneficial effect (if any) on this species. Removing juniper and thinning the pine stands could potentially make the area more penetrable to sage grouse attempting to move into the area and move across the landscape between patches of suitable sagebrush habitat.

Alternative 2

It is anticipated that this alternative would have no effect on this species. However, In the event that sage grouse are present but as yet undiscovered in the project area, it is anticipated that failing to accomplish the treatments proposed in Alternative 1 in would have a negative effect (if any) on this species. Failing to remove juniper and not thinning the pine stands would allow the continued development of conditions increasingly less suitable to sage grouse across the landscape.

Mollusks - Terrestrial: *Deroceras hesparium, Pristoloma arcticum crateris* and *Monadenia chaceana*
Aquatic: *Fluminicola* n. sp. 3 and 11

Alternative 1

This alternative would have minimal to no effect on these species if they are found in the project area. Shade, down woody debris, and riparian habitat will be maintained through adherence to PDFs and

BMPs for riparian reserves. In addition, sites may be buffered to exclude logging, slashbusting or prescribed burning if it is deemed necessary to protect species populations or habitat.

Alternative 2
The no-action alternative would have no effect on bureau sensitive mollusk species.

Livestock Management - Affected Environment

There are seven grazing allotments that are situated completely or partially within the South Gerber Analysis Area. The allotment names, numbers, and seasons of use are as follows:

Rock Creek	(#0888)	May & June
Bear Valley	(#0876)	July through September
Timber Hill	(#0889)	July & August
Willow Valley	(#0890)	April through early July
Horse Camp Rim	(#0886)	May through July
Pitchlog	(#0887)	Mid-May through early July
Horsefly	(#0082)	Mid-April through early July, October through early November

All of these allotments are or are among the highest priority grazing areas in the KFRA. A complete description of the grazing activities in these allotments, including current use levels, seasons of use, historical use, allotment boundaries, etc. is found in the Gerber-Willow Valley Watershed Analysis (July 2003). As part of the watershed analysis process, "Rangeland Health Standards Assessments" (RHSA) were completed for all of these grazing allotments. (Note: Some of these allotments had the RHSAs completed prior to completion of the Watershed Analysis; this analysis reaffirmed and refined the existing RHSAs.) Additional information is found in the KFRA RMP/FEIS, KFRA ROD/RMP and Rangeland Program Summary. The proposed project area does not lie within or adjacent to a Wild Horse Herd Management Area.

Livestock Management - Environmental Consequences

Alternative 1
Harvesting activities as described in the proposed action would have few impacts to livestock grazing use, though the majority of the area is used for livestock grazing each year. There could be a minor, short-term (0-2 years) negative effect on forage amounts due to the ground disturbing impacts of the timber harvesting process and temporary exclusion of livestock from newly treated aspen stands. After that, there could be a small positive impact for several decades due to an increase of palatable, herbaceous plant species that would be more abundant once some of the overstory trees are removed (i.e. less shading and competition from trees).

Grazing takes place in these allotments as early as mid-April and as late as mid-November so the timing of the harvesting activities is important. Unintended negative consequences could occur as a result of timber harvest or forest health treatment activities. There have been disease problems of recent with some of the cattle herds in the area. If allotment boundary fences are impaired, a mixing of herds could occur that could contribute to the spread of disease. Impaired fences and/or increased vehicle traffic could also contribute to collisions with and loss of individual animals.

Mitigation
Fences, including gates, cattle guards, riparian crossings, etc., must be left or restored to their original condition. If fences are cut or otherwise impaired due to the timber harvest activities they must be fixed immediately, especially if the harvesting activities occur during the grazing use season(s) listed above.

Alternative 2
This alternative (No Action) would not cause the short-term loss of forage or provide mid-term forage for livestock, i.e. the opposite of the Alternative 1 above. The risk of herd mixing as a result of forest health treatment activities would be avoided.

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 Gerber-Willow Valley Watershed Analysis, Step 5 – Synthesis and Interpretation. Additional information is also found in the KFRA Resource Management Plan, Record of Decision and Rangeland Program Summary.

Cultural Resources - Affected Environment

A brief cultural overview is presented here. For more detail refer to the Gerber-Willow Valley Watershed Analysis, Follansbee and Pollock (1978), and Beckham (2000).

Native American use of the area spans many millennia. The region was most likely used by the Modoc and/or Klamath peoples. On a map showing the Modoc territory, Ray (1963:206-207) shows the Modoc encompassing the South Gerber Analysis Area. Similarly, Spier (1930:8-9) shows that the Klamath territory extended west to include much of the area just north of the analysis area, but close enough that there was probably overlapping use of the area. Ray (1963:202) notes that the Modoc territory was divided into three geographic areas that were named after those who lived in those areas. Of these three areas, the Kokiwas' (people of the far out country) lived within the project area. In 1864, the area fell within the territory ceded to the United States by the Klamath Tribes, consisting of the Klamath, Modoc, and Yahooskin people. Although treaty rights are no longer federally recognized in the project area, the Klamath Tribes remain concerned about potential disturbance to cultural sites in the area.

