AUG 1 8 2004

5420(OR115)

Dear Neighbor:

The Bureau of Land Management (BLM), Butte Falls Resource Area, is proposing a timber sale and restoration projects in subwatersheds of the Big Butte Creek and Lost Creek watersheds. The proposed project area is on BLM administered lands in Township 34 South, Range 3 East, Sections 2, 12, 13, 14, 15, 21, 24, 25, and 26, Willamette Meridian, Jackson County, Oregon.

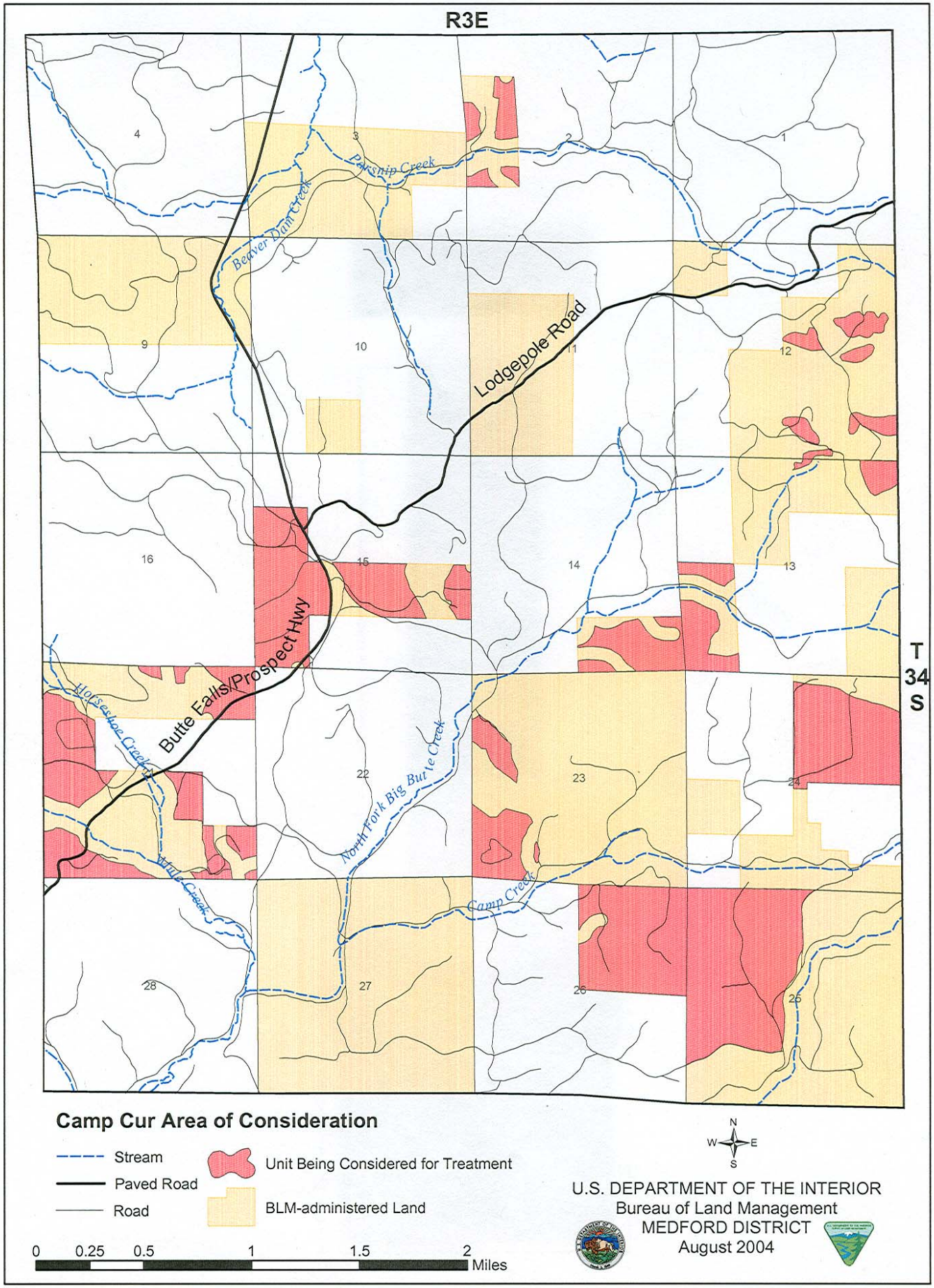
The proposal will assess timber harvesting and would contribute to the timber harvest levels as provided for in the Record of Decision of the Northwest Forest Plan and the Medford District Resource Management Plan. Proposed treatments consist of commercial thinning of dense timber stands, individual tree selection, regeneration harvest to establish young conifers, and site preparation activities, such as underburning or piling and burning, to treat logging slash. Restoration projects, such as road-related projects (e.g., road upgrades, road closures), culvert replacement, pine plantation thinning, and riparian area enclosures, are also proposed in this analysis.

Attached are a vicinity map and a map displaying the area of consideration. This project is in the development stage and exact locations of proposed units and projects have not been decided. We appreciate any comments you may have regarding the proposed timber sale and restoration projects. Your comments will be considered in the evaluation process and development of the Environmental Assessment (EA). Please send comments to Jean Williams, Bureau of Land Management, 3040 Biddle Road, Medford, Oregon 97504, call (541) 618-2385, or email to **or110mb@or.blm.gov.** Be sure to include "Attention: Jean Williams." Please send your comments concerning issues you would like to see addressed in the EA by September 3, 2004. The EA is scheduled for completion by Spring 2005.

Sincerely,

Lance E. Nimmo
Field Manager
Butte Falls Resource Area

1 Attachment:
1 – Area of Consideration Map/Project Vicinity Map (1pp)


R3E
T 34 S
Parsnip Creek
Beaver Dam Creek
Lodgepole Road
Butte Falls/Prospect Hwy
Horseshoe Creek
North Fork Big Butte Creek
Camp Creek
4
3
2
1
9
10
11
12
16
15
14
13
22
23
24
28
27
26
25
Camp Cur Area of Consideration
Stream
Paved Road
Road
Unit Being Considered for Treatment
BLM-administered Land
0 0.25 0.5 1 1.5 2 Miles
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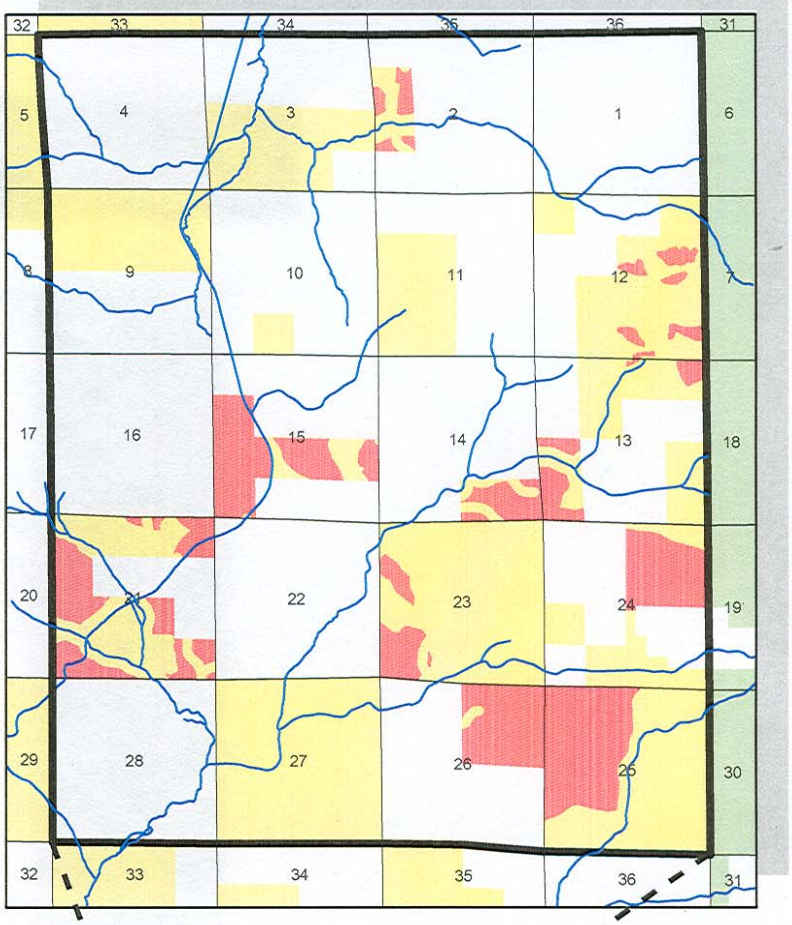
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
August 2004

Camp Cur Timber Sale

Environmental Assessment
Area of Consideration



Project Area

Unit being Considered for Treatment

Road

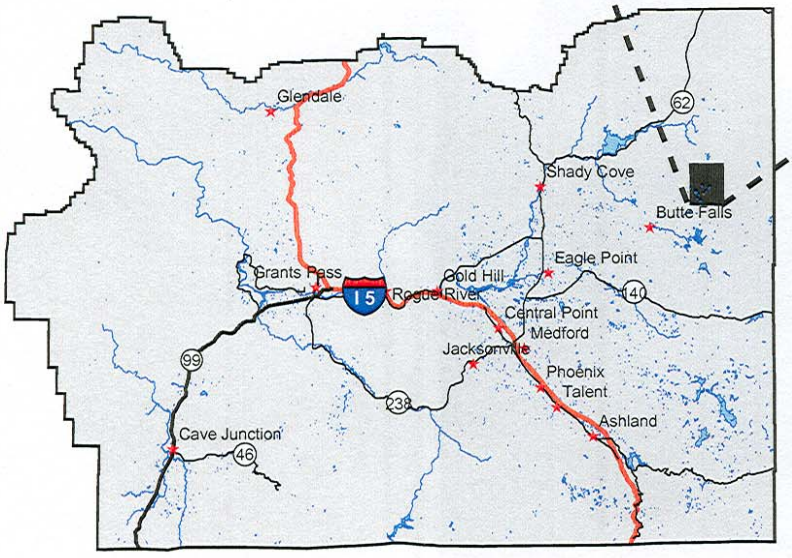
Stream

Project Boundary

Land Administration

BLM

Forest Service



MEDFORD DISTRICT

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
August 2004

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
3040 Biddle Road
Medford, Oregon 97504
email address: or110mb@or.blm.gov

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
OR-115-05-03
Camp Cur
OR115 1792

JUL 19 2005

Dear :

Attached is the recently completed Environmental Assessment (EA) #OR-115-05-03 for Camp Cur. This EA evaluates the Butte Falls Resource Area, Medford District Bureau of Land Management (BLM) proposal for timber harvest on up to 1,133 acres and restoration projects located in the Lost Creek and Central Big Butte Creek watersheds. Proposed treatments include density management, pine plantation thinning, riparian thinning, selection harvest, shelterwood harvest, and regeneration harvest. Proposed road work associated with the silviculture treatment activities includes road renovation, improvement, closure and decommissioning; helicopter landing construction; and temporary operator spur road construction. Proposed landscape restoration projects are livestock exclosures construction, culvert replacement, riparian area planting, spring protection and development, fence removal, stream channel aggrading, wetland protection, pump chance renovation, and road relocation. This project is within Matrix, Riparian Reserves, and Visual Resource Management Class II land use allocations. The timber sale would help meet the Medford District annual sale quantity goals established through the Medford District Resource Management Plan and the Northwest Forest Plan.

This document is available for public review and comment for a period of 30 days. The effective date for the beginning of the comment period will be the date of publication of the notice of EA availability in the *Medford Mail Tribune*. Notice will also appear in the *Upper Rogue Independent*. However, the date of publication in the *Medford Mail Tribune* will prevail as the effective date for this decision.

As I make my decisions regarding this project, I will consider all pertinent site-specific comments. Most useful comments are those clearly articulating site-specific issues or concerns. Comments received after the 30-day period will not be considered.

If you have questions or comments concerning this project, please contact Jean Williams or John Bergin, at (541)618-2385 or (541)618-2265 respectively. Comments may also be mailed to Bureau of Land Management, 3040 Biddle Road, Medford, OR 97504 or e-mailed to or110mb@or.blm.gov (be sure to include "Attention: Jean Williams").

Any comments received, including names and addresses of respondents, will be available for public review at the Medford District BLM Office; 3040 Biddle Road; Medford, Oregon during regular business hours (8:00 am to 4:30 pm), Monday through Friday. If you wish to withhold your name and address or both from public review or from disclosure under the Freedom of Information Act, you must state this at the beginning of your written comment. Your request will be honored to the extent allowed by law. All submissions from organizations or businesses and from individuals identifying themselves as representatives or officials of organizations or businesses will be made available for public inspection in their entirety. We appreciate your interest and involvement in this project.

Sincerely,

Jim Keeton
Acting Field Manager
Butte Falls Resource Area

Attachment – Camp Cur EA (250 pp)

U. S. Department of the Interior
Bureau of Land Management
Medford District
Butte Falls Resource Area

Camp Cur Timber Sale and Landscape Restoration Project Environmental Assessment

EA Number OR115-05-03

Project Location: T34S, R3E, Sections 2, 3, 9, 10, 11, 12, 13, 14, 15, 21, 23, 24, 25, 26, and 27
Willamette Meridian, Jackson County, Oregon

The Butte Falls Resource Area is proposing timber harvest on up to 1,106 acres located in the Lost Creek and Central Big Butte Creek watersheds. Proposed treatments include density management, pine plantation thinning, riparian thinning, selection harvest, shelterwood harvest, and regeneration harvest. Proposed road work associated with the silviculture treatment activities includes road renovation, improvement, closure, and decommissioning; helicopter landing construction; and temporary operator spur road construction. Proposed landscape restoration projects are livestock exclosures construction, culvert replacement, riparian area planting, spring protection and development, fence removal, stream channel aggrading, wetland protection, pump chance renovation, and road relocation. This project is within Matrix, Riparian Reserves, and Visual Resource Management Class II land use allocations. The timber sale would help meet the Medford District annual sale quantity goals established through the Medford District Resource Management Plan and the Northwest Forest Plan.

This Environmental Assessment for Camp Cur was prepared utilizing a systematic interdisciplinary approach integrating the natural and social sciences and the environmental design arts with planning and decision making.

_____
Karen Gillespie
Acting Butte Falls Field Manager

_____
Date:

Table of Contents

1.0 Purpose of and Need for Action

Chapter 1 provides an introduction to the Environmental Assessment (EA) for the proposed Camp Cur Timber Sale and Landscape Restoration Project. The proposed action is summarized and the project area is defined. Project objectives are listed and the need for this proposal is outlined.

1.1 Introduction

This Environmental Assessment will analyze the impacts of proposed forest management and restoration activities on the human environment in portions of the Lost Creek and Central Big Butte Creek watersheds. The EA will provide the decision-maker, the Butte Falls Field Manager, with current information to aid in the decision-making process. It will also determine if impacts are significant and whether an Environmental Impact Statement is needed or if a Finding of No Significant Impact is appropriate.

1.1.1 Proposed Action

The Butte Falls Resource Area, Medford District Bureau of Land Management (BLM), proposes to implement forest management activities and restoration projects within the Lost Creek and Central Big Butte Creek 5th field watersheds. Proposed forest management activities are commercial thinning of dense timber stands; individual tree selection; regeneration harvest to establish young conifers; pine plantation thinning; and site preparation or slash disposal activities, such as underburning or piling and burning, to treat logging slash. Proposed restoration projects are culvert replacement for fish passage; livestock exclosures; renovating pump chances; riparian area planting; fence removal and spring development; and decommissioning, blocking, and improving roads.

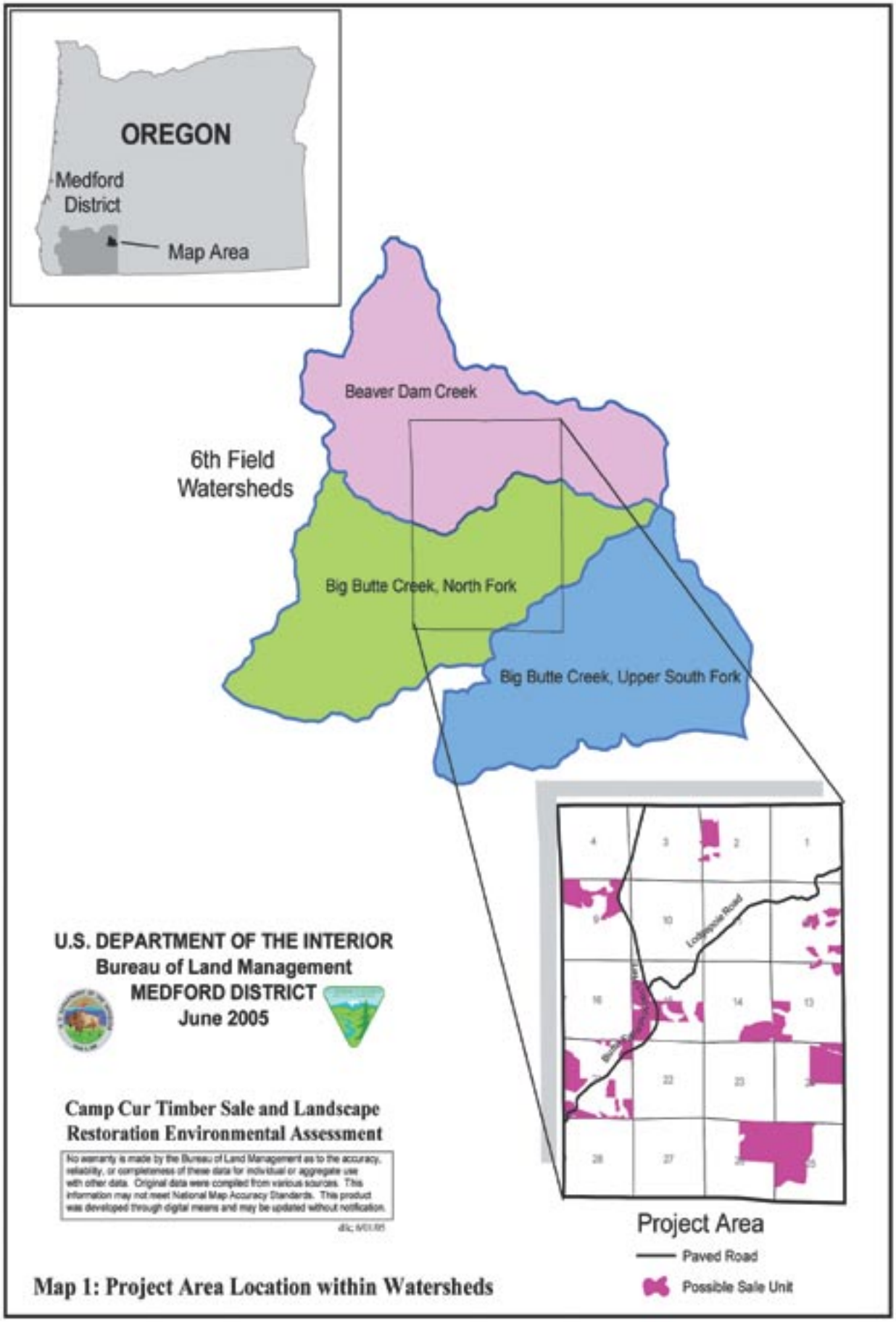
Forest management activities would occur on BLM-administered lands designated as Matrix in the Medford District Record of Decision and Resource Management Plan (ROD/RMP) and the Northwest Forest Plan (NWFP).

1.1.2 Description of Project Area

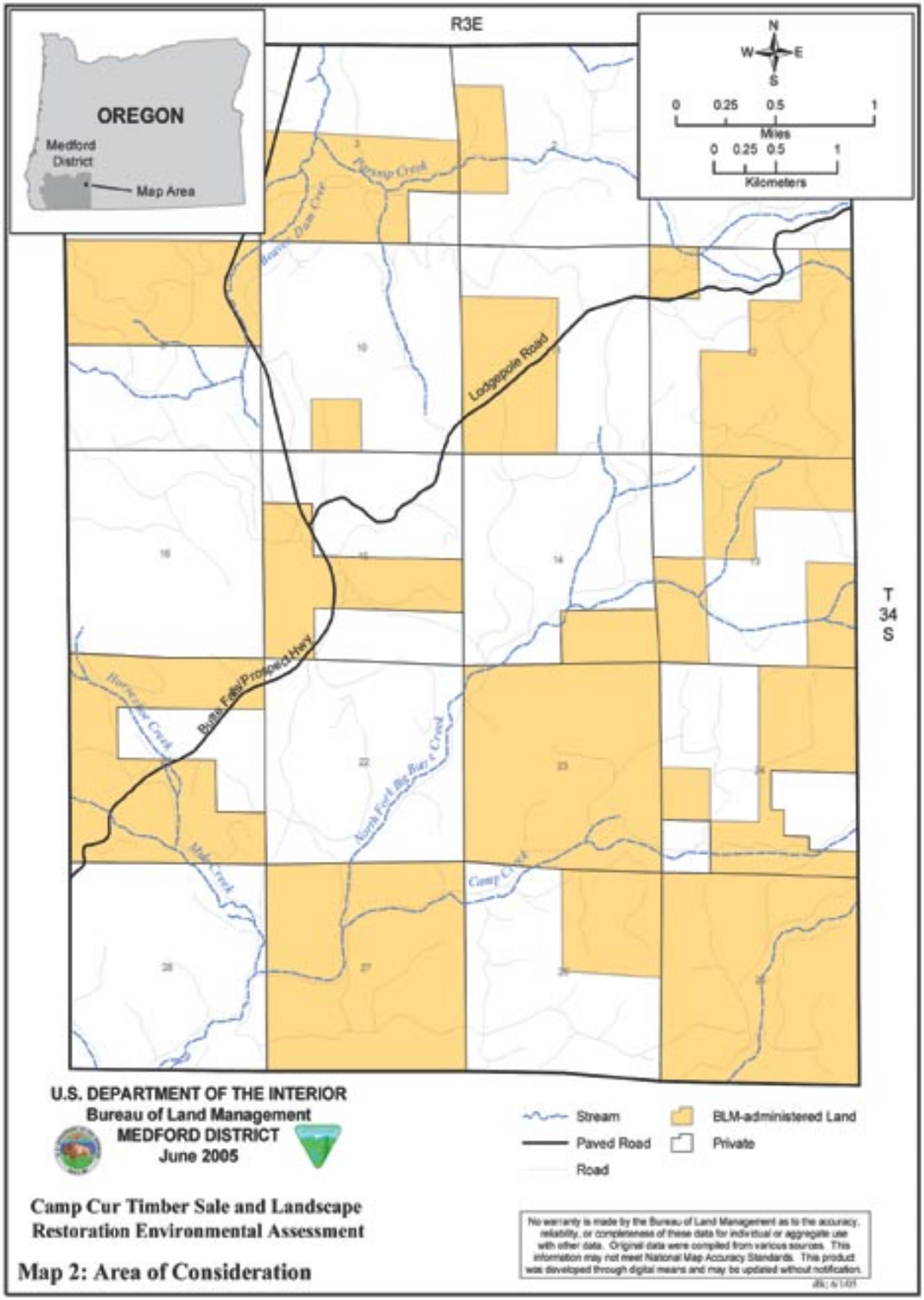
The project area, including the proposed Camp Cur Timber Sale, is located northeast of Medford, Oregon in the Beaver Dam Creek, North Fork Big Butte Creek, and Upper South Fork Big Butte Creek 6th field watersheds (see Map 1). These 6th field watersheds are located within the larger Lost Creek and Big Butte Creek 5th field watersheds. The BLM administers 4,913 of the 12,727 acres in the project area (see Table 1-1). BLM-administered land is intermixed with privately-owned land, creating a mosaic of ownership patterns. The project area is located in T34S, R3E, Sections 2, 3, 9-15, 21, and 23-27 (see Map 2).

Table 1-1. Land Ownership/Jurisdiction within the Camp Cur Project Area

Land Owner/Jurisdiction	Acres	Percent
Bureau of Land Management	4,913	39
Industrial Forest Land	7,675	60
Private Ownership	139	1
Totals	**12,727**	**100**



Map 1: Project Area Location within Watersheds


R3E
OREGON
Medford District
Map Area
N
W
E
S
0 0.25 0.5 1
Miles
0 0.25 0.5 1
Kilometers
Lodgepole Road
Bunker Hill/Prospect Hwy
Pickup Creek
Beaver Dam Creek
Horse Low Creek
Mule Creek
North Fork Big Bear Creek
Camp Creek
T 34 S
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
June 2005
Stream
Paved Road
Road
BLM-administered Land
Private
Camp Cur Timber Sale and Landscape Restoration Environmental Assessment
Map 2: Area of Consideration
No warranty is made by the Bureau of Land Management 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.

1.2 Need

The underlying need for this proposal is for a sustainable supply of timber and forest products while providing a healthy forest ecosystem. This need will be addressed through the following forest management and restoration projects.

1.2.1 Forest Management

Many forest stands in the project area are overstocked with more trees than the site has water, nutrients, and growing space to sustain. Overstocked stands have a greater potential for severe stand-replacing wildfires. To reduce competition-related mortality and wildfire risk, and to increase tree vigor and growth, the number of trees per acre needs to be reduced. In Riparian Reserves, understory trees and shrubs less than 7″ DBH need to be thinned to reduce competition and accelerate the growth and development of residual trees and late-successional characteristics. By decreasing stand densities, more water, nutrients, and growing space would be available for the remaining trees.

Ponderosa pine plantations are scattered throughout the Butte Falls Resource Area. Three of these plantations are located in the Camp Cur project area. These pine plantations were planted in the 1960s and many have been precommercially thinned. In order to release the mixed conifer understory, ponderosa pine stocking levels would be reduced. By decreasing stand densities, more water, nutrients, and growing space would be available for the remaining trees. Future stand development would be directed at managing the mixed conifer stand.

1.2.2 Restoration

1.2.2.1 Livestock Exclosure on Beaver Dam and Parsnip creeks

Beaver Dam and Parsnip creeks support populations of resident cutthroat trout. Heavy grazing by livestock has severely impacted riparian vegetation adjacent to these streams. This has resulted in increased sedimentation, decreased stream shade and large wood input, and increased nutrients and bacteria. Increased nutrients can result in abnormal algae blooms which deplete dissolved oxygen and suffocate aquatic life. Clean, cold water free of sediment is very important for salmonids. Suspended sediment can harm gill structures and impair vision when searching for prey. Sediment deposited on spawning gravels can suffocate incubating fish eggs and reduce macroinvertebrate populations, which are a food source for fish. Riparian vegetation is needed to provide cover, cooling shade, and a source of large woody debris for habitat diversity, cover, and pool habitat. Livestock exclosure fencing is needed to protect stream banks, allow riparian vegetation to recover and flourish, and eliminate sources of excess nutrients and bacteria in Beaver Dam and Parsnip creeks.

1.2.2.2 Culvert Replacement and Livestock Exclosure on Camp Creek

Camp Creek is a tributary to North Fork Big Butte Creek, a coho salmon stream. Two existing culverts on BLM Road #34-3E-15.3 and #34-3E-26 are undersized and prevent fish passage to upstream suitable habitat. Unimpaired fish passage is needed for salmonids to complete life history requirements. The Medford District RMP (p. 87) directs upgrading existing road culverts that pose a substantial risk to riparian conditions. These culverts must accommodate at least a 100-year flood and provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

Areas at the upper culvert crossing and above the lower culvert crossing are being impacted by watering cattle. The banks on both sides of the stream at these two points are severely broken down and active erosion is occurring. Riparian vegetation is trampled and shrubs are heavily browsed. Livestock exclosure fencing is needed at both sites to protect stream banks, allow riparian vegetation to recover and flourish, and eliminate sources of excess nutrients and bacteria in Camp Creek.

1.2.2.3 Riparian Planting

Previous logging has removed most of the large trees which provided canopy cover and shade in the riparian areas within the Camp Cur project area. The entire project area is now located in a frost pocket zone which has resulted in reduced recruitment and survival of conifers. Livestock grazing has further impacted the ability of the riparian areas to recover from this past disturbance. Soils are compacted and brush species have taken over the landscape, competing with conifer and hardwood tree species for light, moisture, and nutrients. Riparian planting would provide conifer and hardwood species within riparian areas to improve water quality, fish habitat, and riparian habitat. These trees would provide a long-term supply of large woody material to the stream, provide shade and canopy cover, and increase aquatic habitat diversity.

1.2.2.4 Spring Protection and Water Development

Springs throughout the project area are open to wildlife and grazing livestock use. As animals access these areas for drinking water, they trample the fragile spring area and add sediment to the spring water. Approximately six springs would be fenced to protect from trampling damage. A spring box with piping to a water trough would be installed to provide water for wildlife and the authorized grazing animals in the vicinity.

1.2.2.5 Grazing Study Fence Removal

In the mid-1980s, two large grazing enclosures were established to explore the regeneration of planted pine seedlings and the effects of cattle grazing. The pine plantations are stocked and established and no longer needed for this evaluation. Approximately 2.5 miles of an old grazing study area fence and its four troughs would be removed from the project area. All material would be removed from the site except for material reused in spring development projects.

1.2.2.6 Stream Channel Aggrading

Past logging activity on private land caused a seasonal stream channel to leave its natural course. This resulted in a meandering channel that cuts across a small meadow on BLM-administered land. The cut channel averages two to three feet deep and four to eight feet wide. During very high rainfall events, the increased volume of water in the stream cuts the channel deeper and wider and increases sediment. Baffling devices would decrease the water velocity in the severely-eroded, seasonal stream channel during high rainfall events.

1.2.2.7 Wetland Protection

Excess water from a domestic spring on private land flows across BLM-administered land on its way to an irrigation canal. The water leaves a defined channel for several hundred feet and spreads over a large, flat area frequented by cattle during the summer grazing season. Cattle are trampling vegetation and browsing shrubs. Fencing would prevent access by cattle and allow the vegetation to stabilize and naturally protect the area.

1.2.2.8 Pump Chance Renovation

Pump chances provide pools of water for use during fire suppression. Pump chances in the project area are overgrown, access is inadequate, inlets and outlets are not functioning

properly, and the pools are filling with gravel and soil. Renovating these pump chances would provide adequate water sources in the project area for fire fighting purposes.

1.2.2.9 Road Projects

Roads are a major source of sediments and road density is high in the project area. To reduce erosion and subsequent sedimentation, roads need to be upgraded and renovated. Roads no longer needed or used should be decommissioned to reduce road density. This would benefit water quality and contribute to improved fish habitat.

1.3 Purpose

The purposes of the proposed actions are to contribute towards meeting objectives identified in the Medford District Resource Management Plan, Northwest Forest Plan, Lost Creek Watershed Analysis, and Central Big Butte Watershed Analysis. This includes contributing to the Medford District's decadal Probable Sale Quantity, as identified in the Medford District Resource Management Plan, providing forest products for the local economy, and meeting existing laws and regulations. It also includes treating and restoring overstocked stand conditions, excluding livestock from streams and adjacent riparian corridors, renovating or improving roads within the project area, and removing barriers to fish passage by replacing culverts.

1.3.1 Objectives

The following objectives were identified by the interdisciplinary project team. Where possible, the source of the objective is shown. Sources include the Northwest Forest Plan (NWFP), Medford District Resource Management Plan (RMP), Lost Creek Watershed Analysis (LCWA), and Central Big Butte Watershed Analysis (CBBWA).

1. Supply a sustainable source of timber from matrix lands to provide jobs and contribute to community stability (RMP p. 38; CBBWA p. 35) by
   - Applying a modified, even-aged treatment to produce stand conditions that include wood of desired quality, quantity, and value (RMP p. 181) (see Section 2.2.1.1 for treatment description);
   - Producing economically harvestable tree sizes in reasonable period of time (RMP p. 182) (see Section 2.2.1.2 for treatment description);
   - Producing a multiple-canopied, multiple-aged stand (RMP p. 182) (see Section 2.2.1.2 for treatment description); and
   - Applying commercial thinning (density management) treatments to increase recoverable timber production and meet structural diversity objectives (RMP p. 185) (see Section 2.2.1.3 for treatment description).
2. Improve forest ecosystem health, diversity, and resiliency (RMP p. 44, 233; LCWA p. 75-77) by
   - Providing 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, and habitat for a variety of organisms associated with both late-successional and younger forests (RMP p. 38, 39; NWFP p. C-40, C-41; LCWA p. 76; CBBWA p. 55).

3. Manage for the conservation of Federal candidate and Bureau Sensitive species and their habitats so as not to contribute to the need to list and to contribute to the recovery of the species (RMP p. 50-51; NWFP p. C-44; LCWA p. 78;) by
   - Providing connectivity (along with other allocations, such as Riparian Reserves) between Late-Successional Reserves (RMP p. 38) and
   - Providing habitat for a variety of organisms associated with both Late-successional and younger forests (RMP p. 38).
4. Protect and conserve Federal listed and proposed species, and manage their habitat to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and Bureau special status species policies (RMP p. 50; LCWA p. 78;) by
   - Maintaining Riparian Reserves and Late-Successional Reserves as important building blocks (RMP p. 18).
5. Improve habitat for coho salmon, steelhead, and trout (RMP p. 49; LCWA p. 82, 83; CBBWA p. 50, 51) by
   - Upgrading selected stream crossings to meet 100-year flood standards (RMP p. 28, 87);
   - Considering decommissioning roads to improve hydrologic and riparian function (RMP p. 165);
   - Managing the transportation system to minimize sediment delivery to streams (RMP p. 28, 160-165); and
   - Reestablishing and manage stands to acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy and Riparian Reserve objectives (RMP p. 27).
6. Reduce the risk of road-generated sediment (RMP p. 22, 28, 160, 163-165; LCWA p. 81, 84, 85; CBBWA p. 51) by
   - Upgrading selected stream crossings to meet 100-year flood standards (RMP p. 28, 87);
   - Considering decommissioning roads to improve hydrologic and riparian function (RMP p. 165); and
   - Managing the transportation system to minimize sediment delivery to streams (RMP p. 28, 160-165).
7. Minimize adverse impacts to soil and maintain or improve long-term soil productivity (LCWA p. 81; CBBWA p. 51, 56) by
   - Designing logging systems to avoid or minimize adverse impact (RMP p.44); and
   - Providing a renewable supply of large down logs (RMP p. 44).
8. Retain the existing Visual Resource Management Class II foreground and middle ground characteristics along Butte Falls - Prospect Road (County Road 992) (RMP p. 70; LCWA p. 75) by
   - Maintaining low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer.

1.4 Legal Requirements

1.4.1 Conformance with Land Use Plans and Other Documents

The actions proposed and analyzed in this EA were developed to be consistent with the management objectives for public lands identified in the following documents:

1.4.1.1 Medford District Record of Decision and Resource Management Plan (RMP), June 1995

The *Medford District Record of Decision and Resource Management Plan* responds to the need for a healthy forest and rangeland ecosystem with habitat that will contribute toward and support populations of native species, particularly those associated with late-successional and old growth forests. The RMP responds to the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies, and contribute valuable resources to the national economy on a predictable and long-term basis. The RMP contains the same land use allocations and standards and guidelines as the NWFP, but also responds to issues specific to the Medford District.

1.4.1.2 Northwest Forest Plan (NWFP), April 1994

The *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* provides extensive standards and guidelines, including land allocations, which comprise a comprehensive ecosystem management strategy.

1.4.1.3 Survey and Manage (S&M), March 2004

The *Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* amends a portion of the 1994 NWFP by removing the Survey and Manage Mitigation Measure Standards and Guidelines. Sections I through VIII and XII of the NWFP were removed in their entirety while Sections IX through XI were retained.

1.4.1.45 Aquatic Conservation Strategy (ACS), March 2004

The *Record of Decision Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Land for Nineteen National Forests Within the Range of the Northern Spotted Owl* clarifies the provisions of the NWFP related to the Aquatic Conservation Strategy. This decision "clarifies the proper spatial and temporal scale for evaluating progress toward attainment of ACS objectives and clarifies that no project-level finding of consistency with the ACS objectives is required." The decision specifies "projects must be considered in a long-term, fifth-field watershed or larger scale to determine the context for project planning and National Environmental Policy Act (NEPA) effects analysis."

1.4.2 Relationship to Statutes, Regulations, and Other Plans

- **Oregon and California Act (O&C) of 1937** – Requires the BLM to manage O&C lands for permanent forest production, in accord with sustained-yield principles. Management of O&C lands must also protect watersheds, regulate streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries.
- **Federal Land Policy and Management Act (FLPMA) of 1976** – Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.
- **National Environmental Policy Act (NEPA) of 1969** – Requires the preparation of environmental impact statements for Federal projects which may have a significant effect on the environment.

- **Endangered Species Act (ESA) of 1973** – Directs Federal agencies to ensure their actions do not jeopardize threatened and endangered species.
- **Clean Air Act (CAA) of 1990** – Provides the principal framework for national, state, and local efforts to protect air quality.
- **Archaeological Resources Protection Act (ARPA) of 1979** – Protects archeological resources and sites on federally-administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.
- **Clean Water Act (CWA) of 1987** – Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.
- **Medford District Integrated Weed Management Plan of 1998 -** Provides a proactive ecosystem-based approach to reduce populations of alien plant species to a level which will allow for the restoration of native plant species, and provide for overall ecosystem health. Control measures may include cultural or preventative (seed testing, vehicle washing, etc), physical (handpulling, competitive planting, burning, etc), biological (insects, etc.), and chemical (herbicide), and may be found in greater detail in the Northwest Area Noxious Weed Control Program EIS, December 1985.

1.5 Scoping and Identification of Issues

1.5.1 Scoping

Scoping was conducted via a letter mailed to 25 individuals, businesses, organizations, and government agencies on August 18, 2004. The letter requested comments concerning issues to be addressed within the project area. A total of five comment letters were received from adjacent land owners, Headwaters, Oregon Natural Resources Council, and Klamath Siskiyou Wildlands Center.

1.5.2 Issues

Issues were identified based on input from the public and the interdisciplinary team plus information contained in the RMP, LCWA, and CBBWA. These issues provide a focus for environmental analysis and a basis for the resulting decisions. The major issues brought forward were used to formulate alternatives, identify appropriate design features, or analyze environmental effects. The following major issues were identified:

1.5.2.1 Issue 1: Fisher

USFWS published a finding in April 2004 that a petition to list fishers as a "Federally Threatened" species was warranted but precluded by higher priority listing actions. The species remains a USFWS candidate species (USDI 2004, 18770). Pacific fishers are a BLM "bureau sensitive" wildlife species.

Radio-collared fishers were detected on and near BLM lands in the 5th field watershed that includes Camp Cur proposed units. They were located during a five-year research project conducted by Pacific Northwest Research Station Olympia Forestry Services Laboratory (PNW) and Rogue River National Forest (RRNF).

There is no management strategy or guidance available at this time, and they remain on the BLM 'bureau sensitive' list. BLM policy is that District decisions would not contribute to the need to list Bureau Sensitive species under the Endangered Species Act.

1.5.2.2 Issue 2: Forest Condition

High stand densities in the project area have resulted in slow or stagnant growth rates. Many forest stands contain more trees than the site can sustain. These high densities result in declining tree vigor and growth, increased tree mortality, and increased susceptibility to insect attack, root disease infection, and stand-replacing wildfires.

1.5.2.3 Issue 3: Transient Snow Zone

The Transient Snow Zone (TSZ) is an elevation band from 3,500 to 5,000 feet where snow accumulates and is susceptible to rain-on-snow events. Historic extreme high flows have been produced by rain-on-snow events where warm rains have melted the snow pack, producing large amounts of runoff. An intact forest canopy helps to reduce the magnitude of rain-on-snow events. Large openings in the TSZ can increase the magnitude of peak flows in watersheds because more snow accumulates on the ground and is subject to rapid melting during a large rain event. This causes more runoff to reach stream channels quicker, resulting in eroded and degraded stream banks and channels. Approximately 10,122 acres, or 50 percent of the Beaver Dam Creek 6th field watershed, and 5,476 acres, or 25 percent, of the North Fork Big Butte Creek 6th field watershed are within the TSZ.

1.5.2.4 Issue 4: Visual Resources

The BLM managed lands along the county road from Butte Falls to Prospect is designated as Visual Resource Management Class II. The objective is to manage to meet the visual quality by retaining the existing character of the landscape. Manage the lands for low levels of change to the characteristics landscape. Management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

1.5.2.5 Issue 5: Late-Successional Connectivity

Late-successional wildlife habitat on BLM is highly fragmented. Pockets of mature timber are surrounded by early seral forests, recovering second growth forests, and open meadows. Connectivity of late-successional forests is poor mostly due to ownership patterns. Within the proposed project area, only two sections have full BLM ownership. Private timber companies own the majority of the remainder of the sections.

1.5.2.6 Issue 6: Road Density

Road density in the project area is high at five miles per square mile. High road densities contribute to degraded riparian and aquatic habitat through sedimentation and increased temperatures. Some roads may no longer be necessary and could be decommissioned. A decline in road maintenance in recent years on BLM-administered roads is causing drainage problems resulting in erosion. Many roads are hydrologically-connected to streams through ditchlines and are contributing sediment to streams. Reducing road density is difficult in watersheds with a checkerboard ownership pattern because of opposition to closing and decommissioning roads. This results in roads that should be closed remaining open. Roads that are stable are closed in order to reduce road density. Recommendations from the RMP, NWFP, and other documents suggest treating roads is one of the best and most efficient methods of restoring degraded riparian and fisheries habitat.

High road densities can have an impact on deer and elk populations. The area is identified as a major migration route by Oregon Department of Fish and Wildlife. Higher road densities provide more opportunities for poaching and disturbance for deer and elk herds during the winter months and during calving and fawning times.

1.5.2.7 Issue 7: Old Growth

Public comments received during scoping identified protecting the "high biological integrity" provided in old growth stands as a concern. The public defined areas of high biological integrity (including old growth stands) as areas where fire hazard, noxious weed, watershed function, soil stability, and fish and wildlife problems are nonexistent or minimal. These problems are typically nonexistent or minimal in unentered old growth forest stands.

1.5.2.8 Issue 8: Riparian Condition

Past logging activities in the project area have removed most of the overstory canopy along streams. This has created frost-prone areas, or frost pockets, where cold air settling close to the ground results in stunted tree growth and impaired conifer and hardwood seedling recruitment. Plant communities have shifted from a conifer-dominated community to a shrub-dominated community. A majority of the riparian areas contain overgrown shrubs that do not allow tree growth to provide shade and a supply of large woody material to the streams. Livestock grazing within the riparian areas has also contributed to the removal of overstory canopy as cattle browse on shrubs and young hardwood trees and trample seedlings.

The lack of trees and large wood along the stream channels has resulted in reduced cover for fish, low quantities of pool habitat, reduced stream habitat diversity, increased downcutting, a lack of side channels and alcoves, decreased channel sinuosity, and disconnection of the streams with their adjacent floodplains.

1.5.2.9 Issue 9: Soil Compaction and Soil Productivity

Due to the relative flatness in the topography on the land in the project area, the majority of lands have been tractor yarded with conventional logging methods (i.e. multiple entries with no well-spaced, designated skid trails). This has resulted in an extensive network of skid trails, roads, and landings. This large amount of compacted ground creates the potential for increases in the magnitude and frequency of high flows in the local streams. These flow increases can destabilize stream channels and accelerate sedimentation rates (USDI 1995b, 6). Due to the large concentration of skid trails, roads, and landings, soil compaction and loss of soil productivity is a concern in the watershed.

1.5.3 Issues Considered but not Analyzed in Detail

The following issues were discussed by the interdisciplinary team. It was determined these issues were beyond the scope of this project or would be considered or discussed under other topics during the environmental analysis process.

1.5.3.1 Frost Prone Areas

Frost is a concern in regeneration harvest areas with slopes less than 20 percent. The Medford District ROD/RMP recognized this and recommended shelterwood harvest as the regeneration method throughout the project area. Shelterwood harvest provides an overstory canopy which modifies temperature extremes in these units. This helps protect newly established seedlings from frost damage during the growing season. This was determined not to be an issue because the RMP recommendation would be followed on regeneration units in all alternatives. Planting in riparian areas for recovery of frost pockets was considered as part of Issue 8: Riparian Condition.

1.5.3.2 Noxious Weeds

Noxious weeds was not analyzed as an issue because it would be treated the same across

all action alternatives. The project design features (PDFs) proposed to protect from the spread of noxious weeds would be implemented in all action alternatives.

1.5.3.3 Grazing

Grazing was not analyzed as an issue because it would be treated the same across all action alternatives. Changes to the existing grazing levels were beyond the scope of this EA. The proposed projects that would affect grazing are the same across all action alternatives.

1.6 Decisions to be Made

The following decisions will be made through this analysis:

- To determine if a FONSI is appropriate, or should an Environmental Impact Statement (EIS) be prepared if the proposed action would result in a finding of significant impacts to the human environment. If impacts are significant, to determine if the project proposals could be modified to mitigate the impacts so an EIS would not be necessary.
- To harvest or not harvest trees on BLM-administered lands within the project area and, if so, at what level, where, and when.
- To implement or not implement proposed restoration projects (fuels density management; mulching, seeding, and fertilizing for cutbank stability; renovating or improving pump chances; decommissioning, blocking, and improving roads; and replacing a culvert for unimpaired fish passage) on BLM-administered lands within the project area and, if so, which projects, at what level, and where.

2.0 Alternatives

2.1 Introduction

Chapter 2 provides a description of the proposed projects. The three action alternatives are described, a "No Action" alternative is supplied as a baseline for analysis, and a comparison between alternatives is provided. This chapter also outlines project mitigation which is designed into the alternatives. Project Design Features (PDFs) are included for the purpose of reducing or eliminating anticipated environmental impacts.

The alternatives address issues identified by a team of interdisciplinary specialists and by the public during scoping. The alternatives represent reasonable ways to meet the need for a sustainable supply of timber and forest products and still provide for a healthy forest ecosystem. During development of the alternatives, 204 acres were considered for harvest entry but were eliminated from consideration due to current stand conditions, Riparian Reserves, or wildlife concerns (see Appendix A, Silviculture Prescription and Marking Guidelines, Table A-1).

2.2 Proposed Projects

2.2.1 Forest Management

Lands proposed for forest management in the project area were designated as Matrix lands under the RMP and the NWFP. Matrix lands are Federal lands outside of reserves and special management areas in which most timber harvest and other silvicultural activities will be conducted. Matrix lands have been divided into the northern and southern General Forest Management Areas (GFMA) and Connectivity/Diversity Blocks. Within the project area, matrix lands are identified as southern GFMA. No Connectivity/ Diversity Blocks are present in the project area.