Euro-American exploration within the analysis area began in 1843 when a band of "free trappers", led by Old Bill Williams, explored the Lost River region. Euro-American settlement did not occur until 1875. Homesteaders pursued sheep and cattle ranching. The Gerber family was the first to establish a ranch at the northern end of the Gerber Block in 1880, hence the name of the area. The Civilian Conservation Corp (CCC) improved the landscape within the analysis area for grazing in the 1930s. The CCC built roads, spring developments, stock ponds, corrals and even a telephone line along Willow Valley Road that still stands. In 1935, the Gerber block became the first grazing district in Oregon and the United States (Bonanza Grazing District No. 1) under the 1933 Taylor Grazing Act. In 1946, the General Land Office was merged with the Grazing Service to create the Bureau of Land Management (Beckhem 2000:120). The BLM has managed the area ever since.

Cultural Resources - Environmental Consequences

<u>Alternative 1</u>

A review of existing inventory files revealed that approximately 70% of the project area has been previously surveyed (Table 12). The remaining 30% (roughly 10,000 acres) will be surveyed for cultural resources and submitted to the State Historical Preservation Office (SHPO) for concurrence prior to the initiation of ground disturbing activities in those areas. All known sites will be marked in the field and avoided during project activities. In addition, sites will be monitored after ground disturbing activity.

Table 12 - Project Area Cultural Survey History

U.S.G.S. Quadrangle Name	% of Quadrangle Previously Surveyed	Approximate Number of Acres Requiring Cultural Resource Surveys
Antler Point, Oregon	80	1,300
Barnes Valley, Oregon	60	800
Brady Butte, Oregon	80	4,000
Gerber Reservoir, Oregon	80	3,200
Sagebrush Butte, California-Oregon	40	500
Steele Swamp, California-Oregon	50	200

Previous surveys used BLM Class III surface survey methods but did not incorporate subsurface techniques. Consequently, sites may not have been discovered due to dense forest ground litter or other factors affecting surface visibility. It is preferred, in addition to avoiding the site, that the least ground disturbing methods are undertaken. If additional cultural resources are encountered during treatment activity, then work shall be halted and the resource area archaeologist shall be called in for further evaluation.

Avoidance techniques employed during implementation of the proposed action should effectively prevent impacts to known archaeological sites. Impact to previously undiscovered sites is possible, but of relatively low probability.

Alternative 2
No impacts to cultural resources would be expected under this alternative.

Recreation Resources - Affected Environment

The analysis area provides opportunities for dispersed recreation such as hunting, fishing, off-highway vehicle driving, camping, sightseeing, watchable wildlife viewing and mountain biking. Recreation facilities with some level of development include Willow Valley Reservoir (a developed day use area with boat ramp and parking area) and Upper Midway Reservoir and Rock Creek campsite (primitive camping areas). Identified watchable wildlife viewing areas include Kilgore, Twentyone and Antelope Reservoirs and the Alkali Spring area. The analysis area currently receives light dispersed recreation use most times of the year except when roads are seasonally closed or impassable due to muddy road conditions. For additional information about recreation resources in the analysis area, reference the Gerber-Willow Valley Watershed Analysis.

Recreation Resources - Environmental Consequences

Alternative 1
Only temporary, minor disruption to recreational uses would occur during treatment activities. Short term disturbances to recreationists from truck traffic, equipment noise, and dust associated with treatment activities would be expected. The impacts associated with the selective harvesting and road building described in Alternative 1 would not exceed those described in the Klamath Falls Resource Area Final RMP (pages 4-104-108).

Alternative 2
No impacts to recreation resources would be expected under this alternative.

Visual Resources - Affected Environment

The BLM has a basic stewardship responsibility to identify and protect visual 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. BLM lands within the analysis area contain a variety of land forms and scenic/aesthetic qualities. The analysis area contains two Visual Resource Management Classes. Approximately 1400 acres in the southeast corner of the South Gerber treatment area are within VRM Class III areas. The remaining lands within the analysis area are within VRM Class IV areas. The management direction for each class is described below:

VRM Class III: Management objectives for VRM Class III are to manage for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer.
VRM Class IV: Lands are to be managed for moderate levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the effect of these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture found in the landscape.

Visual Resources - Environmental Consequences

Alternative 1

Proposed treatment activities would have minimal negative impacts to visual resources. The creation of five acre patch cuts, road construction, and the treatment of logging slash and road building debris, could potentially negatively impact the visual resources. Mitigation and suggested Project Design Features related to visual resources described in Appendix B of this document would reduce overall impacts.