2.2.1.1 Southern GFMA Regeneration Harvest

Regeneration harvest is timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished" (RMP p. 111).

In the southern GFMA, at least 16 to 25 large, green conifer trees per acre would be retained in regeneration harvest units (RMP p. 39).

2.2.1.2 Shelterwood Harvest

Shelterwood harvest is an even-aged regeneration system. "With this method a portion of the mature stand is retained as a source of seed and/or protection during the regeneration period. The retained trees are usually removed in one or more cuttings" (RMP p. 113).

This treatment would leave 12 to 25 trees per acre greater than 20 inches in diameter. These trees are left to modify environmental conditions to provide frost protection for planted and natural understory seedlings and saplings. When the understory has grown tall enough that frost no longer causes mortality (approximately 10-20 years) the overstory green trees in excess of 6 to 8 per acre may be removed.

2.2.1.3 Selection Harvest

Selection harvest is "a method of uneven-aged management involving the harvesting of single trees from stands (single-tree selection) or in groups (group selection) without harvesting the entire stand at any one time" (RMP p. 112).

This treatment would remove poor vigor trees from all diameter classes. Stand densities would be reduced and site resources (water, sunlight, nutrients, and growing space) would be available for the remaining trees. The desired basal area and tree crown ratio and form are the primary factors used to determine which trees would be left or removed. The stand structure would be multi-aged and multi-layered. Canopy closure would range from 40 to 60 percent following treatment. The resulting slash would be piled and burned.

2.2.1.4 Density Management

Density management involves the "cutting of trees for the primary purpose of widening their spacing so that the growth of remaining trees can be accelerated" (RMP p. 104).

Density management harvest can be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

This treatment targets the removal of individual trees to maintain or enhance forest diversity and growth. Removal of smaller trees and trees in direct competition with healthy dominant and codominant trees would redirect the site resources (water, sunlight, nutrients, and growing space) toward the development and maintenance of large healthy trees. Canopy closure would range from 40 to 60 percent following treatment. Slash would be piled and burned.

2.2.1.5 Riparian Thinning

A 70-foot wide no-cut, no-disturbance area on each side of the stream channel would be established, with the remaining reserve area designated for understory thinning. Shrubs would be slashed and small trees 7″ DBH and less would be thinned or slashed to release healthy conifers 8″ DBH and greater. The slash created from these activities would be piled and burned. Stand canopy closure would be reduced by 10 to 20 percent.

2.2.1.6 Pine Plantation Thinning

Ponderosa pine plantations of an unknown seed source were established 40 years ago throughout the Butte Falls Resource Area. Pine plantations would be thinned to reduce stocking levels to 10 to 30 trees per acre. Small areas of merchantable conifers within the pine plantations and along unit boundaries would be commercially thinned. The pine trees remaining after treatment would contain the highest quality crown. The existing naturally-developed understory would be released and development of the mixed-conifer stand typical to the area would be encouraged. Following removal of the pine, the conifer understory would be precommercially thinned to an acceptable density.

In Section 21, a pine plantation surrounds a stand of Douglas-fir containing laminated root rot. In this pine stand, all Douglas-fir within 100 feet of the edge of the fir stand would be removed in order to isolate the root rot disease. Remaining pine would be thinned and a mixture of pine and cedar would be planted to maintain a fir-free zone.

A Special Cut would be used in pine plantations where pine densities are light and the natural understory is inconsistent. In these areas, the pine would be thinned to leave approximately 30 of the healthiest pine trees per acre, releasing the mixed conifer understory, whenever possible, to achieve species diversity.

No activity slash would remain following treatment. All pine slash would be removed from the unit, chipped and scattered on-site, or processed under the tracks of mechanized equipment during log processing. Limb slash from other scattered conifers would be lopped and scattered.

2.2.1.7 New Temporary Spur Road Construction

Temporary spur roads would be constructed to allow operator access to harvest units. These temporary roads would be constructed on ridge tops, when possible. After timber harvesting is completed, the roads would be fully decommissioned in the same season as used. Temporary roads used in pine plantation thinning would be decommissioned by scarification, seeding, and blocking.

Scarification is the "mechanical removal of competing vegetation or interfering debris prior to planting" (RMP p. 112).

2.2.2 Restoration

2.2.2.1 Livestock Exclosure on Beaver Dam and Parsnip creeks

Beaver Dam and Parsnip creeks support populations of resident cutthroat trout. Heavy grazing by livestock has severely impacted riparian vegetation adjacent to these streams. Broken down stream banks, trampled and browsed riparian vegetation, and cattle manure is evident throughout the area. This has resulted in increased sedimentation, decreased stream shade and large wood input, and increased nutrients and bacteria which affect water quality.

This project would improve water quality, fish habitat, and riparian habitat by protecting stream banks, allowing riparian vegetation to recover and flourish, and eliminating sources of excess nutrients and bacteria on Beaver Dam and Parsnip creeks.

Unprotected portions of Beaver Dam and Parsnip creeks and their perennial tributaries in T34S, R3E, Sections 2, 3, and 9 would be fenced to exclude use by livestock. Fencing would occur on approximately two miles of stream and the adjacent riparian corridors. Fence would be built with steel fence posts, four-strand barbed wire, and wooden corner posts and braces. Gates would be installed to allow removal of any cattle which become trapped inside the exclosures. Hanging crossings made of PVC pipe and steel cable will be installed at property boundaries.

2.2.2.2 Culvert Replacement and Livestock Exclosure on Camp Creek

Camp Creek is a tributary to North Fork Big Butte Creek, a coho salmon stream. Coho salmon are listed as "threatened" under the Endangered Species Act. Camp Creek supports steelhead/rainbow and cutthroat trout, but currently does not support coho. Culverts at the crossings of BLM road #34-3E-15.3 and road #34-3E-26 are undersized and constrain flow. Approximately 1.5 miles of habitat above the lower culvert and 0.5 miles above the upper culvert is suitable for juvenile coho salmon rearing. The channel has widened below the culverts and, during high flows, there is a velocity barrier which prevents fish passage.

The Medford District RMP directs upgrading existing road culverts that pose a substantial risk to riparian conditions. These culverts must accommodate at least a 100-year flood and provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams (USDI 1995a, 87).

The existing culverts on BLM road #34-3E-15.3 and road #34-3E-26 would be replaced with properly-sized pipe arches. Following the culvert replacements, livestock exclosure fencing would be installed at both sites to protect the stream banks from cattle trampling. Fence would be built with steel fence posts, four-strand barbed wire, and wooden corner posts and braces. Gates would be installed to allow removal of any cattle which become trapped inside the exclosures.

2.2.2.3 Riparian Tree Planting

Past logging has removed most of the large trees in the riparian areas which provide canopy cover and shade. Brush species dominate the landscape, competing with conifer and hardwood tree species for light, moisture, and nutrients. Competing brush species would be thinned. Conifers and hardwoods would be planted within a 150 foot corridor along either side of fish-bearing streams in T34S, R3E, Sections 2, 3, 9, 13, 14, 21, 23, 24, 25, and 27. Frost-resistant species would be planted to improve the chances of tree survival to maturity in the frost pocket zone. Brush would be left intact for a distance of 15 feet on either side of streambanks to provide bank stability and shade immediately adjacent to the stream while newly-planted trees are maturing. Tubing would be installed to protect tree seedlings from beavers, elk, and deer.

2.2.2.4 Spring Protection and Water Development

Six springs would be protected with barbed wire fence or local native pole material obtained from around the spring location. The spring would be hand-dug to allow installation of a spring box and a trench. Piping, buried in the trench, would transport water from the spring box to a trough at a location less susceptible to damage from cattle and wildlife.

2.2.2.5 Grazing Study Fence Removal

Grazing studies were conducted in the project area in the mid-1980s. As a part of the studies, fencing was installed to keep livestock out of certain parts of the project area. Barbed wire would be removed from fence posts and rolled up; steel and wood fence posts would be pulled; wire gates would be removed; and four water troughs inside the study area would be taken out. To the extent possible, miscellaneous wire and staples would be picked up. Site access would be by all-terrain vehicle. All material would be removed from the site and would be available for fencing needs in the project area. This would allow approximately 50 acres of formerly unavailable grazing forage to be accessible to wildlife and livestock.

2.2.2.6 Stream Channel Aggrading

In the main channel through the meadow, various devices may be installed or placed in the stream channel to impede the flow of water during very high water storm events. These devices may be constructed baffles, compacted hand-placed limb slash, or small diameter poles. Material would not exceed one-half the depth of the degraded channel. Permanent photo monitoring points would be installed.

2.2.2.7 Wetland Protection

In the flat wet area between the defined channels in Section 15, a four-strand barbed wire fence would be constructed to exclude cattle from the wet area. At least two access gates would be installed to allow errant cattle to be released. The BLM would coordinate with local ranchers or cattlemen’s associations on fence location and design.

2.2.2.8 Pump Chance Renovation

Pump chances are primarily used for initial wildfire attack and would be renovated to

hold a minimum of 500 gallons of water. Accumulations of gravels, soil, and vegetation would be excavated and moved to an appropriate disposal site. Rock would be added to access ramps as needed. The access ramp to the pool should have a good rock surface and should be brushed to allow access by 4,000-gallon water tenders. Water inlets and outlets to the pool would be repaired or cleared of vegetation and debris to allow the flow of water through the pump chance. One site in T34S, R3E, Section 24 was identified for restoration.

2.2.2.9 Road Projects

Road Renovation

Prior to road use, road surfaces and ditch lines would be bladed; catch basins would be cleaned or enlarged; corrugated metal pipes would be flushed; brush growing near pipe inlets or outlets would be removed; pipe inlets and outlets would be cleaned; and brush, limbs, and trees would be removed along roadways to improve sight distance and allow for proper road maintenance. All drainage structures, including corrugated metal pipes, water dips, and ditch relief outlets, would be inspected and required work performed so water flow would not be impeded.

Road Improvement

Approximately three miles of existing roads would be upgraded to reduce erosion and sediment deposits into streams. Road drainage would be improved and deteriorated surfacing would be replaced. Some culverts would be replaced with larger ones to meet 100-year flood standards. Additional culverts would be installed on existing roads to improve drainage.

Full Decommissioning

Roads determined through an interdisciplinary process to have no future use would be sub-soiled (or ripped), seeded with native grasses or others as appropriate, mulched, and planted to reestablish vegetation. Cross drains, stream draw culvert fills in stream channels, and potentially unstable fill areas would be removed to restore natural hydrologic flow. Roads would be closed with a device similar to an earthen barrier or equivalent. Roads would not be maintained in the future.

Decommissioning

Decommissioning would be based on resource protection goals identified in the Lost Creek and Central Big Butte Creek Watershed Analyses and Medford District Resource Management Plan directives. Roads would be closed to vehicles on a long-term basis, but may be used again in the future. Roads would be left in an “erosion-resistant” condition by establishing cross drains and removing fills in stream channels and potentially unstable fill areas. Exposed soils would be treated to reduce sedimentation. Roads would be closed with a device similar to an earthen barrier

Road Relocation

A 0.5-mile segment of BLM road #34-3E-14.1 would be realigned further away from the stream banks of the North Fork of Butte Creek to reduce the amount of sediment movement into the creek. The length of road to be constructed is nearly equal to the portion that would be bypassed and decommissioned. The unused route on Silver Butte land would be decommissioned by blocking and waterbarring. The route to be abandoned on BLM would be fully decommissioned by ripping, water barring, and planting.

2.3 Description of the Alternatives

2.3.1 Alternative 1 - No Action

The No Action Alternative describes a baseline against which the effects of the action alternatives can be compared. This alternative describes the existing condition and the continuing trends.

2.3.1.1 Forest Management

No forest management activities would occur. If this alternative was selected, no silviculture treatments and no road renovation, improvement, or closures would occur within the project area at this time. Only normal programmed road maintenance would be performed.

Future harvesting in this area would not be precluded and could be analyzed under a subsequent EA. Harvest would occur at another location within Matrix lands under separate NEPA analysis in order to meet harvest commitments identified in the ROD/ RMP (p. 73). Selection of the No Action Alternative would not constitute a decision to reallocate these lands to noncommodity uses.

2.3.1.2 Restoration

No restoration projects would occur. If this alternative was selected proposed restoration projects to improve riparian conditions such as livestock exclosures, and riparian planting would not occur. Spring protection and water development designed to protect spring areas and provide a water source for cattle and wildlife would not be completed. Stream improvements designed to improve fish habitat (culvert replacement) and restore stream channels (stream channel aggrading) would not occur.

2.3.2 Alternative 2

Vegetation treatments are based on stand age and recommendations found in the RMP. Regeneration harvest is recommended in Matrix stands meeting RMP criteria for regeneration harvest in Southern GFMA and Shelterwood harvest in frost prone areas. Density management is recommended on stands less than 80 years old where high stocking levels exist. This alternative is designed to provide the highest level of timber harvest while meeting RMP and watershed objectives (see Map 1b).

2.3.2.1 Forest Management

Southern GFMA Regeneration Harvest

- 28 acres

Shelterwood Harvest

- 80 acres

Selection Harvest

- 36 acres

Density Management

- 698 acres

Riparian Thinning

- 26 acres

Pine Plantation Thinning

- 201 acres pine thinning to release understory
- 30 acres pine thinning to increase pine density in riparian areas
- 34 acres in special cut areas

Temporary Road Construction

- 5.2 miles

2.3.2.2 Restoration

Livestock Exclosure on Beaver Dam and Parsnip creeks

- 2 miles of stream

Culvert Replacement and Livestock Exclosure on Camp Creek

- 2 culverts
- Fence around culverts

Riparian Tree Planting

- 30 acres

Spring Protection and Water Development

- 6 springs and 6 troughs

Grazing Study Fence Removal

- Remove 2.5 miles of fencing
- Remove 4 water troughs

Stream Channel Aggrading

- Install stream baffles on 200 feet of stream
- Install approximately 700 feet of fencing around channel

Wetland Protection

- Install approximately 1,000 feet of fencing

Pump Chance Renovation

- 1 pump chance

Road Projects

- Improve - 3.5 miles
- Full decommission - 2.2 miles
- Decommission - 6.0 miles
- Relocate - 0.5 miles

2.3.3 Alternative 3

Vegetation treatments are based on actual stand conditions with emphasis on recommendations in the Central Big Butte and Lost Creek watershed analyses. Reduce regeneration treatments by reducing Shelterwood harvest acres (see Map 2b).

2.3.3.1 Forest Management

Southern GFMA Regeneration Harvest

- 28 acres

Shelterwood Harvest

- 14 acres

Selection Harvest

- 52 acres

Density Management

- 728 acres

Riparian Thinning

- 26 acres

Pine Plantation Thinning

- 204 acres pine thinning to release understory
- 30 acres pine thinning to increase pine density in riparian areas
- 34 acres in special cut areas

Temporary Road Construction

- 5.0 miles

2.3.3.2 Restoration

Livestock Exclosure on Beaver Dam and Parsnip creeks

- 2 miles of stream

Culvert Replacement and Livestock Exclosure on Camp Creek

- 2 culverts
- Fence around culverts

Riparian Tree Planting

- 30 acres

Spring Protection and Water Development

- 6 springs and 6 troughs

Grazing Study Fence Removal

- Remove 2.5 miles of fencing
- Remove 4 water troughs

Stream Channel Aggrading

- Install stream baffles on 200 feet of stream
- Install approximately 700 feet of fencing around channel

Wetland Protection

- Install approximately 1,000 feet of fencing

Pump Chance Renovation

- 1 pump chance

Road Projects

- Improve - 3.5 miles
- Full decommission - 2.2 miles
- Decommission - 6.0 miles
- Relocate - 0.5 miles

2.3.4 Alternative 4

Vegetation treatments are based on actual stand conditions. Emphasis designed to address issues raised in public comments to maintain higher biological integrity and minimize soil compaction. Treatments were deferred in previously unentered stands and stands where skid trails had previously been ripped (see Map 3b).

2.3.4.1 Forest Management

Southern GFMA Regeneration Harvest

- 0 acres

Shelterwood Harvest

- 14 acres

Selection Harvest

- 52 acres

Density Management

- 488 acres

Riparian Thinning

- 10 acres

Pine Plantation Thinning

- 204 acres pine thinning to release understory
- 31 acres pine thinning to increase pine density in riparian
- 34 acres special cut areas

Temporary Road Construction

- 3.0 miles

2.3.4.2 Restoration

Livestock Exclosure on Beaver Dam and Parsnip creeks

- 2 miles of stream

Culvert Replacement and Livestock Exclosure on Camp Creek

- 2 culverts
- Fence around culverts

Riparian Tree Planting

- 30 acres

Spring Protection and Water Development

- 6 springs and 6 troughs

Grazing Study Fence Removal

- Remove 2.5 miles of fencing
- Remove 4 water troughs

Stream Channel Aggrading

- Install stream baffles on 200 feet of stream
- Install approximately 700 feet of fencing around channel

Wetland Protection

- Install approximately 1,000 feet of fencing

Pump Chance Renovation

- 1 pump chance

Road Projects

- Improve - 3.2 miles
- Full decommission - 1.5 miles
- Decommission - 4.0 miles
- Relocate - 0.5 miles

2.4 Project Design Features

The following Project Design Features (PDFs) are included in the design of forest management and restoration projects in Alternatives 2-3. These PDFs are a set of the Best Management Practices (BMPs) identified in the Medford District RMP and resource protection measures identified by the EA interdisciplinary team. The PDFs would serve as a basis for resource protection in the implementation of any projects and will be considered in the analysis of impacts in Chapter 4.

2.4.1 Wildlife

- Seasonally restrict harvest activities from March 1 to September 30 within 0.25 miles of known northern spotted owl sites (within 0.5 miles for helicopter operations). The seasonal restriction would be waived if nonnesting is determined. If any new owls are discovered in harvest units following the sale date, activities would be halted until mitigation options could be determined.
- Seasonally restrict pile burning from March 1 to July 15 within 0.25 miles of known active northern spotted owl nests. The seasonal restriction would be waived if nonnesting is determined.
- Retain all known bald eagle nest, perch, or roost trees.
- Preserve bald eagle habitat within 0.25 miles of nest sites.
- Seasonally restrict activities that cause disturbance above ambient noise levels within 0.25 miles (0.5 miles line of site) of active eagle nest sites from January 1 through August 31.

- Seasonally restrict harvest activities within 0.25 miles of active raptor nests from March 1 to July 15. The seasonal restriction would be waived if the nest is not active.
- Buffer known great horned owl and Cooper's hawk nests with one site potential tree distance.
- Maintain all snags except those which need to be felled for safety reasons. Those snags felled for safety reasons would be left on-site.
- Buffer the salt/mineral lick with one site potential tree distance.
- Maintain existing large coarse woody debris in the stands to protect fisher habitat.
- Seasonally restrict harvest activities from February 1 to May 31 in all units to protect fisher from disturbance during natal season when the young are less mobile. These seasonal restrictions would not be waived.
- Seasonally restrict harvest activities from February 1 to June 30 in units 0.5 mile from verified fisher natal and maternal (birthing and kit raising) dens.
- Maintain existing large coarse woody debris in the stands to protect fisher habitat.
- Restrict harvest activities within 300 feet of meadows.

2.4.2 Riparian Reserves

- Store all hazardous materials and petroleum products in durable containers placed outside of Riparian Reserves. Locate so an accidental spill would be contained and would not drain into the stream system.
- Refuel equipment in locations outside Riparian Reserves.
- Ground-based equipment would not be used within Riparian Reserves unless used for lining from existing roads and landings.
- To ensure existing shade levels along streams are maintained, vegetation treatment would not occur within 70 feet of all streams.

2.4.3 Archeology

- Apply mitigating measures to areas containing known archeological sites. Buffers would be determined based upon proposed treatment, site-specific environmental conditions, and protection recommendations.
- If an archaeological site is discovered during the project, work will stop and the BLM will be notified within 12 hours.

2.4.4 Special Status Plants

- Protect known Special Status vascular plant, lichen, bryophyte, and fungi sites. Buffers would be determined based upon species, proposed treatment, site-specific environmental conditions, and protection recommendations.

2.4.5 Noxious Weeds

- Ensure that seed, straw, and mulch are free of weed reproductive plant parts, as per the North American Weed Free Forage Certification Standards.
- Inspect for noxious weed seeds and plant parts, prior to entry onto BLM-administered lands, all vehicles and equipment that will travel off system roads and deem free of said contaminants.

- Exposed soil resulting from installation of livestock exclosures will be seeded with native grasses and mulched immediately following project construction.

2.4.6 Equipment Use

- Require a Spill Prevention, Control and Countermeasure Plan prior to operation. The Plan will include, but not be limited to, identification of hazardous substances to be used in the project area and purchaser's representatives responsible for supervising initial containment action for releases and subsequent cleanup.

2.4.7 Roads and Quarries

- Seasonally restrict all rock and timber hauling operations whenever soil moisture conditions or rainstorms could result in the transport of sediment to nearby stream channels and hauling operations would result in damage to the road beds (usually October 15 to May 15). Restrict all road renovation, closure, and improvement work from October 15 to May 15, or when soil moisture exceeds 25 percent.
- Block or barricade identified roads after use and before beginning of rainy season (generally by October 15).
- All roads identified for full decommissioning would be seeded with native seed and mulched in the same operational season they are decommissioned.
- Lignin, which may be used as a dust-abatement material, will not be applied during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25 feet of a water body or stream channel).
- Locate waste stockpile and borrow sites resulting from road construction or reconstruction at least one site potential tree length (160 feet) from a stream where sediment-laden runoff can be confined.
- Seasonally restrict all quarry development and rock crushing operations whenever soil moisture conditions or rainstorms could cause the transport of sediment to nearby stream channels as a result of quarry operations (generally October 15 to May 15).
- Plant grass seed, native vegetation, or both to stabilize exposed soil in overburden areas from quarry operations within the same operating season.
- If explosives are necessary in quarry development, require a detailed blasting plan to minimize the amount of rock material outside the designated quarry perimeter.
- Install silt fencing or other erosion control devices such as coconut fiber logs or straw bales between the road and North Fork Big Butte Creek before decommissioning BLM road #34-3E-14.1 and between the road and Mule Creek before decommissioning BLM road #34-3E-21.4.
- Apply mulch and plant BLM roads #34-3E-24.1 and #34-3E 21.4 with conifer seedlings and native grass seed following decommissioning.

2.4.8 Fuel Hazard Reduction from Timber Harvest

- To minimize impacts to the soil and damage to residual trees, excavator piling would be accomplished using a grapple rake with a dangle attachment or a movable linkage attached to the boom of an excavator. In addition, the excavator would be walked over slash when possible.
- All prescribed burn units would have an approved prescribed fire plan prior to ignition and would be in compliance with Prescribed Fire Handbook H-9214-1. The prescribed burn plan would contain measurable objectives, a predetermined prescription, and an escape fire plan to be implemented in the event of an escape.

- To prevent fire escapes and to minimize damage to residual vegetation/trees, burning would occur when weather and fuel conditions allow for lower fire intensities (typically late fall through spring).
- Prescribed burning would comply with Oregon Department of Forestry's Smoke Management Plan. Smoke emission control could also include conducting mop-up as soon as possible after ignition is complete, covering hand piles to permit burning during the rainy season, and burning lighter fuels with lower fuel moistures to facilitate rapid and complete combustion, while burning larger fuels with higher moisture levels to minimize consumption.
- In order to avoid the need to burn activity slash in units or at landings, slash from pine plantation thinning would be removed from the site using whole tree harvesting, chipping limb slash in the unit, walking mechanized harvesting equipment over the slash on skid roads or combinations of all three methods.

2.4.9 Timber Harvest

- Minimize the total number of skid roads by designating skid roads with an average of 150 foot spacing. Avoid creating new skid roads and utilize existing roads, where feasible, in order to minimize ground disturbance.
- Construct new temporary roads on ridge tops wherever possible.
- Restrict all tractor yarding, soil ripping, and excavator piling operations from October 15 to May 15, or when soil moisture exceeds 25 percent.
- Treat activity slash as necessary to reduce or eliminate additional fuel loading.
- Restrict tractor and mechanical operations to slopes generally less than 35 percent. In areas where it is necessary to exceed these gradients, utilize ridge tops where possible.
- Waterbar all skid roads and firelines during the same operating season as constructed. Use spacing for high erosion class soils (see RMP, Appendix D-Best Management Practices, Erosion Control for Timber Harvest, p.167).
- Locate skid roads to minimize disturbance to coarse woody debris. Where skid roads encounter large coarse woody debris, a section would be bucked out for equipment access. The remainder would be left in place and not disturbed.
- Areas identified for ripping (e.g., skid roads, landings, decommissioned roads) would be ripped to a depth of 18″ utilizing a sub-soiler or winged-toothed ripper.
- Rip skid trails in all tractor-yarded regeneration harvest units.
- To minimize soil disturbance, mechanized feller bunchers and harvesters used off designated skid trails must have an arm capable of reaching at least 20 feet, must walk on existing or created slash when possible, and must minimize turning by avoiding return trips to the same skid trail whenever feasible.
- Keep landings less than 0.25 acres in size.

2.4.10 Culvert Replacement on Camp Creek

- At all stream crossings, place the approach as near a right angle to the stream as possible to minimize disturbance to stream banks and riparian habitat.
- Design road crossings on all fish-bearing streams to maintain natural streambed substrate and site gradient, where feasible, while minimizing long-term maintenance needs; the specific design shall also be based on expected longevity and economics.
- Width of a crossing structure will be at least the mean bankfull width at the crossing site; to be measured by a qualified professional.
- Divert the stream (e.g. pipe or lined ditch) around the work area to minimize stream sedimentation. Require the contractor to submit an approved plan for water diversion

before instream work begins. The diverted stream will not be returned to the channel through the project area until all instream work has been completed. The Butte Falls Resource Area fish biologist will be consulted before deviating from this practice. If it is impractical to dewater a stream channel due to factors such as deep channel incision or high gradient, schedule the work toward the end of the instream work period, rather than at the beginning.

- Reduce movement of sediment downstream from the project site by installing straw bales, geotextile fabric, or coconut fiber logs/bales immediately downstream of the work area
- Wet (fresh enough to flow) or green (hardened but less than 21 days old) cement and new or old asphalt shall not be allowed to enter a stream. This includes water used to clean tools and wash out cement trucks after delivering material.
- To restore streambed habitat complexity inside new crossing structures, line the bottom of the crossing structure with one to three foot diameter boulders. Boulders positioned in replacement pipes must be large (high) enough so streambed substrate deposited immediately upstream of the inlet to the original pipe does not bury them. A prediction model will be used to determine the size of boulders needed to ensure stability at the estimated 100-year peak flow.
- Stabilize fill material over a stream-crossing structure as soon as possible after construction has been completed, normally before October 15. Work will be temporarily suspended if rain saturates soils to the extent there is potential for environmental damage, including movement of sediment from the road to the stream.
- To reduce soil erosion and discourage invasion of noxious plant species, mulch bare soil areas with hydro-seeding, weed-free straw, bark chips, and/or native seed, or other approved seed mix, prior to fall rain, or when moisture conditions are appropriate.
- Locate waste stockpile and borrow sites at least one site-potential tree length from a stream where sediment-laden runoff can be confined, unless it is not possible for sediment to move off-site.
- Notify the contractor that he is responsible for meeting all state and federal requirements for maintaining water quality. Standard contract stipulations will include the following:
  1. Heavy equipment will be inspected and cleaned before moving onto the project site in order to remove oil and grease, noxious weeds, and excessive soil.
  2. Hydraulic fluid and fuel lines on heavy mechanized equipment must be in proper working condition in order to minimize leakage into streams.
  3. Waste diesel, oil, hydraulic fluid, and other hazardous materials and contaminated soil near the stream will be removed from the site and disposed of in accordance with Oregon Department of Environmental Quality (ODEQ) regulations. Areas saturated with toxic materials will be excavated to a depth of 12 inches beyond the contaminated material, or as required by ODEQ.
  4. Equipment refueling will be conducted within a confined area outside the stream channel to minimize toxic materials from entering a stream.
  5. Spill containment booms or other equipment, as required by ODEQ, will be used.
  6. Equipment containing toxic fluids will not be stored in a stream channel at any time.
- Construct control weirs or rock aprons at culvert outlets to prevent the water velocity through a new culvert from causing perching:
  1. Control weirs (log or boulders) (Prior 00) would be installed about three channel widths downstream of the culvert to back water into the pipe outlet.
  2. Rock aprons would consist of burying one to three foot diameter rock across the stream channel at the culvert outlet and downstream for a distance equal to two to three culvert diameters, with the tops of boulders at the same elevation as the bottom of the culvert.
- When removing culverts, pull slopes back to the natural slope, or at least 1:1, to

minimize sloughing, erosion, and the potential for the stream to undercut streambanks during periods of high streamflows.

- Restrict instream work to the period between June 15 and September 15.

2.4.11 Visual Resource Management

- Use multiple entries over time to maintain the desired character of the landscape and to limit the level of change at each entry so it does not attract the attention of the casual observer.
- In seen areas, vegetation treatments would be designed to have feathered unit edges and naturally appearing shapes, forms, and textures on the landscape (i.e., no straight lines or sharp angles that would result from following property lines or the designated corridor boundary line).
- Retain roadside vegetative screening, where possible, to screen thinning projects.
- Cut stumps to ground level, with cut angled away from the road.
- Use existing roads, if possible. If new roads must be created, screen from road and rehabilitate as soon as possible.
- Design thinning to be irregularly distributed, following the natural patterns in the landscape.
- Create natural, irregular openings, where necessary, to mimic naturally occurring openings in size and spatial patterns. Feather the edges.

2.4.12 Stewardship Projects

- Conduct all felling and skidding operations using low-ground pressure equipment less than 6 pounds per square inch maximum.
- Operate ground-based equipment on slopes less than 35 percent.
- Scarify, seed, and mulch all temporary road construction and block upon completion of use. If hauling on a temporary road is not completed in the same year the road is constructed, the road will be scarified, seeded, and blocked prior to September 30.
- Restrict road clearing width to 15 feet or less.
- No activity slash would be left on the units.
- Install culvert crossings where temporary roads cross intermittent streams. Pull culverts after use and before fall rains begin.

Table 2-1. Comparison of Action Alternatives			
	Alternative 2	**Alternative 3**	**Alternative 4**
Forest Management			
Southern GFMA	28 acres	28 acres	None
Shelterwood Harvest	80 acres	14 acres	14 acres
Selection Harvest	36 acres	52 acres	52 acres
Density Management	698 acres	728 acres	488 acres
Riparian Thinning	26 acres	26 acres	10 acres
Pine Plantation Thinning	201 acres	204 acres	204 acres
Special Cut Areas	34 acres	34 acres	34 acres
Pine Plantation Thinning in Riparian	30 acres	30 acres	30 acres
Total Harvest	1,133 acres	1,116 acres	832 acres
Harvest System			
Tractor	751 acres	731 acres	517 acres
Cable	76 acres	76 acres	22 acres
Small Tractor	250 acres	253 acres	253 acres
No system	56 acres	56 acres	40 acres
Total Harvest	1,133 acres	1,116 acres	832 acres
New Temporary Road Construction	5.2 miles	5.0 miles	3.0 miles
Restoration			
Livestock Exclosure on Beaver Dam and Parsnip creeks	2 miles	2 miles	2 miles
Culvert Replacement and Livestock Exclosure on Camp Creek	2 culverts	2 culverts	2 culverts
Riparian Tree Planting	30 acres	30 acres	30 acres
Spring Protection and Water Development	6 springs	6 springs	6 springs
Grazing Study Fence Removal	2.5 miles	2.5 miles	2.5 miles
Stream Channel Aggrading	200 feet	200 feet	200 feet
Wetland Protection	1 site: 1,000 feet of fence	1 site: 1,000 feet of fence	1 site: 1,000 feet of fence
Pump Chance Renovation	1 site	1 site	1 site
Roads			
Improve	3.5 miles	3.5 miles	3.2 miles
Full Decommission	2.2 miles	2.2 miles	1.5 miles
Partial Decommission	6.0 miles	6.0 miles	4.0 miles
Relocate	0.5 miles	0.5 miles	0.5 miles

Table 2-2. Comparison of Effects on the Issues from All Alternatives

Issue 1: Fisher				
Past Actions	• Historical timber harvest, ongoing and proposed timber harvest, trapping, and reintroductions affect fisher • Past timber harvest actions on BLM and private forest lands have reduced the amount of late-successional forest habitat and fragmented the forest, both at the stand and landscape level • Roads have been built to access timber sale units throughout the 5th field watershed			
Present Actions	• Most private forestlands intensively managed with final harvest on commercial economic rotations averaging 60 years • Titanic Timber Sale ongoing in 2005 on lands adjacent to the Camp Cur project			
Current Conditions	• High stand densities in some areas make the stands less desirable for species that need open understory and large overstory trees • Late-successional habitat is fragmented by natural openings and meadows, private lands and past harvest on BLM-administered lands • 72 acres regeneration and 105 acres selection harvest in Titanic TS would no longer provide constituent elements for fishers			
Future Actions	• Timber harvest would continue to occur in late-successional forest in nonreserved matrix lands • No planned future harvest identified			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No change in habitat on BLM lands	• Loss of large wood through logging would reduce future fisher habitat • 108 acres of disturbance and canopy reduction, no longer fisher habitat • 39 acres of unmanaged forest removed	• Loss of large wood through logging would reduce future fisher habitat • 42 acres of disturbance and canopy reduction, no longer fisher habitat • 39 acres of unmanaged forest removed	• Loss of large wood through logging would reduce future fisher habitat • 143 acres of disturbance and canopy reduction, no longer fisher habitat • No unmanaged forest acres removed
Cumulative Effects	• Private lands continue to be harvested • Regeneration harvest in Titanic TS will increase fragmentation on Federal lands	• Private lands continue to be harvested • Increased disturbance from proposed activities • 180 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat	• Private lands continue to be harvested. • Increased disturbance from proposed activities • 114 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat	• Private lands continue to be harvested • Increased disturbance from proposed activities • 86 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat
Issue 2: Forest Condition				
Past Actions	• Management activities on public and private lands create a mosaic of stand ages • Fire exclusion has altered stand structure. Tree density levels have increased and growth rates have declined • Older slow growing stands replaced by fast growing conifer plantations • Minimal or no protection riparian buffers. Riparian areas treated the same as upland sites • Mature and old growth stands replaced by early seral stands			

Table 2-2. Comparison of Effects on the Issues from All Alternatives

Present Actions	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack. • Regeneration harvests change late-successional stands to early seral conditions			
Current Conditions	• Landscape dominated by younger seral stages • High stand densities and competition for site resources • High growth rate per tree in conifer plantations • Mature and old growth stands have growth and yield rates that have culminated • Old growth (intact and modified) stands occupy less than 5 percent of landscape • Tree vigor and growth rates stagnant or declining			
Future Actions	• Private forest lands intensively managed at short rotations of about 60 years • Silvicultural treatments applied to young and mid-seral stands to accelerate late-successional forest conditions • BLM-administered lands follow management guidelines from the ROD/RMP – Regeneration harvest in stands >100 years and density management in stands <100 years • At the 6th field watershed scale, regeneration harvests would reduce stand structural components, lower biological diversity, and increase habitat fragmentation.			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• Current pattern of seral stages on BLM-administered lands remain the same • Stand densities remain high and continue to increase • Intense competition for site resources results in a decline in tree vigor and limited conifer growth potential. • Growth rates in mature and old growth stands remain stagnant or decline with tree mortality expected to increase • Laminated root rot infected stands not treated. Mortality and windthrow of infected trees increases	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands. • Loss of late-successional habitat and increased fragmentation • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections would be implemented • Stands affected by laminated root rot treated to slow pathogen spread	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections not met • Less fragmentation and higher connectivity between stands • Stands affected by laminated root rot treated to slow pathogen spread	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections not met • Laminated root rot infected stands not treated. Mortality and windthrow of infected trees increases. • Less fragmentation and higher connectivity between stands

Table 2-2. Comparison of Effects on the Issues from All Alternatives

Cumulative Effects	• Checkerboard ownership pattern continues landscape fragmentation. • High stand densities reduce resiliency to environmental disturbances • The rate of tree mortality, stand growth and vigor, and species composition would remain outside of the range of natural conditions • The trend of forest conditions on BLM-administered lands would continue to deteriorate	• Checkerboard ownership pattern continues landscape fragmentation. • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases	• Checkerboard ownership pattern continues landscape fragmentation. • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases	• Checkerboard ownership pattern continues landscape fragmentation • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases
Issue 3: Transient Snow Zone (peak flows)				
Past Actions	• Increased openings in TSZ from logging and road building increased the risk to peak flows • Clear-cutting in TSZ on both BLM and private timber lands			
Present Actions	• Increased openings in TSZ at a lesser scale than in the past from logging continues on private • Clear-cutting on private timber lands in TSZ • On BLM lands, more canopy is retained in TSZ • Recovery has taken place from those acres logged in the past • Less risk to enhanced peak flows than in the past			
Current Conditions	• Openings in TSZ increases risk of increased peak flows from rain-on-snow events			
Future Actions	• Continued logging in TSZ on private lands; retain more canopy on BLM lands • Clear-cutting on private timber lands in TSZ • Recovery on lands harvested in the past • Maintain current low risk to peak flow enhancement			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No openings would be created in TSZ	• Harvest 26 acres in North Fork Big Butte Creek to <30% canopy in TSZ, intensity of 0.1% • Low risk to enhance peak flows	• Harvest 26 acres in North Fork Big Butte Creek to <30% canopy in TSZ, intensity of 0.1% • Low risk to enhance peak flows	• All harvest in TSZ results in canopies >30% • No risk to increased peak flows from TSZ openings

Table 2-2. Comparison of Effects on the Issues from All Alternatives				
Cumulative Effects	• Maintain current risk to peak flow enhancement • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time • Increased peak flows would continue to scour banks and add sediment to streams	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type • Small increase in openings in TSZ would result in no detectable increase in peak flows • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type • Small increase in openings in TSZ would result in no detectable increase in peak flows • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time
Issue 4: Visual Resources				
Past Actions	• BLM-administered lands and private forest lands have been managed for the past 50 years. The view along the highway was of varying seral stages. It was not uncommon to see harvesting of trees along the highway • BLM-administered lands designated as VRM Class II in Medford District RMP			
Present Actions	• Most private forestlands would be intensively managed with final harvest on commercial economic rotations averaging 60 years.			
Current Conditions	• Varying levels of seral stages; dense, over-crowded stands to open stands • Stands dying from over-crowding and or disease			
Future Actions	• Private timber lands would be harvested and new roads may be built for access • Recreational use and grazing along Butte Falls/Prospect Highway would continue			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • In areas of high tree density or pine plantations, trees would decline and die • Private forest lands would continue to be managed and the change would be seen	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands

Table 2-2. Comparison of Effects on the Issues from All Alternatives				
Cumulative Effects	• Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands
Issue 5: Late-Successional Connectivity				
Past Actions	• Past timber harvest actions on private and BLM lands have reduced late-successional forest habitat and fragmented the forest, both at the stand and 5th field landscape levels			
Present Actions	• Most private forestlands intensively managed with final harvest on commercial economic rotations averaging 60 years • Titanic TS ongoing in 2005 on lands adjacent to the Camp Cur project			
Current Conditions	• Natural landscape patterns and past harvest have created a fragmented landscape • 72 acres regeneration and 105 acres selection harvest in Titanic TS would reduce connectivity for late-successional species			
Future Actions	• Timber harvest would continue to occur in late-successional forest in nonreserved Federal matrix lands			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No harvest or restoration • No additional openings on BLM lands	• 108 acres new openings from timber harvest would increase fragmentation • 39 acres of unmanaged forest removed, creating new openings	• 424 acres new openings from timber harvest would increase fragmentation • 39 acres of unmanaged forest removed, creating new openings	• 14 acres new openings from timber harvest would increase fragmentation • No unmanaged forest acres removed
Cumulative Effects	• Private lands would continue to be harvested • Regeneration harvest from Titanic TS will increase fragmentation a small amount on Federal lands	• Private lands would continue to be harvested. • Fragmentation increases • 180 acres late-successional habitat removed by shelterwood and SGFMA regeneration harvest	• Private lands would continue to be harvested • Fragmentation increases • 114 acres late-successional habitat removed by shelterwood and SGFMA regeneration harvest	• Private lands would continue to be harvested. • Fragmentation increases • 86 acres late-successional habitat removed by shelterwood, and SGFMA regeneration harvest

Table 2-2. Comparison of Effects on the Issues from All Alternatives

Issue: Road Density				
Past Actions	• High road densities resulting from road building for settlement and logging • Past actions on private and BLM forest lands increased road density • Road construction near streams and in riparian areas on both BLM and private timber lands			
Present Actions	• Increase in road densities on smaller scale than in past from road building mainly for logging access • 3 miles of road decommissioned under Titanic Timber Sale • Roads being improved for Titanic TS allowing access to areas presently inaccessible to motorized vehicles			
Current Conditions	• High road density averaging 5 miles/square mile in project area • High road density adds sediment to streams and increases peak flows • Open roads create more opportunities for poaching and disturbance to wildlife			
Future Actions	• Trend of increase in road density continues from road building on private lands; mostly temporary roads built on BLM lands • Lack of road maintenance on private lands near streams and in riparian areas • Improved road surfaces increase access during the fall in winter, increasing poaching opportunities • Decommissioned roads reduce poaching and disturbance			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No road building or decommissioning would occur • No roads closed •No change to road density from this project	• 2.2 miles road full decommissioning • 0.5 miles road relocation • Build 5.2 miles of temporary road • Decommission 2.2 miles of roads • Decommissioned roads would reduce wildlife disturbance • Net trend is small reduction in road density	• 2.2 miles road full decommissioning •0.5 miles road relocation • Build 5.0 miles of temporary road • Decommission 2.2 miles of roads • Decommissioned roads would reduce wildlife disturbance • Net trend is small reduction in road density	• 1.5 miles road full decommissioning • 0.5 miles road relocation Build 3.0 miles of temporary road • Decommission 1.5 miles of roads • Decommissioned roads would reduce wildlife disturbance • Net trend is small reduction in road density

Table 2-2. Comparison of Effects on the Issues from All Alternatives				
Cumulative Effects	• Maintain current condition of high road density	• Maintain current condition of high road density • Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning • Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands •Fewer open roads would reduce disturbance to wildlife	• Maintain current condition of high road density • Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning • Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands •Fewer open roads would reduce disturbance to wildlife	• Maintain current condition of high road density •Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning • Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands •Fewer open roads would reduce disturbance to wildlife
Issue: Old Growth				
Past Actions	• Past timber harvest actions on private and BLM forest lands have reduced old growth habitat in watershed			
Present Actions	• Old growth habitat on matrix lands would continue to be harvested, reducing habitat for species that use old growth habitat			
Current Conditions	• 111 acres intact old growth in 6th field watershed			
Future Actions	• 15% of the 5th field watersheds would remain late-successional/old growth habitat (RMP/NWFP)			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No timber harvest or restoration projects	• 28 acres modified old growth habitat converted to early seral habitat • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat. • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat. • No intact old growth stands modified
Cumulative Effects	• No old growth entered	• Loss of 1.5% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered
Issue 7: Old Growth				
Past Actions	• Past timber harvest actions on private and BLM forest lands have reduced old growth habitat in watershed			

Table 2-2. Comparison of Effects on the Issues from All Alternatives				
Present Actions	• Old growth habitat on matrix lands would continue to be harvested, reducing habitat for species that use old growth habitat			
Current Conditions	• 111 acres intact old growth in 6th field watershed			
Future Actions	• 15% of the 5th field watersheds would remain late-successional/old growth habitat (RMP/NWFP)			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No timber harvest or restoration projects	• 28 acres modified old growth habitat converted to early seral habitat • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat. • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat. • No intact old growth stands modified
Cumulative Effects	• No old growth entered	• Loss of 1.5% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered
Issue 8: Riparian Condition				
Past Actions	• Logging in riparian areas on both BLM and private timber lands has removed large conifers • Grazing reduced seedling recruitment • Jackass Creek road relocation, precommercial thinning under Fred-N-Jack Timber Sale, and exclosure fences have improved riparian areas			
Present Actions	• Logging on private timber lands in riparian areas; grazing			
Current Conditions	• Lack of shade and large wood has increased stream temperatures and reduced habitat complexity			
Future Actions	• Logging on private timber lands in riparian areas following OFPA rules • Grazing • Beaver Dam Creek mini exclosures			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	•No action	• 56 acres of precommercial thinning in riparian • 30 acres riparian tree planting •Livestock exclosures	• 56 acres of precommercial thinning in riparian • 30 acres riparian tree planting •Livestock exclosures	• 40 acres of precommercial thinning in riparian • 30 acres riparian tree planting •Livestock exclosures

Table 2-2. Comparison of Effects on the Issues from All Alternatives				
Cumulative Effects	• Continued impacts to riparian vegetation on private lands • Riparian Reserves will slowly recover on BLM lands providing shade and large wood, reducing stream temperatures, and creating pool habitat	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands
Issue 9: Soil Compaction and Soil Productivity				
Past Actions	• Compaction increased from road building, grazing, and tractor logging with no designated skid trails • Loss of soil productivity from road building, grazing, and tractor logging with no designated skid trails • 3,000 acres of tractor logging on BLM lands since 1998 • 300 acres of ripping under Rancheria Timber Sale has reduced compaction			
Present Actions	• 436 acres of tractor logging, 3 miles of road fully decommissioned, and 35 acres of skid trail ripping under Titanic Timber Sale • Compaction increased from road building, grazing, and tractor logging with designated skid trails on BLM lands. Reduce some impacts from compaction • Loss of soil productivity from compaction as a result of road building, grazing, and tractor logging with designated skid trails on BLM lands • Tractor logging on private timber lands • Road construction on private lands • Grazing			
Current Conditions	• Soil compaction reduces infiltration, increasing runoff and peak flows • Large areas of compacted acres • Soil productivity reduced due to compaction			
Future Actions	• Continue increase of compaction from tractor logging, road building, and grazing • Continued loss of soil productivity due to compaction from road building, grazing, and tractor logging			

Table 2-2. Comparison of Effects on the Issues from All Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Proposed Actions	• No action • No compaction added or reduced • No loss of soil productivity from tractor logging • No improvement to soil productivity from ripping old skid trails and road decommissioning	• Tractor logging 1,053 acres increases compaction by <12% and reduces soil productivity by <6% • 803 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 2.2 miles of road decommissioning • Livestock exclosures on springs and streams	• Tractor logging 1,036 acres increases compaction by <12% and reduces soil productivity on less than 6% of those acres • 783 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 2.2 miles of road decommissioning • Livestock exclosures on springs and streams	• Tractor logging 770 acres increases compaction by <12% and reduces soil productivity on less than 6% of acres harvested by tractors • 517 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 1.5 miles of road decommissioning • Livestock exclosures on springs and streams
Cumulative Effects	• Continued trend of increased compaction in the subwatersheds • Continued trend of reduction in soil productivity • Compaction impacts would continue on private lands • Some compaction would be reduced from road decommissioning and slow natural recovery on BLM lands • Current peak flow increases would continue to affect stream channels	• Continued trend of increased compaction in the subwatersheds • Continued trend of reduction in soil productivity • Increase of 96 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 13 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures • Compaction impacts would continue on private lands	• Continued trend of increased compaction in the subwatersheds • Continued trend of reduction in soil productivity • Increase of 94 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 5 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures. • Compaction impacts would continue on private lands	• Continued trend of increased compaction in the subwatersheds • Continued trend of reduction in soil productivity • Increase of 62 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 2 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures • Compaction impacts would continue on private lands

3.0 Affected Environment/ Environmental Consequences

3.1 Introduction

Chapter 3 describes the current condition of the environment within the Camp Cur project area. Past activities have contributed to the conditions that currently exist in the project area and are reflected in the descriptions. Guidance issued by the Council of Environmental Quality (CEQ) on June 24, 2005 specifies that "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." The information in this chapter provides the baseline for determining the effects of the proposed alternatives. This chapter is organized by the resources most relevant to the issues identified in Chapter 1.

After each affected environment description, the impacts of proposed timber harvest under each alternative are analyzed under the same resource heading. Only enough detail has been given to determine if any of the alternatives would cause significant impacts to the human environment as defined in 40 CFR 1508.27. Surveys have been completed for cultural resources, threatened and endangered plants and animals, and special status plants.

The Rogue River-Siskiyou National Forest released a Draft Environmental Impact Statement (EIS) for the Big Butte Timber Sales in July 2005. A final decision is anticipated Fall 2005. The Draft EIS proposed projects within the South Fork Big Butte Creek, Fourbit Creek, and Willow Creek 6th field subwatersheds. These 6th field subwatersheds are located within the Big Butte Creek 5th field watershed. The Proposed Alternative would harvest timber on 8,725 acres, construct 8.4 miles of new system toads, decommission 32 miles of existing system toads, and improve 20.7 miles of existing system roads. This US Forest Service proposal is located within the same 5th field watershed as the proposed Camp cur project; however, projects would not be located within the same 6th field watersheds. The scale of analysis for the Camp Cur project was set by the resource specialists. Each resource specialist used the area of influence to determine the scale at which to describe the existing environment and potential impacts of the proposed projects on their particular resource.

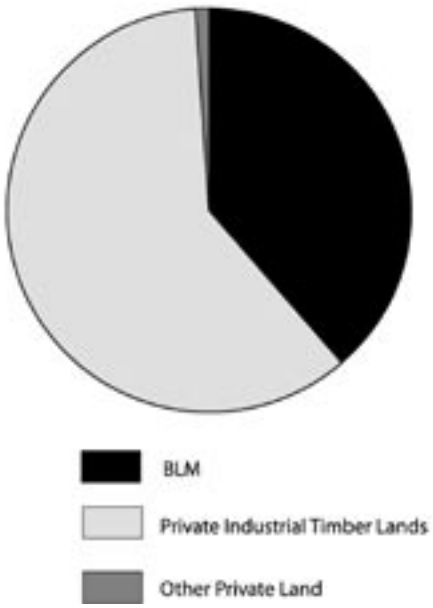
The following critical elements are not known to be present within the proposed project area, or would not be affected by any of the alternatives, and will not be discussed further: Areas of Critical Environmental Concern, Prime or Unique Farmlands, Flood Plains, Native American Religious Concerns, Water Quality, Wetlands, Wild and Scenic Rivers, and Wilderness.

3.2 A Picture of the Watershed containing the Proposed Project

The Camp Cur Environmental Assessment project area covers approximately 12,727 acres located in portions of the Big Butte and South Fork Rogue 5th field watersheds in Jackson County, Oregon. Proposed activities are focused within the North and South Forks Upper Big Butte Creek 6th field watersheds of the Big Butte 5th field watershed and Beaver Dam Creek 6th field watershed of the South Fork Rogue 5th field watershed.

The landscape pattern in the watershed is largely determined by the checkerboard ownership (see Figure 3-1). On industrial timberlands, it is assumed the majority of merchantable overstory trees have been removed, leaving mostly younger Douglas-fir, with lesser amounts of ponderosa pine, incense cedar, and scattered hardwoods. "The nonfederal forests within the range of the northern spotted owl are predominantly forests that have grown back since harvest and are generally even-aged stands. They are typically managed as commercial forests…. harvest generally occurs in a stand's fifth or sixth decade" (USDA and USDI 1994a, 3&4-6). The NWFP states "these forests generally are now in early and mid-successional stages, with many at or approaching ages and sizes that will predictably result in harvest."

Figure 3-1. Land Ownership in the Camp Cur Project Area



The area is located approximately five miles northeast of the town of Butte Falls and southeast of the town of Prospect. The main transportation route is the Butte Falls/ Prospect Highway.

During the mid-1850s, people began to exploit the excellent range lands on the east side of the Cascades in Klamath County for grazing cattle. About the same time, farmers and ranchers began using the high country around Jackson and Josephine counties for raising cattle. Sheep-raising also became important in the late 19th century and the sheep were pastured with cattle in the high mountain meadows of the Cascades. Cattle-raising was very profitable in southern Oregon, with ranchers exporting cattle to Portland and San Francisco for beef and dairy purposes.

In the early 1900s, settlement began in this area. Timber was harvested on private lands and lumber mills were established in the town of Butte Falls to process the timber. The completion of the railroad from Medford to Butte Falls in 1911 provided a means for getting wood to the market. By the 1920s, the mills in Butte Falls had closed and the logs were shipped by railroad to Medford for processing. In the early 1930s, Medford Corporation purchased the private forest lands in this area previously owned by Brownlee-Olds Lumber Company. By the mid 1940s much of the mature timber on Medford Corporation land had been harvested and there was increased demand for harvest on the federal lands. The harvest of private land had resulted in the construction of 70 miles of railroad spurlines into the surrounding area. By the 1950s, improved roads and the increasing use of trucks to haul timber resulted in the removal of many of the spurlines. Logs were hauled to Butte Falls by truck and put on railroad to be shipped to the mill in Medford. By the 1960s, Medford Corporation stopped shipping by rail and

hauled all logs to Medford by truck.

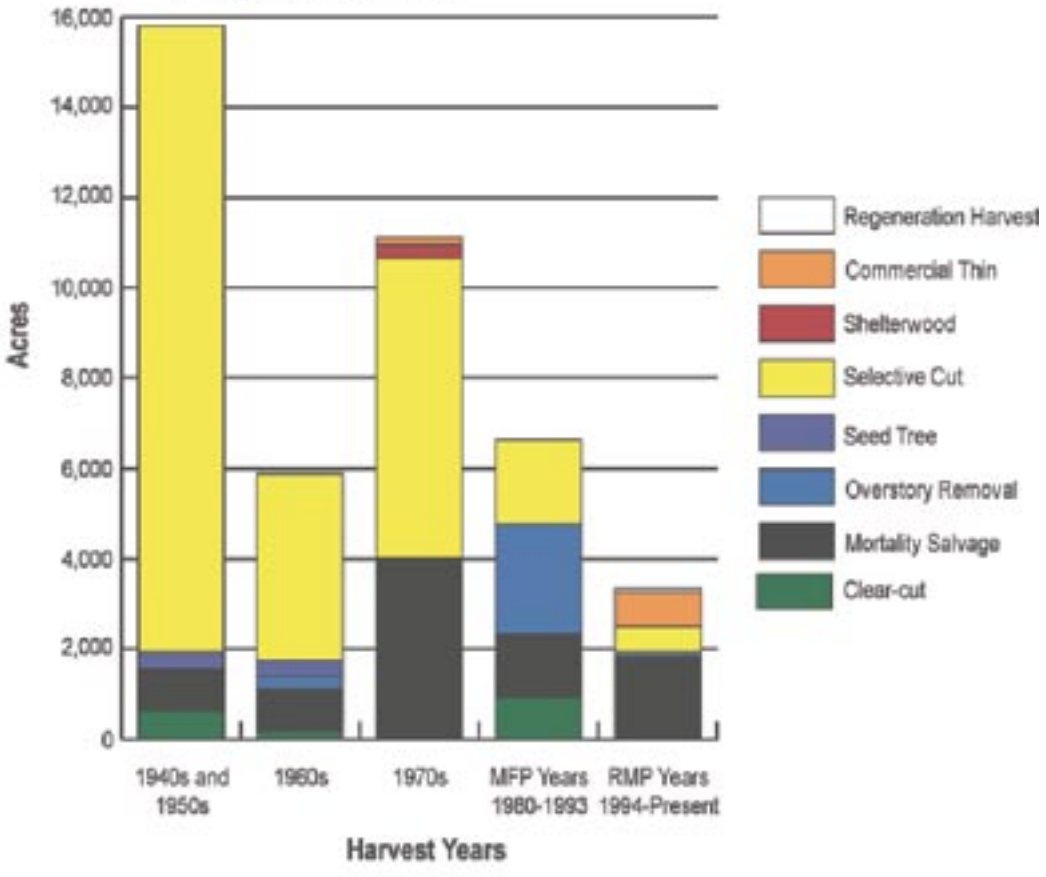
Cattle grazing continued in almost all areas of Jackson County. With the exception of small acreages cleared and seeded for forage south of the Siskiyou mountains, livestock grazing occurred (and still does today) as lands were opened by logging and road building practices. As timber was extracted, livestock moved in to take advantage of newly established grasses and weeds. As those areas became overgrown with brush and trees, cattle moved to other areas more recently opened by logging.

Past harvesting has contributed to the existing condition in the watershed. The current high density and multiple layered stand conditions in many of the proposed harvest units are the result, in part, of fire exclusion and past harvest practices. Past harvest methods have influenced locations and conditions of the roads within the watersheds. These past actions have contributed to the affected environments described in detail later in this section.

The following is a general description of past harvest activities and trends on BLM-administered land within the North Fork Big Butte and Beaver Dam Creek 6th field watersheds. Most activities proposed in this EA are included in these two watersheds; however, a few acres are being considered outside these watersheds in the South Fork Upper Big Butte Creek watershed.

Over the past 60 years, harvest has occurred on approximately 97 percent of the BLM forested land within these watersheds. Harvest practices ranged from mortality salvage, or selective cutting of individual trees, to regeneration harvest, including clearcut harvest (see Figure 3-2).

Figure 3-2. Historical Harvest on BLM Lands in Camp Cur Project Area



1940s and 1950s

During the late 1940s and through the 1950s, harvesting on approximately 16,200 acres occurred on BLM land. Many of these acres had multiple entries and the actual acres where harvesting occurred was approximately 10,000 acres. The predominant harvest treatment was selection cutting with approximately 13,800 acres being treated, including multiple entries in some units. Selection harvest typically focused on the larger, high-valued Douglas-fir and sugar and ponderosa pine trees. These harvest methods created openings in the forest stand and allowed natural regeneration to occur. Most harvesting was completed using tractor yarding and many pioneer roads were built to access these acres. Tractor yarding and road building may have occurred under all weather and soil moisture conditions and likely resulted in soil compaction across these acres.

Other harvest treatments included mortality salvage on approximately 1,300 acres and 630 acres of clear cutting. It is likely mortality salvage harvest reduced the levels of snags and down woody debris on these acres because the dead and dying trees with commercial value were removed. All trees were removed from the clear cut harvest units. Many of these areas were followed up with seeding in the early 1960s. Some of these clear cuts either did not get seeded or the seeding was unsuccessful. These sites were mechanically scarified and ripped in the early 1980s. These areas are now stocked with young trees and most areas have had precommercial thinning treatment in the past 15 years.

1960s

In the 1960s, harvesting occurred on approximately 6,000 acres in these 6th field watersheds with multiple entries occurring on approximately 1,000 of these acres. Selection cutting and mortality salvage were the primary harvest treatments with lesser amounts of seed tree and overstory removal treatments. A total of 180 acres in the watershed were clear-cut. Clear-cut areas were planted with ponderosa pine following harvest. The pines were planted to provide shelter for the natural seeding of other mixed conifer species, such as Douglas-fir and incense cedar, in these areas prone to frost. In many of these plantations, these mixed species trees are now well established and above the frost layer where they are free to grow.

1970s

In the 1970s, selection harvest and mortality salvage again were the primary harvest treatments. Approximately 10,500 of the 11,100 harvest acres were either selection cut or mortality salvage treatments. Multiple entries into areas were typical in the 1970s and approximately 4,000 acres had more than one harvest entry during this decade. Road building continued to provide access into previously unentered stands and onto private industrial lands. During the 1970s, cable yarding use increased to some extent but because of the gentler slopes in these watersheds, tractor logging remained the primary harvest method.

1980s

In 1980, the BLM began implementing the Medford District's Management Framework Plan (MFP). Emphasis in the MFP was to maximize timber production on high intensity management lands throughout the Medford District. Direction in the MFP was to convert existing old growth stands to rapid-growing second growth. Recommended harvest practices included clear-cut, overstory removal, 2-stage shelterwood, and single tree selection harvest. Intensive management practices to maximize growth and yield from these lands included reforestation of the harvested lands, spraying to control competing vegetation, precommercial and commercial thinning, and fertilization. The MFP implemented a 100′ no-harvest buffer on each side of Class 1 and 2 streams. Tractor harvesting was limited to slopes less than 35 percent. Logging units were designed for more sophisticated cable yarding machines which were capable of reaching farther out into units. This reduced the need for road construction to harvest these units.

The Medford District BLM operated under the MFP from 1980 through 1993. During this time, approximately 6,600 acres were harvested using overstory removal, selective cutting, mortality salvage, and clear-cutting. Approximately 2,400 acres of overstory removal was completed in these watersheds. These treatments were used in stands where past selective cut or mortality salvage had created openings. Natural seeding had allowed the establishment of a young stand of trees in the understory. Overstory removal harvested the remaining larger, older overstory trees, leaving the understory intact and free to grow. Openings in the stands that contained low numbers of trees were planted.

Approximately 3,200 acres were either selectively cut or mortality salvage harvested during these years. Clear-cutting increased and approximately 930 acres were clear-cut during this time. These acres were all subsequently planted and precommercial thinning has since occurred in most of these plantations.

1990s to Present

In April 1994, the Record of Decision for the NWFP was signed. The NWFP amended the Medford District ROD/RMP, which was completed in June 1995. The ROD/RMP and NWFP set up a reserve system to protect habitat for the Northern Spotted Owl and other old growth dependent species. The reserve system included designation of Riparian Reserves, 100-acre owl cores, and Late-Successional Reserves throughout the range of the spotted owl. Forest areas outside these reserves and not set aside for other resource values were designated as matrix lands and are currently available for timber management.

Under the ROD/RMP and NWFP, direction for timber management includes regeneration harvest, commercial thinning, density management, and selection harvest. Timber harvest in these watersheds since implementation of the ROD/RMP has included harvest of approximately 3,300 acres; 1,800 acres were mortality salvage harvest. The mortality salvage was completed after a 1996 windstorm which caused widespread windthrown trees throughout the area. Commercial thinning has occurred on approximately 750 acres and selection harvest has occurred on 570 acres. These harvest activities took place on Matrix lands and implemented Riparian Reserve buffers, green tree retention (larger remnant trees) in regeneration harvest units, and coarse woody debris retention, as directed by the ROD/RMP.

Due to the classification of lands administered by the BLM and US Forest Service, the areas in and around Butte Falls are used primarily for timber production and recreation. Livestock stocking rates (cows per acre) in this area are relatively low (50-70 acres per cow as compared to 8-10 acres per cow in good quality open range country), and are not expected to change in the near future. Presently, 3 livestock operators graze 380 cattle from June 1 to September 30 on 26,758 acres of forested lands in and around the Camp Cur project area.

The Medford District ROD/RMP classified lands visible along the Butte Falls/Prospect Highway as VRM Class II. The remainder of the project area falls under VRM Class III (USDI 1995a, 70).

The Titanic Timber Sale was analyzed and sold in 1998. The timber sale occurs on Matrix lands within the same project area as the proposed Camp Cur project. Titanic was enjoined in 1999 following litigation that invalidated the Biological Opinion for fish. Consultation with NOAA Fisheries was re-initiated and a new Letter of Concurrence was received March 2005. Titanic Timber Sale is currently tractor logging 436 acres, ripping skid trails totaling approximately 35 acres, and full decommissioning 3 miles of roads.

3.3 Land Use Allocations

3.3.1 Matrix

Matrix lands were designated by the ROD/RMP and NWFP. The objectives for Matrix lands are to "produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability; provide connectivity between late-successional reserves; 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; and provide early-successional habitat" (USDI 1995a, 38).

3.3.2 Known Northern Spotted Owl Activity Centers

Known northern spotted owl activity centers are one of the five components of the late-successional reserve system that was developed for the NWFP. This allocation is comprised of "100 acres of the best northern spotted owl habitat as close as possible to a nest site or owl activity center" that was known as of January 1, 1994 (USDI 1995a, 32).

3.3.3 Riparian Reserves

Riparian Reserves, designated under the Medford District ROD/RMP and the NWFP, overlay other land use allocations and are dispersed throughout the project area. Riparian Reserves are managed to provide benefits to riparian-associated species, enhance habitat conservation for organisms dependent on the transition zone between upslope and riparian areas, improve travel and dispersal for many terrestrial animals and plants, and provide for habitat connectivity within the watershed. They also serve as corridors to connect late-successional reserves (USDI 1995a, 26).

3.3.4 Deferred Watersheds

The Vine Maple 7th field drainage was designated as a "deferred watershed" in the ROD/RMP because of high cumulative effects (USDI 1995a, 43). This drainage was deferred from timber harvest and other management activities for a period of 10 years starting in January 1993 at which time the deferral could be reevaluated. It is anticipated it will be reevaluated during the next RMP planning cycle. Management activities of a limited nature could be permitted if the effects will not increase the cumulative effects (see Section 3.4 - Hydrology).

3.3.5 Transient Snow Zone

The Transient Snow Zone (TSZ) is an elevation band from 3,500 to 5,000 feet where snow accumulates and is susceptible to rain-on-snow events. Historic extreme high flows have been produced by rain-on-snow events where warm rains have melted the snow pack, producing large amounts of runoff. Approximately 10,122 acres or 50 percent of the Beaver Dam Creek subwatershed is within the TSZ. Approximately 5,476 acres or 25 percent of the North Fork Big Butte Creek 6th field watershed is within the TSZ (see Section 3.4 - Hydrology).

3.4 Forest Condition

3.4.1 Methodology

The forest condition information was compiled from a variety of sources. The Medford District Proposed Resource Management Plan/Environmental Impact Statement (PRMP/EIS) provided general vegetation information and management guidance for the Medford District planning area. Research publications provided baseline information specific to forest vegetation and the impacts of managing or not managing forest stands. Geographic information system (GIS) data described the kind, amount, and distribution of forest vegetation on BLM-administered lands across the watersheds in which the projects are located. Aerial photos from the past 40 years were used to assess changes and determine present forest conditions (structure, canopy cover, size classes) on all land ownerships within the project area. Field visits (stand exams) provided stand-specific data related to tree density, structure, composition, and general stand health.

3.4.2 Assumptions

Timber management activities would occur on BLM-administered lands allocated to planned, sustainable harvest. The type, quantity, and impacts of timber management activities have been analyzed in the Medford PRMP/EIS for both the short- (10 years) and long-term (decades). Local climate patterns of historic record and related conditions for plant growth would continue. Most private forestlands would be intensively managed with final harvest on commercial economic rotations averaging 60 years (USDI 1994, 4-5).

3.4.3 Affected Environment

3.4.3.1 Introduction

High growing season temperatures, frequent frosts, and high evaporative demands affect the establishment, growth, and productivity of forests within the project area. The forest plant communities are at the warm/dry end of the environmental gradient, with moisture limitations late in the growing season limiting biomass production. Frost potential is a problem that affects the establishment and growth of Douglas-fir and white fir. Cold air often accumulates (puddles) in low-lying areas with slopes less than 15 percent. Late frosts caused by excessive loss of heat through nighttime reradiation are a common occurrence in some areas. The degree of vegetative frost damage is influenced by terrain, soil moisture content, and the amount and kind of ground cover present.

3.4.3.2 Plant Series

The white fir plant series is the most common forest plant classification in the project area (USDA 1995b, 24). Douglas-fir is the dominant overstory tree, with lesser amounts of white fir, incense-cedar, ponderosa pine and sugar pine. Understory species include Douglas-fir, white fir, and incense cedar. Hardwoods include minor amounts of California black oak, madrone in areas of relatively recent fires, and golden chinquapin on shallow rocky soils. Shrub competition is moderate following site disturbance once the overstory is opened up. Vegetative management would be required to ensure successful establishment and growth of conifer regeneration. Shrub species present in varying amounts are ceanothus species, oceanspray, vine maple, hazel, serviceberry, and Oregon grape.

3.4.3.3 Landscape Pattern

The current pattern of vegetation, both structurally and successionally, is considerably different than historic conditions. A simplification of forest structure and pattern has reduced biological diversity, connectivity, and landscape function. The "checkerboard ownership" pattern has lead to a distinctive pattern and distribution of forest conditions, with younger forests on private lands and a combination of younger and older forests on federally administered lands. Landscape patterns (structure, amount, and spatial arrangement of vegetation) influence hydrology, movement and dispersal of organisms, microclimate, and the behavior of disturbances.

Logging in the watersheds began in the 1920s. At that time, approximately 80 percent of the forest stands were classified as large conifer stands. The remaining 20 percent were classified as recent burn areas. Logging over the past 80 years has changed this ratio and transformed a landscape characterized by large contiguous stands of late-successional forests into a landscape with a patchy mosaic of young and late-successional stands.

As a general indicator of the current landscape structure and pattern within the project area, Table 3-1 shows the estimated amount of forest stand age classes within the North Fork Big Butte Creek and Beaver Dam Creek sixth field watersheds. Most stands (32 out of 37) targeted for treatments occur in the North Fork Big Butte Creek Watershed.

Table 3-1. Stand Age Classes and Seral Stages for North Fork Big Butte Creek and Beaver Dam Creek Watersheds

Stand Age Class	Seral Stage	North Fork Big Butte Creek		Beaver Dam Creek	
		*Acres	Percent of Total	*Acres	Percent of Total
0-10	Early	2,579	12	1,176	5
11-40	Mid-	4,432	20	3,810	19
41-80	Late	6,925	31	11,178	55
81-200	Mature	6,877	31	3,588	18
201+	Old Growth	1,241	6	558	3

*NOTE: Age class acres are based upon GIS data for BLM-administered lands. Coarse estimates were made from aerial photos for all other lands.

The spatial arrangement of these age classes is further controlled by the checkerboard ownership pattern. In the North Fork Big Butte Creek 6th field watershed, 41 percent (8,967 acres) of the watershed is administered by the BLM, 8 percent (1,770 acres) is administered by the US Forest Service, and the remaining 51 percent (11,317 acres) is owned by private timber companies. In the Beaver Dam Creek 6th field watershed, 26 percent (5,223 acres) of the watershed is administered by the BLM, 18 percent (3,750 acres) is administered by the US Forest Service, and the remaining 56 percent (11,337 acres) is owned by private timber companies. Private forest lands are generally dominated by stands 80 years old and less, whereas BLM and US Forest Service administered lands contain the entire range of age classes.

3.4.3.4 Stand Density

In the forest stands proposed for treatment, the average relative density is 81 percent (see Appendix A, Silviculture Prescriptions and Marking Guidelines).

Relative density is a measure of crowding in a stand of trees. It compares the number of trees present to the number of trees the site has resources to support.

Forest stands with relative densities above 65 percent have reduced tree vigor; mortality of suppressed trees; and a higher susceptibility to insects, disease, and severe fire behavior (Perry 1994; Hann and Wang 1990; Curtis 1982). These conditions reduce stand

resiliency and resistance to environmental stresses.

With the loss of the natural thinning effects of wildfire, overstocked stagnant forest stands have developed and have reduced the supply and increased the demand for essential site resources. Overstocked stands have more trees than the site has moisture, nutrients, and growing space to sustain. Without adequate resources, tree growth and vigor declines, increasing the probability of tree mortality from insects or disease.

3.4.3.5 Conifer Growth and Yield

For most sites in southwest Oregon, 100 years (culmination of mean annual increment) is the age at which the average yearly growth in volume of a forest stand has peaked (USDI 1994). To provide a sustained harvest level and to maximize volume growth and yield, regeneration harvesting on matrix lands within the southern GFMA is planned at 100 years (USDI 1994). Regeneration harvests would replace slow-growing trees with young, fast-growing conifers to provide the optimum rate of growth and maximize volume production.

3.4.3.6 Riparian Reserves

Forest conditions within Riparian Reserves are similar to the density levels, structure, species, and diameter classes found in the upland areas adjacent to the reserves. Moisture availability and microclimate humidity are generally higher in riparian areas immediately adjacent to the stream channel but decrease with distance and slope away from the channel. Canopy closure within the Riparian Reserves approaches 100 percent, with high levels of shade except for an occasional small opening or recent gap created by snags or windthrown trees. The number of canopy layers is typically two or three with an upper layer of scattered mature overstory conifers; a middle layer of hardwood or conifer species; and a lower layer of hardwoods, shrubs, and suppressed conifers. As in the upland areas, high stand densities result in increased inter-tree competition for limited site resources; reduced tree vigor; and slower growth rates in the dominant, codominant, and intermediate conifer size classes.

3.4.3.7 Old Growth Forest Stands

The structural complexity of these forests provides a diversity of habitats for a variety of late-successional organisms and old growth dependent species. Old growth forest stands on BLM-administered lands are defined as at least 200 years old. Characteristics of intact old growth stands include high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground (USDI 1995a). Intact old growth forests perform several important ecological functions, such as buffering of microclimate during seasonal climatic extremes, producing food for consumer organisms that occupy late-successional forests, storing carbon, nutrient and hydrological cycling, and providing sources of arthropod predators and organisms beneficial to other ecosystems or successional stages (FEMAT 1993).

In the North Fork Big Butte Creek 6th field watershed, 1,241 acres of federally managed lands are classified as forest stands older than 200 years. Of that amount, 1,130 acres have been modified by logging. Previous harvest entries removed larger individual trees and left stands that retain some but not all of the structural components of an intact stand. The remaining 111 acres have not been logged in and are considered intact old growth stands. In the Beaver Dam Creek 6th field watershed, 558 acres of federally managed lands are classified as forest stands older than 200 years. All of these stands have been modified by varying levels of logging over the past 40 to 80 years.

3.4.4 Environmental Consequences

Table 3-2. Comparison of Effects on Forest Condition from All Alternatives	
Issue: Forest Condition	
Past Actions	• Management activities on public and private lands create a mosaic of stand ages • Fire exclusion has altered stand structure. Tree density levels have increased and growth rates have declined • Older slow growing stands replaced by fast growing conifer plantations • Minimal or no protection riparian buffers. Riparian areas treated the same as upland sites • Mature and old growth stands replaced by early seral stands
Present Actions	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change late-successional stands to early seral conditions
Current Conditions	• Landscape dominated by younger seral stages • High stand densities and competition for site resources • High growth rate per tree in conifer plantations • Mature and old growth stands have growth and yield rates that have culminated • Old growth (intact and modified) stands occupy less than 5 percent of landscape • Tree vigor and growth rates stagnant or declining
Future Actions	• Private forest lands intensively managed at short rotations of about 60 years • Silvicultural treatments applied to young and mid-seral stands to accelerate late-successional forest conditions • BLM-administered lands follow management guidelines from the ROD/RMP – Regeneration harvest in stands >100 years and density management in stands <100 years • At the 6th field watershed scale, regeneration harvests would reduce stand structural components, lower biological diversity, and increase habitat fragmentation

Table 3-2. Comparison of Effects on Forest Condition from All Alternatives

Issue: Forest Condition

Proposed Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	• Current pattern of seral stages on BLM-administered lands remain the same • Stand densities remain high and continue to increase • Intense competition for site resources results in a decline in tree vigor and limited conifer growth potential • Growth rates in mature and old growth stands remain stagnant or decline with tree mortality expected to increase • Laminated root rot infected stands not treated. Mortality and windthrow of infected trees increases	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands • Loss of late-successional habitat and increased fragmentation • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections would be implemented • Stands affected by laminated root rot treated to slow pathogen spread	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections not met • Less fragmentation and higher connectivity between stands • Stands affected by laminated root rot treated to slow pathogen spread	• Density reduction treatments increase tree vigor and growth and reduce tree susceptibility to insect and disease attack • Regeneration harvests change mature and old growth stands to early seral stands • Growth rates of planted conifers high due to low inter-tree competition and high crown ratios • ROD/RMP timber management assumptions and forest condition projections not met • Laminated root rot infected stands not treated. Mortality and windthrow of infected trees increases • Less fragmentation and higher connectivity between stands

Table 3-2. Comparison of Effects on Forest Condition from All Alternatives				
Issue: Forest Condition				
Cumulative Effects	• Checkerboard ownership pattern continues landscape fragmentation • High stand densities reduce resiliency to environmental disturbances • The rate of tree mortality, stand growth and vigor, and species composition would remain outside of the range of natural conditions • The trend of forest conditions on BLM-administered lands would continue to deteriorate	• Checkerboard ownership pattern continues landscape fragmentation. • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases	• Checkerboard ownership pattern continues landscape fragmentation • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases	• Checkerboard ownership pattern continues landscape fragmentation • Density reduction treatments lower stand densities and increase stand resiliency to environmental disturbances • An increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years • Long-term (100 years) on BLM-administered lands, the ratio of older forest to younger forests increases

3.4.4.1 Effects of Alternative 1 (No Action) on Forest Condition

Direct and Indirect Effects

In Alternative 1, stand densities would remain high and continue to increase. Intense competition for limited site resources would result in a decline in tree vigor and limited conifer growth potential. Growth rates would remain stagnant or decline with tree mortality expected to increase. Declining tree vigor and growth reduces a tree's ability to resist a variety of damaging agents (Franklin, et al. 1987). A higher risk of insects, diseases, and wildfire due to high stand densities and fuel load would be expected (ODF 1990; Powell 1999; Filip 1998). In the absence of disturbance events, such as wildfire or density management, the number of trees per acre would remain at levels above the carrying capacity of the site (Oliver, et al. 1996). Stand canopy closure would remain at 90 to 100 percent.

Stand resiliency to disturbance events, including drought, insects, wildfire and climate change, would remain low. Continued high stand densities, high surface and ladder fuels, and low tree vigor would tend to magnify rather than buffer the effects of disturbance events (Perry 1995). In the event of a wildfire, greater detrimental effects to soils, wildlife habitat, forest structure, and watershed processes would potentially occur, resulting in a longer restoration and landscape recovery period (Brown 2000; USDA and USDI 2000).

Mortality rates of large sugar and ponderosa pines would remain at levels higher than historic rates. Fire exclusion has reduced the extent and frequency of wildfires that naturally thinned the understory. Without density control, competition for limited site resources between dense understories and large overstory pines would increase. This competition would lead to reduced tree vigor and an increased susceptibility of large sugar and ponderosa pines to beetle infestation. Mortality of large pine species would result in the loss of a valuable genetic and structural legacy. Of particular importance

are large healthy ponderosa pine that is tolerant of wildfire and drought (Agee 1993; Habeck 1992). Deep root systems allow these species to access soil moisture deeper in the ground (Wenger 1984; Burns and Honkala 1990). This ability to get to deeper water sources, increases drought tolerance and may also increase the probability of pine species persisting in the event of potential climate change.

Several stands in T34S, R3E, Sections 12 and 13 contain Douglas-fir and white fir infected with laminated root rot (*Phellinus weirii*). Trees infected with laminated root rot have reduced growth rates and higher than normal mortality rates. As the fungus spreads and kills more trees, stand openings would occur, with snags and windthrown trees common. Coarse woody debris would accumulate at higher than normal levels. Root to root contact between infected trees and uninfected trees would continue with crown symptoms appearing 5 to 15 years after initial infection. After crown symptoms appear, large trees would live an average of 10 years before tree mortality (Theis and Sturrock 1995).

Cumulative Impacts

Past Actions - Timber harvesting has altered the structure, amount, and spatial arrangement of forest vegetation from larger contiguous stands of late-successional (mature and old growth seral stages) forests to a patchy mosaic of young and late-successional stands. Over the past 80 years, the amount of conifer stands 80 years old and greater has declined from about 70 to 80 percent in the watersheds to approximately 37 percent in the North Fork Big Butte Creek 6th field watershed and 21 percent in the Beaver Dam Creek 6th field watershed (see Table 3-1). The impacts of these past entries include forest fragmentation, simplification of stand structure, and reduced habitat diversity.

Since the implementation of the Medford District ROD/RMP in 1994, 1,966 acres of BLM-administered lands have been logged within the North Fork Big Butte Creek 6th field watershed and 1,375 acres within the Beaver Dam Creek 6th field watershed. Selective cutting and commercial thinning treatments occurred on about 44 percent of the harvested acres. The impact from these treatments was density reduction with the objective of increasing the vigor and growth of late-successional forest stands. Regeneration harvest occurred on 4 percent of the harvested acres. The impact of the regeneration harvests has been a decrease in stand canopy closure (from 80-100 percent to 10-30 percent), reduced stand structure (multi-layered to two-layered), and a change in vegetative composition toward species found in younger stands (white fir to pine species and Douglas-fir). Growth rates and vigor of planted conifers is high with maximum growth per tree. Stand densities are at levels the site has resources to sustain. Structural complexity will develop overtime, with late-successional characteristics expected to develop in approximately 80 years. The remaining 52 percent of the area received mortality salvage and overstory removal treatments.

Present Actions - Currently, there is one active timber sale on BLM-administered lands in the North Fork Big Butte Creek 6th field watershed; approximately 420 acres will be logged. In the Beaver Dam Creek 6th field watershed, approximately 60 acres will be logged. Density reduction (selection harvest and density management) is the primary silvicultural treatment prescribed and will occur on all of the logged acres in the North Fork Big Butte Creek 6th field watershed and on about 80 percent of the logged acres in the Beaver Dam Creek 6th field watershed. Density reduction will increase tree vigor and growth and reduce tree susceptibility to insect and disease attack. In the remaining area, regeneration harvesting will occur. Stands deteriorating due to insects, disease, crown condition, or tree senescence will be harvested under regeneration guidelines to allow for the planting, establishment, and rapid growth of favored tree species.

Future Actions - On private industrial forest lands, logging plans are unknown. In stands with an average of 8″ DBH and greater, commercial logging is expected within the next 5

to 10 years. Silvicultural methods (clear-cutting and overstory removal) that create early seral stands would most likely be used. In stands less than 8″ DBH, little commercial logging is expected in the next 15 to 20 years. Within these stands, brush control and precommercial thinning are the two primary management activities most likely to occur, both of which would reduce stand densities and increase conifer growth. Depending upon whether the precommercial thinning slash is treated, stand susceptibility to wildfire may increase or decrease. The number of acres that would be treated over the next 10 to 15 years is unknown.

No future commercial timber sales are planned by the BLM in the North Fork Big Butte Creek and Beaver Dam Creek 6th field watersheds in the next five years. Noncommercial treatments, such as brushing and precommercial thinning may occur. These treatments would reduce vegetative competition, increase conifer growth, and accelerate stand development toward older, more complex stands. Depending on how much of the precommercial thinning slash is treated, stand susceptibility to wildfire may increase or decrease.

Cumulative Effects - Stand densities would continue to increase and further reduce the vigor and resiliency of forest stands to environmental disturbances. Tree growth and vigor would not be maximized as competition for limited site resources would remain high. The rate of tree mortality, stand growth and vigor, and species composition would remain outside of the range of natural conditions with the trend of forest conditions on BLM-administered lands continuing to deteriorate (USDI 1994, 3-18).

No regeneration harvests would occur. Growth rates in these stands would remain low and tree mortality due to insects, disease, or low tree vigor would be at higher than normal levels (PRMP/EIS 1994). The amount of older stands on BLM-administered lands in the North Fork Big Butte Creek and Beaver Dam Creek 6th field watersheds would remain the same. In the long-term, without logging or wildfire, a gradual increase of late-successional stands in the watershed would occur as stands less than 80 years old continue to age and develop late-successional characteristics. An increase in late-successional stands would enhance the seral stage mixture toward older, more structurally complex and biologically diverse stands. Healthy older stands would be more resistant and resilient to environmental disturbances.

This alternative (no action) would not meet the timber management assumptions and forest condition projections provided for in the Medford District ROD/EIS.

3.4.4.2 Effects Common to All Action Alternatives on Forest Condition

Direct and Indirect Effects

No intact old growth stands would be affected. Intact old growth stands are stands that have never been logged or that have been lightly entered such that the structural and functional features are essentially unchanged, except in relation to habitat island size (USDI 1994). These stands provide a full component of habitat characteristics for later seral stage dependent and associated species, including the presence of nest groves for northern spotted owls.

In the North Fork Big Butte Creek 6th field watershed, three modified old growth stands (200+ years) would be affected by logging. Modified old growth stands are stands that have been altered by previous logging entries and retain some of the structural characteristics (large diameter overstory trees, large snags, large coarse woody debris, and one or more understory layers) typical of old growth forests. Modified old growth stands have less structural complexity, less biodiversity, and less biological integrity than intact old growth stands.

In stands designated for shelterwood regeneration harvests, 12 to 25 trees per acre greater than 20″ DBH would be left, resulting in a canopy closure of 20 to 40 percent. These trees would provide a protective overstory canopy that would reduce the loss of radiant heat and minimize frost damage of conifer seedlings. The retained overstory trees and down logs would also provide for structural and biological legacies (Franklin 1992; Hansen, et al. 1991; Hunter 1995). Herbaceous, shrub, and tree species composition would be shifted towards shade-intolerant and drought-tolerant species. Snags and coarse woody debris would remain to provide habitat for wildlife, invertebrate, microbial, and fungal species, as well as provide important ecological functions such as moisture retention, soil stabilization, and nutrient recycling (Harmon and Hua 1991; Franklin, et al. 1987). Surface fuels created during management activities would be treated to minimize wildfire risk. The species mix and density level of planted trees would trend toward the plant communities and stocking levels historically present. Maximum growth per tree would occur due to low inter-tree competition and high crown ratios. Overstory trees in excess of 6 to 8 green trees per acre may be harvested approximately 15 to 20 years after the initial shelterwood harvest. At that time, the development of the understory would reach a point where frost tolerance requirements have been met and the additional overstory canopy protection is no longer needed. Late-successional characteristics would be expected to redevelop in approximately 80 years.

Stands identified for density management would have smaller and less vigorous trees harvested. The development of larger diameter and taller trees would be accelerated and the characteristics of a mature stand would develop faster (Bennett and Maguire 1995; Duncan 2002; Emmingham and Elwood 2002). Maintaining larger trees with fuller crowns would provide sufficient tree canopies to reduce vegetative competition from brush and hardwoods. Stand vigor and individual tree size would be increased with density levels at full site occupancy.

In the density management stands, the number of trees per acre would be reduced toward levels the site has water and nutrients to sustain. Forest stand susceptibility to insect attack, disease infection, and fire would be expected to be reduced (Oliver, et al. 1996). Depending on tree size, approximately 50 to 100 trees per acre would be left. The healthiest large conifers and hardwoods would be maintained by reducing adjacent competing vegetation, insuring the long-term ecological benefits of large trees are present within the landscape for the foreseeable future. An increase in tree growth would occur once the root systems of the residual trees expand (approximately 5 to 10 years) and are able to utilize the moisture, nutrients, and additional growing space. Tree crowns would increase in size and photosynthetic area, with stand crown closure increasing approximately 10 percent every 5 years (based on Organon growth and yield projections, Hann 2003) until full canopy closure is reached. Carbon uptake, pollen production, and the production of viable seeds would also increase as tree vigor increases (USDOE 1999; Kramer and Kozlowski 1979). Treated stands would result in stands and a landscape that would be vigorous, healthy, and resilient to environmental changes.

Canopy closure in density management stands would be decreased from 80 to 100 percent to approximately 40 to 60 percent. Conifer and hardwood species diversity would be present with drought-tolerant species favored for retention. Additionally, the potential for a high intensity wildfire would be reduced as average tree size increases, total vegetative biomass decreases, and surface fuels are treated (Graham, et al. 1999; Agee 1996; Pollet and Omi 2002).

In selection harvest stands, the number of trees would be reduced towards the carrying capacity of the site (relative density of 35 to 50 percent). Full site occupancy would be maintained with tree vigor and growth increased. Stand structure would be multi-layered, with high stand heterogeneity and a low effect on edge and fragmentation (McComb and Hansen 1992). Canopy closure would be decreased from 80 to 100 percent to approximately 40 to 60 percent.

Plantation thinning would release small (<4″ DBH) understory Douglas-fir by reducing the amount of ponderosa pines in the overstory to approximately 30 trees per acre. Along with the removal of the pines, the Douglas-fir would be thinned. The ponderosa pine was planted to provide canopy cover (frost protection) for the establishment and growth of Douglas-fir. The objective has been met, as currently there are approximately 200 to 800 Douglas-fir trees per acre. Where Douglas-fir is not present in the understory, the pine would be thinned at a variable spacing depending on average tree size. Spacing would range from 11 to 18 feet between trees. The impacts of this treatment would be the reallocation of site resources (water and nutrients) from ponderosa pine to Douglas-fir, the acceleration of tree growth by reducing stand densities, and a shift in species composition away from stands dominated by ponderosa pine toward stands with Douglas-fir as the dominant species and ponderosa pine as a common associate.

Within designated Riparian Reserves, shrubs would be slashed and small trees less than 7” DBH would be thinned. The slash created from these activities would be piled and burned. Stand canopy closure would be reduced by 10 to 20 percent. The reduction of vegetative biomass and small tree densities would provide additional site resources (moisture and nutrients) for residual trees. These changes would increase tree vigor and accelerate the growth and development of larger conifer trees.

Within the proposed timber sale, all treatments would favor large healthy sugar and ponderosa pine by reducing competing trees. This reduction in competition would result in increased tree vigor, decreased mortality, and the conservation of a unique genetic and structural stand component (Latham and Tappeiner 2002).

Roads identified for full decommissioning would have the road bed tilled, mulched, and planted to reestablish conifer species. Removal of the compacted surface would increase site productivity and provide suitable growing conditions for planted conifers and the establishment of native vegetation. Canopy cover would slowly form and blend with adjacent stands. Roads identified for partial decommissioning would not be tilled or planted. Soil compaction would limit the establishment and growth of trees, shrubs, and herbaceous vegetation.

No effects on forest conditions are expected from pump chance renovation or the roadway stability and culvert replacement for fish passage projects.

Cumulative Effects

Density reduction treatments (density management, selection harvest, precommercial thinning, and pine plantation thinning) would reduce competition-related mortality, increase tree vigor and growth, and maintain preferred species. With these changes, the trend of forest conditions in the treated stands would improve and approach the range of natural variation associated with the plant series, leading to more complex stand structures. With an increase in tree vigor, the treated stands would be less susceptible to insects and disease. This treatment, combined with past, present and future density reduction treatments in the watershed, would improve stand and landscape resistance and resiliency to environmental disturbances.

Stands identified for regeneration harvests (shelterwood and SGFMA) are at the biological age where the average annual growth in volume of the stand has culminated. Following regeneration harvest, the growth and vigor of planted trees would be maximized due to low vegetative competition and high crown ratios. The species mix and density levels of planted trees would be within the range of natural conditions for the plant series. At the watershed scale, regeneration harvests would reduce stand structural components, lower biological diversity, and increase habitat fragmentation.

3.4.4.3 Effects of Alternative 2 on Forest Condition

Table 3-3. Silviculture Treatments in Alternative 2 within Matrix and Riparian Reserves

Silviculture Treatment	Matrix Acres	Riparian Reserve Acres
SGFMA Regeneration	28	0
Shelterwood Regeneration	80	0
Selection Harvest	36	0
Density Management	698	0
Riparian Thinning	0	26
Pine Plantation Thinning	235	30
Total treatment acres	**1,077**	**56**

Direct and Indirect Effects

Within the North Fork Big Butte Creek 6th field watershed, shelterwood regeneration harvests would convert approximately 28 acres of modified old growth to early seral stands. No intact old growth stands would be logged. An additional 80 acres of regeneration harvest (shelterwood and SGFMA) would occur in mature seral stands and result in the conversion to early seral conditions. The combined regeneration harvest treatments would equal less than 2 percent of the remaining late-successional (mature and old growth) stands within the watershed. Regeneration harvest would decrease canopy closure and stand structure, and change the vegetative composition towards species found in younger, less complex stands. No regeneration harvest would occur in the Beaver Dam Creek 6th field watershed. See Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition for descriptions of direct and indirect effects of shelterwood regeneration harvest.

Two stands, units 12-5 and 12-6, are located within the TSZ and would be managed under SGFMA guidelines. Within these stands, regeneration harvests would leave 16 to 25 trees per acre greater than 20″ DBH and would result in a canopy closure of 20 to 40 percent. The retained overstory trees and down logs would also provide for structural and biological legacies (Franklin 1992; Hansen, et al. 1991; Hunter 1995). Herbaceous, shrub, and tree species composition would be shifted towards shade-intolerant and drought-tolerant species. Snags and coarse woody debris would remain to provide habitat for wildlife, invertebrate, microbial, and fungal species, as well as important ecological functions, such as moisture retention, soil stabilization, and nutrient recycling (Harmon and Hua 1991; Franklin, et al. 1987). Surface fuels created during management activities would be treated to minimize wildfire risk. The density level of planted trees would trend toward stocking levels historically present. Maximum growth per tree would occur due to low inter-tree competition and high crown ratios. The species mix of planted species would be ponderosa pine, sugar pine and incense cedar, all of which are tolerant or resistant to laminated root rot. Healthy hardwoods (chinquapin and madrone) immune to laminated root rot would also be retained. By reducing the continuity of susceptible root systems, the spread and impact of laminated root rot would be reduced.