Alternative 2

Some impacts to visual resources would be expected under this alternative. An increased likelihood of stand replacing wildfire, windthrow and increased mortality due to drought and bark beetle activity would negatively impact visual resources.

Cumulative Effects

The analysis of cumulative effects takes into account treatments proposed in this assessment (Table 3) as well as other actions in and around the analysis area in the recent past, present, and foreseeable future. Step 3 (*Description of Current Conditions*) of the Gerber-Willow Valley Watershed Analysis (2003) discusses cumulative effects of historic activities and provides the starting point for this analysis. The actual number of acres to be treated will be substantially lower than the total number of acres in the analysis area. The cumulative effects of treatments in the analysis area on all resources will not exceed those projected and analyzed in the KFRA RMP EIS. These cumulative actions consist of an array of vegetation treatments to improve ecological conditions, reduce fuels, and to improve forest health on BLM-administered lands within the analysis area. Examples of recently completed projects are: riparian hand cut and pile projects (Upper Antelope Creek, Wildhorse Creek, Duncan Springs, etc.), Holbrook Prescribed Underburn, and Fuel Treatment Zone (FTZ) 46, 52, and 34 Shearing. One project (Shearing in Area Twenty-one) is currently in progress. Proposed future projects include: the Brady Butte Underburn, North Horse Camp Rim Hand Cut and Pile, and Horse Camp Rim 1 and 2 Shearing.

Management activities in the analysis area on lands in private ownership or managed by the U.S. Forest Service tend to be similar to those on BLM administered lands, with the exception of prescribed underburning on private lands. Although underburning has not been a tool commonly used by private landowners, some have recently entered into agreements with the BLM to do some limited underburning. Management activities on both private and USFS lands are considered in the analysis of cumulative effects.

Upland Forest Vegetation and Juniper Woodland

Other than scattered salvage of individual dead/dying trees, the forest stands in the South Gerber Analysis Area have not been entered for harvest in the past twenty years. During that time, at least one entry of prescribed fire (underburning) has been implemented in some of these stands, however many stands still contain fuel loads that are too high to safely underburn without pretreatment (slashbusting, shearing, thinning, etc.). In the past five years, juniper treatments (cutting, piling, and burning) have been designed and implemented to maintain ecological site conditions and desired vegetative composition. Treatments will continue to occur both on rangeland and within commercial forest stands where juniper has encroached into these vegetation types. The cumulative effects to upland forest vegetation and juniper woodlands of past treatments and those currently proposed in this and other documents is the continued reduction in fuel loads and risk of stand-replacing wildfire, improved ecological site conditions, and improved forest health through increased stand resiliency.

Special Status Plant Species

Protection measures (flagging and avoidance, buffers, and boundary adjustments) implemented for past actions have been effective in preventing impacts to special status plant species and will continue to be used to avoid impacts for current and future activities. Cumulative effects to the three species identified in the analysis area would include some increased habitat availability and potential for population

expansion into treated areas, especially for Baker's globe mallow (*Iliamna bakeri*) which has been known to flourish after recent burns and prefer sites with reduced tree canopy.

Noxious Weeds

The cumulative effects of past, present and, future treatments include disturbance of existing vegetation and increased potential for the spread of noxious weeds in the analysis area. Project Design Features (PDFs) and Best Management Practices (BMPs) for weed prevention and soil protection have demonstrated effectiveness in controlling the spread of weeds from past activities. These measures (Appendix B) will continue to be implemented. Cumulative effects on noxious weed distribution and dispersal are expected to be minimal.

Roads

The combination of all treatments in the analysis area is expected to cause increased traffic from vehicles and machinery. Increased traffic on unimproved roads can cause deterioration of the road bed. Road improvement (surfacing, realignment, drainage features, etc.) is an ongoing effort in the analysis area and an integral part of the proposed action. Another facet of activities proposed in the analysis area is the obliteration or decommissioning of temporarily created roads or skid trails and existing roads determined to be unnecessary and/or contributing to resource damage. No new roads have been constructed in the analysis area in the past 20 years. The proposed action is designed to replace existing roads that are located in undesirable locations (such as riparian reserves) with new roads in less impacting upland locations. Treatments currently proposed would result in a net decrease of one half mile of road within the analysis area. There will be some short term cumulative impacts from road obliteration in riparian reserves. The cumulative long term effect of these activities should be an overall improvement in the transportation network and a reduction in road-related resource damage in the analysis area.

Soils

The cumulative effects of past, present and, future treatments in the analysis area include soil disturbance and increased potential for compaction and erosion. The "self-plowing" characteristics of the shrink-swell clay soils that are common in the South Gerber Analysis Area improve the recovery rate and help to minimize impacts to soils from traffic or compaction. Monitoring information, collected to date, regarding the effectiveness of BMPs on minimizing soil compaction and disturbance indicates that cumulative effects to soil resources would not exceed the RMP standards for detrimental soil conditions (ROD, page D-11). The designation of no-mechanical-entry buffers in Riparian Reserves will help protect soils within these buffers from impacts associated with equipment usage. Treatments would be implemented during summer months (June-October) when soils are least susceptible to compaction.