Density reduction treatments (density management, understory thinning, selection harvest, and pine plantation thinning) would increase the vigor, growth, and structural development of treated stands.

Stand and landscape resistance and resiliency to environmental disturbances would increase. In the North Fork Big Butte Creek 6th field watershed, 3 percent of the acres within the watershed would receive the following forest management treatments: 36 acres of selection harvest, 626 acres of density management, 64 acres of pine plantation

thinning, and 26 acres of riparian thinning. In the Beaver Dam Creek 6th field watershed, about 1 percent of the watershed would receive the following forest management treatments: 72 acres of density management and 201 acres of plantation thinning. See Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition for descriptions of direct and indirect effects of these treatments.

Cumulative Effects

Density reduction treatments (density management, riparian thinning, selection harvest, and pine plantation thinning) would occur on 726 acres in the North Fork Big Butte Creek 6th field watershed and 273 acres in the Beaver Dam Creek 6th field watershed (see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition).

Regeneration harvest would add to past and present actions by further reducing the amount of forest stands in the watershed 80 years and older. In the North Fork Big Butte Creek 6th field watershed, 108 acres (28 acres of modified old growth and 80 acres of mature stands) would be converted to early seral stands. This equals .005 percent of the total acres within the watershed and less than 2 percent of the remaining late-successional stands within the watershed (see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition for additional information).

At the larger spatial scale of the planning area (Medford District), it is projected that implementation of the PRMP/EIS alternative would result in an increase from present levels of late-successional stands on BLM-administered lands over the next 10, 20, 30, and 100 years (USDI 1994, 4-26). Regeneration acres would be offset by the in-growth of stands into the late-successional classification. In the long-term (100 years), the ratio of older forests to younger forests will increase and more closely approximate the balance of seral stages which is thought to have existed on BLM-administered lands prior to grazing, logging, and fire suppression (USDI 1994, 4-24).

3.4.4.4 Effects of Alternative 3 on Forest Condition

Table 3-4. Silviculture Treatments in Alternative 3 within Matrix and Riparian Reserves

Silviculture Treatment	Matrix Acres	Riparian Reserve Acres
SGFMA Regeneration	28	0
Shelterwood Regeneration	14	0
Selection Harvest	52	0
Density Management	728	0
Riparian Thinning	0	26
Pine Plantation Thinning	238	30
Total treatment acres	**1,060**	**56**

Direct and Indirect Effects

Within the North Fork Big Butte Creek 6th field watershed, shelterwood regeneration harvest would convert 14 acres of modified old growth to early seral stands. No intact old growth stands would be logged. An additional 28 acres of SGFMA regeneration harvest would occur in mature seral stands and result in the conversion to early seral conditions. Combined regeneration harvest equals less than .004 percent of the remaining late-successional (mature and old growth) stands within the watershed. Regeneration harvest would cause a decrease in canopy closure from 80 to 100 percent to 20 to 40 percent, a change in stand structure from multi-layered to two-storied, and a change in vegetative composition towards species found in younger, less complex stands. In the early seral

stand, individual conifer tree growth would be maximized with stand density maintained at levels that the stand has resources (moisture, nutrients, and sunlight) to support. The regeneration harvest acres would be less than the levels prescribed for (based on stand age) and allowed under the Northwest Forest Plan and the Medford District Resource Management Plan. No regeneration harvest would occur in the Beaver Dam Creek 6th field watershed (see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition, for the effects of shelterwood regeneration harvest).

Two stands, units 12-5 and 12-6, are located within the TSZ and would be managed under SGFMA guidelines. Within these stands, regeneration harvest would leave 16 to 25 trees per acre greater than 20″ DBH, resulting in a canopy closure of 20 to 40 percent. The retained overstory trees and down logs would also provide for structural and biological legacies (Franklin 1992; Hansen, et al. 1991; Hunter 1995). Herbaceous, shrub, and tree species composition would be shifted towards shade-intolerant and drought-tolerant species. Snags and coarse woody debris would remain to provide habitat for wildlife, invertebrate, microbial, and fungal species, as well as provide important ecological functions such as moisture retention, soil stabilization, and nutrient recycling (Harmon and Hua 1991; Franklin, et al. 1987). Surface fuels created during management activities would be treated to minimize wildfire risk. The density level of planted trees would trend toward stocking levels historically present. Maximum growth per tree would occur due to low inter-tree competition and high crown ratios. The species mix of planted species would be ponderosa pine, sugar pine, and incense cedar, all of which are tolerant or resistant to laminated root rot. Healthy hardwoods (chinquapin and madrone) immune to laminated root rot would also be retained. By reducing the continuity of susceptible root systems, the spread and impact of laminated root rot would be reduced.

In the North Fork Big Butte Creek 6th field watershed, 4 percent of the watershed would receive the following forest management treatments: 52 acres of selection harvest, 656 acres of density management, 64 acres of plantation thinning, and 26 acres of riparian thinning. In the Beaver Dam Creek 6th field watershed, 1 percent of the watershed would receive the following forest management treatments: 72 acres of density management and 204 acres of plantation thinning. These density reduction treatments would increase the vigor, growth, and structural development in treated stands. Stand and landscape resistance and resiliency to environmental disturbances would increase.

Cumulative Effects

Density reduction treatments (density management, riparian thinning, selection harvest, and pine plantation thinning) would occur on 798 acres in the North Fork Big Butte Creek 6th field watershed and 276 acres in the Beaver Dam Creek 6th field watershed (see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition).

This alternative would add to past and present actions by further reducing the amount of forest stands 80 years and older. In the North Fork Big Butte Creek 6th field watershed, 42 acres (14 acres of modified old growth and 28 acres of mature forest stands) would be converted to early seral stands. This equals .002 percent of the total acres within the watershed. In the Beaver Dam Creek 6th field watershed, no late-successional stands would be converted to early seral condition. For additional cumulative effects information, see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition.

At the larger spatial scale of the planning area, 42 acres of regeneration harvest would not cause a decrease in the total amount of late-successional stands on BLM-administered lands. Regeneration harvest would be offset by the in-growth of stands into the late-successional classification.

Implementation of this alternative would not meet the timber management assumptions and forest condition projections detailed in the Medford District PRMP/EIS. The PRMP/EIS modeled harvest levels and projected future stand ages within the planning area based on the assumption that stands on matrix lands within the northern GFMA that are 100 years or older would be programmed for a regeneration harvest. This alternative does not use stand age as the sole criteria for prescribing regeneration harvests. Stand structure (canopy closure, species diversity, variability of tree size classes), stand density, and tree condition (crown ratio, form, and foliage color) are the principal characteristics used to assess overall stand health. Based on the condition of these attributes and combined with the recommendations from the watershed analyses, the silvicultural systems were determined.

3.4.4.5 Effects of Alternative 4 on Forest Condition

Table 3-5. Silviculture Treatments in Alternative 4 within Matrix and Riparian Reserves

Silviculture Treatment	Matrix Acres	Riparian Reserve Acres
SGFMA Regeneration	0	0
Shelterwood Regeneration	14	0
Selection Harvest	52	0
Density Management	488	0
Riparian Thinning	0	10
Pine Plantation Thinning	238	30
Total treatment acres	**1,060**	**40**

Direct and Indirect Effects

Within the North Fork Big Butte Creek 6th field watershed, shelterwood regeneration harvest would convert 14 acres of modified old growth to early seral stands. No intact old growth stands would be logged. This equals less than .002 percent of the remaining late-successional stands within the watershed. Regeneration harvest would decrease canopy closure and stand structure, and change the vegetative composition towards species found in younger, less complex stands. No regeneration harvest would occur in the Beaver Dam Creek 6th field watershed. See Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition for descriptions of the effects of shelterwood regeneration harvest. The regeneration harvest acres would be less than the levels prescribed for (based on stand age) and allowed under the NWFP and the Medford District ROD/RMP.

In the North Fork Big Butte Creek 6th field watershed, 3 percent of the watershed would receive the following forest management treatments: 52 acres of selection harvest, 457 acres of density management, 64 acres of plantation thinning, and 10 acres of riparian thinning. In the Beaver Dam Creek 6th field watershed, 1 percent of the watershed would receive the following forest management treatments: 31 acres of density management and 204 acres of pine plantation thinning. These density reduction treatments would increase the vigor, growth, and structural development in treated stands. Stand and landscape resistance and resiliency to environmental disturbances would increase.

Refer to Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition, for detailed descriptions of the effects of regeneration harvest, density reduction, selection harvest, and pine plantation treatments.

Cumulative Effects

Density reduction treatments (density management, riparian thinning, selection harvest, and pine plantation thinning) would occur on approximately 583 acres in the Upper North Fork Big Butte Creek watershed and approximately 235 acres in the Beaver Dam Creek 6th field watershed (see Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition).

Regeneration harvest would add to past and present actions by further reducing the amount of forest stands in the watershed that are 80 years and older. In the North Fork Big Butte Creek 6th field watershed, 14 acres would be converted to early seral stands. This is equal to .0006 percent of the total acres within the watershed and less than .002 percent of the remaining late-successional stands within the watershed. See Section 3.4.4.2, Effects Common to All Action Alternatives on Forest Condition, for additional information.

At the larger spatial scale of the planning area, 14 acres of regeneration harvest would not cause a decrease in the total amount of late-successional stands on BLM-administered lands. Regeneration harvest would be offset by the in-growth of stands into the late-successional classification.

Implementation of this alternative would not meet the timber management assumptions and forest condition projections detailed in the Medford District PRMP/EIS. The PRMP/EIS modeled harvest levels and projected future stand ages within the planning area based on the assumption that stands on matrix lands within the northern GFMA that are 100 years or older would be programmed for a regeneration harvest. Furthermore, stands less than 100 years would be programmed for commercial density reduction. This alternative does not use stand age as the only criteria for prescribing management treatments. Soil compaction concerns and stand health were the principal factors in selecting stands and recommending the type of silvicultural treatment. To address soil compaction concerns, forest stands that had never been logged and stands in which the skidtrails had been ripped were removed from consideration. The remaining stands were evaluated for stand structure, stand density, and tree condition. Based on the condition of these attributes, the silvicultural systems were determined.

3.5 Soil

Key points in the project area:

- High amounts of compacted acres due to skid trails and landings
- Lost soil productivity due to compaction

3.5.1 Methodology

The BLM Central Big Butte Watershed Analysis (USDI 1995b) and the Lost Creek Watershed Analysis (USDI 1998) were the primary sources of information for the affected environment. GIS was also used for analyzing the existing conditions of the two 6th field watersheds. GIS was used to identify soils in the project area and the *Soil Survey of Jackson County, Oregon* (USDA 1993) was used to characterize soils in the project area.

The scale used in this analysis is the 6th field subwatershed level and the 7th field drainage level. The 5th field watershed is used to describe general conditions of the watershed. The temporal scale being used is both short-term (1 to 5 years) and long-term (10 to 30 years). Cumulative effects analysis would look at longer time scales when describing the events leading up to the current conditions.

3.5.2 Assumptions

- Designated skid trails spaced at approximately 150′ apart result in compaction of 12 percent or less on a unit-by-unit basis.
- Private lands are primarily tractor logged leading to large areas of compaction.
- Roads built for timber harvest on private are not decommissioned.

3.5.3 Affected Environment

3.5.3.1 Soil Types

The dominant soil types in the project area are the Freezner and Geppert soil series.

The Freezner soil is very deep (60”+) and has formed in colluvium and residuum from andesitic rocks. This soil is well-drained and has a clay loam subsoil. This is typically found on plateau tops and gently sloping sidehills.

The Geppert soil is moderately deep (20 to 40”) and is skeletal (>35 percent rock fragments in the subsoil) with an extremely cobbly clay loam subsoil. This soil has formed in colluvium from adesitic rocks and is typically found on the sideslopes of ridges.

The dominant mapping unit (see *Jackson County Soil Survey* produced by the Soil Conservation Service) in this watershed is the Freezner-Geppert soil complex which is 65 percent Freezner soils and 30 percent Geppert soils with 5 percent inclusions. Inclusions in this unit are small areas of Terrabella soils near drainageways and on concave slopes and soils similar to the Freezner soil but with more than 35 percent rock fragments or bedrock within a depth of 60 inches. These soils are considered to be relatively stable with respect to surface erosion and landslide potential. The soils associated with these lands are sandy loam to loam textures and cobbly to very gravelly. They are shallow to moderately deep, generally acid to moderately acid (pH between 5.0 and 6.5). The productivity of these soils is rated as low to moderate. The high rock content of the soils and high water tables in the area add to the low to moderate productivity. Soils found in the units are listed in Table 3-6.

Table 3-6. Soils found in the Camp Cur Project Area

Soil Type	Number	Slope
Dumont-Coyata gravelly loam	52C	1-12%
Dumont-Coyata gravelly loam	53E, 54E	12-35% N and S slopes
Freezener gravelly loam	62C	1-12%
Freezener gravelly loam	63E, 64E	12-35% N and S slopes
Freezener-Geppert complex	65C	1-12%
Freezener-Geppert complex	67E	12-35% S slopes
Geppert very cobbly loam	69E, 70E	12-35% N and S slopes
Terrabella clay loam	192A	0-3% slopes

Due to the relative flatness in the topography on the BLM lands, a major portion of the project area has been tractor yarded with conventional logging methods (i.e. multiple entries with no well-spaced, designated skid trails). This has resulted in an extensive network of skid trails, roads, and landings. This large amount of compacted ground creates the potential for increases in the magnitude and frequency of high flows in the local streams. These flow increases can destabilize stream channels and accelerate sedimentation rates (USDI 1995b, 6). Beginning in the 1980s, the BLM started using designated skid trails on BLM lands to help minimize compaction.

3.5.3.2 Soil Compaction and Productivity

Due to the large concentration of skid trails, roads, landings, and off-highway vehicle use, soil compaction and the resultant loss of soil productivity is a concern in the watershed. The relationship of compaction to soil productivity is that compaction reduces root growth thereby reducing height and volume of trees (Elliot, et al. 1999). Loss of soil productivity also may result from soil erosion removing topsoil and ultimately reducing soil productivity. Soil erosion can occur when soil is disturbed from activities such as tractor yarding, cable yarding, and road building. The main limitations affecting timber production are erosion, compaction, and plant competition.

Existing Soil Cumulative Impacts

Soil compaction and loss of soil productivity in the North Fork Big Butte and Beaver Dam Creek 6th field subwatersheds is a result of the land use practices in the area since settlers arrived here. Roads built to access lands for homes and forestry are permanent, unnatural features on the landscape and represent a permanent loss to soil productivity. Tractor logging has been extensive in these subwatersheds and will continue to be the main harvest method due to the relative flatness of the area and the cost prohibitive nature of helicopter logging. Ground-based harvest methods would continue to increase compaction in the watersheds as well as reduce soil productivity in the subwatersheds.

3.5.4 Environmental Consequences

Table 3-7. Comparison of Effects on Soil from All Alternatives

Issue: Soil Compaction				
Past Actions	• Compaction increased from road building, grazing, and tractor logging with no designated skid trails			
Present Actions	• Compaction increased from road building, grazing, and tractor logging with designated skid trails on BLM lands. Reduce some impacts from compaction			
Current Conditions	• Large areas of compacted acres • Reduction in infiltration and loss of soil productivity			
Future Actions	• Continue increase of compaction from tractor logging, road building, and grazing			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No compaction added or reduced	• Tractor logging on 1,053 acres increases compaction by <12% of the area logged	• Tractor logging 1,036 acres increases soil compaction by <12% of tractor logged acres	• Tractor logging 770 acres increases soil compaction <12% on tractor logged acres
Cumulative Effects	• Continued trend of increased compaction in the subwatersheds	• Continued trend of increased compaction in the subwatersheds	• Continued trend of increased compaction in the subwatersheds	• Continued trend of increased compaction in the subwatersheds
Issue: Soil Productivity				
Past Actions	• Loss of soil productivity from road building, grazing, and tractor logging with no designated skid trails			
Present Actions	• Loss of soil productivity from compaction as a result of road building, grazing, and tractor logging with designated skid trails on BLM lands			
Current Conditions	• Soil productivity reduced due to compaction			
Future Actions	• Continued loss of soil productivity due to compaction from road building, grazing, and tractor logging			

Table 3-7. Comparison of Effects on Soil from All Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Proposed Actions	• No Action • No loss of soil productivity from tractor logging • No improvement to soil productivity from ripping old skid trails and road decommissioning	• Tractor logging 1,053 acres increases compaction by <12% and reduces soil productivity by <6%	• Tractor logging 1,036 acres reduces soil productivity on less than 6% of those acres	• Tractor logging 770 acres reduces soil productivity on less than 6% of acres harvested by tractors
Cumulative Effects	• Continued trend of reduction in soil productivity	• Continued trend of reduction in soil productivity	• Continued trend of reduction in soil productivity	• Continued trend of reduction in soil productivity

3.5.4.1 Effects of Alternative 1 (No Action) on Soil

Direct and Indirect Effects

Under the No Action Alternative, no timber harvest, culvert replacement, livestock exclosures, riparian planting, or roadwork would occur. No ground disturbance would occur so there would be no direct effects to soils.

Timber harvest would not occur under this alternative. There would be no ground disturbance or direct effects to soil as a result of this alternative. There would be no temporary roads built and therefore no short-term impacts to soils. There would be no additional compaction due to ground based equipment or road building and, therefore, there would be no loss of soil productivity.

There would be no culverts replaced for fish passage under this alternative. Soils would not be disturbed because culverts would not be replaced.

Livestock exclosures would not be installed on approximately two miles of perennial stream and associated riparian corridors. Soils in these riparian corridors would continue to be impacted from cattle, especially along stream banks where soil is being lost through eroding stream banks. There would not be the benefit of protecting soils by reducing erosion and compaction from cattle.

Riparian planting would not occur as a result of this alternative. There would be no ground disturbance as a result of this project. There would be no benefit of riparian vegetation protecting stream banks.

Roads would remain in the current condition and continue to erode. A decrease in funding has caused maintenance levels to drop and roads to become more prone to erosion. Roads that are eroding and exhibiting drainage problems would not be improved under this alternative. Roads would not be decommissioned to help meet ACS objectives by reducing road-related sediment and road density. Erosion levels would be maintained at the current levels with some road erosion becoming worse through time. Benefits to soils, such as reducing the amount of compaction and erosion coming from roads, would not be achieved.

Cumulative Effects

The dominant cumulative effect in this watershed is the extensive compaction found on the relatively flat terrain. The No Action Alternative would not add to or reduce the amount of compaction within the project area. Soil compaction has a negative effect on soil productivity by reducing porosity and affecting root growth. The total growth reduction caused by multiple harvest entries is additive, based on how much of the area

has compacted skid trails (Froehlich and McNabb 1983).
Continuation of current management would maintain the current condition of roads and the current level of road-related erosion.

Roads and skid trails have the greatest impact to soils because of the long lasting effects these disturbances have on soils. Compaction, loss of soil productivity, and erosion are all effects of roads and skid trails found in the project area.

A total of 3,006 acres of timber harvest has occurred on BLM lands since 1995 in the Big Butte Creek 5th field watershed: 2,552 acres using ground-based tractors, 368 acres using cable harvest methods, and 86 acres using helicopter. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest chance of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. Because ground-based logging is the most logical and economical logging method, due to the relatively flat terrain, a large area has been logged using ground-based methods.

Designated skid trails limit the amount of compaction to less than 12 percent within the harvest area (USDI 1995a, 166). Assuming designated skid trails were used on the 2,552 acres harvested using ground-based methods since 1995, a maximum of 306 acres would have been compacted on BLM lands. Compaction on BLM lands would be within the guidelines set in the Medford District ROD/RMP to keep compaction to less than 12 percent on a unit-by-unit basis. Ripping skid trails on final harvest in regeneration harvest units would help reduce compaction and improve soil productivity on BLM lands.

Under the Titanic and Lower Big Butte timber sales, 1,215 acres proposed for treatment, but not yet been completed, exist in the Big Butte Creek 5th field watershed. Approximately 780 acres will be logged using ground-based methods, 10 acres will use cable systems, and 425 will use helicopter. The North Fork Big Butte Creek 6th field watershed, where the Camp Cur project is proposed, contains 429 of those acres: all of these acres are to be tractor logged.

Assuming that designated skid trails compact approximately 12 percent of the harvest area, the Titanic Timber Sale will compact 94 acres in the Big Butte Creek 5th field watershed and 52 acres in the North Fork Big Butte Creek 6th field watershed.

A total of 572 acres of timber harvest has occurred on BLM lands since 1995 in the South Fork Rogue River 5th field watershed: 399 acres using ground-based tractors and 173 acres using cable harvest methods. Helicopter yarding was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest probability of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods.

Assuming that less than 12 percent of the acres treated on BLM lands were compacted based on using designated skid roads, a total harvest area of approximately 400 acres would have been compacted in the Big Butte Creek 5th field watershed. A total of 71 acres in the South Fork Rogue River 5th field watershed would have been compacted.

Private lands are assumed to remain in an early to mid-seral state with the majority of harvest methods being ground-based. There is a large network of skid trails on private lands in the project area with many being used by off-highway vehicles. This large network of skid trails is contributing to high levels of compaction at the watershed scale which reduces soil productivity and, therefore, vegetative growth.

Future BLM projects within the Big Butte Creek 5th field watershed could potentially occur on over 1,200 acres. It is likely over half these acres would not have treatments occurring on them due to Riparian Reserves, other buffers, and stands not meeting criteria

for treatment. Similar ratios of treatments and harvest methods would be expected as those being considered in this analysis.

Under the Titanic Timber Sale, 73 acres of compacted lands had skid trails ripped or subsoiled to reduce the total amount of compaction in the watershed. This activity also improved soil productivity on the acres treated. Under the Rancheria Timber Sale, an additional 235 acres of land compacted by past tractor logging has had skid trails ripped. Although these units would be reentered under this timber sale, the net compaction should be reduced to less than 12 percent through the use of designated skid trails.

It is likely these past projects, along with the previous 50+ years of logging and grazing, have led to the current condition of compacted soils. This condition has reduced infiltration and increased runoff timing and magnitude. Compaction has also produced areas of lost soil productivity which ultimately reduces tree and vegetation growth.

3.5.4.2 Effects on Soil Common to All Action Alternatives

Restoration Projects

Livestock exclosures, fish culvert replacement, pump chance renovation, riparian planting, spring development, road improvement, and road decommissioning projects are essentially the same in all alternatives.

Livestock exclosures would be constructed on Beaver Dam, Parsnip, and Camp creeks. Fencing would occur on approximately two miles of stream channel and riparian corridors. Excluding livestock would provide protection to soil by reducing erosion and compaction in the Riparian Reserves of these creeks.

Two culverts are proposed for replacement to improve fish passage. The removal and replacement of these culverts would likely cause a small amount of erosion at the site level.

One pump chance would be renovated to provide better storage of water. This pump chance would be cleaned and the intake would be improved to allow the pump chance to function properly. No compaction or displacement of soils would result from this project. This project would have a neutral effect on soils.

Riparian planting would occur in previously logged areas in the frost pocket zone along fish-bearing streams. By using of hand crews to complete this project, soil erosion or compaction would be minimized.

Spring development would occur on six springs. The general design is to install a spring box at the source, trench a pipe to a trough, and trench a return flow pipe back to the stream channel. This would involve digging with hand tools in the spring and digging trenches to install the pipe. The spring would be fenced from livestock to protect the soils at the site. The work would be completed during the summer low flow period to reduce the chance of soil erosion as well as to ensure sufficient flow for water supply during low flow periods. Saturated soils around the springs would be protected from trampling by providing cattle and wildlife access to water from a trough located on more stable soils. This would be beneficial to soils in and adjacent to the spring where the likelihood for erosion and compaction is greater than where the troughs would be located.

BLM road #34-3E-14.01 would have 0.5 miles of road located adjacent to North Fork Big Butte Creek relocated outside the Riparian Reserve and into the uplands. The road encroaches on the stream channel for the entire 0.5 miles on BLM land. This road is currently eroding and is a chronic source of sediment due to its location next to North Fork Big Butte Creek.

The proposal would move a portion of BLM road #34-3E-14.01 to a more stable location outside of the Riparian Reserve in the uplands. This relocation would require construction of 0.6 miles of new road and decommissioning of 0.5 miles. There would be additional soil compaction on the newly-constructed road and a loss of soil productivity on the length of the new road. Decommissioning the old road would reduce the erosion and subsequent sedimentation potential on this road. The old road would be ripped to reduce compaction thereby increasing soil productivity and allowing vegetation to reestablish in the Riparian Reserve. This would offset the additional compaction from the new road construction. Overall, this project would be a net benefit because of the reduction in surface erosion adjacent to the stream.

3.5.4.3 Effects of Alternative 2 on Soils

Direct and Indirect Effects

Under Alternative 2, 1,118 acres would be treated throughout the project area: 28 acres SGFMA regeneration harvest, 80 acres shelterwood harvest, 36 acres selection harvest, 698 acres density management, 56 acres riparian thinning, 201 acres pine plantation thinning, and 34 acres special cut. Treatments would be spread across the landscape, minimizing the impacts in any one area. The 2 harvest systems used would include 863 acres of tractor yarding and 24 acres of cable yarding in the North Fork Big Butte 6th field watershed and 248 acres of tractor yarding in the Beaver Dam Creek 6th field watershed.

The types of harvest methods that would be used in the project are tractor, Feller-Buncher, and cable. Generally, tractor and Feller-Buncher cause the most ground disturbance, followed by cable, and helicopter. Ground disturbance from tractor yarding would be minimized by using designated and existing skid trails. Feller-Bunchers would follow PDF designed to minimize disturbance when leaving skid trails in order to access trees. Helicopters would not be used in this timber sale due to the gentle terrain of the project area.

Tractor yarding or yarding with a Feller-Buncher would occur over a total of 1,053 acres in this alternative. By using designated and existing skid trails and following PDFs for the Feller-Buncher, the amount of additional compaction would be limited to 12 percent or less of each unit. This would equal a maximum of 118 acres of compaction.

In the Beaver Dam Creek 6th field watershed, 248 acres would be tractor logged and subject to compaction and in the North Fork Big Butte Creek 6th field watershed, 805 acres would be tractor logged and subject to compaction. These levels of tractor logging would equal 1.3 percent of the Beaver Dam Creek 6th field watershed and 3.6 percent of the North Fork Big Butte Creek 6th field watershed. Assuming 12 percent or less of these units would be compacted, 30 acres would be compacted in the Beaver Dam Creek 6th field watershed and 97 acres would be compacted in the North Fork Big Butte Creek 6th field watershed. This would equal 0.15 percent of the Beaver Dam Creek 6th field watershed and 0.5 percent of the North Fork Big Butte Creek 6th field watershed. This added level of compaction would be insignificant at the 6th field subwatershed scale. Locally, compaction has lasting effects such as decreased soil productivity, decreased infiltration, and increased runoff.

Ripping skid trails in regeneration (SGFMA and shelterwood) harvest units would help to ameliorate compacted conditions further by increasing porosity and infiltration. Skid trails in 108 acres of regeneration harvest units would be ripped to reduce compaction and increase infiltration and soil productivity. The remaining acres are proposed for thinning and skid trails would not be ripped in order to protect the remaining trees located near skid trails from sustaining damage to root systems. These areas would have skid trails ripped upon final harvest. Skid trails in density management units immediately above roads would be mulched for approximately 100 feet to minimize sediment-laden runoff from skid trails reaching ditchlines and potentially flowing into streams.

Cable yarding corridors on steep slopes have the potential for rill and gulley erosion until vegetation is reestablished. If gullies form, soil productivity would be lost. Under Alternative 2, 24 acres of cable yarding would occur. Yarding corridors would be spaced at a maximum of 150 feet, but would likely be closer due to harvest system restraints. The potential for sediment to be transported off-site is low due to slash and remaining vegetation beneath corridors. Heavy machinery would be kept on roads and landings; therefore, additional soil compaction would be negligible.

Tractor yarding causes soil disturbance which can increase erosion rates above natural background rates. Erosion rates from timber harvesting and road construction may increase to 0.05 to 0.25 tons per acre per year (Dissmeyer 2000, 104).

Soil compaction as a result of tractor yarding would reduce long-term soil productivity. The level of impact is dependent on the extent and degree of compaction. These impacts are anticipated to be kept at minimal levels from the implementation of PDFs, such as the ripping of skid trails, seasonal restrictions from wet soil conditions, and utilization of well-spaced, designated skid trails.

Approximately 5.2 miles of temporary road would be constructed in Alternative 2. This a ction would increase compaction and reduce soil productivity in the road prism over the short-term (1 to 5 years). The temporary roads were designed to follow existing skid trails and old spur roads as much as possible which would reduce the effects by using previously disturbed areas. The compaction and loss of soil productivity would be mitigated by ripping the road surface the same year as timber harvest and quickly reestablishing vegetation. Erosion would be limited by decommissioning the roads in the same year as harvest during the dry season. Erosion control methods such as seeding and mulching would further reduce the erosion potential.

In Alternative 2, 3.5 miles (3 percent) of road out of 123 miles in the project area would be improved. Road improvement would include grading, rocking, improving ditchlines, adding cross-drains, and improving culverts. These actions would improve the drainage and condition of roads locally to reduce road-related erosion. Roads that would not be used for the timber sale or located on private lands would not be included in this project.

Road decommissioning would include 2.2 miles of full decommissioning and 0.6 miles of partial decommissioning. This action would reduce road density within the project area from 5 miles per square mile to 4.8 miles per square mile. Fully decommissioning roads would include ripping the roadbed to reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning, cross-drain and stream-crossing culverts would be pulled and roads would be blocked. This action would benefit soils by decreasing compaction, decreasing the amount of open roads and road density, removing the risk of culverts becoming plugged and causing fill-slope failures, and reducing the amount of potential erosion from roads.

Cumulative Effects

The dominant cumulative effect to soils in the project area is the extensive compaction of soils and subsequent reduction in soil productivity.

Temporary road building would not add to the cumulative effects of road-related sediment because the roads would be located on stable ridgetops and flat ground and would only be in place during the dry season. One objective of using temporary roads is to harvest timber while reducing some impacts, especially cumulative impacts. A study completed to evaluate four methods to till compacted forest soils found that even the best soil tillage is unlikely to return a compacted soil to its original condition and productivity (Andrus and Froehlich 1983). Although these roads would be decommissioned, it is likely some compaction would remain and contribute to cumulative watershed effects. Temporary roads built on private lands to access BLM lands would likely remain in

place for future use. These portions remaining on private lands would contribute to the cumulative effects compaction has on the project area.

A total of 3,006 acres of timber harvest has occurred since 1995 on BLM lands in the Big Butte Creek watershed: 2,552 acres with ground-based tractors, 368 acres with cable harvest methods, and 86 acres with helicopter. An additional 1,053 acres would be tractor logged under this alternative with 12 percent or less of those acres being disturbed. This would cumulatively add to the acres compacted in the watershed.

A total of 572 acres of timber harvest has occurred since 1995 on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres with ground-based tractors and 173 acres with cable harvest methods. Helicopter was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have had the greatest probability of causing erosion as a result. Ground-based logging causes the greatest amount of compaction among logging methods.

Private lands would continue to be managed on a short rotation and are assumed to be in an early to mid-seral stand condition. Harvest occurs with primarily ground-based logging methods leading to large amounts of compacted acres on private lands.

This alternative would increase cumulative effects of compaction in the project area and temporarily increase road density.

The cumulative effects of restoration projects include reducing erosion from roads, reducing compaction through decommissioning of roads, and reducing impacts to soils with cattle exclosures (see Section 3.5.3.2, Effects on Soil Common to All Action Alternatives).

Future BLM projects within the Big Butte Creek 5th field watershed could potentially occur over approximately 1,200 acres. It is likely over half these acres would not have treatments occurring on them due to Riparian Reserves, other buffers, and stands not meeting criteria for treatment. Similar ratios of treatments and harvest methods would be expected as those being considered in this analysis.

3.5.4.4 Effects of Alternative 3 on Soils

Direct and Indirect Effects

A total of 1,099 acres would be harvested under Alternative 3: 28 acres SGFMA regeneration harvest, 14 acres shelterwood harvest, 52 acres selection harvest, 728 acres density management, 56 acres riparian thinning, 201 acres plantation thinning, and 34 acres special cut. The 2 methods used for harvest would include 785 acres of tractor and 24 acres of cable in the North Fork Big Butte 6th field watershed and 248 acres of tractor in the Beaver Dam Creek 6th field watershed.

The use of existing and designated skid trails is designed to limit compaction to 12 percent or less throughout the tractor units. Using tractors for harvest could compact 94 acres which equates to 0.5 percent of the North Fork Big Butte Creek 6th field watershed. In the Beaver Dam Creek 6th field watershed, up to 30 acres could be compacted, assuming 12 percent or less is compacted using designated skid trails. This intensity of compaction equates to 0.15 percent of the Beaver Dam Creek 6th field watershed.

Ripping skid trails in regeneration (SGFMA and shelterwood) units would help to ameliorate compacted conditions further by increasing porosity and infiltration. Skid trails in 42 acres of regeneration harvest units would be ripped to reduce compaction and increase infiltration and soil productivity. The remaining acres are proposed thinning units and skid trails would not be ripped in order to protect the remaining trees located near skid trails from sustaining damage to root systems. These areas would have skid trails

ripped upon final harvest. Skid trails in density management units immediately above roads would be mulched for approximately 100 feet to minimize sediment-laden runoff from skid trails reaching ditchlines and potentially flowing into streams.

Cable yarding corridors on steep slopes have the potential for rill and gulley erosion until vegetation is reestablished. If gullies form, soil productivity would be lost. Under Alternative 3, 24 acres of cable yarding would occur. Yarding corridors would be spaced at a maximum of 150 feet, but would likely be closer due to harvest system restraints. The potential for sediment to be transported off-site is low due to remaining slash and vegetation below corridors. Heavy machinery would be kept on roads and landings; therefore, additional soil compaction would be negligible.

There would be 5.0 miles of new temporary road constructed under Alternative 3. This action would increase compaction and reduce soil productivity in the road prism over the short-term (1 to 5 years). The temporary roads were designed to follow existing skid trails and old spur roads as much as possible which would reduce the effects by using previously disturbed areas. The effects of compaction and loss of soil productivity would be mitigated by ripping the road surface in the same year as timber harvest and quickly reestablishing vegetation. Erosion would be limited by decommissioning the roads in the same year as harvest during the dry season. Erosion control methods such as seeding and mulching would further reduce the erosion potential.

In Alternative 3, 3.5 miles (3 percent) of road out of 123 miles in the project area would be improved. Road improvement would include grading, rocking, improving ditchlines, adding cross-drains, and improving culverts. These actions would improve the drainage and condition of roads locally to reduce road-related erosion. Roads that would not be used for the timber sale or located on private lands would not be included in this project.

Road decommissioning would include 2.2 miles of full decommissioning and 0.6 miles of partial decommissioning. This action would reduce road density within the project area from 5 miles per square mile to 4.8 miles per square mile. Fully decommissioning roads would include ripping the roadbed to reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning, cross-drain and stream-crossing culverts would be pulled and roads would be blocked. This action would benefit soils by decreasing compaction, decreasing the amount of open roads and road density, removing the risk of culverts becoming plugged and causing fill-slope failures, and reducing the amount of potential erosion from roads.

Cumulative Effects

The dominant cumulative effect to soils in this watershed is the extensive compaction found throughout the project area. Long-term impacts from tractor yarding and temporary road building would contribute to the cumulative effect of compaction. Compaction has negative effects on other resources, such as hydrology, by reducing infiltration rates and increasing the timing and magnitude of runoff. Compaction also reduces soil productivity which reduces the amount and timing of tree and vegetation growth.

Building approximately 5.0 miles of temporary road would not add to the road-related cumulative watershed effects of sedimentation because the roads would be located away from streams and decommissioned in the same operating season as they are built. The objective of using temporary roads is to harvest timber while reducing some impacts, especially cumulative impacts. Although these roads would be decommissioned, it is likely some compaction would remain and contribute to cumulative watershed effects. Temporary roads built on private lands to access BLM lands would likely remain in place for future use. These portions remaining on private lands would contribute to the cumulative effects compaction has on the watershed. These temporary roads would temporarily add to the road density which can be an indicator of high watershed cumulative effects.

A total of 3,006 acres of timber harvest has occurred since 1995 on BLM lands in the Big Butte Creek 5th field watershed: 2,552 acres used ground-based tractors, 368 acres used cable harvest methods, and 86 acres used helicopter.

An additional 1,040 acres would be tractor logged under this alternative with 12 percent or less of those acres being disturbed. This would cumulatively add to the acres compacted in the watershed. Skid trails in 42 acres of regeneration harvest units would be ripped to reduce compaction and increase infiltration and soil productivity. The remaining acres are proposed thinning units and skid trails would not be ripped in order to protect the remaining trees located near skid trails from sustaining damage to root systems.

A total of 572 acres of timber harvest has occurred since 1995 on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres used ground-based tractors and 173 acres used cable harvest methods. Helicopter was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have had the greatest probability of sediment reaching streams as a result. Ground-based logging also causes the greatest amount of compaction among logging methods. Private lands would continue to be managed on a short rotation and are assumed to be in an early to mid-seral stand condition. Harvest occurs with primarily ground-based logging methods leading to large amounts of compacted acres on private lands

The cumulative effects of the proposed restoration projects include reducing erosion from roads, reducing compaction through decommissioning of roads, and reducing impacts to soils with cattle exclosures (see Section 3.5.3.2, Effects on Soil Common to All Action Alternatives).

Future BLM projects within the Big Butte Creek 5th field watershed could potentially occur over 1,200 acres. It is likely over half of these acres would not have treatments occurring on them due to Riparian Reserves, other buffers, and stands not meeting criteria for treatment. Similar ratios of treatments and harvest methods would be expected as those being considered in this analysis.

This alternative would increase cumulative effects of compaction in the project area and temporarily increase road density.

3.5.4.5 Effects of Alternative 4 on Soils

Direct and Indirect Effects

A total of 832 acres would be harvested under Alternative 4: 13 acres shelterwood, 52 acres selection harvest, 488 acres density management, 37 acres special cut, 40 acres riparian thinning, and 204 acres plantation thinning. The 2 methods used for harvest would be 560 acres of tractor and 22 acres of cable in the North Fork Big Butte 6th field watershed and 210 acres of tractor in the Beaver Dam Creek 6th field watershed.

The use of existing and designated skid trails is designed to limit compaction to 12 percent or less throughout the tractor units. Using tractors for harvest could compact 67 acres which equates to 0.3 percent of the North Fork Big Butte Creek 6th field watershed. In the Beaver Dam Creek 6th field watershed, up to 25 acres could be compacted, assuming 12 percent or less is compacted using designated skid trails. This intensity of compaction equates to approximately 0.12 percent of the Beaver Dam Creek 6th field watershed. This alternative would also stay out of unentered stands not previously tractor logged.

Ripping skid trails in regeneration units would help to ameliorate compacted conditions further by increasing porosity and infiltration. Skid trails would be ripped in 14 acres of shelterwood units. The other 770 acres of tractor logging units are in located in selection harvest and density management units which skid trails would not be ripped in order to protect the remaining trees located near skid trails from sustaining damage to root

systems. Skid trails in density management units would remain compacted and continue to reduce infiltration and soil productivity. These skid trails would have less vegetative cover and growth would be slowed in these areas. Skid trails in density management units above roads would be mulched to minimize sediment laden runoff from skid trails reaching ditchlines.

Cable yarding corridors on steep slopes have the potential for rill and gulley erosion until vegetation is reestablished. If gullies form, soil productivity would be lost. Approximately 24 acres of cable yarding would occur under Alternative 4. Yarding corridors would be spaced at a maximum of 150 feet, but would likely be closer due to harvest system restraints. The potential for sediment to be transported off-site is low due remaining slash and vegetation on and below yarding corridor. Heavy machinery would be kept on roads and landings; therefore, additional soil compaction would be negligible.

There would be approximately 3.0 miles of new temporary road constructed under Alternative 4. This action would increase compaction and reduce soil productivity in the road prism over the short-term (1 to 5 years). The temporary roads were designed to follow existing skid trails and old spur roads as much as possible to reduce effects by using previously disturbed areas. These effects of compaction and loss of soil productivity would be mitigated by ripping the road surface in the same year as timber harvest and quickly reestablishing vegetation. Erosion would be limited by decommissioning the roads in the same year as harvest during the dry season. Erosion control methods such as seeding and mulching would further reduce the erosion potential.

In Alternative 4, 3.2 miles (3 percent) of road, out of 123 miles in the project area, would be improved. Road improvement would include grading, rocking, improving ditchlines, adding cross-drains, and improving culverts. These actions would improve the drainage and condition of roads locally to reduce road-related erosion. Roads that would not be used for the timber sale or located on private lands would not be included in this project.

Road decommissioning would include 1.5 miles of full decommissioning and 0.6 miles of partial decommissioning. This action would reduce road density within the project area from 5 miles per square mile to 4.8 miles per square mile. Fully decommissioning roads would include ripping the roadbed to reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning, cross-drain and stream-crossing culverts would be pulled and roads would be blocked. This action would benefit soils by decreasing compaction, decreasing the amount of open roads and road density, removing the risk of culverts becoming plugged and causing fill-slope failures, and reducing the amount of potential erosion from roads.

Cumulative Effects

The dominant cumulative effect to soils in this watershed is the extensive compaction found throughout the project area. Long-term impacts from tractor yarding and temporary road building would contribute to the cumulative effect of compaction. Compaction has negative effects on other resources, such as hydrology, by reducing infiltration rates and increasing the timing and magnitude of runoff. Compaction also reduces soil productivity which reduces the amount and timing of tree and vegetation growth.

Building 3.0 miles of temporary road would not add to the road-related cumulative watershed effects of sedimentation because the roads would be located away from streams and they would be decommissioned in the same operating season as they are built. The objective of using temporary roads is to harvest timber while reducing some impacts, especially cumulative impacts. Although these roads would be decommissioned, it is likely some compaction would remain and contribute to cumulative watershed effects. Temporary roads built on private lands to access BLM lands would likely remain in place for future use. These portions remaining on private lands would contribute

to the cumulative effects compaction has on the watershed. These temporary roads would temporarily add to the road density which can be an indicator of high watershed cumulative effects.

A total of 3,006 acres of timber harvest has occurred since 1995 on BLM lands in the Big Butte Creek 5th field watershed: 2,552 acres used ground-based tractors, 368 acres used cable harvest methods, and 86 acres used helicopter.

An additional 770 acres would be tractor logged under this alternative with 12 percent or less of those acres being disturbed. This would cumulatively add to the acres compacted in the watershed. Skid trails in 143 acres of regeneration harvest units would be ripped to reduce compaction and increase infiltration and soil productivity. The remaining acres are thinning units and skid trails would not be ripped in order to protect the remaining trees located near skid trails from sustaining damage to root systems.

A total of 572 acres of timber harvest has occurred since 1995 on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres used ground-based tractors and 173 acres used cable harvest. Helicopter was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have had the greatest probability of sediment reaching streams as a result. Ground-based logging also causes the greatest amount of compaction among logging methods.

Private lands would continue to be managed on a short rotation and are assumed to be in an early to mid-seral stand condition with primarily ground-based logging methods leading to large amounts of compacted acres on private lands.

The cumulative effects of the restoration projects include reducing impacts to soils with cattle exclosures, reducing erosion from roads, and reducing compaction through decommissioning of roads.

Future BLM projects within the Big Butte Creek 5th field watershed could potentially occur over approximately 1,200 acres. It is likely over half these acres would not have treatments occurring on them due to Riparian Reserves, other buffers, and stands not meeting criteria for treatment. Similar ratios of treatments and harvest methods would be expected as those being considered in this analysis.

This alternative would increase cumulative effects of compaction in the project area and temporarily increase road density.

3.6 Hydrology

Key points in the project area:
- Large areas of compaction may contribute to increased peak flows.

3.6.1 Methodology

The BLM Central Big Butte Watershed Analysis (USDI 1995b) and Lost Creek Watershed Analysis (USDI 1998) were the primary sources of information for the affected environment. GIS was also used for analyzing the existing conditions of the two 6th field watersheds. BLM Riparian Reserve surveys were used to determine functioning condition of streams on BLM lands (USDI 1996). A change detection analysis was done using satellite imagery data from the past 30 years.
The scale used in this analysis is the 6th field subwatershed level with some analysis at the 7th field drainage level. The 5th field watershed is used to describe general conditions of the watershed. The temporal scale being used is both short-term (1 to 5 years) and long-

term (10 to 30 years). Cumulative effects analysis would use longer time scales when describing the events leading up to the current conditions.

3.6.2 Assumptions

Private timberlands will remain in an early to mid-seral condition with high densities of roads and skid trails.

3.6.3 Affected Environment

3.6.3.1 Introduction

The Camp Cur project area lies within the Big Butte Creek and South Fork Rogue River 5th field watersheds. North Fork Big Butte Creek and Beaver Dam Creek are the smaller 6th field subwatersheds in the project area. Approximately 45 acres lie within the Upper South Fork Big Butte Creek 6th field subwatershed. This subwatershed has hydrology similar to the North Fork Big Butte Creek 6th field and the effects would be similar. There were 12, 7th field drainages delineated in the North Fork Big Butte subwatershed and 7, 7th field drainages delineated in the Beaver Dam Creek subwatershed. A total of 10, 7th field drainages contain proposed harvest units. The Central Big Butte Watershed Analysis and the Lost Creek Watershed Analysis cover the North Fork Big Butte and Beaver Dam Creek 6th field subwatersheds respectively.

The Beaver Dam Creek 6th field subwatershed totals approximately 18,690 acres and the North Fork Big Butte Creek 6th field subwatershed totals 22,061 acres.

The Vine Maple 7th field drainage in the Beaver Dam Creek 6th field subwatershed was deferred from management activities, including timber harvest and other surface disturbing activities, for a period of 10 years starting in January 1993 due to high cumulative effects. Management activities of a limited nature could be permitted if the effects will not increase the cumulative effects (USDI 1995a, 43). The Vine Maple drainage area contains approximately 5,300 acres; 2,375 acres, or 45 percent, are BLM-administered lands. The remaining 55 percent is managed by industrial timberlands and is expected to remain in an early to mid-seral condition. Vegetation on BLM lands in this drainage has essentially been left alone for the past 10 years in order to provide additional canopy to allow the drainage to recover. Approximately 50 percent of the TSZ was in an open state during 1993, which indicated high cumulative effects for deferral.

The climate of these watersheds is a Mediterranean type with hot, dry summers and cool, wet winters. Summer high temperatures range from the 80s to the high 90s, with occasional daytime temperatures reaching 100 plus degrees Fahrenheit (° F). Winter lows often drop to 10 to 20° F.

One USGS gaging station is currently operating in the Big Butte Creek 5th field watershed near the mouth of Big Butte Creek. Several historic gaging stations in the watersheds are no longer operating.

The drainage pattern in the project area is dendritic. Drainage density within the project area is low which means streams are generally longer, further apart, and have flatter valley sides than areas with high drainage densities.

According to the Lost Creek Watershed Analysis, the Beaver Dam Creek 6th field subwatershed is considered important due to the relatively good quality habitat, high number of beaver ponds, and relative uniqueness of these features with the watershed (USDI 1998, 11).

The existing condition of the watersheds where the Camp Cur project is proposed is a result of past and present land management activities. Past actions have resulted in watershed conditions such as elevated stream temperatures, increased fine sediment above background levels, and simplified stream channels. The main past actions in these watersheds that have resulted in cumulative effects include timber harvest and road building. Other actions that have resulted in cumulative watershed effects include rural settlement, agriculture, livestock, off-highway vehicle use, and water withdrawals.

Ranchers settled the Big Butte Creek Watershed in the mid-1800s to graze cattle in the high country during the summers (USDI 1998, 48). These early settlers cleared the land adjacent to stream channels which added to the cumulative watershed effects by removing the riparian vegetation that provided stream shade and bank stability. Residents logged their lands to build their homes and to use for firewood (USDI 1998, 47).

Logging in both watersheds began in the early 1900s as mills were built in the area. By 1944, the Medford Corporation had cut most of its mature timber and began to increase the harvest of federal timber (USDI 1998, 49). Timber activity throughout the 20th century has resulted in a landscape dominated by second or third growth forests on private lands (USDI 1998, 49). Early logging in these watersheds did not use stream buffers and the majority of the logging, especially in the 1980s, involved ground-based clear-cut logging. This type of logging along with lack of stream buffers resulted in cumulative effects on aquatic systems, such as increased stream temperatures, increased fine sediment, increased channel simplification, and decreased channel stability.

Early road building for settlement and to facilitate logging in these watersheds was focused along stream channels. These roads were easy to build due to the gentle topography along mainstem stream channels. Building these roads required the removal of riparian vegetation which cumulatively contributed to increased stream temperatures, decreased large wood delivery to stream channels, and decreased bank stability. Roads also cause soil compaction which reduces infiltration and increases runoff. Roads along streams are especially problematic with respect to increased runoff because they are hydrologically connected to the stream. Sediment created by these roads is transported to streams through this hydrologic connectivity. Logging roads also intercept subsurface flow which can also alter hydrology.

3.6.3.2 Water Quality

Temperature

One stream in the Big Butte Creek Watershed fails to meet the Oregon Department of Environmental Quality (ODEQ) summer standard for stream temperature, which is a rolling 7-day average high of 64 degrees, and Dissolved Oxygen (DO). This stream is classified as water quality limited under the Clean Water Act (CWA) and is on the ODEQ 303(d) list. As of 2002, Big Butte Creek is the only stream in the watershed included on the 303(d) list as water quality limited for summer stream temperature. From river mile 0 to 11.6, Big Butte Creek is listed for both summer temperature and DO from June 1 to September 30. There are no streams on the 2002 303(d) list in the North Fork Big Butte Creek or Beaver Dam Creek 6th field subwatersheds. However, the North Fork Big Butte Creek remains a stream of potential concern in the ODEQ 2002 integrated report. Other streams of potential concern for elevated stream temperatures in the Big Butte Creek 5th field watershed include Clark Creek, Dog Creek, Hukill Creek, Jackass Creek, and Twincheria Creek. These streams were on the ODEQ 303(d) list at one time but were removed because the data that caused them to be listed was collected during a drought year and was determined to be invalid.

Channel Morphology

Stream surveys were completed in the watershed to determine the functioning condition

and the duration of streams. Streams in these subwatersheds are generally of low gradient due to the relative flatness of this area. Drainage density of the area is low.

Sediment

Road density is high in both the North Fork Big Butte Creek and the Beaver Dam Creek 6th field subwatersheds at 4.6 miles per square mile and 5.5 miles per square mile respectively. Road density can be an indicator of possible sediment sources in the watershed. Not all roads contribute sediment to streams; however roads within Riparian Reserves may be connected to streams through ditchlines allowing sediment to reach stream channels. The North Fork Big Butte Creek 6th field watershed contains 43 miles of road located within Riparian Reserves and the Beaver Dam Creek 6th field watershed contains 40 miles of road located within Riparian Reserves. A decline in road maintenance in recent years on BLM-administered roads is causing drainage problems, such as loss of road crown and rutting, resulting in erosion.

Numerous skid trails exist throughout the watershed from decades of ground-based logging. Skid trails can contribute to sediment by reducing infiltration, increasing runoff, and eroding disturbed areas before they become vegetated.

Riparian areas that are properly functioning store water and sediment, and help regulate stream temperatures and flows. Riparian Reserves on BLM-administered lands in the project area were impacted by past management activities, such as timber harvest and road building, before these areas were set aside for protection. This, coupled with the checkerboard ownership pattern, has left these areas in mostly an early to mid-seral condition. A majority of reaches are functioning at risk (FAR) which means the stream is functioning, based on physical and biological components, but may not include all of the necessary components to be considered properly functioning.

Fish-bearing streams receive a Riparian Reserve buffer of 320 feet on either side of the stream and 160 feet on both sides for all non-fish-bearing perennial and intermittent streams.

Water Quantity

Annual precipitation ranges from 35 to 50 inches in the projects area. The streamflow regime is similar to the precipitation pattern; however, runoff generally lags behind precipitation by about one month. Roads can contribute to peak flows when a considerable amount (12 percent) of the watershed is in a roaded condition (Harr 1976). Currently, 1.8 percent of the North Fork Big Butte Creek 6th field subwatershed and 2.1 percent of the Beaver Dam Creek 6th field subwatershed is in a roaded condition.

Transient Snow Zone

The Transient Snow Zone (TSZ) is an elevation band from 3,500 to 5,000 feet where snow accumulates and is susceptible to rain-on-snow events. Historic extreme high flows have been produced by rain-on-snow events where warm rains have melted the snow pack, producing large amounts of runoff. In the Beaver Dam Creek 6th field subwatershed, 10,122 acres (50 percent) are located within the TSZ. In the North Fork Big Butte Creek 6th field subwatershed, 5,476 acres (25 percent) are located within the TSZ.

Cumulative effects to stream temperature

Elevated stream temperatures exist at both the subwatershed and watershed scale resulting in Big Butte Creek being listed on the ODEQ 303(d) list. Other streams in the Big Butte Watershed considered a potential concern include Hukill Creek, Clark Creek, North Fork Big Butte Creek, and Twincheria Creek. These elevated stream temperatures were caused by the removal of riparian vegetation, from logging, settlement, and road building, that provides stream shade; withdrawal of water during the summer low

flow period for irrigation and domestic use; and removal of large wood from streams resulting in simplified channels with high width/depth ratios and large areas of stream scoured to bedrock due to the removal of large wood from stream channels. These human disturbances, along with natural causes such as climate and geology, have resulted in stream temperatures above the ODEQ summer standard.

Some streams may exceed this standard and would never be able to achieve that temperature because of natural causes. For example, Jackass Creek was found to be near full potential (80 year old trees) for stream shade according to an analysis done by ODEQ (ODEQ 2003). Other small streams in the watershed, such as Clark Creek and Twincheria Creek, are also at or near potential on BLM lands and would continue on this trend based on the implementation of the Riparian Reserves required under the NWFP. On private timber lands, there are more reaches not at potential because private companies have a shorter harvest rotation and less restrictive buffers are required under the Oregon Forest Practices Act (OFPA) to protect streams.

The main stems of Big Butte Creek and North Fork Big Butte Creek are further from full potential shade for a variety of reasons. One reason is that these streams need more shade because of the larger stream widths and, therefore, more surface area to shade from solar radiation. Another reason is the main roads along these mainstem creeks permanently reduce the shade potential along these streams.

The majority of Big Butte Creek flows through nonindustrial private land where rural homeowners have settled and small agricultural, forestry, and livestock operations exist. In many cases, overstory vegetation has been cleared right up to the stream and these areas have a very low likelihood of reaching full stream shade potential because of these land uses. The cumulative effect from removing riparian vegetation was an increase in stream temperature. The majority of the land in the Big Butte Creek watershed is used for forestry.

Another cause of elevated stream temperatures is water withdrawal for irrigation and domestic use during the summer low flow period. Water withdrawals cause stream temperatures to rise by reducing the streamflow, resulting in a smaller volume of water that heat up quicker and to higher temperatures. Water withdrawals occur along the mainstem of Big Butte Creek and in the North Fork Big Butte Creek subwatershed. These withdrawals occur in areas of agriculture and mixed land use types where irrigation is heavily used for crops, lawns, small gardens, and other domestic uses.

Elevated stream temperatures are also a cumulative result of channel widening from the past removal of large wood from streams and the removal of streamside vegetation. Flooding has also resulted in channel widening, especially on streams where large wood and riparian vegetation was removed. Channels with high width/depth ratios as a result of these past practices heat up quicker and to higher temperatures than deep, narrow channels. These wide, shallow channels also have large areas of exposed bedrock that heats up and retains heat longer than alluvial stream beds.

The hot, dry climate of southern Oregon also causes high summer stream temperatures. Summer high temperatures range from the 80s to the high 90s with occasional daytime temperatures reaching 100° F plus. Southern Oregon commonly has higher summertime temperatures than the rest of Oregon west of the Cascades which in turn cause higher stream temperatures. Due to this natural climate pattern, it is likely many streams in southern Oregon may never reach the ODEQ summer standard for stream temperature for basins with salmonid rearing as a beneficial use.

The cumulative effect of elevated stream temperature from a number of past and present actions has resulted in the current condition of the project area. Future actions of the same

nature as described would continue to contribute to the cumulative effect of elevated stream temperature. Actions that have led to this current condition include the removal of riparian vegetation for a variety of reasons, such as settlement, logging, and road building. Other past and present actions include removal of large wood, stream channel simplification, and water withdrawals. Outside of human influences, natural conditions for high summer stream temperatures include climate and geology.

Sedimentary Cumulative Effects

The current condition of sedimentation in the Beaver Dam Creek and North Fork of Big Butte Creek 6th field subwatersheds is a result of past and present actions. The cumulative effect of increased sedimentation above background levels in the subwatersheds is a result of various land management activities on both public and private lands. The main management activities that cause erosion and subsequent sedimentation in these subwatersheds are logging, road building, agriculture, and livestock. There are no streams in the North Fork Big Butte Creek or Beaver Dam Creek 6th field subwatersheds on the ODEQ 303(d) list for sediment.

The sources of sedimentation are very difficult to quantify and identify at a watershed level because of the complexity of processes that occur over time and space. A study done by the National Council for Air and Stream Improvement (NCASI) determined that cumulative watershed effects are particularly difficult to predict and identify due to the individual water and sediment inputs transported to the stream at different points in time and space, and how these interact with the water and sediment already in the stream (NCASI 1999, 1).

Past ground-based clear-cut logging in these watersheds has led to an increase in fine sediment levels in streams. Clear-cuts were often right to the edge of stream channels with little or no streamside buffers. This common practice led to stream bank erosion and soil disturbance adjacent to stream channels which resulted in sedimentation during rainstorms. Skid trails and roads used to access timber harvest have also greatly added to the background levels of stream sediment. Although there are several land management activities that can cause increased amounts of sediment to be delivered to stream channels, roads are the main contributors of sediment identified in a forested watershed.

Natural surface roads in both 6th field watersheds are the greatest contributor to the nonpoint source pollution of sedimentation. Natural surface roads become rutted and the road surface erodes during the wet winter season which can deliver sediment to stream channels. The extent of this nonpoint source pollution is not known throughout the 6th field watersheds. Placing rock on roads, seasonal road closures, and decommissioning roads can reduce this sedimentary cumulative watershed effect.

3.6.4 Environmental Consequences

Table 3-8. Comparison of Effects on Hydrology from All Alternatives				
Issue: Road Density (road-related sediment)				
Past Actions	• High road densities resulting from road building for settlement and logging			
Present Actions	• Increase in road densities on smaller scale than in past from road building mainly for logging access			
Current Conditions	• High road density averaging 5 miles/square mile in project area			
Future Actions	• Trend of increase in road density continues from road building on private lands; mostly temporary roads built on BLM lands			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No road building or decommissioning would occur • No change to road density from this project	• Build 5.2 miles of temporary road • Decommission 2.2 miles of roads • Net trend is small reduction in road density	• Build 5.0 miles of temporary road • Decommission 2.2 miles of roads • Net trend is small reduction in road density	• Build 3.0 miles of temporary road • Decommission 1.5 miles of roads • Net trend is small reduction in road density
Cumulative Effects	• Maintain current condition of high road density	• Maintain current condition of high road density • Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning	• Maintain current condition of high road density • Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning	• Maintain current condition of high road density • Trend would be an increase in road density based on land ownership patterns, but a decrease on BLM lands from road decommissioning
Issue: Transient Snow Zone (peak flows)				
Past Actions	• Increased openings in TSZ from logging and road building increased the risk to peak flows			
Present Actions	• Increased openings in TSZ at a lesser scale than in the past from logging continues on private • On BLM lands, more canopy is retained in TSZ • Recovery has taken place from those acres logged in the past • Less risk to enhanced peak flows than in the past			
Current Conditions	• Openings in TSZ increases risk of increased peak flows from rain-on-snow events			
Future Actions	• Continued logging in TSZ on private lands; retain more canopy on BLM lands • Recovery on lands harvested in the past • Maintain current low risk to peak flow enhancement			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No openings would be created in TSZ	• Harvest 26 acres in North Fork Big Butte Creek to <30% canopy in TSZ, intensity of 0.1% • Low risk to enhance peak flows	• Harvest 26 acres in North Fork Big Butte Creek to <30% canopy in TSZ, intensity of 0.1% • Low risk to enhance peak flows	• All harvest in TSZ results in canopies >30% • No risk to increased peak flows from TSZ openings

Table 3-8. Comparison of Effects on Hydrology from All Alternatives				
Cumulative Effects	• Maintain current risk to peak flow enhancement	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type	• Maintain current risk to peak flow enhancement • Trend would maintain low risk to enhance peak flows based on TSZ total area and harvest type

Responses of watersheds to disturbances are very complex and depend on a great deal of conditions that include, but are not limited to, the timing and intensity of storm events, slope, aspect, soils, channel stability, ground cover, and canopy cover. All of these conditions vary greatly over time and space to produce different watershed responses. The magnitude of effects from management activities depends largely on the timing and intensity of storm events during the recovery process.

3.6.4.1 Effects of Alternative 1 (No Action) on Hydrology

Direct and Indirect Effects

Under the No Action Alternative, no forest management or restoration projects would occur and there would be no direct effects from ground disturbance on water quality or quantity.

No timber harvest would occur under this alternative. No ground disturbance related to timber harvest would occur and there would be no impacts to water quality or quantity.

The pine plantation thinning would not be done under this alternative.

The 31 acres of Riparian Reserves would not be thinned under the stewardship project. There would be no benefits of increased shade and large wood for riparian areas.

No livestock exclosures would be built on fish-bearing streams. The current condition of sedimentation from cattle trampling stream banks and causing erosion would be maintained. There would be no benefit of reduced vegetation as a result of this alternative.

No culverts would be replaced to improve fish passage so the benefit of improved fish passage would not be met under this alternative. Since there would be no removal and replacement of culverts, there would be no sediment delivered to stream channels.

Riparian planting would not occur and the benefits of long-term shade and large wood in stream channels would not be achieved with this alternative. Since there would be no ground disturbance from the planting, there would be no effect on water quality.

Spring development would not occur and current conditions would remain. There would be no benefit to water quality as a result of this alternative.

Road improvements or road decommissioning projects would not be completed under the No Action Alternative. Roads would remain inadequately surfaced and continue to have drainage problems. Roads determined no longer needed by an Interdisciplinary Team would not be decommissioned. The current rate of sedimentation from erosion on roads would continue and potentially increase. This would have a negative effect on water quality due to the continuation of sedimentation. There would be no benefits of sediment reduction as a result of this alternative.

BLM road #34-3E-14.01 would not be relocated out of the Riparian Reserve and therefore the benefit to water quality of reduced sedimentation would not occur.

Cumulative Effects

Cumulative watershed impacts in Beaver Dam Creek and North Fork Big Butte Creek 6th field watersheds are expressed in degraded stream and aquatic conditions. Cumulative impacts in these subwatersheds include simplified stream channels, lack of riparian vegetation, increased stream temperatures, and increased sedimentation.

Streams in these watersheds are in generally good condition but do exhibit examples of cumulative impacts. Some of these examples include lack of LWD, increased stream temperatures, lack of riparian vegetation, and high levels of road-related sediment.

Under the No Action Alternative, no additional cumulative effects would occur. The existing cumulative effects described in the affected environment would remain. A total of 3,006 acres of timber harvest have occurred since 1995 on BLM lands in the Big Butte Creek 5th field watershed. These acres were treated under the NWFP and included Riparian Reserves to buffer streams. PDFs and BMPs were used to minimize cumulative watershed effects. In the Big Butte Creek 5th field watershed, 2,552 acres were harvested using ground-based tractors, 368 acres using cable harvest methods, and 86 acres harvested using helicopter. Private lands are mostly in an early to mid-seral stand condition in both the uplands and along streams. There are 123 miles of road in the subwatershed for a road density of 5 miles per square mile.

Early seral stand conditions on 256 acres of forest resulted from 53 acres of clear-cuts, 179 acres of regeneration harvest, and 24 acres of overstory removal. A total of 2,636 acres of density management or commercial thinning resulted in a late to mature seral stand and a canopy closure of 40 to 60 percent. Mortality salvage on 365 acres to remove dead or dying trees and select cut on 494 acres did not change the seral stage of these acres. Early seral stands are at a greater risk for increased runoff, especially due to rain-on-snow events, because canopy is removed and snow can accumulate to greater depths in these openings. These increases in flow can cause increases in erosion and subsequent sedimentation.

A change detection analysis was completed using satellite imagery data from the past 30 years. In the North Fork Big Butte Creek 6th field subwatershed, 17 percent of the area was harvested on all lands in the past 30 years, In the Beaver Dam Creek 6th field watershed, 15 percent of the area was harvested on all lands in the past 30 years.

Road density in the project area is high at approximately five miles per square mile. The North Fork Big Butte Creek 6th field watershed contains 157 miles of road for a road density of 4.6 miles per square mile. The Beaver Dam Creek 6th field watershed contains 162 miles of road for a road density of 5.5 miles per square mile. Areas with high road densities have a higher potential for negative effects on aquatic resources, such as increased sedimentation and increased stream temperatures.

Forest roads also contribute to peak flow enhancement by extending the natural stream network by roadside ditches. Ditches essentially act as small streams during storm events. If the ditch is connected to a stream channel the peak flow of the stream is increased. Areas of high road density with roads hydrologically connected to the stream channels can experience increased peak flows and subsequent channel degradation. Proper culvert placement and spacing can reduce this effect. Projects developed under the Titanic Environmental Assessment that reduce local sedimentation include improving BLM road #34-3E-15.03 and road #34-3E-21 by installing additional cross-drain culverts to reduce the amount of ditchline water reaching stream channels.

This alternative would maintain the current cumulative effects from previous logging and road building and would not directly add additional effects because no projects would be implemented. However, eroding roads could become worse over time if left in the current condition.

3.6.4.2 Effects Common to All Action Alternatives on Hydrology

Livestock exclosures, culvert replacement, riparian planting, spring development, pump chance renovation, and road relocation would be essentially the same in all alternatives.

Livestock exclosures would be constructed on Beaver Dam, Parsnip, and Camp creeks. Fencing would occur on approximately two miles of stream channel and riparian corridors. This project would provide protection to water quality by reducing erosion and subsequent sedimentation in these creeks from cattle trampling stream banks. Riparian vegetation would be allowed to recover along these streams which would in turn stabilize stream banks and provide cover. Stream channels would begin to narrow and deepen as vegetation becomes established causing water quality to improve by reducing stream temperatures and sedimentation. This vegetation would also provide shade to help reduce stream temperatures. In the long-term, riparian vegetation would provide large woody debris (LWD) to the streams which would provide additional stability and cover.

Two culverts are proposed for replacement for fish passage. The removal and replacement of large culverts would likely cause a small amount of sediment to be transported downstream. This would have a short-term impact (hours to days) on water quality. The sediment would likely settle in pools and areas of deposition until it is moved down through the stream system during fall and winter flows. Due to the very low quantity of sediment transported, this amount would be considered within the range of natural variability. The amount would be minimized by using PDFs and timing the installation to occur during low flow periods. This project would be beneficial to water quality and the aquatic ecosystem shortly after this project is completed. The benefits to water quality include reducing erosion by increasing the capacity of the culvert and allowing high flows and associated debris to pass without plugging the culvert and causing a failure.

Riparian planting would occur in the frost pocket zone along fish-bearing streams. This project would have a beneficial effect on water quality by providing shade and large wood to fish-bearing stream channels over the long-term.

Spring development would occur on six springs. The general design is to install a spring box at the source, trench a pipe to a trough, and trench a return flow pipe back to the stream channel. This would involve digging with hand tools in the spring and digging trenches to install the pipe. The spring would be fenced from livestock to protect the water quality at the site. The work would be completed during the summer low flow period to reduce the chances of soil erosion and subsequent sedimentation as well as to ensure sufficient flow for water supply during low flow periods. Saturated soils around the springs would be protected from trampling by providing cattle and wildlife access to water from a trough located on more stable soils. Water quality at the springs would be improved by keeping cattle away from these sensitive sites to reduce the amount of sediment and turbidity in the springs and associated stream channels. Nutrient levels in the springs would also likely be reduced. This project would benefit water quality by protecting springs from sediment and nutrient pollution.

One pump chance would be renovated to improve water storage. This pump chance would be cleaned and the intakes improved to allow the pump chance to function properly. This project would have a neutral effect on water quality. Water quantity would essentially remain the same, although the capacity of pump chances would be returned to the original designed storage capacity.

BLM road #34-3E-14.01 would have 0.5 miles of road located adjacent to North Fork Big Butte Creek relocated outside the Riparian Reserve and into the uplands. The road encroaches on the stream channel for the entire 0.5 miles on BLM land. This road is currently eroding and is a chronic source of sediment due to its location next to North

Fork Big Butte Creek. The road also is intercepting groundwater from the upslope side of the road creating a wet area on the road bed. This project would benefit water quality by reducing the overall amount of sediment reaching North Fork Big Butte Creek.

3.6.4.3 Effects of Alternative 2 on Hydrology

Direct and Indirect Effects

Under this alternative, a total of 1,116 acres would be harvested in 2 separate 6th field watersheds: 273 acres in the Beaver Dam Creek 6th field watershed and 834 acres in the North Fork Big Butte Creek 6th field watershed. The intensity of this proposal equates to 1.3 percent of the Beaver Dam Creek 6th field watershed and 3.8 percent of the North Fork Big Butte Creek 6th field watershed. These units are located throughout the watersheds; therefore, the effects, such as increased erosion and runoff, would not be concentrated in one location but spread over the landscape. Changes would be less noticeable than if the units were concentrated in one area.
SGFMA regeneration harvest on 28 acres would leave 16 to 25 trees per acre greater than 20″ DBH and a canopy closure of 20 to 40 percent. Shelterwood harvest on 80 acres would leave 12 to 25 trees per acre and a remaining canopy closure of approximately 20 to 40 percent. These treatments would increase the early seral conditions of the North Fork Big Butte Creek 6th field watershed by 0.5 percent. This amount is negligible in terms of increases in flow at the subwatershed level.

Stream temperature would not be affected as a result of this alternative because full Riparian Reserves would be used on harvest units. Precommercial thinning would occur on 26 acres within Riparian Reserves under Alternative 2. No trees over 8″ DBH would be removed in this project. Stream temperature would not be affected because the canopy would be left intact and a 75′ no-cut buffer would protect the stream canopy. Because this project is proposed on intermittent streams, stream temperatures would be protected because water would not be present during the summer when stream temperatures rise. This project would reduce stand densities and increase the growth rate of trees within the Riparian Reserves. This would be beneficial to Riparian Reserves and aquatic resources in the long-term at a localized scale, but young, overstocked stands would still remain in the majority of Riparian Reserves.

Of the two subwatersheds, the Beaver Dam Creek 6th field subwatershed has the highest percentage of land within the TSZ at approximately 50 percent. The lower boundary of detectability for peak flow increases is approximately 10 percent. In other words, peak flow increases of less than 10 percent above background levels cannot be detected using standard streamflow measurements. In order for forestry-related impacts to increase the risk of peak flow enhancement above this lower boundary of detectability, 66 percent of the Beaver Dam Creek 6th field watershed would have to contain less than 30 percent crown closure (WPN 1999, IV-11). The Beaver Dam Creek 6th field subwatershed is more sensitive to changes in peak flow because a larger percentage of the subwatershed is in the TSZ. The Beaver Dam Creek 6th field subwatershed has a low risk for increase of peak flow enhancement from the treatments because only approximately 27 acres are proposed for treatment in the TSZ and none of the proposed treatments in this subwatershed would result in a crown closure of less than 30 percent.

Approximately 25 percent of the North Fork Big Butte Creek subwatershed is located in the TSZ. In order for forestry-related impacts to increase the risk of peak flow enhancement above the lower boundary of detectability, 92 percent of the North Fork Big Butte 6th field subwatershed would have to contain less than 30 percent crown closure. This subwatershed also has a low risk for increases in peak flow because of the 173 acres proposed for treatment in the TSZ, only 26 acres would result in a crown closure less than 30 percent. The remaining 147 acres are density management treatments which would result in a crown closure of 40 to 60 percent and would not contribute to peak flow increases. The 26 acres resulting in less than 30 percent crown closure equates to an

intensity of 0.1 percent and therefore would not substantially contribute to the percentage of the subwatershed with less than 30 percent crown closure.

There would be 698 acres of density management treatments in the watershed under Alternative 2. This would maintain a canopy closure of approximately 40 to 60 percent. This treatment would keep the stands in a late to mature condition which would be considered hydrologically intermediate. This condition is not likely to result in additional increases in runoff from removing canopy and vegetation.

The types of harvest methods that would be used in the project are tractor, Feller-Buncher, and cable. Generally, tractor and Feller-Buncher cause the most ground disturbance, followed by cable, and helicopter. Ground disturbance from tractor yarding would be minimized by using designated and existing skid trails. Increased erosion and subsequent sedimentation is possible with ground-disturbing activities such as tractor harvest. The use of Riparian Reserves and PDFs would minimize possible sedimentation by leaving existing vegetation and surface litter intact. This would allow sediment from disturbed areas and skid trails to be filtered out before reaching stream channels. Helicopter harvest would not be used as a harvest method due to the relatively gentle terrain.

Under Alternative 2, 3.5 miles of temporary roads would be constructed. These roads would be located on or near ridgetops, away from stream channels. These roads would not deliver sediment to stream channels because they would be located on the ridgetop and would be ripped and mulched within the same season as the roads are constructed. Runoff would not be increased because these temporary roads would be rehabilitated. This alternative includes a stewardship project that would be completed over a period of approximately 10 years. The proposal involves a variety of projects designed to reestablish natural stands from pine plantations while accomplishing other restoration activities such as fencing springs, spring development, road decommissioning, and ripping or scarifying skid trails.

For the stewardship project, 201 acres would be treated in the Beaver Dam Creek 6th field watershed and 79 acres would be treated in the North Fork Big Butte Creek 6th field watershed. Treatment on these acres would involve thinning the pines to release the mixed conifer understory. Harvest would be accomplished with a low ground pressure Feller-Buncher and would involve whole tree harvesting to the landings. This project would not contribute sediment to local stream channels because machinery would be kept outside Riparian Reserves and no transport mechanism, such as skid trails, would allow sediment to move to stream channels.

Approximately 30 acres are proposed for Riparian Reserve thinning under the stewardship project. This would promote the growth of larger conifers adjacent to stream channels which would benefit riparian areas by providing larger trees for shade and future large wood for stream structure.

To accomplish the pine plantation thinning, 6 temporary roads, totaling 1.7 miles, would be built. These roads would be decommissioned after use by scarifying, ripping, or subsoiling the roadbed followed by stabilization through erosion control measures, such as grass seeding and mulching.

Under the stewardship project, 201 acres are located in the Vine Maple drainage that was deferred for a period of 10 years starting in 1993 from surface disturbing management activities, such as timber harvest. This watershed was deferred for a large amount of openings in the TSZ (cumulative effects analysis, 1993). None of the proposals in the stewardship project are located in the TSZ, so there would be no increase in cumulative effects from openings in the TSZ. The stewardship project is restorative in nature and this project would help to reduce cumulative effects in the watershed over the long-term.

In Alternative 2, 3.5 miles out of 123 miles of road in the project area would be improved. Many more miles of road need improvement, but since they would not be used in this project, they would not receive treatment. This would improve the drainage and condition of roads in the subwatershed to reduce erosion and subsequent sedimentation. Improving 3.5 miles of road would benefit water quality locally by reducing erosion and subsequent sedimentation.

Road decommissioning would include 2.2 miles of full decommissioning and 0.6 miles of partial decommissioning. Fully decommissioning roads includes ripping the roadbed which would reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning the cross-drain and stream-crossing pipes would be pulled and the road blocked. Pulling culverts would cause a short-term increase in sediment that would be minimized with PDFs. Decommissioning would benefit water quality by increasing infiltration, decreasing the total amount of open roads and road density, removing the risk of pipes becoming plugged and causing fill slope failures, and reducing the amount of potential erosion from the road.

Road density would decrease in the project area from 5 miles per square mile to 4.8 miles per square mile. Although this is still considered a high road density, the trend is toward reducing overall road miles. Reducing road density is difficult in watersheds with a checkerboard ownership pattern because of opposition to closing and decommissioning roads. As a result, roads that should be closed are left open and stable roads that should be left open are closed in order to reduce densities.

For the effects of restoration projects, see Section 3.6.4.2 Effects Common to All Action Alternatives on Hydrology.

Cumulative Effects

The dominant cumulative effect in this watershed is the extensive deposition of sediments found throughout the stream system. The effects described here would be additive to the existing cumulative effects described in the affected environment. Short-term impacts from tractor yarding and road renovation and decommissioning would contribute to the cumulative effect of stream sedimentation. However, the long-term benefit of road drainage and surfacing upgrading and road decommissioning would reduce potential sedimentation in the future.

Under Alternative 2, 5.2 miles of temporary road construction is proposed. A majority of the temporary roads would be built on old existing skid trails and overgrown access roads on relatively flat, stable terrain. The resulting temporary increase in road density would be mitigated by ripping, seeding, and mulching the roadbeds after use. Road decommissioning is proposed on 2.8 miles of existing road which is trending toward a cumulative reduction of road density in the 2 subwatersheds.

Since 1995, a total of 3,006 acres of timber harvest has occurred on BLM lands in the Big Butte Creek 5th field watershed: 2,552 acres using ground-based tractors, 368 acres using cable harvest methods, and 86 acres using helicopter. These acres were treated under the NWFP which included the use of Riparian Reserves to buffer streams and PDFs and BMPs to minimize cumulative watershed effects. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest chance of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. Due to the relatively flat terrain, ground-based logging is the most logical and economical logging method and this results in a large area logged using ground-based methods.

In the Big Butte Creek 5th field watershed, 1,215 acres of harvest has not yet been completed: 780 acres using ground-based harvest methods, 10 acres using cable systems,

and 425 using helicopter. Approximately 429 acres are located in the North Fork Big Butte Creek 6th field watershed where the Camp Cur project is proposed. All of these acres will be tractor logged.

A total of 572 acres of timber harvest has occurred since 1995 on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres using ground-based tractors and 173 acres using cable harvest methods. Helicopter was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest probability of sediment reaching streams. These acres were harvested following the NWFP which included Riparian Reserves on all streams to minimize the chance of sediment reaching stream channels.

Private timberlands are assumed to be at an early to mid-seral stage with high densities of roads and skid trails. Within the TSZ, 636 acres of private timberlands would remain in an early to mid-seral stage. Approximately 32 percent of the TSZ is managed at an early to mid-seral stage. This alternative would increase the amount of early seral conditions in the TSZ by 3 percent.

BLM projects planned for the future in the watershed would follow PDFs and would be designed to meet ACS objectives to maintain water quality.

3.6.4.4 Effects of Alternative 3 on Hydrology

Direct and Indirect Effects

Under Alternative 3, a total of 1,116 acres would be harvested in two separate subwatersheds: 276 acres in the Beaver Dam Creek subwatershed and 834 acres in the North Fork Big Butte Creek subwatershed. The intensity of this proposal equates to 1.3 percent of the Beaver Dam Creek 6th field subwatershed and 3.8 percent of the North Fork Big Butte Creek 6th field subwatershed. These units are located throughout the subwatersheds; therefore, the effects, such as increased sedimentation and runoff, would not be concentrated in one location, but spread over the landscape. Changes would be less noticeable than if the units were concentrated in one area.

Shelterwood harvest would occur on 14 acres under this alternative. The canopy closure remaining would be approximately 20 to 40 percent and the early seral condition of the subwatersheds would increase by 0.06 percent. This amount of harvest would have a low risk of increasing runoff at the subwatershed and site scale.

Stream temperature would not be affected as a result of this alternative because full Riparian Reserves would be used on harvest units. Precommercial thinning on 26 acres within Riparian Reserves would no remove trees over 8″ DBH. Stream temperature would not be affected because the canopy would be left intact and a 75′ no-cut buffer would protect the stream canopy. This project is proposed on intermittent streams which would also protect temperature because water would not be present during the summer when stream temperatures rise. This project would reduce stand densities and increase the growth rate of trees within the reserve. This would benefit Riparian Reserves and aquatic resources in the long-term at a localized scale, but young, overstocked stands would still remain in the majority of Riparian Reserves

In the North Fork Big Butte Creek 6th field subwatershed, 173 acres of harvest is proposed within in the TSZ where rain-on-snow events can cause peak flow increases. This subwatershed also has a low risk for increases in peak flow as a result of proposed treatments because only 26 of the 173 acres proposed for harvest in the TSZ would result in a crown closure less than 30 percent. The remaining 147 acres proposed for harvest in the TSZ are density management treatments which would result in a crown closure of 40 to 60 percent and would not contribute to peak flow increases. The 26 acres resulting in less than 30 percent crown closure equates to an intensity of 0.1 percent and, therefore,

would not substantially contribute to the percentage of the subwatershed with less than 30 percent crown closure. Density management units are low risk for changes in peak flow because the remaining canopy closure would be above 30 percent (WPN 1999, IV-11). At the subwatershed level, changes in peak flow due to openings in the TSZ are at a low risk because only 25 percent of the North Fork Big Butte Creek 6th field subwatershed is in the TSZ.

The types of harvest methods that would be used in the project are tractor, Feller-Buncher, and cable. Generally, tractor causes the most ground disturbance, followed by cable, and helicopter causes the least ground disturbance. Ground disturbance from tractor yarding would be minimized by using designated and existing skid trails. Under Alternative 3, 5.0 miles of temporary road would be constructed. These roads would be located on or near ridgetops away from stream channels. These roads would not deliver sediment to stream channels because they would be located on the ridgetop and would be ripped and mulched within the same season as the roads are constructed.

This alternative includes a stewardship project that would be completed over a period of approximately 10 years. This proposal involves a variety of projects designed to reestablish natural stands from pine plantations while accomplishing other restoration activities, such as fencing springs, spring development, road decommissioning, and ripping skid trails.

In the stewardship project, 204 acres would be treated in the Beaver Dam Creek 6th field watershed and 92 acres would be treated in the North Fork Big Butte Creek 6th field watershed. Treatment on these acres involves thinning the pines to release the mixed-conifer understory. Harvest would be accomplished with a low ground pressure Feller-Buncher and would involve whole tree harvesting to the landings. This project would not contribute sediment to local stream channels because machinery would be kept outside Riparian Reserves and no transport mechanism, such as skid trails, would exist to allow sediment to move to stream channels.

Approximately 30 acres are proposed for Riparian Reserve thinning under the stewardship project. This would promote the growth of larger conifers adjacent to stream channels which would benefit riparian areas by providing larger trees for shade and large wood for stream structure.

Six temporary roads, totaling 1.5 miles, would be built to accomplish the pine plantation thinning. These roads would be decommissioned after use by scarifying, ripping, or subsoiling the roadbed followed by stabilization through erosion control measures, such as grass seeding and mulching.

Approximately 204 acres of this proposed project are located in the Vine Maple drainage that was deferred for a period of 10 years, starting in 1993, from surface-disturbing management activities such as timber harvest. This watershed was deferred for the large amount of openings in the TSZ. None of the proposals in the stewardship project are located in the TSZ so there would be no increase in cumulative effects from openings in the TSZ. The stewardship project is restorative in nature and this project would help to reduce cumulative effects in the watershed over the long-term.

In Alternative 3, 3.5 miles out of 123 miles of road in the project area would be improved. Many more miles of road need improvement, but since they would not be used in this project they would not receive treatment. This would improve the drainage and condition of roads in the subwatershed to reduce erosion and subsequent sedimentation. Improving 3.5 miles of road would benefit water quality locally by reducing erosion and subsequent sedimentation.

Road decommissioning would include 2.2 miles of full decommissioning and 0.6 miles of partial decommissioning. Fully decommissioning roads includes ripping the roadbed which would reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning, the cross-drain and stream-crossing culverts would be pulled and the road blocked. Pulling culverts would cause a short-term increase in sediment that would be minimized with the use of PDFs. Decommissioning would benefit water quality by increasing infiltration, decreasing the total amount of open roads and road density, removing the risk of pipes becoming plugged and causing fill slope failures, and reducing the amount of potential erosion from the road.

Road density would decrease in the project area from 5 miles per square mile to 4.8 miles per square mile. Although this is still considered a high road density, the trend is to reduce overall road miles. Reducing road density is difficult in watersheds with a checkerboard ownership pattern because of opposition to close and decommission roads. As a result, roads that should be closed are left open and stable roads that should be left open are closed in order to reduce densities.

For the effects of restoration projects, see Section 3.6.4.2 Effects Common to All Action Alternatives on Hydrology.

Cumulative Effects

The dominant cumulative effect in this watershed is the extensive deposition of sediments found throughout the stream system. The existing cumulative effects as described in the affected environment would be additive to the effects resulting from this alternative. Short-term impacts from tractor yarding and road renovation and decommissioning would contribute to the cumulative effect of stream sedimentation. However, the long-term benefit of road drainage and surfacing upgrading and decommissioning of roads would reduce potential sedimentation in the future.

Under this alternative, a total of 5.0 miles of temporary road would be constructed. A majority of the temporary roads would be built on old existing skid trails and overgrown access roads on relatively flat, stable terrain. The temporary increase the road density would be mitigated by ripping, seeding, and mulching the roadbeds after use. Road decommissioning is proposed on 2.8 miles of road which is trending toward a cumulative reduction of road density in the two subwatersheds.

Since 1995, a total of 3,006 acres of timber harvest has occurred on BLM lands in the Big Butte Creek 5th field watershed: 2,552 acres using ground-based tractors, 368 acres using cable harvest methods, and 86 acres using helicopter. These acres were treated under the NWFP which included Riparian Reserves to buffer streams and the use of PDFs and BMPs to minimize cumulative watershed effects. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest chance of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. Due to the relatively flat terrain, ground-based logging is the most logical and economical logging method and results in a large area logged using ground-based methods.

In the Big Butte Creek 5th field watershed, 1,215 acres of harvest has not yet been completed: 780 acres using ground-based methods, 10 acres using cable systems, and 425 using helicopter. Approximately 429 acres are in the North Fork Big Butte Creek 6th field watershed where the Camp Cur project is proposed. All of these acres will be tractor logged.

Since 1995, a total of 572 acres of timber harvest has occurred on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres using ground-based tractors and 173 acres using cable harvest methods. Helicopter was not used as a method to harvest

timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest probability of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. These acres were harvested following the NWFP which included Riparian Reserves on all streams, minimizing the chance for sediment to reach stream channels.

Private timberlands are assumed to be at an early to mid-seral stage with high densities of roads and skid trails. Within the TSZ, 636 acres of private timberlands would remain in an early to mid-seral stage. Approximately 32 percent of the TSZ is managed at an early to mid-seral stage. This alternative would increase the amount of early seral conditions in the TSZ by less than 1 percent and would have a low risk to changes in peak flows.

BLM projects planned for the future in the watershed would follow PDFs and would be designed to meet ACS objectives to maintain water quality.

3.6.4.5 Effects of Alternative 4 on Hydrology

Direct and Indirect Effects

Under Alternative 4, a total of 832 acres would be harvested in 2 separate subwatersheds: 235 acres in the Beaver Dam Creek subwatershed and 587 acres in the North Fork Big Butte Creek subwatershed. The intensity of this proposal equates to 1.1 percent of the Beaver Dam Creek 6th field subwatershed and 2.7 percent of the North Fork Big Butte Creek 6th field subwatershed. These units are located throughout the subwatersheds; therefore, effects such as increased sedimentation and runoff would not be concentrated in one location, but spread over the landscape. Changes would be less noticeable than if the units were concentrated in one area.

Under this alternative, 14 acres of shelterwood harvest are proposed. The canopy closure remaining would be approximately 20 to 40 percent and the early seral condition of the watershed would increase by 0.06 percent. This would have a low risk of increasing runoff at the subwatershed and site scales.

Stream temperature would not be affected as a result of this alternative because full Riparian Reserves would be used on harvest units. Precommercial thinning would occur on 10 acres within Riparian Reserves and no trees over 8″ DBH would be removed. This would not affect stream temperature because the canopy would be left intact and a 75′ no-cut buffer would protect the stream canopy. This project is proposed on intermittent streams which would also protect temperature because water would not be present during the summer when stream temperatures rise. This project would reduce stand densities and increase the growth rate of trees within the reserve. This would benefit Riparian Reserves and aquatic resources in the long-term at a localized scale, but young, overstocked stands would still remain in the majority of Riparian Reserves

In the North Fork Big Butte Creek 6th field subwatershed, 135 acres are proposed for harvest in the TSZ where rain-on-snow events can cause peak flow increases. All the acres proposed for treatment under this alternative are density management units which would result in a remaining canopy closure of approximately 40 to 60 percent. Density management units are low risk for changes in peak flow because the remaining canopy closure is above 30 percent (WPN 1999, IV-11). At the subwatershed level, changes in peak flow due to openings in the TSZ are at a low risk because only 25 percent of the North Fork big Butte Creek 6th field subwatershed is in the TSZ.

The two types of harvest methods that would be used in the project are tractor and cable. Generally, tractor causes the most ground disturbance, followed by cable, with helicopter causing the least ground disturbance. Ground disturbance from tractor yarding would be minimized by using designated and existing skid trails. Under Alternative 4, 3.0 miles of temporary road would be constructed. These roads would be located on or near ridgetops

away from stream channels. These roads would not deliver sediment to stream channels because they would be located on the ridgetop and would be ripped and mulched within the same season as the roads are constructed.

This alternative includes a stewardship project that would be completed over a period of approximately 10 years. This proposal involves a variety of projects designed to reestablish natural stands from pine plantations while accomplishing other restoration activities, such as fencing springs, spring development, road decommissioning, and ripping skid trails.

In the Beaver Dam Creek 6th field watershed, 205 acres would be treated in the stewardship project and in the North Fork Big Butte Creek 6th field watershed, 92 acres would be treated. Treatment on these acres would involve thinning the pines to release the mixed-conifer understory. Harvest would be accomplished with a low ground pressure Feller-Buncher and would involve whole tree harvesting to the landings. This project would not contribute sediment to local stream channels because machinery would be kept outside Riparian Reserves and no transport mechanism, such as skid trails, would be present to allow sediment to move to stream channels.

Under the stewardship project, 30 acres are proposed for Riparian Reserve thinning. This would promote the growth of larger conifers adjacent to stream channels which would benefit riparian areas by providing larger trees for shade and large wood for stream structure.

Six temporary roads, totaling 1.5 miles, would be built to accomplish the pine plantation thinning. These roads would be decommissioned after use by scarifying, ripping, or subsoiling the roadbed followed by stabilization through erosion control measures such as grass seeding and mulching.

Approximately 204 acres of this proposed project are located in the Vine Maple drainage that was deferred for a period of 10 years, starting in 1993, from surface-disturbing management activities such as timber harvest. This watershed was deferred for the large amount of openings in the TSZ. None of the proposals in the stewardship project are located in the TSZ so there would be no increase in cumulative effects from openings in the TSZ. The stewardship project is restorative in nature and this project would help to reduce cumulative effects in the watershed over the long-term.

In Alternative 4, 3.2 miles out of 123 miles of road in the project area would be improved. Many more miles of road need improvement, but since they would not be used in this project they would not receive treatment. This would improve the drainage and condition of roads in the subwatershed to reduce erosion and subsequent sedimentation. Improving 3.2 miles of road would benefit water quality locally by reducing erosion and subsequent sedimentation.

Road decommissioning would include 1.5 miles of full decommissioning and 0.6 mile of partial decommissioning. Fully decommissioning roads includes ripping the roadbed which would reduce compaction and increase the rate of infiltration in the road prism. In full and partial decommissioning, the cross-drain and stream-crossing culverts would be pulled and the road blocked. Pulling culverts would cause a short-term increase in sediment that would be minimized with the use of PDFs. Decommissioning would benefit water quality by increasing infiltration, decreasing the total amount of open roads and road density, removing the risk of pipes becoming plugged and causing fill slope failures, and reducing the amount of potential erosion from the road.

Road density would decrease in the project area from 5 miles per square mile to 4.8 miles per square mile. Although this is still considered a high road density, the trend is toward reducing overall road miles. Reducing road density is difficult in watersheds with a

checkerboard ownership pattern because of opposition to close and decommission roads. As a result, roads that should be closed are left open and stable roads that should be left open are closed in order to reduce densities.

For the effects of restoration projects, see Section 3.6.4.2 Effects Common to All Action Alternatives on Hydrology.