Riparian Resources

The Gerber-Willow Valley Watershed Analysis identified resource condition issues including overstocked stands in Riparian Reserves and juniper/pine encroachment into riparian areas and aspen patches. Projects recently implemented in the analysis area have begun to address juniper encroachment into riparian areas. The treatments proposed in this assessment would continue this process and are expected to contribute to accelerated development of late seral characteristics and improved health of Riparian Reserves in the analysis area. With the exception of the treatments within the past few years, there has been a limited amount of riparian restoration to date. Road treatments in this EA are specifically designed to protect and restore the function of the forest and riparian ecosystems in the analysis area. For example, nearly one mile of road along the perennial and ephemeral portions of Holbrook Spring Creek would be permanently decommissioned and would move the stream toward Proper Functioning Condition. The combined effect of restoration efforts recently implemented, currently proposed, and projected for the future would facilitate substantial progress toward meeting the Aquatic Conservation Strategy (ACS).

Hydrology

The analysis area is almost entirely within the Upper Lost River 5th Field Watershed. (The portions of the analysis area in the Gerber Reservoir 5th Field and the North Fork Willow Creek Watersheds are so minimal as to be inconsequential at the watershed scale.) Overall, the cumulative management actions in the analysis area will contribute to maintenance and restoration of hydrologic conditions in this portion of the watershed. Road treatments would reduce road-related runoff, peak flows, and delivery of sedimentation to streams. Proposed vegetation treatments would reduce fuel loads, thereby reducing the potential for extensive high intensity wildfires, and move vegetation towards ecologically and hydrologically desired conditions. Implementation of actions adhere to appropriate PDFs and BMPs (Appendix B) and cumulative effects to water quality will not contribute to the addition of waterbodies to the list of state water quality impaired streams (Oregon Department of Environmental Quality - 303 (d) list). Information exists to suggest that the cumulative effect of vegetative treatments could result in higher water yields and increased discharge from springs. Pre- and post-treatment monitoring of spring discharge continues in the analysis area to determine if this increase is measurable.

Aquatic Wildlife Species

Aquatic species and habitat are limited in the analysis area. Potential increases in water yield and spring flow are not expected to be sufficient to contribute to an increase in aquatic habitat. However, the quality of existing habitat would be enhanced as a result of implementing these projects including the proposed action. The cumulative effect of treatments designed to improve, protect, and restore the function of riparian ecosystems in the analysis area would have similar results on aquatic habitat, consistent with the ACS. The cumulative treatments would have "No Affect" on Lost River suckers or shortnose suckers or their Critical Habitat. The analysis area is over 6.25 stream miles away from the upper extent of sucker distribution in the Gerber Reservoir 5th Field Watershed, over 6.5 stream miles away from the Lost River in the Antelope Creek subwatershed, and over 10 miles away from the Lost River in the Rock Creek subwatershed. Activities occurring in riparian areas would not create fine sediments, flow problems or other potentially harmful physical changes that could affect the Lost River or shortnose suckers or their habitat in the lower section of Pitch Log Creek. In the unlikely event that sediment was created on project sites, the Willow Valley Reservoir and several wetlands on Rock Creek would trap and/or prevent sediment from reaching suckers downstream.

Terrestrial Wildlife Species

Juniper and fuels treatments in the analysis area have been designed with PDFs and BMPs similar to those listed for the proposed action in Appendix B of this assessment. Seasonal restrictions and nest site buffers minimize short-term effects to wildlife from human disturbance. Treatment designs that leave thermal clumps and "feathered" edges mitigate potential cumulative short-term loss of cover and forage and maintain diversity of habitat for foraging, cover, prey base, and nesting. The long-term cumulative effects of juniper treatments would include increased quality and diversity of habitat for terrestrial wildlife species dependent on mixed sagebrush steppe vegetation including song birds, small mammals (and predators that rely on them), mule deer, and elk. Forest health treatments would result in a mix of early, mid, and late successional habitat and stand components for species dependent on them. The cumulative effect of fuels treatments is to create ecosystems less susceptible to high intensity wildfire and large scale loss of habitat.

Special Status Wildlife Species

Cumulative effects of vegetation treatments would increase potential habitat for sage grouse that could become reestablished in the analysis area and create open foraging habitat near pine stands that would benefit great gray owls. Cumulative effects of forest health treatments promoting the growth and survival of large pines would benefit bald eagles, great gray owls, and northern goshawk. Implementing treatments with appropriate PDFs and BMPs (Appendix B) will ensure that sufficient late seral characteristics (snags, large pines, etc.) will be available to provide habitat for bats, white-headed woodpecker, black-backed woodpecker, pygmy nuthatch, flammulated owl, and other species dependent on late seral habitats. There would be no effects to the following species: northern spotted owl, Canada lynx, mollusks, American martin, American Peregrine falcon, or northwestern pond turtle.