Cumulative Effects

The dominant cumulative effect in this watershed is the extensive deposition of sediments found throughout the stream system. Effects from this alternative would be additive to those described in the affected environment. Short-term impacts from tractor yarding and road renovation and decommissioning would contribute to the cumulative effect of stream sedimentation. However, the long-term benefit of road drainage and surfacing upgrading and road decommissioning would reduce potential sedimentation in the future.

A total of 3.0 miles of temporary road would be constructed under this alternative. A majority of the temporary roads would be built on old existing skid trails and overgrown access roads on relatively flat, stable terrain. This temporary increase in the road density would be mitigated by ripping, seeding, and mulching the roadbeds after use. Road decommissioning is proposed on 2.8 miles of road which is trending toward a cumulative reduction of road density in the 2 subwatersheds.

Since 1995, a total of 3,006 acres of timber harvest has occurred on BLM lands in the Big Butte Creek 5th field watershed: 2552 acres using ground-based tractors, 368 acres using cable harvest methods, and 86 acres were using helicopter. These acres were treated under the NWFP which included Riparian Reserves to buffer streams and the use of PDFs and BMPs to minimize cumulative watershed effects. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest chance of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. Due to the relatively flat terrain, ground-based logging is the most logical and economical logging method resulting in a large area logged using ground based methods.

In the Big Butte Creek 5th field watershed, 1,215 acres of harvest has not yet been completed: 780 acres using ground-based methods, 10 acres using cable systems, and 425 using helicopter. Approximately 429 acres are in the North Fork Big Butte Creek 6th field watershed where the Camp Cur project is proposed. All of these acres will be tractor logged.

Since 1995, a total of 572 acres of timber harvest has occurred on BLM lands in the South Fork Rogue River 5th field watershed: 399 acres using ground-based tractors and 173 acres using cable harvest methods. Helicopter was not used as a method to harvest timber. Ground-based tractor logging causes the greatest amount of ground disturbance and would have resulted in the greatest probability of sediment reaching streams. Ground-based logging also causes the greatest amount of compaction among logging methods. These acres were harvested following the NWFP which included Riparian Reserves on all streams, minimizing the chance for sediment to reach stream channels.

Private timberlands are assumed to be at an early to mid-seral stage with high densities of roads and skid trails. Within the TSZ, 636 acres of private timberlands would remain in an early to mid-seral stage. Approximately 32 percent of the TSZ is managed at an early to mid-seral stage. This alternative would increase the amount of early seral conditions in the TSZ by less than 1 percent and would have a low risk to changes in peak flows.

BLM projects planned for the future in the watershed would follow PDFs and would be designed to meet ACS objectives to maintain water quality.

3.7 Fish and Aquatic Habitat

3.7.1 Methodology

The information in this section is derived from Aquatic Habitat Inventories completed in 1996 and 1997 by the Oregon Department of Fish and Wildlife (ODFW), the Central Big Butte Creek and Lost Creek watershed analyses, BLM riparian inventories, BLM temperature monitoring data, ODFW fish presence/absence surveys, and stream habitat surveys completed in 1997 by BLM fisheries professionals.

3.7.2 Assumptions

The project area analyzed in this section includes the North Fork Big Butte Creek 6th field watershed, the Upper South Fork Big Butte Creek 6th field watershed, and the Beaver Dam Creek 6th field watershed. There are no effects anticipated to fish or aquatic habitat outside of these boundaries. No direct, indirect, or cumulative effects are expected to occur at the 5th field watershed scale. Short-term effects are defined as those effects lasting less than five years; long-term effects are defined as those lasting five years or longer. It is assumed logging on private timber lands would continue to occur according to the standards required under the Oregon Forest Practices Act (OFPA).

3.7.3 Affected Environment

The proposed project area includes parts of 2, 5th field watersheds: Big Butte Creek and South Fork Rogue River and 3, 6th field watersheds: Beaver Dam Creek, North Fork Big Butte Creek, and Upper South Fork Big Butte Creek. The portions of the watersheds in which these projects occur were analyzed in the Central Big Butte Creek and Lost Creek Watershed Analysies.

Fish-bearing streams within the project area include North Fork Big Butte Creek, Camp Creek, Titanic Creek, Rancheria Creek, Mule Creek, Cedar Springs Creek, Beaver Dam Creek, Parsnip Creek, and Vine Maple Creek. These streams have been surveyed and are known to contain steelhead/rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*O. clarki*), and sculpin (*Cottus* species). Beaver Dam, Parsnip, and Vine Maple creeks only contain resident cutthroat trout because these streams are located above Lost Creek Reservoir; therefore, anadromous fish are unable to reach this habitat. Coho salmon (*O. kisutch*) have been documented in North Fork Big Butte Creek below the confluence of Mule Creek, but repeated surveys have not found coho within the project area. However, coho salmon Critical Habitat extends into North Fork Big Butte, Titanic, Mule, Cedar Springs, and Camp creeks because there are no natural barriers on these streams which would prevent coho from utilizing them. Essential Fish Habitat is identical to coho salmon Critical Habitat within the project area. Chinook salmon (*O. tshawytscha*) spawn in the lower reaches of South Fork Big Butte Creek below the large falls known as Butte Falls, but they have never been documented higher up in the watershed in streams within the project area.

Riparian areas adjacent to the fish-bearing streams within these watersheds were previously logged, removing most of the large tree canopy cover that provided shade and a supply of large wood. Stream shade is now provided by dense brush such as red osier dogwood, willows, ninebark, spirea, and vine maple. Currently, streams throughout the project area are lacking in large woody debris and do not have an adequate future supply of large wood. This has resulted in a shortage of pool habitat and cover for rearing fish. A large wood placement project was successfully completed in 1999 on North Fork Big Butte Creek in Section 27.

The original native forests in the Riparian Reserves along Mule and Horseshoe creeks were clearcut in the 1960s and replaced with pine plantations. These trees have not adapted to the soils and climate of this watershed and, as a result, growth is stunted and many have broken tops. The plantations were underplanted with Douglas-fir seedlings in the late 1970s and early 1980s. This understory, now up to 8 feet tall, will provide a better long-term source of large woody material when it matures than the current pine overstory.

Livestock grazing has further impacted the growth of riparian species by trampling and continual browsing of shrubs and saplings. Bank stability has been affected by livestock in Beaver Dam, Vine Maple, and Parsnip creeks. Active erosion is occurring at several sites, increasing sediment loads in these streams. Three areas are protected by livestock exclosure fencing that was installed in the 1980s on Vine Maple and Beaver Dam creeks. These exclosures were repaired in 2003 and now provide protection for the riparian areas and streambanks. Riparian vegetation, including willows and spirea, is beginning to flourish, streambanks are stabilizing, and stream width/depth ratios are decreasing within the exclosures. Sedges, rushes, and other native aquatic vegetation are abundant within the exclosures, providing cover for rearing fish and habitat for aquatic macroinvertebrate populations.

Culverts that are undersized or perched can block migration of both adult and juvenile fish to upstream habitat. Two culverts within the project area have been identified as fish passage barriers. One of these is located near the mouth of Camp Creek and the other is located on Horseshoe Creek. These barriers affect both resident and anadromous fish by reducing the amount of available spawning and rearing habitat.

Road densities within the project area are high, with approximately 5 miles of road per square mile. Roads are one of the main sources of stream sedimentation, especially those that have natural, ungraveled surfaces and cross or closely parallel streams. Sediment can enter streams by traveling down ditchlines to stream crossings or at improperly placed ditchline cross-drains that empty into streams.

Elevated soil compaction levels have been identified within the project area. This has occurred due to past and current tractor logging, skid roads, logging landings, and road building, as well as intensive grazing practices. Soil compaction reduces water infiltration during storm events and can increase peak flows in stream channels. These flow increases can cause bank erosion that contributes sediment to streams, affecting spawning habitat by reducing intergravel dissolved oxygen and smothering incubating eggs. Sediment can also harm aquatic macroinvertebrate populations which provide a source of food for fish. Suspended sediment, or turbidity, can affect fish by reducing prey visibility and harming gill structures.

ODFW aquatic habitat inventories were conducted on North Fork Big Butte Creek within the project area in 1996 and 1997. These surveys found low amounts of key pieces of large wood and high percentages of fines (silt, sand, organics) in stream substrates. The two stream reaches upstream of Phillips Creek exhibited higher percentages of actively eroding banks, ranging from 12.6 percent to 13.8 percent. Streams with greater than 10 percent actively eroding banks are considered to be functioning at risk. In the lowermost reach, from the mouth to just below the Butte Falls/Prospect Highway, 23.8 percent of banks are actively eroding. Although this is located downstream of the project area, it may be indicative of conditions originating upstream. There are no streams within the project area listed under ODEQ 303(d) rules as being water quality limited.

3.7.3.1 Key Aquatic Habitat Elements

Off-Channel Habitat

Beaver activity along North Fork Big Butte Creek and Beaver Dam Creek has formed off-channel habitat, such as side channels and alcoves, in the project area. This type of habitat is favored for use by rearing juvenile coho salmon.

Average Wetted Width/Maximum Depth Ratio

ODFW aquatic habitat inventories completed in 1996 found the stream reaches on North Fork Big Butte Creek located within the project area have low width/depth ratios, ranging from 7.5 to 8.5. For stream types in this area, width/depth ratios less than 12 are considered to be in properly functioning condition.

Temperature

Under the Clean Water Act requirements, ODEQ rules have set the 7-day average maximum summer temperature limit as 64.4 degrees Fahrenheit (° F) in the fish-bearing streams within this project area. No streams within the project area are listed under ODEQ 303(d) rules for exceeding these temperature requirements, although the mainstem of Big Butte Creek from the mouth to river mile 11.6 (downstream from the project area) is 303(d)-listed for summer temperature and dissolved oxygen. Streams within the project area are spring-fed, so temperatures remain relatively stable even though many reaches are lacking shade. Mule Creek, Camp Creek at the confluence with North Fork Big Butte Creek, Rancheria Creek above the confluence with Twincheria Creek (approximately 3 miles downstream of the project area), and North Fork Big Butte Creek above Jackass Creek have been monitored by the BLM for temperature (see Table 3-9 and Figure 3-3). North Fork Big Butte Creek temperature was taken above Jackass Creek, just downstream from the beginning of BLM land at the property boundary. The stream temperature is most likely influenced by lack of shade on private timber land immediately upstream.

Table 3-9. 7-Day Maximum Temperatures for Streams within the Camp Cur Project Area

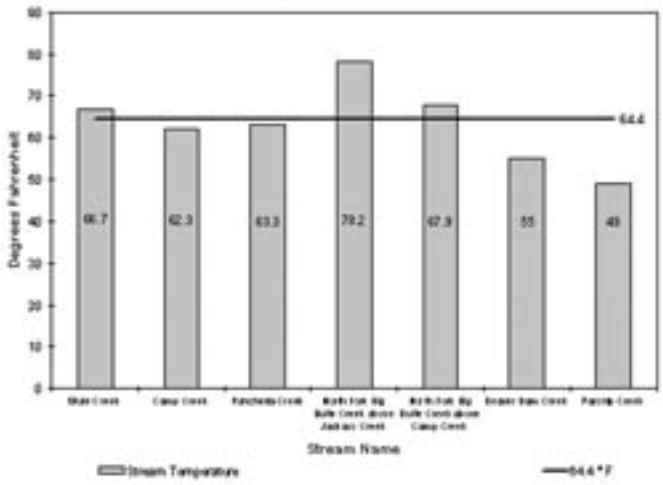
Stream	Years Monitored	7-day Maximum Temperature
Mule Creek	1994	66.7° F
Camp Creek	1994, 1996, 1998, 1999, 2001, 2004	62.3° F
Rancheria Creek	1994, 1996, 1997, 2003	63.3° F
North Fork Big Butte Creek, above Jackass Creek	1994, 2003, 2004	78.2° F
North Fork Big Butte Creek, above confluence with Camp Creek	1994	67.9° F
Beaver Dam Creek	July 1997	55° F
Parsnip Creek	July 1997	49° F

NOTE: Temperature readings were taken on Beaver Dam and Parsnip creeks in July 1997 during BLM aquatic habitat inventories.

Suspended Sediment – Intergravel Dissolved Oxygen/Turbidity

The alteration in the drainage network from roads has contributed to a general increase in road-related sediment reaching the streams. Livestock accessing streams for water has also resulted in sediment increases in the immediate area of these sites, although the amount has not been quantified. ODFW surveys in 1996 found average percentages of sand/silt/organics on North Fork Big Butte Creek within the project area ranged from 31 percent to 54 percent. BLM aquatic habitat surveys in 1997 documented high percentages of sand/silt/organics in riffle substrates on Beaver Dam and Parsnip creeks.

Figure 3-3. Stream Temperatures in the Camp Cur Project Area



Substrate Character/Embeddedness

Gravel and cobble are the dominant substrate only on the reaches located downstream of Camp Creek. ODFW surveys in 1996 found average percentages of sand/silt/organics on North Fork Big Butte Creek within the project area ranged from 31 percent to 56 percent. BLM aquatic habitat surveys in 1997 also documented high percentages of sand/silt/organics in riffle substrates on Beaver Dam and Parsnip creeks.

Large Woody Debris

ODFW aquatic habitat inventories in 1996 found a lack of large wood in North Fork Big Butte Creek, averaging 18 key pieces of wood per mile. Streams with less than 30 key pieces of wood per mile within the western Cascades region are considered not properly functioning. BLM surveys in 1997 found Beaver Dam Creek averaged slightly more than one key piece of wood per mile. Parsnip Creek had higher levels of large wood with an average of 57 key pieces per mile, which is considered to be functioning at risk.

Pool Habitat and Pool Quality

Lack of large woody debris has resulted in a low number of pools. ODFW aquatic habitat surveys on North Fork Big Butte Creek in 1996 found the percent of pool habitat ranged from 3.5 percent to 11 percent. BLM surveys in 1997 found Beaver Dam Creek averaged 49 percent and Parsnip Creek averaged 53 percent pool habitat. Very little large woody debris is available for pool cover, resulting in low pool quality and very few pools deeper than one meter.

Large Pools

Very few large pools exist in the project area due to insufficient large wood in the streams. Surveys on North Fork Big Butte Creek found only 12 pools were greater than 1 meter deep within the project area.

Streambank Condition

Cattle crossings and livestock watering areas have altered streambanks on Beaver Dam Creek, North Fork Big Butte Creek between Jackass and Mule creeks, and North Fork Big Butte Creek between Camp and Phillips creeks, most of which is located on private lands. However, much of the area on BLM is stabilized by thick, brushy vegetation and cobbles. ODFW surveys in 1996 found bank stability averages 77 percent overall on North Fork Big Butte Creek. Bank stability less than 80 percent is considered to be not properly functioning.

Floodplain Connectivity

Road construction has constricted and channelized stream channels, reducing channel sinuosity. “Stream cleaning” removed large wood debris jams along streams in the project area. In addition, historical beaver trapping reduced populations of this animal whose dam-building activities created pools, side channels, alcoves and floodplain habitat. The combination of these human activities has resulted in a disconnection of streams with the adjacent floodplains. This condition leads to channel downcutting and lowered water tables that alter streamside vegetation communities.

Peak/Base Flows

Human activities that alter peak and base flows include the removal of vegetation by timber harvest and wildfire, road building, and soil compaction caused by tractor logging and livestock trampling. Clear-cutting in the TSZ has resulted in peak flow increases during rain-on-snow events. These flow increases can cause bank erosion that contributes sediment to streams. In addition, water diversion for irrigation purposes has regularly reduced Beaver Dam Creek base flows within the project area during the summer months. Decreased base flows can increase stream temperatures which creates physiological stress to fish populations.

Riparian Reserves

Past logging activities in Riparian Reserves removed much of the large conifer canopy along streams. Persistent frost pockets have inhibited the recovery of the conifer overstory. Brush is now the dominant riparian vegetation on many stream reaches and there is a lack of shade on private timber lands resulting from narrow riparian buffers. Stream reaches surveyed by the BLM in 1997 found canopy closures ranged from as little as 5 percent to 23 percent on Beaver Dam Creek and from 17 percent to as much as 75 percent on Parsnip Creek.

3.7.4 Environmental Consequences

Table 3-10. Comparison of Effects on Fish and Aquatic Habitat from All Alternatives

Issue: Transient Snow Zone (peak flows)				
Past Actions	• Clear-cutting in TSZ on both BLM and private timber lands			
Present Actions	• Clear-cutting on private timber lands in TSZ			
Current Conditions	• Large openings in TSZ increase peak flows during rain-on-snow events			
Future Actions	• Clear-cutting on private timber lands in TSZ			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No action	• Regeneration harvest of 26 acres in TSZ to control root rot disease	• Regeneration harvest of 26 acres in TSZ to control root rot disease	• No harvest in TSZ
Cumulative Effects	• New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time • Increased peak flows would continue to scour banks and add sediment to streams	• Small increase in openings in TSZ would result in no detectable increase in peak flows • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time	• Small increase in openings in TSZ would result in no detectable increase in peak flows • New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time	• New clear-cuts in TSZ on private lands would continue to affect peak flows • Old clear-cuts would recover over time
Issue: Road Density				
Past Actions	• Road construction near streams and in riparian areas on both BLM and private timber lands			
Present Actions	• 3 miles of road decommissioned under Titanic Timber Sale			
Current Conditions	• High road density adds sediment to streams and increases peak flows			
Future Actions	• Lack of road maintenance on private lands near streams and in riparian areas			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No action	• 2.2 miles road full decommissioning • 0.5 miles road relocation	• 2.2 miles road full decommissioning • 0.5 miles road relocation	• 1.5 miles road full decommissioning • 0.5 miles road relocation
Cumulative Effects	• Continued impacts from high road densities adding sediment to streams and increasing peak flows	• Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands	• Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands	• Reduced road densities and related impacts on public lands • Continued impacts from high road densities on private lands
Issue: Riparian Condition				
Past Actions	• Logging in riparian areas on both BLM and private timber lands has removed large conifers • Grazing reduced seedling recruitment • Jackass Creek road relocation, precommercial thinning under Fred-N-Jack Timber Sale, and exclosure fences have improved riparian areas			

Table 3-10. Comparison of Effects on Fish and Aquatic Habitat from All Alternatives				
Present Actions	• Logging on private timber lands in riparian areas; grazing			
Current Conditions	• Lack of shade and large wood has increased stream temperatures and reduced habitat complexity			
Future Actions	• Logging on private timber lands in riparian areas following OFPA rules • Grazing • Beaver Dam Creek mini exclosures			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No action	• 56 acres of precommercial thinning in riparian • 30 acres riparian tree planting • Livestock exclosures	• 56 acres of precommercial thinning in riparian • 30 acres riparian tree planting • Livestock exclosures	• 40 acres of precommercial thinning in riparian • 30 acres riparian tree planting • Livestock exclosures
Cumulative Effects	• Continued impacts to riparian vegetation on private lands • Riparian Reserves will slowly recover on BLM lands providing shade and large wood, reducing stream temperatures, and creating pool habitat	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands	• Improved riparian conditions on public lands • Continued impacts to riparian vegetation on private lands
Issue: Soil Compaction				
Past Actions	• 3,000 acres of tractor logging on BLM lands since 1998 • Tractor logging on private timber lands, grazing, and road construction has compacted soils • 300 acres of ripping under Rancheria Timber Sale has reduced compaction			
Present Actions	• 436 acres of tractor logging, 3 miles of road fully decommissioned, and 35 acres of skid trail ripping under Titanic Timber Sale • Tractor logging on private timber lands • Road construction on private lands • Grazing			
Current Conditions	• Soil compaction reduces infiltration, increasing runoff and peak flows			
Future Actions	• Tractor logging and road construction on private timber lands • Grazing			

Table 3-10. Comparison of Effects on Fish and Aquatic Habitat from All Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Proposed Actions	• No action	• 803 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 2.2 miles of road decommissioning • Livestock exclosures on springs and streams	• 783 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 2.2 miles of road decommissioning • Livestock exclosures on springs and streams	• 517 acres of tractor logging using designated skid trails • Ripping skid trails in regeneration and shelterwood harvest units • 1.5 miles of road decommissioning • Livestock exclosures on springs and streams
Cumulative Effects	• Compaction impacts would continue on private lands • Some compaction would be reduced from road decommissioning and slow natural recovery on BLM lands • Current peak flow increases would continue to affect stream channels	• Increase of 96 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 13 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures • Compaction impacts would continue on private lands	• Increase of 94 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 5 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures. • Compaction impacts would continue on private lands	• Increase of 62 acres of soil compaction (12% of harvest acres) due to tractor logging would be offset by ripping 2 acres of skid trails in shelterwood and regeneration harvest units, road decommissioning, and livestock exclosures • Compaction impacts would continue on private lands

3.7.4.1 Effects of Alternative 1 (No Action) on Fish and Aquatic Habitat

Direct and Indirect Effects

Under the No Action alternative, no timber harvest, livestock exclosure fencing, culvert replacement, riparian planting, road improvements, or road decommissioning projects would take place. The culverts identified for replacement or removal would not be replaced and would continue to block fish passage and limit gravel inputs to Camp Creek and Horseshoe Creek. Roads which are currently contributing sediment to the stream system would be left in their existing condition. Road densities would remain high within the watershed.

The existing vegetation within the Riparian Reserves does not provide certain necessary elements for healthy aquatic ecosystems, such as shade and large woody debris. Reduced recruitment of seedlings and suppressed growth of tree species would continue to occur in frost pockets and areas accessible to livestock. In areas where the Riparian Reserves are currently in an overstocked or early to mid-successional condition, late-successional characteristics would develop at a naturally slow rate due to competition for light, moisture, and nutrients.

This alternative would maintain current degraded aquatic habitat conditions and fish passage barriers. Maintaining this current situation would indirectly result in a continuation of the current reduced freshwater survival of salmonids and delayed or obstructed fish migration.

Additionally, this alternative would indirectly contribute to stream sedimentation by delaying or foregoing renovation of the road system. This would have a negative effect on fisheries and aquatic resources by contributing to habitat degradation over the long-term.

Cumulative Effects

Past Actions

In the past, clear-cutting occurred in the TSZ on both BLM and private timber lands. Road construction near streams and in riparian areas on both BLM and private timber lands also was a standard practice. Tractor logging on private timber lands, grazing, and road construction has compacted soils. Logging in riparian areas on both BLM and private timber lands has removed large conifers, and grazing has reduced seedling recruitment. Exclosure fences along North Fork Big Butte Creek and Beaver Dam Creek have improved riparian areas.

Since 1998, approximately 3,000 acres of tractor logging has occurred on BLM-administered land. Previous timber harvest activities on federal lands within the project area include the B Lost Timber Sale (2004), Fred-N-Jack Timber Sale (2000), and Rancheria Timber Sale (1999). The B Lost Timber Sale commercially thinned 34 acres in the Beaver Dam Creek 6th field watershed. Seven acres were harvested by tractor logging and the remainder by means of a cable yarder. The Fred-N-Jack Timber Sale occurred on 1,389 acres in T34S, R2E, Sections 24, 26, and 35; T34S, R3E, Sections 19, 29, and 31; and T35S, R2E, Sections 1 and 3. Harvest treatments consisted of regeneration harvest, density management/commercial thinning, and individual tree selection. Precommercial thinning in the Riparian Reserve was also completed under the Fred-N-Jack Timber Sale. Restoration projects completed under the timber sale included a large wood placement project and relocation of a road outside the Riparian Reserve on Jackass Creek. The Rancheria Timber Sale occurred on 950 acres of second-growth timber in T34S, R3E, Sections 25 and 35, and T35S, R3E, Sections 1, 2, 3, 11, 12, and 13. Harvest treatments consisted of commercial thinning and density management. In addition, approximately 300 acres of previously compacted soils in harvest units were ripped to increase soil productivity.

Present Actions

Clearcutting is presently occurring on private timber lands in the TSZ. Logging on private timber lands in riparian areas, following OFPA rules, is occurring. Tractor logging and road construction on private timber lands is ongoing. Grazing on both BLM and private lands is continuing to occur.

The Titanic Timber Sale occurs in the same area as the proposed Camp Cur Timber Sale. This sale was enjoined in 1999 following litigation that invalidated the Biological Opinion on fish for the sale. Consultation was re-initiated and a new Letter of Concurrence was received from the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) in March 2005. The Titanic Timber Sale is currently tractor logging 436 acres and ripping skid trails totaling approximately 35 acres. Full decommissioning of three miles of road in the Titanic Timber Sale is also being implemented.

Future Actions

On private timber lands in the project area, the following activities are expected to continue: clear-cutting in the TSZ; logging in riparian areas, following OFPA rules; tractor logging; and a lack of road maintenance near streams and in riparian areas. Some new road construction may occur on private lands. Grazing will continue to occur on both BLM and private lands within the project area.

Combined Effects with the Proposed Action
As the Riparian Reserve vegetation slowly continues to develop in areas with intact conifer canopies and delivers material to the streams over the long-term, a positive cumulative effect would result on BLM lands due to increased sizes and amounts of large wood contributed to the aquatic ecosystem. Pool habitat, shade, and cover for fish would slowly increase and contribute to improved stream temperatures and fish survival rates. Effects of riparian harvest on private timber lands would continue to affect aquatic habitat and fish by limiting shade and large wood.

Current levels of stream sedimentation would be increased as the condition of roads in the project area continues to deteriorate. Some roads may stabilize over time as they re-vegetate naturally; however, this may take many decades to achieve. The cumulative effect of roads is also dependent upon private landowners' activities and their use and maintenance of the transportation system in the watershed. Foregoing road renovation would have a negative cumulative effect on fisheries and aquatic resources by continuing sediment inputs to streams. Spawning habitat would be degraded and macroinvertebrate populations that provide a source of food for fish would be reduced.

Foregoing the culvert replacement and removals would continue to maintain current limited habitat access. This would contribute to the cumulative effect of lack of aquatic habitat connectivity and lack of spawning and rearing habitat.

The current effects of soil compaction, road densities, and TSZ harvest would continue to increase peak flows and subsequent bank scouring, increasing sedimentation and effects to fish habitat. Some soil decompaction may occur slowly over time on BLM lands as roads become naturally revegetated and old clearcuts recover in TSZ elevations.

Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon, SONC Critical Habitat, and Essential Fish Habitat (EFH) from Implementation of Alternative 1:

May Affect, Not Likely to Adversely Affect (NLAA)

The No Action Alternative would result in less than a negligible chance of "take" of this species. The No Action Alternative is considered "not likely to adversely affect" SONC coho salmon, and would not adversely modify SONC Critical Habitat and EFH.

3.7.4.2 Effects of Alternative 2 on Fish and Aquatic Habitat

Direct and Indirect Effects

No direct impacts are expected to occur to fish and aquatic habitat from all proposed timber harvest treatments. Reducing canopy cover below 40 percent in the proposed 28 acres of regeneration harvest and 80 acres of shelterwood harvest is not expected to alter the natural hydrologic regime because of the small amount of acreage affected by these harvest treatments.

Soil compaction caused by tractor logging on 803 acres is not expected to increase the amount of run-off to streams. Compaction would occur on designated skid trails, which would equate to 96 acres of compaction, or 12 percent of the total harvest acres. These effects would be ameliorated by maintaining Riparian Reserve buffers, ripping approximately 108 acres of skid trails following regeneration and shelterwood harvest, and using existing or designated skid trails for all other harvest. By restricting commercial harvest to areas outside Riparian Reserves, keeping tractors on designated skid trails, and ripping skid trails in regeneration and shelterwood harvest units following use, actual compacted acres would be minimized and the effects to peak flows are expected to be immeasurable.

No direct or indirect impacts are expected to occur to fish and aquatic habitat from stands identified for selection harvest, density management, or pine plantation thinning. These treatments would maintain the characteristics of a mature stand and would provide sufficient tree canopies to protect the long-term habitat elements necessary for healthy aquatic ecosystems.

Riparian precommercial thinning units in North Fork Big Butte Creek would be treated using hand-held equipment and material would be lopped and scattered. No heavy equipment would be used within these Riparian Reserves. There would be no effect to shade or large wood recruitment because all trees greater than 8″ DBH would be left intact and a 70′ no-cut buffer would be maintained along streams.

Riparian thinning units in the pine plantations would remove larger trees by means of low ground pressure equipment, such as a Feller-Buncher. One unit is adjacent to Mule Creek. The original native forests along Mule and Horseshoe creeks were clear-cut in the 1960s and replaced with pine plantations. These trees have not adapted to the soils and climate of this watershed and, as a result, their growth is stunted and many have broken tops. The plantations were underplanted with Douglas-fir seedlings in the late 1970s and early 1980s. The younger fir understory, now up to 8 feet tall, would be maintained so it can mature and provide a long-term source of shade and large wood to this stream. Although there would be a short-term direct effect to large wood recruitment by removing the nonnative pine overstory, in the long-term, the riparian condition would improve as the naturally-occurring native fir tree canopy dominates these sites.

This alternative would require the construction of 3.5 miles of temporary road for timber harvest. An additional 1.7 miles of temporary road would be constructed to access the pine plantation thinning units. These roads would be fully decommissioned following use by ripping with a subsoiler and seeding with native grasses. Two of these roads being used for the pine plantation thinning would cross intermittent streams. These roads could alter the hydrologic flow paths by compacting the soil and intercepting and redirecting surface flow at these two stream crossings. Temporary culvert crossings would be installed and the roads would be ripped following use to minimize these impacts. Although the current road density within the project area of five miles per square mile is considered high, the remainder of the proposed temporary roads would be located on ridges or on stable slopes and would not measurably affect the hydrology of the watershed. Full decommissioning of 2.2 miles of existing road would also offset the effects of this temporary road construction and result in a net decrease in road density within the project area. Improvement/ renovation of 3.5 miles of road would also result in a decrease in road-related sediment, further reducing the impacts to the aquatic ecosystem.

Replacement/removal of culverts can directly impact the aquatic system by disturbing stream banks, vegetation, and substrate. Although these actions can result in short-term increases in turbidity and sedimentation, they would result in a direct beneficial effect on the aquatic system in the long-term by restoring hydrologic connectivity and function and providing access to additional habitat currently unreachable by anadromous fish. Replacement of undersized culverts would also indirectly benefit the aquatic system by reducing the risk of road failure during high flow events.

There would be an indirect beneficial effect to aquatic habitat from the exclosure fencing of streams and springs within the project area. Reduced sedimentation and increased bank stability, as well as increased productivity of riparian vegetation, would result in improved water quality and productivity of both resident and anadromous fisheries. Developing these springs for off-site livestock watering would reduce current livestock trampling that adds sediment to springs.

Riparian planting would increase potential large wood and shade on streams, thereby reducing high stream temperatures and increasing cover and pool habitat for rearing fish.

The pump chance renovation would have a short-term impact by adding some sediment to the stream channel immediately below this activity. The quantity of sediment that would be disturbed by this activity is unknown.

A portion of BLM road # 34-3-14.1 would be relocated outside of the Riparian Reserve of North Fork Big Butte Creek to reduce impacts caused by direct inputs of sediment to the stream. Full decommissioning of 0.5 miles of road would occur and 0.5 miles of new road would be constructed upslope of this location. This would result in an immediate reduction in the sediment currently entering the stream from this road. PDFs requiring an erosion control device between the decommissioning action and the stream, and the application of seed and mulch would reduce any sediment resulting from this action to minimal levels.

Cumulative Effects

Past, Present, and Future Actions

These effects are the same as those described in Section 3.7.4.1, Effects of Alternative 1 (No Action) on Fish and Aquatic Habitat.

Combined Effects with the Proposed Action

Cumulative effects from the regeneration and shelterwood harvest treatments are not expected to increase the risk of peak flow events within the stream channel. Reducing the canopy closure below 40 percent on the amount of acreage affected would not be of a magnitude that would result in excessive runoff to stream channels. Restricting these harvest units to Matrix lands outside of Riparian Reserves minimizes the effects to fish and aquatic habitat. No negative cumulative effects to fish and aquatic resources would occur from any timber harvest prescriptions on Matrix lands within the timber sale.

The cumulative effects of timber harvest on private lands must also be considered along with the actions on public land. The majority of timber harvest on private land is occurring in the North Fork Big Butte Creek 6th field watershed, where there is 50 percent more private industrial timber lands than public lands. Although private timber companies are required to follow OFPA rules in riparian areas, they are not required to meet the same standards for protection of riparian areas that federal agencies must follow. As a result, a greater impact to the aquatic system is occurring in this subwatershed. Reduced riparian buffer widths on private timber lands, compared to those on BLM lands, have led to reduced shade and large wood recruitment. This affects aquatic habitat by reducing pool habitat and cover, and increasing stream temperatures.

The current effects of soil compaction, road densities, and TSZ harvest on private lands would continue to increase peak flows and subsequent bank scouring, consequently increasing sedimentation and effects to fish habitat.

The proposed road-related projects could have a negative effect on fisheries and aquatic resources in the short-term by adding to current high levels of stream sediment from road maintenance, renovation, decommissioning, and culvert replacement. However, by following PDFs, these effects would be minimized. A long-term, positive cumulative effect to fish and aquatic habitat is anticipated from reducing potential road-generated fine sediment by completing road maintenance, renovation, and decommissioning, and from the livestock exclosure fencing.

Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon, SONC Critical Habitat, and Essential Fish Habitat from Implementation of Alternative 2:

May Affect, Not Likely to Adversely Affect (NLAA)

Some effect to aquatic habitat may occur due to potential short-term sediment delivery to streams resulting from the planned timber harvest, road renovation, road decommissioning, and culvert replacement. However, by following the appropriate PDFs, these effects would be minimized and are expected to be insignificant. Baseline sediment levels would be reduced in the long-term as a result of the road improvements, reduction in road densities, and exclosure fencing. As a result, Alternative 2 would result in a negligible chance of "take" of this species and is considered "not likely to adversely affect" SONC coho salmon, and would not adversely modify SONC Critical Habitat and EFH. Informal consultation with NOAA Fisheries was initiated in January 2005 for SONC coho salmon, SONC Critical Habitat, and Essential Fish Habitat.

3.7.4.3 Effects of Alternative 3 on Fish and Aquatic Habitat

Direct and Indirect Effects

No direct impacts are expected to occur to fish and aquatic habitat from all proposed timber harvest treatments. Reducing canopy cover below 40 percent in 28 acres of regeneration harvest and 14 acres of shelterwood harvest is not expected to alter the natural hydrologic regime because of the small amount of acreage affected by these harvest treatments. Soil compaction caused by tractor logging on 783 acres is not expected to increase the amount of run-off to streams. These effects would be ameliorated by maintaining Riparian Reserve buffers, ripping the skid trails following use in the shelterwood treatment units, and using existing or designated skid trails in all other harvest units.

By restricting commercial harvest to areas outside of Riparian Reserves, keeping tractors on designated skid trails, and ripping skid trails in regeneration and shelterwood harvest units following use, actual compacted acres would be minimized and the effects to peak flows are expected to be immeasurable. No direct or indirect impacts are expected to occur to fish and aquatic habitat from stands identified for selection harvest, density management, or pine plantation thinning. These treatments would maintain the characteristics of a mature stand and would provide sufficient tree canopies to protect the long-term habitat elements necessary for healthy aquatic ecosystems.

This alternative would require the construction of 3.5 miles of temporary road for timber harvest. An additional 1.55 miles of road would be constructed to access the pine plantation thinning units. These roads would be fully decommissioned following use by ripping with a subsoiler and seeding with native grasses. Two of these roads would cross intermittent streams. These roads could alter the hydrologic flow paths by compacting the soil and intercepting and redirecting surface flow. Although the current road density within the project area of five miles per square mile is considered high, the proposed roads would be located on ridges or on stable slopes and would not measurably affect the hydrology of the watershed. Full decommissioning of 2.2 miles of existing road would also mitigate the effects of this new road construction and result in a net decrease in road density within the project area. Improvement/renovation of 3.5 miles of road would also result in a decrease in road-related sediment, further reducing the impacts to the aquatic ecosystem.

The effects of all other actions, including riparian thinning, road renovation, culvert replacement/removal, riparian exclosure fencing, riparian planting, spring development, pump chance renovation, road decommissioning, and road relocation are the same as those described in Section 3.7.4.2, Effects of Alternative 2 on Fish and Aquatic Habitat.

Cumulative Effects

Past, Present, and Future Actions

These effects are the same as those described in Section 3.7.4.1, Effects of Alternative 1 (No Action) on Fish and Aquatic Habitat.

Combined Effects with the Proposed Action

Cumulative effects from the regeneration and shelterwood harvest treatments are not expected to increase the risk of peak flow events within the stream channel. Reducing the canopy closure below 40 percent on the amount of acreage affected would not be of a magnitude that would result in excessive runoff to stream channels. Restricting these harvest units to Matrix lands outside of Riparian Reserves minimizes the effects to fish and aquatic habitat. No negative cumulative effects to fish and aquatic resources would occur from any timber harvest prescriptions on Matrix lands within the timber sale.

The cumulative effects of timber harvest on private lands must also be considered along with the actions on public land. The majority of timber harvest on private land is occurring in the North Fork Big Butte Creek 6th field watershed, where there is 50 percent more private industrial timber lands than public lands. Although private timber companies are required to follow OFPA rules in riparian areas, they are not required to meet the same standards for protection of riparian areas that federal agencies must follow. As a result, a greater impact to the aquatic system is occurring in this subwatershed. Reduced riparian buffer widths on private timber lands, compared to those on BLM lands, have led to reduced shade and large wood recruitment. This affects aquatic habitat by reducing pool habitat and cover, and increasing stream temperatures.

The current effects of soil compaction, road densities, and TSZ harvest on private lands would continue to increase peak flows and subsequent bank scouring, consequently increasing sedimentation and effects to fish habitat.

The proposed road-related projects could have a negative effect on fisheries and aquatic resources in the short-term by adding to current high levels of stream sediment from road maintenance, renovation, decommissioning, and culvert replacement. However, by following PDFs, these effects would be minimized. A long-term, positive cumulative effect to fish and aquatic habitat is anticipated from reducing potential road-generated fine sediment by completing road maintenance, renovation, and decommissioning, and from the livestock exclosure fencing.

Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon, SONC Critical Habitat, and Essential Fish Habitat from Implementation of Alternative 3:

May Affect, Not Likely to Adversely Affect (NLAA)

Some effect to aquatic habitat may occur due to potential short-term sediment delivery to streams resulting from the planned timber harvest, road renovation, road decommissioning, and culvert replacement. However, by following the appropriate PDFs, these effects would be minimized and are expected to be insignificant. Baseline sediment levels would be reduced in the long-term as a result of the road improvements, reduction in road densities, and exclosure fencing. As a result, Alternative 3 would result in a negligible chance of "take" of this species and is considered "not likely to adversely affect" SONC coho salmon, and would not adversely modify SONC Critical Habitat and EFH. Informal consultation with NOAA Fisheries was initiated in January 2005 for SONC coho salmon, SONC Critical Habitat, and EFH.

3.7.4.4 Effects of Alternative 4 on Fish and Aquatic Habitat

Direct and Indirect Effects

No direct impacts are expected to occur to fish and aquatic habitat from all proposed timber harvest treatments. Reducing canopy cover to 20 percent or less in the 14 acres of shelterwood harvest is not expected to alter the natural hydrologic regime because of the small amount of acreage affected by this harvest treatment. No regeneration harvest would occur under this alternative. Soil compaction caused by tractor logging on 517 acres is not expected to increase the amount of run-off to streams. These effects would be ameliorated by maintaining Riparian Reserve buffers, ripping the skid trails following use in the shelterwood treatment units, and using existing or designated skid trails in all other harvest units.

Harvest of 135 acres would occur in the TSZ of the North Fork Big Butte 6th field subwatershed. The harvest prescription for these units is density management, which would leave approximately 40 to 60 percent canopy closure. There would be no measurable effect on peak flows resulting from this harvest due to the residual canopy cover and the small amount of acreage affected.

By restricting commercial harvest to areas outside of Riparian Reserves, keeping tractors on designated skid trails, and ripping skid trails in shelterwood and regeneration units following use, actual compacted acres would be minimized and the effects to peak flows are expected to be immeasurable. No direct or indirect impacts are expected to occur to fish and aquatic habitat from stands identified for selection harvest, density management, or pine plantation thinning. These treatments would maintain the characteristics of a mature stand and would provide sufficient tree canopies to protect the long-term habitat elements necessary for healthy aquatic ecosystems.

The effects of all other actions, including riparian thinning, road renovation, culvert replacement/removal, riparian exclosure fencing, riparian planting, spring development, pump chance renovation, road decommissioning, and road relocation are the same as those described in Section 3.7.4.2, Effects of Alternative 2 on Fish and Aquatic Habitat.

Cumulative Effects

Past, Present, and Future Actions

These effects are the same as those described in Section 3.7.4.1, Effects of Alternative 1 (No Action) on Fish and Aquatic Habitat.

Combined Effects with the Proposed Action

Cumulative effects from the shelterwood harvest treatments are not expected to increase the risk of peak flow events within the stream channel. Reducing the canopy closure below 40 percent on the amount of acreage affected would not be of a magnitude that would result in excessive runoff to stream channels. Restricting these harvest units to Matrix lands outside of Riparian Reserves minimizes the effects to fish and aquatic habitat. No negative cumulative effects to fish and aquatic resources would occur from any timber harvest prescriptions on Matrix lands within the timber sale.

The cumulative effects of timber harvest on private lands must also be considered along with the actions on public land. The majority of timber harvest on private land is occurring in the North Fork Big Butte Creek 6th field watershed, where there is 50 percent more private industrial timber lands than public lands. Although private timber companies are required to follow OFPA rules in riparian areas, they are not required to meet the same standards for protection of riparian areas that federal agencies must follow. As a result, a greater impact to the aquatic system is occurring in this subwatershed. Reduced riparian buffer widths on private timber lands, compared to those on BLM lands, have led to reduced shade and large wood recruitment. This affects aquatic habitat by reducing pool habitat and cover, and increasing stream temperatures.

The current effects of soil compaction, road densities, and TSZ harvest on private lands would continue to increase peak flows and subsequent bank scouring, consequently increasing sedimentation and effects to fish habitat.

The proposed road-related projects could have a negative effect on fisheries and aquatic resources in the short-term by adding to current high levels of stream sediment from road maintenance, renovation, decommissioning, and culvert replacement. However, by following PDFs, these effects would be minimized. A long-term, positive cumulative effect to fish and aquatic habitat is anticipated from reducing potential road-generated fine sediment by completing road maintenance, renovation, and decommissioning, and from the livestock exclosure fencing.

Determination of Effects on Southern Oregon/Northern California (SONC) Coho Salmon, SONC Critical Habitat, and Essential Fish Habitat from Implementation of Alternative 4:

May Affect, Not Likely to Adversely Affect (NLAA)

Some effect to aquatic habitat may occur due to potential short-term sediment delivery to streams resulting from the planned timber harvest, road renovation, road decommissioning, and culvert replacement. However, by following the appropriate PDFs, these effects would be minimized and are expected to be insignificant. Baseline sediment levels would be reduced in the long-term as a result of the road improvements, reduction in road densities, and exclosure fencing. As a result, Alternative 4 would result in a negligible chance of "take" of this species and is considered "not likely to adversely affect" SONC coho salmon, and would not adversely modify SONC Critical Habitat and EFH. Informal consultation with NOAA Fisheries was initiated in January 2005 for SONC coho salmon, SONC Critical Habitat, and EFH.

3.8 Wildlife

Land ownership patterns, natural landscape openings (large meadows and open areas interspersed with conifer forests), and past harvest regimes result in a highly fragmented landscape in the proposed Camp Cur project area. Late-successional wildlife habitat is highly fragmented, with pockets of mature timber surrounded by early seral forests, recovering second growth forests, and open meadows. Only two sections in the proposed action area have full BLM ownership. The remaining sections with proposed projects have partial BLM ownership. Private timber companies own the majority of the remainder of the sections.

For a list of all special status species evaluated for this report, see Appendix D, Wildlife, Table D-2.

3.8.1 Methodology

The process for conducting biological evaluations and assessments includes review of existing records, field reconnaissance, field surveys, and analysis of potential impacts. A review of potential habitat was conducted using maps, aerial photographs, Micro*Storms computer data, and stand exam records for the project area.

The list of special status species known to be present in the Medford BLM district was updated with the latest information from the Oregon Natural Heritage Program in March 2005. The updated special status species list was reviewed to identify the impacts of the proposed action and provide mitigation measures.

3.8.2 Assumptions

Known spotted owl sites in and near the project area are monitored annually. If the sites are not occupied, the survey area is expanded to suitable habitat within approximately one mile of the known site.

If no T&E and/or special status species habitat is present in the planning area or the area is outside the range, then no further analysis is needed. If habitat is present, but no activities are planned for that habitat, or the project would not impact the population, then no further analysis is needed. If a T&E or special status species is known or suspected to be present and habitat is proposed to be disturbed, then the species would be analyzed (see Appendix D, Wildlife, for the list of Special Status Species considered).

3.8.3 Affected Environment

3.8.3.1 USFWS Threatened, Endangered, and Candidate Species

Medford District BLM lands are excluded from the range of the lynx, due to the absence of key lynx habitat characteristics and lack of historic sightings (USDA and USDI 1998). The project area is outside the range of vernal pool fairy shrimp.

Bald Eagle – Federally Threatened

Eagle nest trees are larger, dominant or codominant trees in the stand and are usually components of old growth or older second growth forests. Prey of bald eagles is fish, waterfowl, small mammals (rabbits, etc.), and carrion.

A bald eagle nest is present near Parsnip Creek. In 2002, the eagles built a nest in a large ponderosa pine in Section 3. This is an active nest which has produced young each year since 2003. It is located approximately 0.75 miles from any proposed timber harvest unit and approximately 0.5 miles from proposed pine plantation thinning projects. The proposed livestock exclosure construction would occur within 0.25 miles of the nest and is covered under USFWS BO 1-15-03-F-511, dated 20 October 2003. BLM biologists monitor this nest annually.

Northern Spotted Owl (NSO) – Federally Threatened

Old growth coniferous forest is preferred nesting, roosting, and foraging habitat. Spotted owls also use late-successional forests with some old growth characteristics, such as multi-layered, closed canopies with large diameter trees and abundant dead and down woody material. Northern spotted owls commonly nest in cavities 50 feet or more above the ground in large, decadent old growth trees. Other nest sites include large mistletoe clumps, abandoned raptor nests, and platforms formed by whorls of large branches. Prey is primarily small arboreal mammals, such as flying squirrels, woodrats, and voles, and occasionally small birds.

Nesting, roosting, and foraging habitat for all spotted owl activity centers within the two 5th field watersheds containing proposed Camp Cur projects was analyzed using data based on McKelvey habitat rating. Approximately 40 percent of BLM lands in the Big Butte and 38 percent of South Fork Rogue River 5th field watersheds have suitable spotted owl habitat.

McKelvey Habitat Rating - The system used to identify suitable spotted owl habitat, based on the McKelvey spotted owl habitat model. Habitat was rated in 1992. Since that time, some stands which were previously not suitable habitat have continued to develop and now may provide suitable nesting or suitable roosting and foraging habitat.

A status review of the northern spotted owl was released in September 2004 (Courtney, et al. 2004). This report consists of a critical review and synthesis of recent information on the status of the spotted owl. It was prepared to provide USFWS with information for the 5-year status review. A USFWS news release on November 18, 2004 announced that after completing the formal 5-year status review of the spotted owl, USFWS concluded the species continues to warrant the protection of the Endangered Species Act as a threatened species.

Two 100-acre spotted owl activity centers are present within the provincial radius (1.2 miles) of the proposed action. The activity centers were established around sites known before January 1, 1994. The activity centers are designated late-successional reserve (LSR). These activity centers are established to preserve an intensively used portion of the breeding season home range.

The last year the Camp Creek activity center had an active nest was 2000. Surveys during the past three years have failed to detect spotted owls at the 100-acre activity center. The female was found at another site in 2003. Spotted owls were detected in 2005 on adjacent USFS lands, east of the activity center. Suitable habitat is provided in the 100-acre activity center and on USFS lands adjacent to the activity center.

One spotted owl site without an established activity center is located within 1.2 miles of proposed units. This site is on matrix lands and was discovered after January 1, 1994. Under the NWFP, northern spotted owl sites on matrix lands found after 1994 do not receive a 100-acre activity center. The site was discovered in 2003 when young were found in a proposed timber sale unit. The nest tree was never located. The female at the site was from a nearby 100-acre activity center in Section 13, approximately 1.25 miles away. The new site may be an alternate nest of the northern spotted owls in Section 13. The forest stand where the young spotted owls were found in 2003 was surveyed 6 times in the summer of 2004. No spotted owls were found. However, a pair of barred owls was located at the site. Repeated surveys in 2005 did not detect any spotted owls in this site. One adult from the area was found nesting in another section outside the sale boundary. A barred owl was detected again in 2005.

Two other potential threats to spotted owls are West Nile Virus and sudden oak death. These two threats are of uncertain magnitude and effect.

Management direction and land allocations of the standards and guidelines are intended to constitute the US Forest Service and BLM contribution to the recovery of the northern spotted owl (NWFP ROD 1994c, A-2). The Medford District RMP and NWFP provide a network of LSRs, 100-acre activity centers, connecting riparian corridors, connectivity blocks, and 15 percent late-successional forest retention in the 5th field watershed.

Fisher – Federal Candidate

Fishers use a variety of habitats. Their occurrence is closely associated with low to mid-elevation (generally <4,000 feet) forests with a coniferous component, large snags, or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2002). In a Pacific Northwest Research Station (PNW) - Rogue River National Forest (RRNF) study, researchers found that most of the openings used for natal dens (where the female gives birth to kits) appeared to have been excavated by pileated woodpeckers (Aubry and Raley 2002).

In general, the habitats used by fishers are forest woodland landscape mosaics that include conifer-dominated stands. They use a variety of habitats, including 5-10 year old regeneration harvests and heavily thinned stands which have large residual trees associated with them, either within the stands or at the edge. See Appendix D, Wildlife, for a more complete discussion of fisher habitat needs.

A study in Northern California on extensively managed private forest lands, found fishers were associated with large, residual forest structures (snags, logs, hardwoods, and live trees with mistletoe and large branches). More fishers were detected in areas of logs and hardwoods, and areas where patches of larger trees were left on the landscape (Diller 2004). Fisher use areas that have been harvested if patches of habitat with residual components are left in the landscape.

The size of the fisher population in the Butte Falls Resource Area and Rogue River National Forest is unknown. In the PNW-RRNF study, 22 were captured from 1995 to 2001 (Aubry and Raley 2002). The males travel extensively during the breeding season. They begin moving and breeding in late February. Females give birth in March and April and are restricted to the natal and maternal dens until the kits are furred and more mobile. Beginning in early June, the young are mobile and can move with their mother. A seasonal restriction from February 1 to May 31 would protect fishers during the times when they are more sensitive to disturbance (Raley 2004).

Genetic analysis was used to determine if the captured fishers in the PNW-RRNF study were from re-introductions that occurred in southwestern Oregon in the 1960s to 1980s or a native population. Results from the tests indicated all fishers captured in the PNW study represented the reintroduced populations. They were descended from fishers translocated to Oregon from British Columbia and Minnesota (Aubry and Lewis 2002).

USFWS published a finding in April 2004 that a petition to list fishers as a "Federally Threatened" species was warranted but precluded by higher priority listing actions. The species remains a USFWS candidate species (USDI, USFWS 2004, 18770). There is no management strategy available at this time. Fishers remain a BLM Bureau Sensitive species. The Camp Cur project was informally consulted with USFWS.

Other USFWS Federal Candidate Species

The Camp Cur project area is outside the range of Oregon spotted frog and Mardon skipper butterfly, both USFWS Federal Candidates. These species will not be discussed further.

3.8.3.2 Sensitive Species (Bureau Sensitive and Bureau Assessment)

For a list of sensitive species in the Butte Falls Resource Area, Medford BLM, see Appendix D, Wildlife, Table D-2. Only those species known or suspected to be present in the watershed and impacted by the proposed projects will be discussed.

Invertebrates - Bureau Sensitive

Protocol mollusk surveys were done in the proposed timber sale units in 2004. No Bureau Sensitive (including former Survey and Manage) invertebrate species were found.

A grasshopper, the Siskiyou short horned grasshopper, is on the BLM Bureau Sensitive list. There is sparse information about the habitat of this grasshopper in the literature and there are no survey protocols. It was associated with elderberry (Brenner 2005). No elderberry is growing in any proposed unit.

There are no records of the grasshopper in the Camp Cur project area. Conifer trees and mixed conifer forests are normally not the primary habitat of grasshoppers. Grasshoppers are generally associated with open meadows and woodlands with grasses and shrubs. They may be present in vegetation associated with meadows and other grass/shrub openings. Only three site reports are in the Oregon Natural Heritage Database and none of these are on Butte Falls Resource Area land.

Flammulated Owl - Bureau Sensitive

Flammulated owls are secondary cavity-nesters. Habitat is coniferous woodlands and forest edges, especially oak and pine ecosystems. They nest in abandoned woodpecker holes, especially those of flickers. It is assumed that the standards and guidelines for snags and green-tree replacements for woodpeckers and other primary cavity-nesting species, as provided by existing BLM RMP and NWFP ROD for the woodpeckers in this species group, would provide for flammulated owls (USDI 1995; USDA and USDI 2004b).

One flammulated owl was heard during great gray owl surveys in 2004. Subsequent visits did not detect a flammulated owl and no nest was located. The location was outside any proposed units in the Camp Cur project area. Surveys will be repeated in the summer of 2005. If a nest is found within a proposed action unit, it would be buffered with a seasonal restriction and a 100′ no-cut buffer around the tree.

Great Gray Owl (GGO) - Bureau Tracking, Former Survey and Manage

Habitat preference for great gray owls is open forest or forest with adjoining deep-soil meadows. Great gray owls nest in broken top trees, abandoned raptor nests, mistletoe clumps, and other platforms created by whorls of branches. The majority of nests are in overmature or remnant stands of Douglas-fir and grand fir forest types on north-facing slopes. However, in the Butte Falls Resource Area, nests have been found in openings with little or no canopy cover, and in a broken top tree in a clear-cut near the edge of a timber stand.

Great gray owls were formerly a NWFP "Survey and Manage" species. They were removed from survey and manage and are now listed as "Bureau Tracking" for BLM. There has been an increase in the known range of the great gray owl since the 1994 NWFP FSEIS.

At the time of the NWFP FSEIS, great gray owls were documented as nesting in an area along the central Cascade Mountains of Oregon and in a small area southwest of Medford, Oregon. Published data and the results of surveys indicate the range is likely much greater. Great gray owls have been documented over much of the Cascade Range in Oregon and Washington, although nesting has not been confirmed in some of the new areas. Based on its known distribution, the great gray owl is presumed to be moderately widespread in its geographic range within the NWFP area. There are currently 114 great gray owl sites in the Interagency Species Management System (ISMS) database. Recent information indicates the great gray owl uses elevations below 3,000′ (USDA and USDI 2004a)

The ratings for Alternative 9 of the NWFP FSEIS, which did not include Protect and Buffer provisions for the great gray owls, provided for less reserve, and generally provided less favorable habitat conditions. Even these less protective alternatives had a 100 percent likelihood of providing habitat of sufficient quality, distribution, and abundance to allow the great gray owls populations to stabilize, but with significant gaps in the historic distribution across federally managed lands (USDA and USDI 2004a).

The *FSEIS to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines* determined that under all alternatives, habitat (including known sites) is sufficient to support stable populations in the NWFP area (USDI and USDA 2004a). There is no requirement to survey for great gray owls.

In 2004, 6 survey visits for great gray owl surveys were completed in suitable great gray owl habitat in the Camp Cur proposed timber sale units. Three surveys in 2005 did not locate any great gray owls in the area. No great gray owl nests were located and no great gray owls were heard in any of the proposed units in suitable habitat.

Northern Goshawk - Bureau Sensitive

Goshawks are found in a variety of forest types, including both deciduous and conifer types. Dense, overhead foliage or high canopy cover is typical of goshawk nesting habitat. Perches where they pluck their prey, known as plucking posts, are provided by stumps, rocks, or large horizontal limbs below the canopy. Goshawks use a variety of stand types that are usually a forest mosaic. This includes large trees, snags, and down logs interspersed with openings (Marshall 2003). Northern goshawks have home ranges of approximately 6,000 acres (Reynolds, et al. 1992). Goshawk habitat is present throughout the project area.

The Camp Cur project area is located between two active goshawk nests and is likely used for foraging by one or both pairs of goshawks. The nests are each about 1.5 miles from any proposed unit. Goshawk surveys were completed in 2004 and no goshawks were found in the proposed project area. Surveys will be repeated in 2005.

A petition to list the northern goshawk in the western United States as a threatened species was considered by USFWS in 1998. The final conclusion was published in the Federal Register, June 29, 1998. The decision stated: "After review of all available scientific and commercial information, the Service finds that listing this population as endangered or threatened is not warranted" [63, No. 124 FR 35183-35184 (06/29/1998)]. USFW found no evidence to support the contention goshawks are in danger of extinction; nor is the species likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

Bats - Bureau Sensitive and Bureau Assessment

Three bats are on the Butte Falls Resource Area sensitive species list: Townsend's big-eared bat (Bureau Sensitive), pallid bat (Bureau Assessment), and fringed myotis (Bureau Assessment). A 2004 mist net survey of a pond near the project area did not capture any of these three species.

No buildings, caves, or rock outcrops which may provide suitable habitat for Townsend's big-eared bats, are present within the project area. Snags with excavated cavities, holes, broken tops, and loose bark may provide roosting and maternity sites for bats. Snag requirements under the ROD/RMP would provide habitat for bats.

Red Tree Vole - Bureau Tracking

The area is outside the range of the red tree vole (Biswell, et al. 2000).

3.8.3.3 Other Wildlife Species

Elk and Deer

Elk and deer are present in the watersheds year around. The Camp Cur area provides thermal cover, foraging habitat, and hiding cover. Presence of elk and deer is evident by the well-worn trails and droppings which are observed in all units. The units are all in close proximity to recovering clear-cuts and natural openings, which provide good forage for the elk and deer. The area also provides elk and deer calving and fawning areas. Riparian buffers act as travel corridors and provide fawning and calving habitat.

Animals from the South Cascades deer herd migrate through the area 5 to 10 miles south of Medco Pond (Vargas 2004). Spring migration is April through mid-June. Autumn Migration in is in late September through early November. A mineral lick is present in one proposed unit of Camp Cur. This is used extensively by elk and deer as well as other wildlife. A no-cut buffer would protect the site.

Amphibians and Reptiles

Ponds in the area have been surveyed for frogs and turtles. No sensitive frogs or northwestern pond turtles were detected. No ponds are present in any proposed action unit. A riparian buffer would be in effect for proposed actions near streams.

Neotropical and Nonmigratory Birds

For a list of birds in the watershed, see Appendix D, Wildlife. This list was based on bird surveys near the project area, historical records, and casual observations.

All birds use a wide variety of habitats, late-successional forests, riparian areas, brush in recovering clear-cuts, grasslands, and small trees in developing stands. Some birds, such as the olive-sided flycatcher, perch on residual canopy trees and forage over clear-cuts and openings.

Many birds are associated with deciduous shrubs and trees in early successional habitats (i.e., orange-crowned warblers and rufous hummingbirds). Any action which changes or removes vegetation used by one species may benefit another. For example, thinning in the understory may negatively affect a species which uses dense understory in late-successional forests, such as winter wren, but benefit other species, such as Hammond's flycatcher, which forage in the open mid-story. Foraging, nesting, and hiding habitat for birds is present in all of the units.

Neotropical migrants are those birds that migrate to Central or South America each year. No Neotropical migratory songbirds are listed as endangered or threatened on the BLM Medford District. In February 2003, USFWS released a list of species of migratory nongame birds that are identified as birds of conservation concern (68, No. 25 FR 6179). Six of the birds on this list are known to occur on the BLM Medford District (see Table 3-11).

Table 3-11. USFWS Migratory Nongame Birds of Conservation Concern for Medford BLM District

Species	Status
Peregrine falcon	Not present in project area (no cliff habitat)
Flammulated owl	Suspected to be present near project area
Olive-sided flycatcher	Present in watershed
Rufous hummingbird	Present in watershed
Lewis' woodpecker	Not present in watershed
White-headed woodpecker	Not present in watershed

Resident birds remain in the same general area or migrate to lower elevations in the winter months. Pileated woodpeckers, which remain in the same territory all year, and dark-eyed juncos, which winter in the lower elevations and return to the mountains to nest, are examples of resident birds. Quail, grouse, and wild turkey are all resident nonmigratory game birds found in the project area.

A Cooper's hawk nest was located during goshawk surveys. The nest would be protected with a seasonal restriction.

3.8.4 Environmental Consequences

Table 3-12. Comparison of Effects on Wildlife from All Alternatives				
Issue: Fisher				
Past Actions	• Historical timber harvest, ongoing and proposed timber harvest, trapping, and reintroductions affect fisher • Past timber harvest actions on BLM and private forest lands have reduced the amount of late-successional forest habitat and fragmented the forest, both at the stand and landscape level • Roads have been built to access timber sale units throughout the 5th field watershed			
Present Actions	• Most private forestlands intensively managed with final harvest on commercial economic rotations averaging 60 years • Titanic Timber Sale ongoing in 2005 on lands adjacent to the Camp Cur project			
Current Conditions	• High stand densities in some areas make the stands less desirable for species that need open understory and large overstory trees • Late-successional habitat is fragmented by natural openings and meadows, private lands and past harvest on BLM-administered lands • 72 acres regeneration and 105 acres selection harvest in Titanic TS would no longer provide constituent elements for fishers			
Future Actions	• Timber harvest would continue to occur in late-successional forest in nonreserved matrix lands • No planned future harvest identified			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • No change in habitat on BLM lands	• Loss of large wood through logging would reduce future fisher habitat • 108 acres of disturbance and canopy reduction, no longer fisher habitat • 39 acres of unmanaged forest removed	• Loss of large wood through logging would reduce future fisher habitat • 42 acres of disturbance and canopy reduction, no longer fisher habitat • 39 acres of unmanaged forest removed	• Loss of large wood through logging would reduce future fisher habitat • 143 acres of disturbance and canopy reduction, no longer fisher habitat • No unmanaged forest acres removed
Cumulative Effects	• Private lands continue to be harvested • Regeneration harvest in Titanic TS will increase fragmentation on Federal lands	• Private lands continue to be harvested • Increased disturbance from proposed activities • 180 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat	• Private lands continue to be harvested. • Increased disturbance from proposed activities • 114 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat	• Private lands continue to be harvested • Increased disturbance from proposed activities • 86 acres shelterwood and SGFMA regeneration harvest in Titanic and Camp Cur actions reduces fisher habitat

3.8.4.1 Effects of Alternative 1 (No Action) on Wildlife

Direct and Indirect Effects

Threatened and Endangered Species

Table 3-12. Comparison of Effects on Wildlife from All Alternatives

Issue: Late-Successional Connectivity				
Past Actions	• Past timber harvest actions on private and BLM lands have reduced late-successional forest habitat and fragmented the forest, both at the stand and 5th field landscape levels			
Present Actions	• Most private forestlands intensively managed with final harvest on commercial economic rotations averaging 60 years • Titanic TS ongoing in 2005 on lands adjacent to the Camp Cur project			
Current Conditions	• Natural landscape patterns and past harvest have created a fragmented landscape • 72 acres regeneration and 105 acres selection harvest in Titanic TS would reduce connectivity for late-successional species			
Future Actions	• Timber harvest would continue to occur in late-successional forest in nonreserved Federal matrix lands			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No harvest or restoration • No additional openings on BLM lands	• 108 acres new openings from timber harvest would increase fragmentation • 39 acres of unmanaged forest removed, creating new openings	• 424 acres new openings from timber harvest would increase fragmentation • 39 acres of unmanaged forest removed, creating new openings	• 14 acres new openings from timber harvest would increase fragmentation • No unmanaged forest acres removed
Cumulative Effects	• Private lands would continue to be harvested • Regeneration harvest from Titanic TS will increase fragmentation a small amount on Federal lands	• Private lands would continue to be harvested. • Fragmentation increases • 180 acres late-successional habitat removed by shelterwood and SGFMA regeneration harvest	• Private lands would continue to be harvested • Fragmentation increases • 114 acres late-successional habitat removed by shelterwood and SGFMA regeneration harvest	• Private lands would continue to be harvested. • Fragmentation increases • 86 acres late-successional habitat removed by shelterwood, and SGFMA regeneration harvest
Issue: Road Density				
Past Actions	• Past actions on private and BLM forest lands increased road density			
Present Actions	• Roads being improved for Titanic TS allowing access to areas presently inaccessible to motorized vehicles			
Current Conditions	• Open roads create more opportunities for poaching and disturbance to wildlife			
Future Actions	• Improved road surfaces increase access during the fall in winter, increasing poaching opportunities • Decommissioned roads reduce poaching and disturbance			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No roads closed	• Decommissioned roads would reduce disturbance	• Decommissioned roads would reduce disturbance	• Decommissioned roads would reduce disturbance
Cumulative Effects	• None identified	• Fewer open roads	• Fewer open roads	• Fewer open roads

Table 3-12. Comparison of Effects on Wildlife from All Alternatives

Issue: Old Growth				
Past Actions	• Past timber harvest actions on private and BLM forest lands have reduced old growth habitat in watershed			
Present Actions	• Old growth habitat on matrix lands would continue to be harvested, reducing habitat for species that use old growth habitat			
Current Conditions	• 111 acres intact old growth in 6th field watershed			
Future Actions	• 15% of the 5th field watersheds would remain late-successional/old growth habitat (RMP/NWFP)			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No timber harvest or restoration projects	• 28 acres modified old growth habitat converted to early seral habitat • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat • No intact old growth stands modified	• 14 acres modified old growth habitat converted to early seral habitat • No intact old growth stands modified
Cumulative Effects	• No old growth entered	• Loss of 1.5% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered	• Loss of 0.7% of modified old growth habitat in the project area 6th field watersheds • No intact old growth entered

Bald eagle - There would be no effect to the resident bald eagles. Eagles use large dominant trees on ridges and at the edges of forest stands, meadows and openings for nesting. Forested stands would continue to develop into mature forest structure with large boles and large limbs which would provide the necessary structure to support heavy eagle nests.

Northern spotted owl - The No Action Alternative would have no immediate direct effect on the northern spotted owl. Forested stands would continue to develop into mature seral stages, benefiting spotted owls. There would be increased opportunities for establishing new spotted owl sites as marginal stands grow larger and develop into suitable habitat for spotted owls. With no thinning, it would take longer for large overstory trees in dense, overstocked stands to develop into good nesting habitat due to competition for nutrients and light.

The pine plantation thinning would not occur and the pines would never attain potential growth rates. This would result in a longer time frame for the large, native conifers to return to dominance. These areas would be slow to return to suitable spotted owl habitat conditions.

Fisher - Fishers would continue to use the areas with no disturbance from habitat removal, temporary road construction, and associated noise. Increased forest fragmentation due to SGFMA and shelterwood harvest would not occur.

The unmanaged, late-successional stands in Section 12 and 13, where laminated root rot is causing mortality, would not be harvested. There would be an increase in CWD as root rot develops, weakens the roots of the trees, and causes them to fall. The overstory canopy would be reduced in patches. Adjacent large green trees would be impacted and continue to die. There would be an increase in CWD on the ground. Brush and smaller trees would provide cover for foraging in these stands, but resting and denning

opportunities in larger trees would be reduced as root rot kills the overstory trees.

Sensitive Species

Flammulated owl - Existing snag habitat for cavity nesters, such as flammulated owls, would continue as decay and additional snag habitat would be created through natural tree mortality.

Northern goshawk - Northern goshawk nesting habitat would continue to develop as overstory trees continue to grow and develop old growth characteristics. Overstocked stands with high understory density would remain less suitable for flight and foraging. Suitable nesting habitat would remain suitable for the foreseeable future. As the mid-seral stands develop into trees with larger limbs and forked tops, goshawk nesting substrate would be increase.

Bats - Existing large trees would continue to grow and become decadent. Additional trees would develop deeply furrowed bark, loose bark, cavities and other deformities typical of bat roosts. This would increase roosting and maternity sites for bats. With no action, there would be no reduction in the number of future snags. There would be an increase in productivity as the snags become available for forage and nesting substrate.

Green trees, with characteristics that make them suitable roosts for bats, would remain intact for the foreseeable future. Remnant trees would remain and additional trees would develop deeply furrowed bark, cavities, and other deformities typical of bat roosts.

Other Wildlife Species

Elk and Deer - As trees continue to develop, elk and deer foraging habitat would be reduced as the understory shrubs and forbs become shaded out. No new openings would be created on BLM-administered land. There would be no additional disturbance to deer and elk due to timber harvest, pine plantation thinning, and other activities. Roads would not be closed and there would be no decrease in disturbance from traffic and poaching.

Hiding cover for deer and elk would remain. Forage for deer and elk would decrease with the continued development of late-successional and old growth habitat. Most of the forage would be provided by early seral forests on adjacent private lands.

Neotropical and Nonmigratory Birds - As the trees grow and canopy cover develops, there would be a reduction in understory forbs and flowering shrubs. A slight decline in foraging habitat for hummingbirds would occur. As the understory closes in, the stand becomes less suitable for species that use open understory, such as flycatchers and warblers.

There would be an expected long-term increase in productivity in other species that use older forests with high canopy, such as varied thrush and hermit warblers. There would be a decrease in productivity in species that use early-and mid-seral forests.

Cumulative Effects

No change is expected from current trends in the watershed. Nonfederal lands would be harvested and most would remain in early to mid-seral conditions.

Barred owls may continue to immigrate into the area, even with no action proposed on BLM lands. The emergence of barred owls as invasive competitors with northern spotted owls suggests an increase in risk to the species since 1990. Barred owls have been found in the South Fork Rogue River and Big Butte Creek watersheds. Barred owls may be more of a habitat generalist and occupy a wider diversity of habitat types than spotted owls. The rate and extent of displacement of spotted owls by barred owls is likely

occurring, but the rate and extent of this are unknown. Whether this effect is exacerbated by other confounding issues (including timber harvest) is uncertain (Courtney, et al. 2004; Kelly, et al. 2003).

3.8.4.2 Effects on Wildlife Common to All Action Alternatives

Direct and Indirect Effects

Threatened and Endangered Species

Bald eagle - The pine plantation thinning project proposes to thin a 45 year old stand approximately 0.5 miles from the eagle nest. The proposal would remove ponderosa pines 6 to 16″ DBH. No eagle nesting or roosting habitat would be removed. The proposed unit is far enough from the nest that disturbance would not affect the nest success. The nest was monitored during private timber harvest activities within 0.25 to 0.5 miles from the nest in 2003 and 2004 (Hale, personal observation). The nest was successful and produced young both years while the private timber harvest was occurring.

The proposed action is covered under BO #1-15-03-F-511, 20 October 2003. Because eagles may forage within 0.25 miles of the area of proposed pine plantation thinning and the proposed livestock exclosure project is within 0.25 miles of the nest, these proposed actions "may affect" the bald eagle. The activities would "not likely affect" the bald eagle because the following project design features would be in place:

- No known bald eagle nest trees, perch trees, or roost trees will be cut.
- Bald eagle habitat will not be removed within 0.5 miles of nest or roost sites.
- Potential eagle perches within 0.5 miles will not be cut.
- Work activities would not take place within 0.25 miles (0.5 miles line-of-sight) of the nest while the nest is active (from January 1 to August 31).

No timber harvest is proposed within 0.5 miles of the eagle nest. Timber harvest would have no effect on bald eagles. None of the other proposed actions (road closure, spring development, fence removal, or pump chance renovation) would have any effect on bald eagles.

The proposed actions would not affect bald eagle nest success and recovery of the species. This would be the same for all action alternatives.

Northern spotted owl – No projects are proposed in spotted owl USFWS designated Critical Habitat.

In all action alternatives, pine plantation thinning would not occur in suitable spotted owl habitat. The project would improve habitat by accelerating growth of the native conifers in the area to provide future nesting and foraging habitat. Because no suitable habitat would be removed and no units are within 0.25 miles of a known spotted owl, the plantation thinning would have no effect on spotted owl.

The three action alternatives would remove suitable spotted owl habitat with timber harvest on matrix lands. Each of the actions is determined to be a "May Affect, Likely to Adversely Affect." Consultation with USFW has been completed. The proposed actions would be covered under the *Rogue River/South Coast Biological Assessment FY 04-08 for Activities that may affect listed species in the Rogue River/South Coast Province for Medford District BLM, Rogue River and Siskiyou National Forests* dated 11 July 2003 and the Biological Opinion (FWS) 1 -15-03-511 dated 20 October 2003. PDFs from the BO are as follows:

- No 100-acre activity center would be entered.
- A seasonal restriction would be in effect 0.25 miles from any active nest site between

March 1 and September 30, or until two weeks after the fledging period. The restriction may be extended if there is a late nesting attempt.

There is no requirement to survey for spotted owls prior to the action. However, known spotted owl sites would be checked prior to beginning any action and a seasonal restriction would be in effect if nesting owls are found. If the owls are not found at known sites, the search area would be expanded to areas adjacent to the nest stand.

In all action alternatives, 134 acres adjacent to a 100-acre activity center (Cur Creek) would be density management thinned. The unit currently provides suitable foraging and roosting for spotted owls. Because of reduction in canopy, thinning would reduce the suitability of the forest within the proposed unit in the short-term (10 to 15 years) to dispersal only. Thinning adjacent to the 100-acre activity center would improve future spotted owl habitat by increasing diameter growth rates on the remaining trees and allowing the stands to develop larger overstory tree features.

The action would downgrade suitable habitat to dispersal near the Camp Creek 100-acre activity center and could result in incidental take. This would be the same for all three action alternatives. The action is covered under BO #1-15-03-F-511, 20 October 2003.

Density management is proposed on 77 acres of matrix land where a spotted owl was found in 2003. This area has no activity center and the nest tree was never found. It is undetermined whether the nest was inside a unit proposed for harvest or located in an adjacent stand. Repeated surveys in 2004 failed to locate the spotted owls. Spotted owl surveys in 2005 were negative. The female spotted owl was located in May 2005 at a new nest site 0.25 miles outside the proposed timber harvest area. A seasonal restriction would be in effect for timber harvest within 0.25 miles of the new nest site if it is occupied during the year of the action.

Barred owls were found in 2004 and 2005 in this 77-acre stand. Biologists working with owls have varied opinions about the possible negative effects of barred owls on spotted owls. There is no clear evidence that timber harvest is the major cause of the emergence of barred owls within the range of the northern spotted owl. The reason for the increase in barred owls is unclear. "*Habitat loss to timber harvest is often postulated to be a major factor in spotted owl decline, but habitat is still present in the study areas (indeed some areas where spotted owls are in the worst decline, such as Olympic National Park, have never been harvested)*" (Courtney, et al. 2004).

The stand would not be a viable nest site after the action because of a reduction in canopy and disturbance. However, it would provide dispersal habitat until suitable spotted owl habitat conditions return (10 to 15 years). The area is currently overstocked and dense. Thinning would improve the suitability of the stand in the long-term by opening the understory and increasing tree growth and development. The proposed harvest is covered under the BO #1-15-03-F-511, 20 October 2003.

No harvest is proposed within 0.5 miles of the Titanic West spotted owl activity center. The activity center is separated from any Camp Cur proposed harvest unit by 0.5 miles of early and mid-seral habitat on private lands. There is no connectivity of the activity center with Camp Cur proposed harvest unit. The units within 1.2 miles of the nest would be commercially thinned and selection harvested. The units would remain dispersal habitat after the action. The action is covered under BO #1-15-03-F-511, 20 October 2003.

Fisher - Livestock exclosures, riparian projects, spring development, fence removal, and pump chance renovation could have a short-term impact by human presence while the projects are ongoing, but would not have any negative impact to the fisher population. A short-term impact from work activities (noise and human presence) would occur from the

projects. None of the projects would reduce the quality of habitat for fishers in the project area. Planting riparian areas would improve future habitat for fishers.

Impacts from temporary spur roads would be the same for all proposed action alternatives. All temporary spur roads would be closed after the action and there would only be a short-term impact from roads. The fishers would likely move away from the areas when the roads are being used due to disturbance from traffic and the associated harvest.

Presumably, fishers experience habitat loss when timber harvest removes overstory canopy from areas larger and more extensive than natural wind throw and firewood. Small patch cuts interspersed with large, connected uncut areas should not seriously affect fisher populations. Large clear-cuts and numerous, adjacent small clear-cuts of similar age would limit resting and foraging habitat for fishers during the winter. This in turn, may limit fisher population size. The effects of uneven-aged timber management practices has not been studied but are likely to have less effect on fisher habitat than even-aged management (Powell and Zielinski 1994).

Sensitive Species

Flammulated owl - Flammulated owls are cavity nesters that use cavities in snags and live trees created by woodpeckers or which occur naturally. Flammulated owls breed in open forest with open understory or open area adjacent. The areas also contain dense patches of saplings or shrubs (Marshall, et al. 2003). The standards and guidelines of the NWFP ROD for snags and green-tree replacements for woodpeckers and other cavity-nesting species would provide for flammulated owls (USDA and USDI 1994b, C-47; USDA and USDI 2004b).

Flammulated owls were not found in any proposed timber sale units; however, they were found within 0.5 miles of a proposed timber sale unit. An owl was heard on USFS land in a recovering clear-cut approximately 15 years old. Medford District ROD/RMP standards and guidelines for green tree and snag retention on matrix lands would be met in the SGFMA and shelterwood harvest acres. All snags in density management and selection harvest units would be left unless they are a safety hazard. Under all proposed actions, some snags may need to be felled for safety reasons, but would be left as coarse woody material. Trees with obvious pileated woodpecker nest cavities would not be removed. This would provide nest habitat within the project area after the action is completed. Forest habitat adjacent to the project area would also remain intact.

Since flammulated owls have not been found nesting in any proposed timber harvest unit, the risk to an individual is expected to be minimal. Snags and trees with obvious pileated woodpecker nest cavities would remain in the stand and in adjacent, unharvested areas. Density management/thin, selection harvest, shelterwood harvest, and SGFMA regeneration harvest would all leave an open forest. Shrubs and saplings would be present throughout the project area. The impacts from the proposed action are expected to be inconsequential to the species and would not reduce the persistence of the flammulated owls or any other sensitive cavity-dependent species in the project area. See Appendix D, Wildlife, Table D-2 for assessment of sensitive species in the watershed, including flammulated owls which use cavities.

Great gray owl - No great gray owl nests were found during surveys. One adult great gray owl was detected in 2005 on USFS lands, east of the project area. The owl was found to be not nesting on follow-up visits. None of the proposed actions would impact any known nest. No great gray owls are known to be present near any proposed timber sale unit or other proposed project.
The great gray owls could continue to forage in the units after timber harvest is completed. SGFMA regeneration, shelterwood harvest, and thinning treatments would improve foraging habitat for the great gray owls by reducing the understory so they could hunt in the forest. The regeneration acres would provide improved foraging habitat until

the brush and trees become established. There would be no known impacts to great gray owls. The proposed project would not affect the viability of the species in the project area from any proposed action.

Northern goshawk - Goshawks were not detected in any proposed timber sale units during surveys in 2004. Two nests are present in the vicinity, but away from the project area. The Lodgepole and Titanic nests are each over one mile from the proposed action. Approximately 17,000 acres of late-successional (80+ years) forest occur on BLM-administered lands in the 5th field watershed where the projects would occur. Trees with suitable nest structure would remain throughout the late-successional forests in the watersheds. Foraging habitat would be improved by density management.

Riparian thinning, pine plantation thinning, livestock exclosures, riparian planting, spring development, fence removal, and pump chance renovation would not have an effect on goshawks. There would be no known impacts to goshawks from the proposed actions because no goshawks were found in the project area. In the Butte Falls Resource Area, goshawks were found to have nested in thinned timber stands the year after the action was completed. The proposed action would not affect the ability of the goshawks to forage or nest in the watershed or migrate through to adjacent watersheds. The proposed actions would not affect the viability of the species in the watersheds where the projects are located.

Bats - There are no caves, buildings, or bridges that could provide habitat for Townsend's big-eared bats in any proposed harvest unit. SGFMA regeneration and shelterwood harvest would remove live, green trees with characteristics that make them suitable roosts for bats. However, provisions for snags, trees with pileated woodpecker nest holes, decadent trees, and green tree retention would serve as legacy structures for future bat habitat. The NWFP ROD standards and guidelines for snags and green-tree replacements for woodpeckers and other cavity-nesting species would provide habitat for bats (USDA and USDI 1994b, C-47). Bat species would utilize snags and large down logs.

Density management and selection harvest would retain trees with potential bat roosting features. Snag habitat would be retained to provide cavities and loose bark for bats. One study found that snags and down wood, as well as hardwoods and rocks, were used for roost sites by bats (Herder 2000). The study suggests that moderately open understory created easier access to snags for roosting.

Riparian Reserve thinning and planting would improve future riparian habitat for bats. Bats use riparian areas for access to water and often forage on insects above water. The pump chance renovation would create a pool of water bats can use for drinking and foraging for insects over the pool.

The action would not affect the persistence of the sensitive bat species in the watersheds.

Other Wildlife

Elk and Deer - Timber harvest would have minimal impacts to resident or migratory elk and deer. There would be a decrease in hiding cover with proposed thinning. Foraging habitat in the SGFMA regeneration and shelterwood harvest areas would be enhanced as shrubs and forbs begin to reclaim the area.

Road closures would reduce the potential for disturbance and poaching. The VRM restriction would also provide some protection for deer and elk and other animals from poaching/shooting from the highway.

Density management harvest is proposed in a unit where a mineral lick is present. The mineral lick would be buffered with a site-potential-tree length to maintain the site. There is currently little hiding cover around the mineral lick and the proposed project would not

change this. The buffer would maintain canopy over the site. The mineral lick would not be impacted by timber harvest.

Deer and elk could move away from an action while the disturbance is on-going and then return when the action is completed. Foraging habitat would be enhanced by the regeneration harvest areas when forbs and shrubs return to the site to provide browse. None of the proposed actions would affect the viability of the deer and elk herds in the area.

Neotropical and nonmigratory birds - A Cooper's hawk nest is present in a proposed density management unit in all action alternatives. Thinning would improve the habitat by opening the understory. Cooper's hawk nest in conifer, mixed, and deciduous forests, as well as riparian, juniper, and oak woodlands (Marshall, et al. 2003).

The nest would be checked prior to beginning any action. If the nest is occupied, it would be buffered with a 0.25 mile seasonal restriction. The nest tree would be protected with one site-potential-tree distance. The stand was surveyed for Cooper's hawks in June 2005. No cooper's hawks were detected and the nest was not being used at that time.

Cooper's hawks forage primarily on birds. Birds would continue to be present in the stand and adjacent areas after the action. Under all action alternatives, the stand would be thinned, and a 40-60 percent canopy would remain in the stand after the project is completed. The nest tree would remain and there would be other trees to provide nesting habitat after the action. There are approximately 17,000 acres of late-successional habitat in the 5th field watersheds of the proposed project. Cooper's hawks also use mid-seral stands and oak woodlands. The proposed actions would have minimal impact to the nest and would not reduce the viability of the species in the watershed.

Cumulative Effects

Cumulative impacts are impacts on the environment which result from incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The proposed project has environmental impacts on certain species that do not extend beyond the project area or are so insignificant that they cannot be reasonably measured beyond the project area. In these instances, there is no incremental increase to past, present or future actions regardless of other actions, therefore it is unnecessary to provide a catalog of those other actions. See Appendix D, Wildlife, Table D-2 for a discussion of the impacts of the proposed actions.

Activities and events that cumulatively affect wildlife include historical and current timber harvest. The lands being analyzed for commercial harvest are all matrix allocation and all alternative proposals fall within the goals and guidelines of the Medford District ROD/RMP and the NWFP. Continued harvest in matrix lands would trend toward younger stands.

The Titanic Timber Sale is being implemented in 2005 on BLM-administered lands in the same area as the proposed Camp Cur project. Under the Titanic Timber Sale, 429 acres will be tractor logged, 252 acres commercially thinned, 105 selection harvested, and 72 acres regeneration harvested. The action will remove habitat on matrix lands. Regeneration harvest would make 72 acres of land no longer suitable spotted owl habitat. The proposed action will not preclude the ability of spotted owls to disperse through the area.

A status review of the northern spotted owl was released in September 2004 (Courtney, et al. 2004). This report consists of a critical review and synthesis of recent information on the status of the spotted owl. It was prepared to provide USFWS with information for the 5-year status review. A USFWS 5-year review summary (USDI 2004b) concluded the species continues to warrant the protection of the Endangered Species Act as a threatened species.

Harvest Activity Impacts on Wildlife Habitat

Range-wide, the northern spotted owl population experienced an average decline of 3.7 percent per year from 1985 to 2003 (USDI 2004b, 14). Within the Tyee, Klamath, and South Cascades study areas in southwestern Oregon, the spotted owl populations appear to be stable from 1985 to 2003 (USDI 2004b, 13-14). Habitat loss due to timber harvest was identified as the paramount threat in 1990 (USDI 2004b, 54).

The rate of suitable habitat loss due to timber harvest on private, state, and federal forest lands declined between the late 1980s and early 1990s (USDI 2004b, 24). The harvest rates of suitable habitat on BLM lands in Oregon was 3 percent (22,000 acres) per year in 1990 and 0.52 percent (4,911 acres) per year by 2003 (USDI 2004b, 28). During this period of declining rates of habitat loss, the spotted owl populations in southwestern Oregon appeared to be stable. The rate of habitat loss due to timber harvest on federal lands is expected to be less than 4 percent per decade (USDA and USDI 2004b, 111).

The NWFP (p. C-44) requires retention of late-successional forest throughout the landscape. Analysis shows that for the 5th field watersheds, currently 55 percent of the BLM-administered forest lands provides late-successional habitat. The Medford District ROD/RMP and the NWFP require that 5th field watersheds retain late-successional forests at 15 percent. Approximately 17,000 acres of late-successional habitat on BLM-administered lands are present within the watersheds where the action is proposed.

The emergence of barred owls as invasive competitors, West Nile virus, and sudden oak death as new threats to spotted owls suggests an increase in risk to the species since 1990. Barred owls may be more of a habitat generalist and occupy a wider diversity of habitat types than spotted owls. Spotted owls may respond to barred owls by avoidance. The rate and extent of displacement of spotted owls by barred owls is likely occurring, but the rate and extent of this are unknown, and, further, whether this effect is exacerbated by other confounding issues is uncertain (Courtney, et al. 2004).

These newly identified threats are poorly understood, are likely to be pervasive, and would be difficult to alleviate. The threats are of uncertain magnitude and effect. It is uncertain what role timber harvest may play although it has been suggested that timber harvest may be one of the reasons for increased barred owl presence. Timber harvest would not have any known additive effect. However, the increased risk from these new threats was not sufficient to change the status of the spotted owls (USDI 2004b, 55).

The proposed Camp Cur project would occur on matrix lands and would meet the requirements outlined in the NWFP FSEIS which was consulted with the USFWS. Harvest would not occur in 100-acre activity centers which are designated late-successional reserve (LSR). These activity centers, Riparian Reserves, and 15 percent late-successional habitat retention were designed to mitigate timber harvest effects by providing for well-distributed patches of late-successional forest that serve for dispersal of mobile species, such as the northern spotted owl.

Since the harvest rate on Federal lands in Oregon is expected to remain low for the foreseeable future, it is reasonable to expect the northern spotted owl population would remain stable in southwestern Oregon. The regeneration harvest in suitable habitat and the short-term degradation of suitable roosting/foraging habitat associated with the proposed project are included as part of the BLM timber harvest program in southwestern Oregon. In addition, it is estimated that within the NWFP area, habitat in-growth is occurring at approximately 8 percent (600,000 acres) over the baseline condition established in the NWFP (USDI 2004b, 26).

Private lands and federal, nonreserved matrix lands will not develop into suitable spotted owl habitat given management objectives for those lands. The private lands are managed in compliance with the ESA and were not included in the designated spotted owl critical

habitat. Nonfederal lands continue to be harvested and most would remain in early to mid-seral conditions. This would benefit species that depend on these seral stages, including many species of birds, including sharp-shinned hawks, Neotropical birds, quail, skunks, squirrels, and rabbits.

Approximately 80 percent of federal lands within the NWFP area is reserved from regeneration timber harvest (USDA and USDI 2004b, 111) and will develop into suitable owl habitat. Managed, mid-seral stands on Federal nonreserved matrix and on private lands would offer dispersal-quality habitat to spotted owls and may be used as connectivity between blocks of late-seral habitat contained within the Federal reserves.

The proposed project would not incrementally affect the stability of the northern spotted owl population in southwestern Oregon since the rate of habitat loss is substantially reduced, there is substantial in-growth of habitat, and newly identified threats are independent to the proposed action.

The assessment of the NWFP implementation effects on the fisher was that there was a 63 percent likelihood of achieving an outcome in which there is sufficient quality, distribution, and abundance of habitat to allow the fisher population to stabilize and be well-distributed over Federal lands. The NWFP was designed with a network of reserves of late-successional forests surrounded by younger, managed forests. “Fisher populations are believed to have declined on Federal lands within the range of the NSO, primarily for two reasons, both of which are related to the widespread conversion of old growth Douglas-fir forests to young plantations: loss of habitat due to forest fragmentation resulting from clearcutting designed in a staggered-setting prescription, and removal of large, downed coarse woody debris and snags from the cutting units” (USDA and USDI 1994a, J-2-469).

Many known locations for fishers are outside LSRs, and it is possible that harvest of such forests may cause local extirpation of populations (USDA and USDI 1994a, J-2). The species’ range includes 34 percent nonfederal lands (USDA and USDI 1994a, J-2-470). Although the NWFP may provide suitable habitat that is well-distributed on federal lands, fisher populations may never respond and be well-distributed because of (1) their apparently low rates of recolonization of restored habitats after local extirpation, (2) the lower amount of federal land at lower elevations, and (3) their natural rareness (USDA and USDI 1994a, J-2-470).

Within the Big Butte and South Fork Rogue 5th field watersheds, where the Camp Cur Project is located, BLM administers 35,819 acres of land. Approximately 17,000 acres are 80+ years old. Fifty-five percent of BLM administered conifer forests in the watershed are over 80 years old.

Fishers use large areas. One fisher radio-collared in the RRNF near Prospect dispersed approximately 34 miles (55 km) to the Deschutes National Forest. Fishers can disperse through the watersheds and use habitat present in the surrounding watersheds, including the RRNF (see Appendix D, Wildlife, Table D-1). There are approximately 30,440 acres designated LSR in the RRNF Forks Watershed and 1,400 acres LSR in Lost Creek Watershed. RRNF has 59,163 acres of wilderness in Forks Watershed to the east of the Camp Cur project area. These areas would not be entered for timber harvest and would remain to provide habitat for fishers.

Since the regeneration harvest units are scattered throughout the watershed and 55 percent of the watershed is over 80 years old, the proposed actions would not increase the need to list the fisher as T&E. The proposed action would not reduce the persistence of the population that is present in the southwestern Oregon Cascades, although they may remain naturally rare.

In April 2005, a review of all special status wildlife species that could be present in the watershed was completed. An analysis of the impacts from the proposed timber harvest is included in Appendix D, Wildlife, see Table D-2.

The proposed actions, while potentially adversely disrupting local individuals of sensitive wildlife species and causing loss of habitat in some cases, are not expected to affect long-term population viability of any Bureau Sensitive wildlife species known to be in the area. Activities under all alternatives would not lead to the need to list sensitive wildlife species as T&E.

3.8.4.3 Effects of Alternative 2 on Wildlife

Direct and Indirect Effects

Threatened and Endangered Species

Bald eagle - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives for effects on bald eagles.

Northern spotted owl - Of 842 acres of matrix land proposed for timber harvest under this alternative, 431 acres are currently rated as suitable spotted owl habitat (see Table 3-13). Suitable habitat provides nesting/roosting/foraging and roosting/foraging habitat. Suitable habitat is considered downgraded to dispersal if it maintains 40 to 59 percent canopy post-treatment, and is considered removed if canopy coverage drops below 40 percent (USDI 2003, BA-41).

Table 3-13. Summary of Effects of All Alternatives on Spotted Owl Habitat within the Camp Cur Project Area

	Suitable Habitat		Suitable Habitat Removed - No Longer Suitable	Suitable Habitat Downgraded to Dispersal
	Before Harvest	After Harvest		
Alternative 1	1,449 acres	1,449 acres	0 acres	0 acres
Alternative 2	1,449 acres	1,018 acres	102 acres	329 acres
Alternative 3	1,449 acres	1,018 acres	94 acres	337 acres
Alternative 4	1,449 acres	1,161 acres	73 acres	215 acres

SGFMA regeneration and shelterwood harvest would occur on 102 acres of suitable spotted owl habitat on matrix land. This area would not provide suitable habitat for the next 80-100 years.