Livestock Management
Seven different grazing allotments are affected by management actions in and adjacent to the analysis area. Cumulative effects in the short term (less than 2 years), include a slight decrease in available forage for livestock. The long-term cumulative effects of vegetation treatments will be to improve ecological condition and provide an increase in palatable herbaceous plant species, especially in juniper woodlands. Cumulative acres of vegetation treatments will not exceed those described in the RMP for each allotment.

Cultural Resources
Protection measures (flagging and avoidance, buffers, and boundary adjustments) implemented for past actions have been effective in preventing impacts to cultural resources and will continue to be used to avoid impacts for current and future activities.

Recreation Resources
The short-term cumulative effects of road and vegetation treatments would include temporary, minor disruption to individuals enjoying the dispersed recreation opportunities in the analysis area. Developed day use and primitive camp sites would not be affected. In the long-term, road treatments (closures, obliteration, decommissioning) could cause inconvenience to individuals accustomed to accessing remote, undesignated and undeveloped, camp sites. Long-term improvement in wildlife habitat could create additional opportunities for hunting or viewing wildlife.

Visual Resources
Piles left from recent juniper and fuels treatments have created a temporary visual impact in the analysis area. Once piled vegetation is utilized or burned, treatments are expected to be virtually unnoticeable to the casual observer. Road treatments, timber harvest, and prescribed burns also produce temporary visual impacts that become less noticeable over time. Adhering to PDFs and BMPs for all activities and implementing forest health treatments that leave a substantial portion of the canopy intact, will minimize cumulative effects on visual resources. The levels of change expected from the cumulative actions in the analysis area would be consistent with management direction for Visual Resource Management (VRM) Class III and IV lands as described in the **Visual Resources – Affected Environment** section of this EA and will not affect VRM classifications.

Summary
Individually by resource and collectively, cumulative actions within the analysis area will not exceed those analyzed in the KFRA RMP/EIS.

Resources Not Impacted

Resource values that are either not present in the project area, or would not be impacted by the proposed alternative are: wild horses, 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, and minerals. Also, there are no known hazardous waste sites in the analysis area.

For either alternative, no direct or indirect disproportionately high or adverse human health or environmental effects to minority or low income populations are expected to result from implementation of the proposed action or the alternatives.

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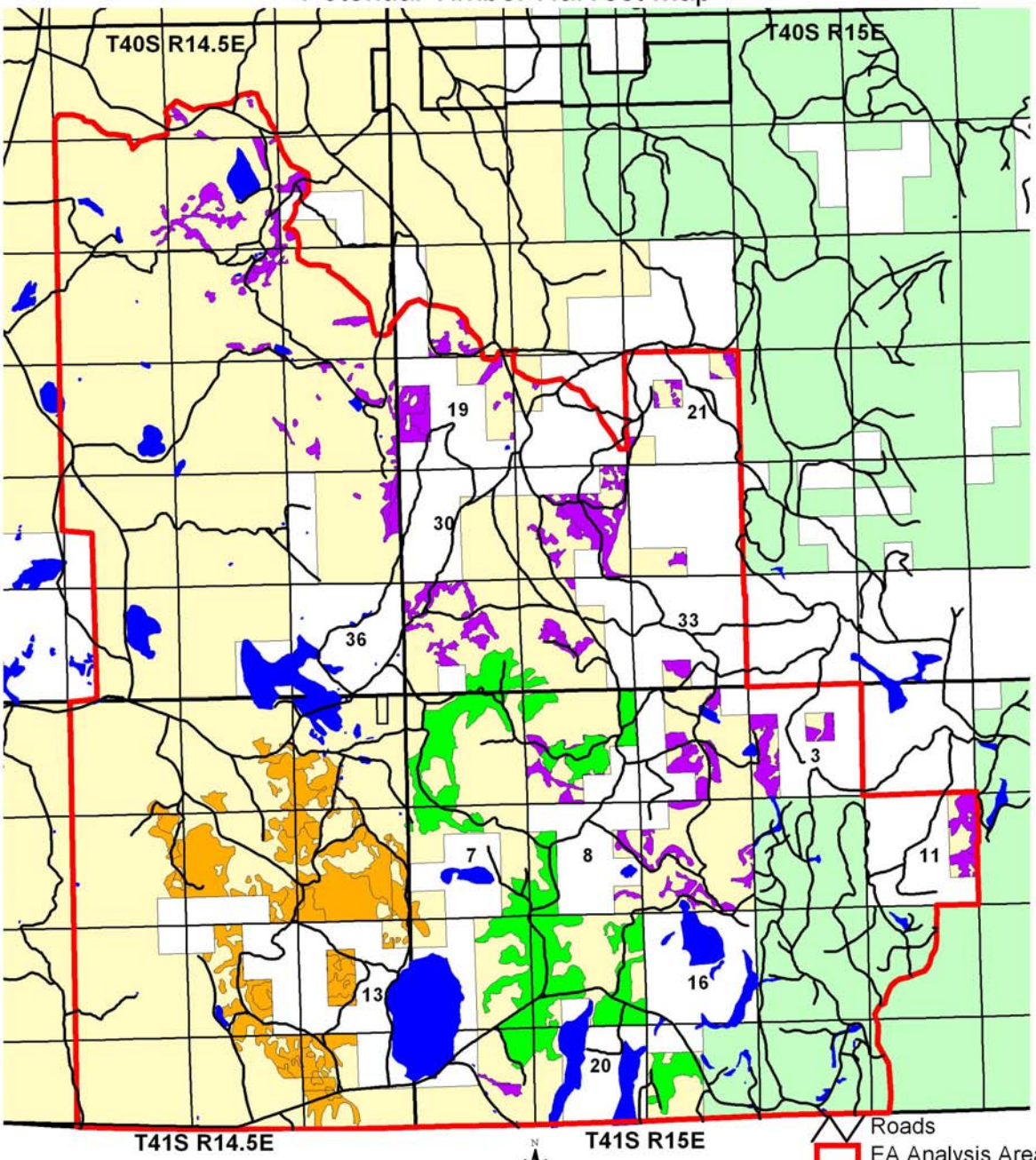
Scott Senter	Recreation & Visual Resources
Gene Shull	Fisheries Biologist
Scott Snedaker	Fisheries Biologist
Lou Whiteaker	Botanist - Noxious Weeds, and Special Status Plants

South Gerber EA Analysis
Potential Timber Harvest Map

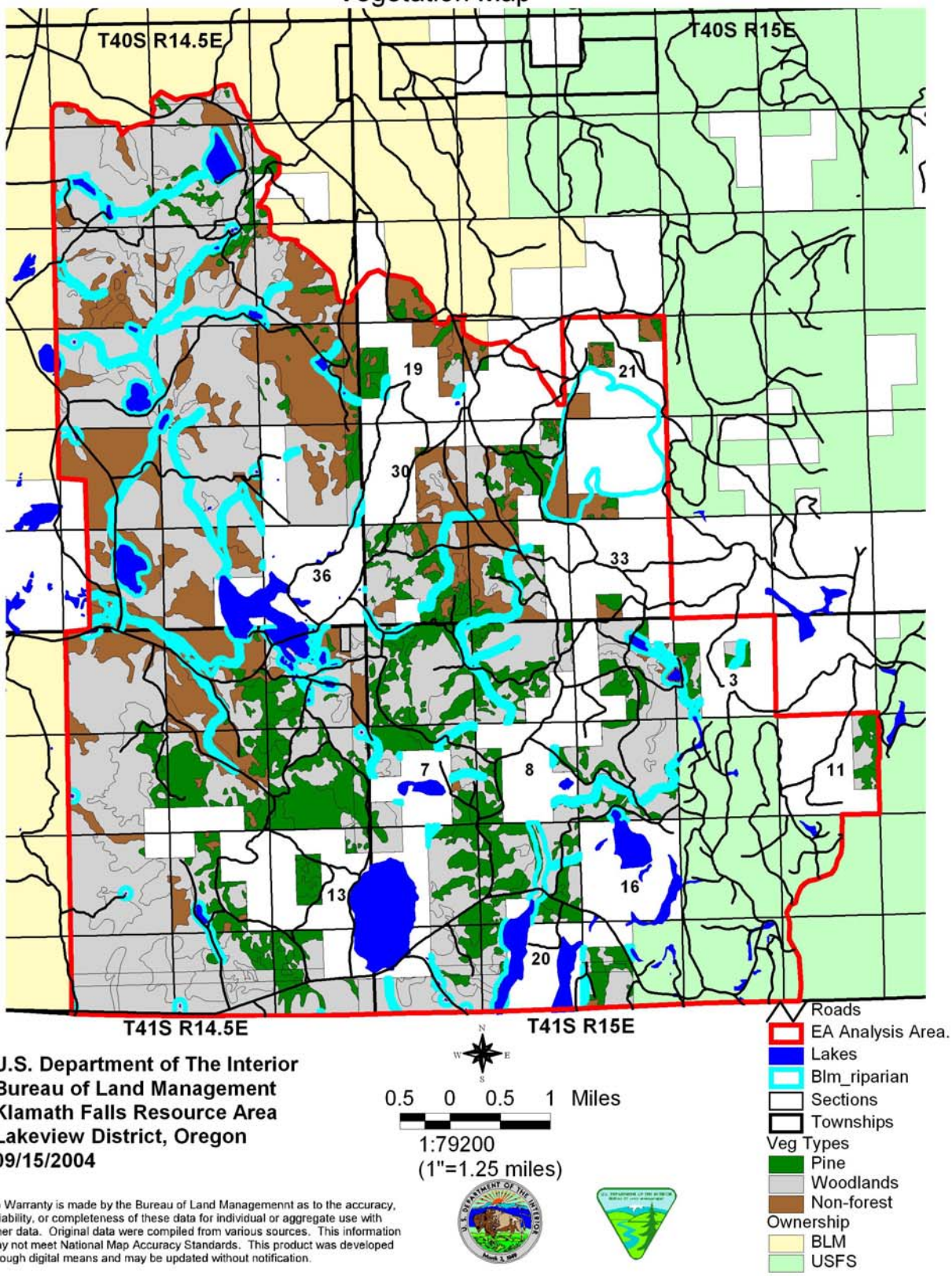


U.S. Department of The Interior
Bureau of Land Management
Klamath Falls Resource Area
Lakeview District, Oregon
09/15/2004

0.5 0 0.5 1 Miles
1:79200
(1"=1.25 miles)

No Warranty is made by the Bureau of Land Managemennt as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

South Gerber EA Analysis
Vegetation Map



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Appendix B – Best Management Practices & Project Design Features

Mitigating Measures for the Proposed Action are a combination of the standard Best Management Practices (BMPs) described in Appendix D of the KFRA RMP and additional Project Design Features (PDFs) specific to the Proposed Action. Both the BMPs and PDFs are designed to minimize adverse impact to the natural and human environment. In addition to the BMPs listed in Appendix D of the RMP (pages D1-D46), the following PDFs will be incorporated into the Proposed Action to mitigate impacts:

Upland Forest Vegetation Harvest Prescription

Density Management Harvests

Density Management Harvests are designed to control stand density, maintain stand vigor, and enhance desired stand characteristics. For eastside ponderosa pine stands, maintain the old growth pine component and canopy closure greater than or equal to 40% while maintaining a multi-age, multi-strata stand structure in density management units.

Patch Cuts

Patch Cuts are designed to address root rot areas, mistletoe pockets, and insect episodic areas and to create stand openings to allow establishment of shade-intolerant species (mainly ponderosa pine). Patch Cut Harvest will occur on no more than 200 acres, or approximately 5%, of the 4,000 total potential harvest acres. RMP standards allow up to 15% Patch Cut Harvests in Density Management Units and limit patch cuts to 5 acres in size (KFRA RMP- Plan Maintenance FY 1999 page 23). Retain up to 5 large overstory trees in the Patch Cuts. In the understory, retain pines, Douglas-fir, and incense cedar (thinning thickets of these is okay). Cutting within patch cuts will concentrate on diseased and dying trees.

The patch cuts shall be selected prior to marking, since marking methods will be modified in the patch area. West to southwest aspects are best, with patches scattered around a unit. Diseased and insect infested areas are good candidates. In addition, areas where past mortality had reduced canopy closure by 30+ percent and fuel loads are exceeding manageable levels are good candidates. The area selected must also be plantable (not too rocky).

Coarse Woody Debris

On all Matrix lands, retain (where available) a minimum of 50 linear feet of Class 1 and 2 down logs that are at least 12 inches in diameter and 8 feet long.

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.
- Apply mulch and seeding or other methods of soil stabilization 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, to allow use during all seasons and is expected to minimize erosion from the road surfaces.
- 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.

Special Status Plant and Fungi Species

Known sites will be protected for all ground disturbing projects. Protection measures for known populations of special status plant and fungi species can include flagging of buffers around sites, or unit boundary adjustments.

Noxious Weeds

- Require cleaning of all equipment and vehicles prior to moving on-site to prevent spread of noxious weeds. Also, if the job site includes a noxious weed infestation, require cleaning of all logging and construction equipment and vehicles prior to leaving the job site. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts could be accomplished by using a pressure hose to clean the equipment.
- Mow noxious weeds in the immediate area of yarding operations to ground level prior to seed development.
- Conduct monitoring activities related to proposed treatments as described in the Klamath Falls ROD
- Road graders used for road construction or maintenance would grade towards any known noxious weed infestations. If no good turn around area exists within one half mile that would allow the operator to grade towards the noxious weed infestation, then the operator would leave the material that is being moved within the boundaries of the noxious weed infestation.

Soil Resources

- 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).
- Permit logging activities during this time period if frozen ground or sufficient snow is present, or as approved by a resource specialist.
- 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).
- Apply mitigation (including ripping, backblading, and/or seeding) where detrimentally impacted soils exceed 20% of the unit area.

Hydrology & Riparian Reserve Treatments

For Riparian Reserve Vegetation Treatments (Including Timber Harvest Operations):

- Delineate no-mechanical-equipment-entry zones along stream channels to protect thermal regimes adjacent to streams and maintain stream bank stability. These operational boundaries will correspond with natural topographic breaks in the upland slope or will be determined by a core interdisciplinary team, to include at a minimum specialists from forestry/silviculture and hydrology/fisheries. Site specific deviation from these recommended buffers can be made with concurrence of the core interdisciplinary team.
- 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 impacts based on review by the KFRA interdisciplinary team.

- Construction of new permanent roads within Riparian Reserves will be considered where needed to avoid greater overall impact to riparian reserve or water quality (i.e. where construction or re-alignment of short road segments allows obliteration of longer road segments within Riparian Reserves). Road construction would be implemented according to Best Management Practices (BMPs) in Appendix D of the RMP.
- Practices that would disturb the least amount of soil and vegetation (including: limiting activities to the dry season, minimizing skid trails, and yarding over snow or frozen ground where feasible) would be used in the Riparian Reserves.
- Consider retaining some downed logs for instream structural enhancement projects.
- Mechanical treatments would be allowed in aspen stands only during periods when detrimental soil impacts would be least likely to occur.

Wildlife Terrestrial Species

Snag Retention - On all Matrix lands, retain a minimum of 1.4 snags per acre, where available, over 16" dbh. Leave dead-top green replacement trees in areas void of snags.

Coarse Woody Debris - Maintain CWD according to standards and guidelines in the RMP.

Seasonal Restrictions - Seasonal restrictions for specific species can be found on pages 231-240 of the KFRA FEIS. Require seasonal restrictions where the following wildlife species are actively nesting: bald eagle, northern spotted owl, American marten, northern goshawk, survey and manage species, and protection buffer species.

Great Gray Owls - If a nest site is located before or during operations, establish Management Recommendations for treatment around the nest site area.

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

Terrestrial and Aquatic Mollusks - Known sites will be protected to manage for species conservation needs.

Cultural Resources

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

Visual Resources

- Where possible, maintain visual screening along roadways.
- Within recreation sites, concentrated recreation use areas, or Special Areas, implement the following design features to reduce visual impacts from harvesting:
    - Cut stumps close to ground (less than 4 inches).
    - Disperse small (hand) piles of slash for firewood use.
    - Minimize use of tree marking paint on trees identified for harvest.
    - Do not create large landings.
    - Minimize number of skid trails and amount of ground disturbance
    - Minimize damage to residual trees through careful timber falling.
    - All treatments will meet appropriate Visual Class objectives specified in the KFRA ROD/RMP (page 44).

Recreation Resources

Post signs indicating logging traffic and associated activities when operating near recreation sites.

Appendix C – Glossary

Road Restoration Treatments
The following descriptions define the scope of the proposed road restoration treatments. These descriptions are based on those in the Western Oregon Transportation Management Plan (BLM 1996).

"Decommission" means that the road would be closed to motor vehicles on a long-term basis, but may be used again in the future. The road would be prepared to avoid future maintenance needs and would be left in an "erosion-resistant" condition by establishing cross drains, and removing road fill from stream channels and potentially unstable areas. Ditch-relief culverts would generally not be removed. The road would be barricaded and slash would be placed on the road surface or small diameter trees would be felled onto the road. Although the roadbed would not be ripped and conifers would not be planted, some seeding of herbaceous species could occur.

"Obliteration" means that the road would not be open to motor vehicles in the future. The road would be barricaded and slash would be placed on the road surface or small diameter trees would be felled onto the road. The road surface would be ripped in places and recontouring would occur where needed. Ditch-relief culverts would be removed and trees, shrubs, or grass would be planted on the road surface. This term includes both "Full Decommissioning" and "Obliteration" as defined in the Western Oregon Transportation Management Plan.

"Improvement" may include raising the road surface to prevent water ponding, providing roadside and leadout drainage ditches, and surfacing with materials to harden the road surface and minimize the potential for rutting from use during wet conditions.

Soils
The total acreage of all detrimental soil conditions should not exceed 20% of the total acreage within the activity area (e.g. timber sale area), including landings and system roads. Detrimental soil conditions include the following definitions:

Compaction – A 15% or more increase in soil bulk density over the undisturbed level

Displacement – Removal of more than 50% of topsoil or humus from an area of 100 square feet or more which is at least 5 feet in width.

Erosion
Surface – hazard rating system based on percent of ground cover 1st and 2nd years following disturbance
Soil Mass Wasting (landslide, debris flows)

Puddling – Depth of rutting 6 inches or more from shearing forces that destroy soil structure and reduce porosity (e.g. vehicle tracks).

Severely Burned – Top layer of mineral soil changes significantly in color (usually to red) and the next one-half inch is blackened from charring by heat.