Density management and selection harvest are proposed on 329 acres of suitable spotted owl habitat. The proposed treatment would leave 40 percent (or greater) canopy and would reduce suitable roosting/foraging habitat to dispersal habitat. This area would continue to grow and could become suitable habitat again in 10 to15[1] years. Based on expected growth and crown development projections, stands thinned to 40-50 percent would be expected to provide 60 percent canopy within 10-15 years.

Harvest would occur in the 2 laminated root rot pockets in Sections 12 and 13. Fragmentation would be increased in this area near the US Forest Service boundary. The proposed harvest would remove the last unmanaged late-successional stands in Section 12. Spotted owls could still disperse through Section 12, but 3 units would no longer

[1] Tree crown would increase in size and photosynthetic area, with crown closure increasing approximately 10 percent every 5 years (based on Organon growth and yield projections, Hann 2003).

provide suitable foraging/roosting habitat. The stands are surrounded by mid-seral forest and are not large enough to provide nesting habitat.

Riparian thinning is proposed on 26 acres of Riparian Reserve in Alternative 2. Riparian thinning would remove the precommercial understory only and would continue to provide suitable spotted owl foraging and roosting habitat after the action. No riparian thinning is planned within 0.25 miles of a known spotted owl nest, and the proposed action would have no effect to spotted owl. Riparian thinning and planting would improve opportunities for future development of large overstory tree development, benefiting spotted owls in the long-term (80+ years).

Dispersal habitat provides cover and shelter as spotted owls migrate across the landscape. Spotted owls are vulnerable to predation as they move across open areas. Dispersal habitat would be provided by the 15 percent late-successional retention, Riparian Reserves, and 100-acre owl activity centers (USDI 1995a; USDI and USDA 1994b). Currently, approximately 40 percent of BLM lands in Big Butte and 38 percent in South Fork Rogue River 5th field watersheds provide suitable spotted owl habitat. Dispersal of spotted owls on BLM lands through the 5th field watersheds between 100-acre activity centers and LSRs could occur. The proposed action would not change the status of spotted owls.

Fisher - In Alternative 2, timber harvest is proposed on 842 acres. SGFMA regeneration and shelterwood harvest would occur on 108 acres and would leave a residual canopy less than 40 percent. Alternative 2 would increase fragmentation with eight units proposed for SGFMA regeneration or shelterwood harvest. Fishers were found to avoid recent clear-cuts and forested stands with less than 40 percent canopy cover (Aubry and Lewis 2002). The areas proposed for SGFMA/shelterwood would be avoided by fishers. The SGFMA regeneration and shelterwood harvest areas would not provide foraging habitat for fishers for approximately five years until the brush returns to provide cover. Fishers will forage in recovering clear-cuts and openings when the canopy begins to recover. A low level canopy of brush and small trees in the recovering regeneration harvest areas would provide berries, quail and other birds, and small mammals (squirrels, skunks, rabbits, hares, etc.) that are part of the fisher's diet.

Alternative 2 is expected to reduce the quality of fisher habitat in all units. Density management and selection harvest would leave 40-60 percent green tree canopy. These stands would continue to provide cover and constituent elements (large overstory trees, snags, hardwoods, and CWD) for the life cycle of the fishers. These units would still meet fisher habitat needs for resting and foraging; fishers would forage and hide in the stands. Unentered stands adjacent to these harvest stands would provide denning opportunities. Fishers will use managed forests for den locations, resting, and foraging.

If pileated woodpecker nest cavities and other cavities in trees are present in the density management stands, the stand could be used for fisher for denning. Den locations were found in managed forests with 1 to 66 percent of overstory trees removed (Aubry and Raley 2002). Leaving all snags and CWD would retain structures in the stands that fishers could use for maternity dens (Aubry and Raley 2002). Trees with obvious pileated woodpecker nest holes would be left in the stands to provide future dens. Other constituent elements (large overstory trees, hardwoods, snags and CWD) would remain in the units.

Disruption would occur while the timber harvest is occurring, but the areas with density management and selection harvest would continue to provide resting sites, snags, hardwoods, and down logs after the action. Fishers could use these areas after the actions are completed. Fishers have large home ranges and would be able to move away from the action. The average female home range is approximately 6,200 acres (25 square kilometers). Male home ranges were estimated to be 36,000 acres (147 square kilometers)

during the breeding season and approximately 15,000 acres (62 square kilometers) during the nonbreeding season (Aubrey and Raley 2002).

A seasonal restriction on timber harvest units from February 1 through May 31 would reduce disturbance during the critical breeding times. Since males travel extensively during breeding season, the seasonal restriction would reduce the disruption while he is actively seeking breeding females beginning in early February. The seasonal restriction through the end of May on units outside the natal and maternal area would protect any unknown sites, if present. The seasonal restriction would be extended to June 30 for units within 0.5 miles of the known natal and maternal den sites. Work would be suspended until the end of June if young were detected.

There is little information available about the direct impact of logging with the associated noise and spur road construction. There is evidence that fishers avoid roaded areas (Harris and Ogan 1997). Approximately 3.5 miles of temporary spur road would be constructed to access harvest units and 1.7 miles of temporary roads would be constructed for pine plantation thinning. Fishers would likely move away from the disturbance. Temporary spur roads would be closed after the proposed action is completed. After the temporary spur roads are closed and the disturbance is gone, there would be negligible long-term effects on fishers from roads. The proposal to close existing roads would benefit fisher by reducing disturbance and allowing vegetation to become established.

Alternative 2 would remove 39 acres of unmanaged forests in Section 12 and 13. This is an area that was found to be used by fishers for foraging in the PNW-RRNF study. The study found 56 percent of den sites were in unmanaged forests. Both females and males were found to use managed forests for resting locations (Aubry and Raley 2002). Alternative 2, because of higher SGFMA regeneration and shelterwood harvest proposed, would remove more habitat that could provide den and resting sites than Alternative 3 and 4.

Within the South Fork Rogue and Big Butte 5th field watersheds, a total of approximately 30,800 acres of BLM land are forested; 55 percent are over 80 years old. These lands would provide foraging, hiding, and denning habitat for the Pacific fisher. Fishers appear to use a variety of habitats, including mid-and early seral stands.

Activities proposed in Alternative 2 would not be expected to cause direct mortality of any fishers. Disturbance from timber harvest and work activities and loss of habitat in the regeneration acres would occur. However, fishers are mobile and have large home ranges. Fishers would likely move to another part of their home range while the activity is ongoing.

Existing snags and CWD would be left to provide habitat for fisher. Snags that would be felled for safety reasons would remain on-site. Canopy would remain at 50 percent (or greater) in the density management units and 40-60 percent in the selection harvest units. No known den stands would be impacted. Large green conifers would be left in the density management/thin and select cut stands. Alternative 2 would not be expected to reduce the viability of the fisher population in the South Fork Rogue and Big Butte 5th field watersheds although fisher numbers would be expected to remain naturally low.

Sensitive Species

Flammulated owl, Great gray owl, Northern goshawk, Bats - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Other Wildlife Species

Elk and Deer - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Neotropical and nonmigratory birds - There would be a reduction of 108 acres of late-successional habitat from SGFMA regeneration and shelterwood harvests. This would remove hiding cover and nesting habitat for Neotropical birds that use older forests. However, habitat for species that use early seral habitat would be increased under Alternative 2 due to the increase in early seral conditions.

Riparian buffers, untreated areas, 100-acre activity centers, late-successional habitat retention, and connectivity block late-successional acres would preserve patches of late-successional habitat for cover and nesting birds that use late-successional forests.

Proposed harvest and riparian thinning activities that would occur during the active nesting period could cause some nests to fail. The fisher restriction until the May 31 and spotted owl seasonal restriction until June 30 would protect some nests from disturbance due to timber harvest. However, loss of some nests during the year timber harvest and thinning occurs during active nesting season is unavoidable. The loss of a nest in one nesting season would not be expected to reduce the persistence of any bird species in the watershed. Timber harvest would reduce the suitability of the stands for some bird species and improve the suitability for others. There would be an increase in early seral habitat which would increase the amount of flowering forbs and shrubs in the regeneration harvest areas. This would improve conditions for rufous hummingbirds by providing increased nectar-producing flowers.

Edge would increase due to proposed regeneration harvest in 8 units in Sections 12, 13 and 21. NWFP snag numbers would be met on all SGFMA regeneration and shelterwood harvest units. There would be an increased benefit for species that use edges, such as olive sided flycatchers, and early seral species, such as rufous hummingbirds.

Habitat would be improved within density management and selection harvest units for species that use the open understory. Olive-sided flycatchers forage at the edge of clear-cuts, perching on large trees and snags at the edge of the forest. Harvest would not reduce these habitat elements, and would improve foraging for the flycatchers. Snags would be left to provide hunting perches for olive-sided flycatchers.

The proposed action is not expected to affect population viability of any Neotropical or nonmigratory bird species. Proposed activities would not lead to the need to list any of the Bureau Sensitive species as T&E.

Cumulative Effects

See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives.

3.8.4.4 Effects of Alternative 3 on Wildlife

Direct and Indirect Effects

Threatened and Endangered Species

Bald eagle - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for effects on bald eagles.

Northern spotted owl - Of 822 acres of matrix land proposed for timber harvest under this alternative, 431 acres are currently rated as suitable spotted owl habitat (see Table 3-13.). Suitable habitat provides nesting/roosting/foraging and roosting/foraging habitat. Suitable habitat is considered downgraded to dispersal if it maintains 40 to 59 percent canopy post-treatment, and is considered removed if canopy coverage drops below 40 percent (USDI 2003, BA-41).

SGFMA regeneration and shelterwood harvest would occur on 42 acres of spotted owl habitat on matrix land. This area would not provide suitable habitat for 80-100 years. Harvest would occur in 2 laminated root rot pockets in Sections 12 and 13. Fragmentation would be increased in this area near the US Forest Service boundary. The proposed action would remove the last remaining unmanaged late-successional stands in Section 12. Spotted owls could still disperse through Section 12, but the regeneration units would no longer provide suitable foraging/roosting habitat. The stands are not large enough to provide nesting habitat.

Density management and selection harvest on 337 acres of suitable spotted owl habitat would leave 40 percent or greater canopy and would reduce suitable roosting/foraging habitat to dispersal habitat. The density management and selection harvest would continue to grow and could become suitable habitat again in 10 to 15 years.

Riparian thinning is proposed on 26 acres of Riparian Reserve in Alternative 3. Riparian thinning would remove the precommercial understory only and would continue to provide suitable spotted owl foraging and roosting habitat after completion. No riparian thinning is planned within 0.25 miles of a known spotted owl nest. Riparian thinning would have no effect to spotted owls because no suitable habitat would be removed and overstory canopy would not be changed. Riparian thinning and planting would improve opportunities for future development of large overstory tree development, benefiting spotted owls in the long-term (80+ years).

Currently, approximately 40 percent of BLM lands in Big Butte and 38 percent of the South Fork Rogue River 5th field watersheds provide suitable spotted owl habitat. Dispersal of spotted owls on BLM lands through the 5th field watersheds between 100-acre activity centers and LSRs could occur through late-successional habitat retention, Riparian Reserves, and 100-acre activity centers. The proposed harvest activities would not change the status of spotted owls.

Fisher - In Alternative 3, timber harvest is proposed on 822 acres: 42 acres regeneration harvest (SGFM and shelterwood) and 780 acres of selection harvest and density management. SGFMA regeneration and shelterwood harvest would occur in 3 units and would leave a residual canopy of less than 40 percent. Fishers were found to avoid recent clear-cuts and forested stands with less than 40 percent canopy cover (Aubry and Lewis 2003). These three units would be converted to early seral habitat and would no longer be suitable for fisher. Forest fragmentation would also increase. The regeneration harvest units would not provide foraging habitat for fisher until the canopy begins to recover with conifer and other vegetation regeneration in 10 to 15 years. PNW-RRNF study telemetry data in the Camp Cur project area shows that fishers use recovering clear-cuts when the trees are 10 to 15′ tall.

Timber harvest activity and canopy reduction would degrade fisher habitat. The disturbance could cause fisher to move away from the area and may reduce overall suitability of the individual stands. Fishers have a large home range, and would be able to move away from the disturbance. A seasonal restriction would be in effect until May 31 for all actions in late-successional habitat. This would be extended to June 30 in the units within 0.5 miles of the known natal and maternal dens. Camp Cur proposed projects are designed to avoid disturbance during the reproductive period to allow breeding, to protect kits during the early dependency period, and to prevent loss of a breeding cycle. The seasonal restriction would allow the kits time to develop and become mobile, so the mother could move them away from the action if it were occurring near a den site. Timber harvest would not be expected to cause direct mortality of any fishers. Habitat remains in the area.

Density management and selection harvest units would continue to be habitat with 40 to 50 percent (or greater) canopy after harvest. These units would still meet fisher habitat needs for resting and foraging. The PNW-RRNF study showed that fishers will use den

locations in managed forests with >66 percent of overstory trees removed. Leaving all snags and CWD would retain structures in the stands that fishers could use for maternity dens (Aubry and Raley 2002). No known denning stands would be impacted. Fishers could continue to use density management and selection harvest units.

There is no information about the direct results of canopy reduction on fisher, although optimal fisher habitat is high canopy closure, late-successional forests. Constituent elements (snags, large overstory trees, hardwoods and CWD) would remain in the units, although below current levels. There would be disturbance (noise, human presence, vehicles, etc.) while the action is occurring.

Existing CWD and snags would be left to provide habitat. Canopy retention in the density management and selection harvest would be 40 percent or greater. The 42 acres proposed for SGFMA regeneration and shelterwood harvest would not provide suitable denning or resting habitat. The proposed action would not reduce the viability of the fisher population in the South Fork Rogue and Big Butte 5th field watersheds although fisher numbers would be expected to remain naturally low. Alternative 3 would reduce the quality of fisher habitat below that currently available in all proposed harvest units.

Sensitive Species

Flammulated owl, Great gray owl, Northern goshawk, Bats - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Other Wildlife Species

Elk and Deer - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Neotropical and nonmigratory birds - This alternative proposes to harvest 42 acres with SGFMA and shelterwood harvest. This would remove hiding cover and nesting habitat for some Neotropical birds that use older forests. There would be more habitat with higher canopy closure, but less early seral forbs and shrubs available for species that use these habitats, such as rufous hummingbirds.

The effects of Alternative 3 to bird populations would be low. Some birds could lose a nest in one year due to harvest and thinning actions. This is unavoidable. They would be able to renest the following year after the action is completed.

The proposed action, while affecting local individuals of birds with disturbance, harvesting trees, and disrupting the nesting cycle in the year the action occurred for some bird nests, would not affect the viability of any populations of Neotropical and nonmigratory birds. No Neotropical or non-migratory Bureau Sensitive bird would need to be listed as T&E as a result of the proposed action.

Cumulative Effects

See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives.

3.8.4.5 Effects of Alternative 4 on Wildlife

Threatened and Endangered Species

Bald eagle - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives for effects on bald eagles.

Northern spotted owl - Riparian thinning would not occur under this alternative. Riparian reserves would take longer to develop large overstory trees suitable for spotted owl nesting habitat.

Timber harvest is proposed in 554 acres: 14 acres shelterwood harvest and 440 acres density management and selection harvest. Timber harvest would remove 14 acres of suitable spotted owl habitat. The proposed action would downgrade 215 acres suitable spotted owl habitat from suitable to dispersal habitat (see Table 3-13).
Only one unit would be shelterwood harvested (14 acres) under this alternative. Shelterwood harvest would change 14 acres of late-successional habitat into early seral habitat. These areas would not be expected to recover until late-successional conditions return, 80-100 years.

No timber harvest or other actions are proposed in section 12 and 13 near the 100-acre spotted owl activity center. Increased fragmentation due to timber harvest in would not occur in these sections near the US Forest Service boundary because the stands would be left intact. The proposed units would remain to provide roosting and foraging habitat. The stands are currently too small to provide nesting habitat.

Areas that are thinned, leaving 40-50 percent (or greater) canopy would be degraded, but would likely return to provide suitable habitat in 10 to 15 years. Dispersal of spotted owls on BLM lands through the 5th field watersheds between 100-acre activity centers and LSRs could occur through late-successional habitat retention, riparian reserves, and 100-acre activity centers. The proposed action would not change the status of spotted owls.

Fisher - In Alternative 4, timber harvest is proposed on 554 acres. Only 14 acres in one shelterwood harvest unit would be converted into early seral and would be unsuitable for fisher foraging in the short-term. This area would not provide foraging habitat until the trees and brush begin to recover and provide forging habitat when low canopy becomes established in 10 to 15 years.

There is no information about the direct results of canopy reduction on fisher, although optimal fisher habitat is high canopy closure, late-successional forests. However, the PNW-RRNF study showed that fishers will use den locations in managed forests with >66 percent of overstory trees removed (Aubry and Raley 2002). Constituent elements (snags, large overstory trees, hardwoods and CWD) would remain in the density management and selection harvest units, although below current levels. Canopy in these units would remain at 40 percent and greater. Fishers could still use these areas. No known denning stands would be impacted. There would be disturbance (noise, human presence, vehicles, etc.) while the action is occurring.

Late-successional habitat in Section 12 would remain. This section has been harvested in the past and the remaining late-successional unmanaged units would stay unharvested at this time. In the short-term, there would be no disturbance to fishers in this section. There could be some long-term increase in openings in these areas as trees are infected with root rot, but the increase in CWD would offer cover and the openings would be small and not all trees would die at one time.

Effects to fisher population in Alternative 4 are expected to be low. Proposed activities would not be expected to cause direct mortality of any fishers. Habitat remains in the area. The seasonal restriction would be in effect during the early reproductive period (February 1 to May 31).This would be extended to June 30 in units within 0.5 miles of the known natal and maternal den sites. Shelterwood harvest would create one 14-acre opening. Canopy would be 40 to 50 percent and greater in the density management and selection harvest units. Snags, CWD, hardwoods, and green trees would remain in the stands which could be used for resting, foraging, and den sites by fishers.

Camp Cur proposed projects are designed to avoid disturbance during the reproductive period to allow breeding and protect kits during the early dependency period to prevent loss of a breeding cycle. The proposed Camp Cur timber sale is not expected to reduce the viability of the fisher population in the southern Oregon Cascades, although the population would remain naturally low.

Sensitive Species

Flammulated owl, Great gray owl, Northern goshawk, Bats - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Other Wildlife Species

Elk and deer - See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives, for impacts to these species.

Neotropical and nonmigratory birds
Impacts would be the same as Alternative 3, except less disturbance would occur due to lower numbers of acres harvested. The small patches of unmanaged forest in Section 12 and 13 would not be entered under Alternative 4. This would reduce the amount of disturbance and change of habitat type in this section which has been heavily harvested in the past. There would be an increase in snags and CWD in the laminated root rot pockets over time as the disease develops.

The proposed harvest, while affecting local individuals of birds with disturbance and disrupting the nesting cycle in the year the action occurred for some bird nests, would not affect the viability of any populations of Neotropical and nonmigratory birds. No Neotropical or nonmigratory Bureau Sensitive bird would need to be listed as T&E as a result of actions proposed in Alternative 4.

Cumulative Effects

See Section 3.8.4.2, Effects on Wildlife Common to All Action Alternatives.

3.9 Visual Resources

3.9.1 Methodology

Field reconnaissance of the units along the Butte Falls/Prospect Highway was conducted. The “seen” area was evaluated. Pictures were taken for the file and recommendations in the form of PDFs were made for units along the highway.

3.9.2 Assumptions

The BLM-administered lands adjacent to the Butte Falls/Prospect Highway will continue to be designated Visual Resource Management (VRM) II. This is the land (foreground/middleground) seen from the road within one mile or the first ridge, whichever is closer. Timber management activities will continue on private forest lands with the primary harvest system being tractor. New roads may be built to access private lands. Grazing will continue throughout the project area as well as, hunting, camping and off-highway vehicle use.

3.9.3 Affected Environment

The Butte Falls/Prospect Highway is the only primary road with critical viewpoints in to the Camp Cur project area. The viewshed from this highway is designated in the Medford District ROD/RMP (p. 70) as Visual Resource Management (VRM) Class II. The objective is to manage to meet the visual quality by retaining the existing character of the landscape. The lands should be managed for low levels of change to the characteristic landscape. Management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

Adjacent to the Butte Fall/ Prospect Highway, selective cutting has occurred on BLM-administered land and private lands. The predominant view is a mixed-aged conifer forest with infrequent open areas, such as roads and natural openings.

A few proposed units within the project area are within the foreground and middle ground of the viewshed from this road. All other units fall into VRM Class IV. The management objective for this class states "management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the effect" (USDI 1995a, 70).

3.9.4 Environmental Consequences

Table 3-14. Comparison of Effects on Visual Resources from All Alternatives

Issue: Visual Resources				
Past Actions	• BLM-administered lands and private forest lands have been managed for the past 50 years. The view along the highway was of varying seral stages. It was not uncommon to see harvesting of trees along the highway • BLM-administered lands designated as VRM Class II in Medford District RMP			
Present Actions	• Most private forestlands would be intensively managed with final harvest on commercial economic rotations averaging 60 years.			
Current Conditions	• Varying levels of seral stages; dense, over-crowded stands to open stands • Stands dying from over-crowding and or disease			
Future Actions	• Private timber lands would be harvested and new roads may be built for access • Recreational use and grazing along Butte Falls/Prospect Highway would continue			
Proposed Actions	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
	• No Action • In areas of high tree density or pine plantations, trees would decline and die • Private forest lands would continue to be managed and the change would be seen	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands	• Treatments in Units 15-7, 21-1, 21-2, and 21-7, located along the highway, would have a change in color in the short-term • In the long-term, the change would not be any different than adjacent stands

Table 3-14. Comparison of Effects on Visual Resources from All Alternatives

Cumulative Effects	• Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands	• Short-term changes to visuals from proposed harvest would not be discernable after first year • Stands seen from the highway would continue to show change in vegetation as stands are treated • Change on private lands would be more apparent than treatment on BLM lands

3.9.4.1 Effects of Alternative 1 (No Action) on Visual Resources

Direct and Indirect Effects

In Alternative 1 there would be no direct effects to the visual resource. Indirectly, in the areas of high tree density or pine plantations, the trees would decline and die. These areas would continue to be seen from the highway. Private timber lands would be harvested and recreational use along the highway would continue.

Cumulative Effects

Timber harvesting on BLM-administered lands and private timber lands has altered the structure, amount, and spatial arrangement of forest vegetation from larger contiguous stands of late-successional (mature and old growth seral stages) forests to a patchy mosaic of young and late-successional stands. These past entries, along with the natural ecological changes, provide the change that is seen along the highway. The changes repeat the basic elements of form, line, color, texture, and scale found in the predominant features of the landscape.

3.9.4.2 Effects on Visual Resources Common to All Action Alternatives

Direct and Indirect Effects

In all action alternatives, the BLM-administered lands along the county road from Butte Falls to Prospect are designated as VRM Class II. The PDFs were used to layout the units along the highway for Units 15-7, 21-1, 21-2, and 21-7. PDFs would provide for additional visual consideration. No tree over 24″ DBH would be cut within 100 feet of the Butte Falls/Prospect Highway. In all treatment areas along the highway, no new openings would be built and equipment would not enter the units from the highway. The trees to be cut would be felled away from the highway, with the stumps cut low at an angle facing away from the highway so not to be seen. Clumps of vegetation not needed for stand treatment would be retained to provide screening.

Cumulative Effects

There would be a change in the vegetation in the four units adjacent to the highway. This change would not alter the form, line, color, texture, and scale found in the predominant feature of the landscape. The first season of harvest, the average person driving the highway at 55 miles per hour would notice a change due to soil and vegetation

disturbance. This change would be very slight because of the application of the PDFs. After the first year, with completion of harvest activities and the regrowth of vegetation, the change would be no different than what is seen along other areas of the Butte Falls/ Prospect Highway. Because of the intermixed private timberlands, the changes in the visual resource would not be any different than what a traveler sees as they drive other parts of the highway.

3.10 Summary of Effects on Other Resources

The following resources did not pertain to the issues identified and analyzed in this EA. Possible effects from each alternative were analyzed and the analyses are included in the Appendices for this document. A summary of these effects is included below. See the Appendices for the complete discussion.

3.10.1 Effects of Alternatives on Botany

The Camp Cur project area is outside the ranges and does not contain suitable habitat for *Fritillaria gentneri*, *Limnanthes floccosa* ssp *grandiflora,* or *Lomatium cookii*. The proposed activities would result in **"no effect"** to these three Endangered plants.

Surveys for Special Status vascular and nonvascular plants have been completed for the harvest and pine plantation thinning projects. Surveys in restoration project areas would be completed prior to implementation. The proposed activities would not impact any sites or trend Special Status vascular or nonvascular plants toward listing. Predisturbance surveys for Special Status fungi are not practical (USDA and USDI 2004a, 122) because the fungi produce ephemeral sporocarps (fruiting bodies) on an irregular basis. Because of their rarity across the NWFP area, it is unlikely Sensitive fungi are present in the Camp Cur timber harvest units and the risk is low they would be impacted. The assumption is made that protecting known sites (current and future found) for these Sensitive fungi species, in addition to conducting large-scale fungi inventories throughout the Pacific Northwest, will be adequate in ensuring this project and future projects would not contribute to the need to list them (USDI 2004, 5-2).

See Appendix B, Botany, for a full discussion of the effects of the alternatives.

3.10.2 Effects of Alternatives on Cultural Resources

There will be no direct environmental consequences to cultural resources, because all sites will be buffered and protected. Indirectly, the increased activity in the project area could lead to the possibility of further looting of some of the sites.

See Appendix C, Cultural Resources, for a full discussion of the effects of the alternatives.

3.10.3 Effects of Alternatives on Fire and Fuels

Slash generated from the thinning of timber stands, if not treated, would created surface fuels loading greater than current levels. This increase in surface fuels would increase fire behavior intensities, with higher flame lengths and greater rates of spread in the event of a wildfire. Fuels assessment would be conducted within each unit following harvest activity. This assessment would determine the fuels hazard and fire risk based on aspect, slope, surface fuels loading (tons per acre), access, and location of each unit. Treatment recommendations would be based on post harvest fuels assessment of the amount of slash created during harvest activities.

Treatments designed to reduce canopy fuels through density management and selection harvest, increase and decrease fire activity simultaneously. Understory thinning in combination with a reduction to 40 to 60 percent canopies in late seral stands would provide the greatest benefit to reduced crown fire activity.

Wildfire occurrence would result in less severe effects due to the reduction in fuels amounts. Silvilcultural treatments would modify vegetation dynamics in the short and long terms. The removal of ladder fuels reduces the amount of vertical continuity and lowers the propagation and spread of crown fire activity. Treatment of the harvest fuels would reduce the fuel loading created.

3.11 Economic Assessment of Timber Harvest in the Camp Cur Project Area

- Figures are estimates for comparison purposes only and may not reflect actual values. Figures are rounded.
- Direct employment figures based on Table 3&4-49 of NWFP FSEIS (USDA and USDI 1994a)

3.11.1 Alternative 1 (No Action)

Since no harvest would occur under this alternative, there would be no return to the Federal Treasury. No forestry related jobs would be created.

3.11.2 Alternative 2

Under Alternative 2, approximately 5.3 million board feet would be harvested, with an estimated return to the Federal Treasury of $1.37 million. Direct employment resulting from timber harvest and processing of a commodity would provide for approximately 50 jobs.

3.11.3 Alternative 3

Under Alternative 3, approximately 4.7 million board feet would be harvested, with an estimated return to the Federal Treasury of $1.23 million. Direct employment resulting from timber harvest and processing of a commodity would provide for approximately 44 jobs.

3.11.4 Alternative 4

Under Alternative 4, approximately 3.1 million board feet would be harvested, with an estimated return to the Federal Treasury of $.81 million. Direct employment resulting from timber harvest and processing of a commodity would be approximately 29 jobs.

3.12 Unavoidable, Irretrievable, and Irreversible Effects

3.12.1 Environmental Effects that cannot be Avoided

Implementing any alternative would result in some degree of environmental effects that cannot be avoided. While standards, guidelines, PDFs, BMPs, and mitigation measures are intended to keep the extent and duration of these effects within acceptable levels, effects cannot be completely eliminated. Although standards, guidelines, PDFs, and BMPs are designed to prevent effects to soil and water, the potential for impacts does exist. Sediment could be produced by surface erosion and channel erosion. Air quality would be affected by smoke from prescribed fires and burning of slash piles. Ground-disturbing activities have the potential to temporarily increase sediment loads in some streams. Mitigation measures for ground-disturbing activities would include using existing skid trails, pulling slopes back to the natural slope when removing culverts, and restricting mechanical operations to slopes less than 35 percent, water-barring skid October 15.

3.12.2 Relationship between Short-Term Uses and Long-Term Productivity

Short-term use of the land includes day-to-day and even year-to-year activities that affect the landscape. It includes activities that remove resources from the land, such as fishing and hunting, as well as activities that do not, such as photography, sightseeing, and hiking. Short-term actions include management activities, such as vegetation management and harvesting of trees. As a renewable resource, trees and vegetation can reestablish and grow again if the productivity of the land is not impaired. Maintaining the productivity of the land is a complex, long-term objective. All action alternatives protect the long-term productivity of the project area through the use of specific standards and guidelines, mitigation measures, PDFs and BMPs.

Long-term productivity could change as a result of various management activities. Soil and water are two key factors in ecosystem productivity, and these resources would be protected in all action alternatives to avoid damage that could take many decades to rectify. Timber, wildlife habitat, and other renewable resources all rely on maintaining long-term soil productivity. Quality and quantity of water from the project area may fluctuate as a result of short-term uses, but no long-term effects to the water resources are expected to occur as a result of the alternatives.

3.13 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994) requires that all federal agencies “make achieving Environmental justice part of [their] mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of it program, policies, and activities on minority populations and low-income populations.”

Based on experience with other projects in the Butte Falls Resource Area, none of the proposed actions would substantially affect minority or low-income individuals. Implementation of these projects is expected to provide job opportunities in communities such as Butte Falls, Prospect, Trail, Shady Cove, Eagle Point, White City and Medford.

These communities include minority and low income populations that may benefit from the economic effects. Small or minority-owned business would have the opportunity to compete for some of the work.

4.0 List of Preparers

Name	Job Title	Responsibilities
John Bergin	Ecosystem Planner	Team Lead; Economics
Jean Williams	Environmental Coordinator	NEPA Compliance; Visual Resources
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Shawn Simpson	Hydrologist	Soil; Hydrology
Marcia Wineteer	Botanist	Botany
Diane Parry	Geologist	Cultural Resources
John Osmanski	Forester	Forest Condition; Silviculture Prescriptions and Marking Guidelines
Dianne Keller	GIS Specialist	Maps; Data
Craig Brown	Forester	Layout
Randy Bryan	Engineer	Roads
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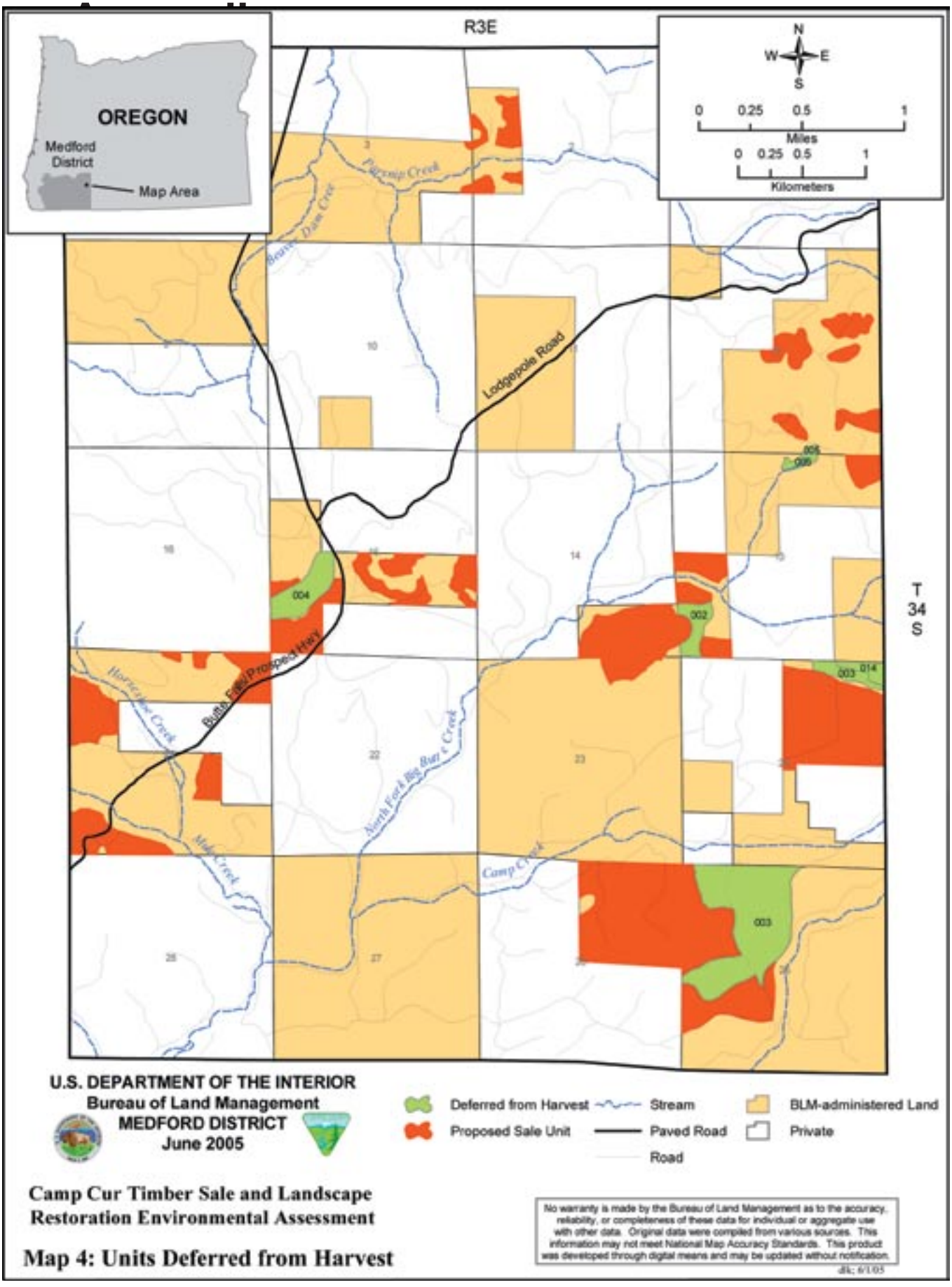
Appendices

Appendix A
Silviculture Prescription and Marking Guidelines

Approximately 204 acres were originally considered for harvest entry but were eliminated from consideration due to current stand conditions, Riparian Reserves, or wildlife considerations (see Map 5 for unit locations). All or portions of the following operational units were deferred from entry at this time (see Table A-1).

Table A-1. Operational Inventory Units Deferred from Harvest Entry

Legal Description	Operational Inventory Unit	Acres	Remarks
34S-3E-12	005	3	Riparian Reserve
34S-3E-13	006	6	Riparian Reserve
34S-3E-13	002	20	Low site; rocky with madrone, chinquapin, and scattered conifers
34S-3E-15	004	38	Portion of OI containing smaller (<8″ DBH) stands with moderate to heavy amounts of brush
34S-3E-24	003	12	Wildlife habitat
34S-3E-24	014	9	Wildlife habitat
34S-3E-25	003	116	Stand partially harvested in the 1970s; individual and small pockets of trees remain (average diameter 14″ DBH). Understory regeneration of Douglas-fir and white fir common. Condition, growth, and density levels of conifers >8″ DBH at target levels.
	Total	**204**	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Medford District
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0 0.25 0.5 1
Miles
0 0.25 0.5 1
Kilometers
Lodgepole Road
Butte Falls/Prospect Hwy
Parsnip Creek
Beaver Dam Cree
Harrington Creek
North Fork Big Bur e Creek
Mule Creek
Camp Creek
004
002
003
014
005
006
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
June 2005
Deferred from Harvest
Proposed Sale Unit
Stream
Paved Road
Road
BLM-administered Land
Private
Camp Cur Timber Sale and Landscape Restoration Environmental Assessment
Map 4: Units Deferred from Harvest
No warranty is made by the Bureau of Land Management 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.
dlk; 6/1/05

Silvicultural Prescription

I. Management Direction and Objectives

1. Management Direction

On matrix lands, as defined by the Medford District Resource Management Plan (RMP) and the Record of Decision for the Northwest Forest Plan (NWFP), the following objectives are to be met:

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide connectivity (along with other allocations, such as Riparian Reserves) between Late-Successional Reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger stands.
- 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.
- Provide early successional habitat.
- Reduce tree mortality and restore the vigor, resiliency, and stability of forest stands.

2. Treatment Objectives

Implement management activities that would promote the development of a landscape that has the ability to buffer and absorb disturbances, such as fire, insects, disease, drought, floods and potential climate change, rather than to magnify those disturbances. To meet this objective, the following management treatments are planned:

- Reduce densities in overstocked forest stands to increase tree vigor and redistribute growth to the largest and healthiest trees.
- Manage mature forest stands to develop and maintain healthy large conifer trees, favoring drought-tolerant species (ponderosa pine, sugar pine, incense cedar, and Douglas-fir).
- Regenerate forest stands that are declining, retaining structural and functional components and provide for the establishment of shade-intolerant conifer species.

II. Site/Stand Condition

1. General Description of the Site

The proposed treatment area is located within Jackson County and approximately 30 air miles northeast of the City of Medford. The area is located in portions of Sections 2, 12, 13, 14, 15, 21, 24, 25, and 26 in Township 34S, Range 3E.

2. Drainage/Watershed

The proposed treatment area is located in the Upper North Fork Big Butte Creek and Beaver Dam Creek 6th field watersheds.

3. Abiotic Conditions

a. Soil Type

The dominant soil types are the Geppert and Freezner soil series. The Freezner-Geppert soil complex is defined as 60 percent Freezner solids and 35 percent Geppert soils with 5 percent inclusions. Freezner soils are very deep and well drained with a clay loam subsoil. The Geppert soil is moderately deep and is skeletal (>35 percent rock fragments in the subsoil with an extreme cobbly clay subsoil.

b. Site Index

Site index is the average height of the dominant trees at 50 years. Site index is relatively independent of stand density and provides a comparable measure of site productivity between different forest stands. The site index for Douglas-fir within the treatment area averages 88, based on Hann-Scrivani site index equations (Hann and Scrivani 1987).

c. Topography/Precipitation

The land form within this area is generally flat to gentle slopes and not high dissected. The elevation ranges from a low of 3,160 feet above sea level to 3,840 feet. Annual precipitation averages 45 inches, with approximately 7 inches of dry season precipitation.

d. Existing Site Problems

High growing season temperatures, frequent frosts, and high evaporative demands characterize the climate of the timber sale area. Frost can be a regeneration problem. Cold air often accumulates (puddles) in low lying areas with slopes less than 15 percent. Late frosts caused by excessive loss of heat through nighttime reradiation are a common occurrence in some areas. The degree of vegetative frost damage is influences by terrain, soil moisture content, and the amount and kind of ground cover present.

The high demand for moisture during prolonged hot and dry summer days causes greater tree stress, particularly in overstocked forest stands. Plants require at least 75 percent water content in functional cells (Bradford and Hsiao 1982). During hot, dry periods, the uptake of moisture cannot keep up with the loss through transpiration. When this occurs, the plant closes leaf stomates to maintain adequate cell water content. With the leaf stomates closed, carbon dioxide is not taken into the plant through photosynthesis and the conversion of carbon dioxide and water into carbohydrates or "food" does not occur. Without the creation of "food," the life processes of the tree are interrupted, resulting in increased tree stress and a higher risk of insect attack or disease infection. Reduced resin flow in water-stressed trees enables insects to successfully attack the tree (Kramer and Kozlowski 1979).

4. Biotic Conditions

a. Plant Series

The north/south orientation of the Cascade Mountains provides the environmental gradient that influences the presence and abundance of vegetative species. Slope, aspect, elevation, soil depth, and geology further define the extent and occurrence of various species. Within the proposed sale area, white fir is the dominant plant series. The white fir series is one of the most widespread, diverse, and productive plant series of the southern Oregon Cascades. Ponderosa pine, sugar pine, incense cedar, and Douglas-fir represent the early seral tree component of this series. Douglas-fir generally dominates the overstory of most stands before being replaced by white fir.

The plant communities are on the warm/dry end of the environmental gradient, with moisture limitations late in the growing season limiting biomass production. The understory is dominated by white fir, with Douglas-fir common. White fir, Douglas-fir, incense cedar, and sugar pine will establish on the site following disturbance. Hardwoods include minor amounts of California black oak; madrone, in areas of relatively recent fires; and golden chinkapin on shallow, rocky soils. Shrub competition is generally moderate to severe following a site disturbance in which the overstory canopy is opened (<60 percent crown closure). Vegetative management will be required to insure successful establishment and growth of conifer regeneration. Shrub species which are present in varying amounts are deerbrush ceanothus, oceanspray, vine maple, hazel, red stem ceanothus, Oregongrape, and thimbleberry.

Common herbaceous vegetation includes pathfinder, western starflower, western twinflower, and white inside-out flower.

b. Stand History

Historically, fire was the primary large-scale, natural disturbance event. High summer temperatures and moderate precipitation provide conditions favorable for fires. Both stand-replacement fires and less intense underburns were common prior to fire suppression. Intense, stand-replacement fires occurred approximately every 80-200+ years; less intense underburns were more frequent. The presence of madrone within stands indicates relatively recent fires.

During the past 80 years, logging has replaced fire as the primary event that shaped stand condition and structure. Timber harvesting in the project area consisted of partial cutting, overstory removal, clearcutting, and salvage of dead and dying trees. Within the project area, the last harvest entries on BLM-administered lands were the Titanic timber sale in 1998 (not completed), the Round Forks timber sale in 1998, and the Fred N Jack timber sale in 1996. Density reduction treatments occurred on over 93 percent (1,627 acres) of the acres treated. Density reduction treatments include individual tree selection and density management. Individual tree selection removes trees across all diameter classes and is based upon tree condition (live crown ratio and crown form). Density management removes smaller suppressed, intermediate, and some codominant trees, leaving the most vigorous dominant trees. The remaining 7 percent (118 acres) of the acres treated received

shelterwood regeneration harvest. Shelterwood regeneration harvest is a two aged, even-aged silvicultural method that leaves 12-25 large overstory trees as frost protection for planted conifer seedlings. A shelterwood regeneration harvest converts late-successional stands to early seral stands.

c. Structure Description

Stands can be classified as single-layer, even-aged or multi-layer, uneven-aged stands. Where wildfires burned intensively, crown fires occurred and even-aged stands became established. The majority of the even-aged stands are 120 years old or less. When wildfires burned at a lower level of intensity and were confined to the ground level, multi-layered, uneven-aged stands developed. With decades of fire suppression, stand development has stagnated, and stand densities have increased.

Hardwoods occur as clumps or a widely scattered stand component. Hardwoods represent an early drought-tolerant seral tree component; competition between adjacent trees and conifer canopy closure has reduced the vigor and increased the mortality of many large hardwood trees.

d. Coarse Woody Debris

Coarse woody debris provides habitat for wildlife, invertebrate, microbial, and fungal species, as well as important ecological functions such as moisture retention, soil stabilization, and nutrient recycling. The amount and decay class of woody debris reflects the stage of stand development. In a natural cycle, two stages (stand initiation and old growth) typically have the greatest amounts of coarse woody debris. Older decay classes (3, 4 and 5) are more common and reflect coarse woody debris created since stand initiation wildfires in the early 1900s. Where coarse woody debris does occur it will not be removed from the site and will be protected from disturbance. In forest stands identified for shelterwood regeneration harvests, trees would be designated and reserved to meet the coarse woody debris requirements of 120 linear feet of logs per acre greater than or equal to 16 inches in diameter and 16 feet long, decay class 1 or 2.

e. Snags

NWFP standards and guidelines require 1-2 snags per acre, over time, to meet the requirement for cavity nesting birds at 40 percent of potential population levels. All classes of snags would be retained as part of the silvicultural prescription. During harvest operations, existing snags would be reserved from felling where they are not a safety hazard and, where necessary, additional green trees would be reserved to meet the target levels. If a snag must be fallen for safety concerns, the snag would be left on-site to function as coarse woody debris.

f. Tree and Stand Health, Insects, and Disease

Bark beetle activity is currently low within the project area. Flatheaded wood borers (*Melanophila drummondi*), western pine beetles (*Dendroctonus brevicomis*), and fir engraver beetles (*Scolytus ventralis* LeConte) are active at native levels in and adjacent to the project area. High stocking levels and low moisture availability will continue to create environmental conditions favorable to bark beetle infestation of stressed trees.

Stem rots (*Phellinus pini, Oligoporus amarus*, and *Phaelos schweinitzii)* are present in a small number of trees, but do not pose a serious concern for stand health. The trees infected with stem rots enhance forest diversity by providing trees with unique structural defects that serve as plant and wildlife habitat, as well as future coarse woody debris.

Douglas-fir mistletoe is present in limited and small, less than 1 acre, pockets in T34S, R3W, Sections 24, 25 and 26. Mistletoe is host-specific and may cause tree mortality, growth loss, alteration of crown and canopy structure, increased fire hazard, and increased susceptibility to bark beetles, root rots, and drought stress. Mistletoe brooms, although detrimental towards tree growth, provide habitat for mammals and birds. When mistletoe trees are retained, they should be left adjacent to Riparian Reserves and, where possible, adjacent to standing snags to protect the snag as well as provide better habitat.

Laminated root rot is present and is affecting white fir and Douglas-fir. In T34S, R3E, Sections 12 and 13, the occurrence of laminated root rot is common and has caused tree decline and mortality. Management options vary depending on the amount of root rot present. In stands where the inoculum is present in 20 percent or more of the stand, thinning is **not** recommended; rather a regeneration harvest with species conversion to resistant species is the most appropriate treatment. In stands with less than 20 percent of the area affected, thinning can benefit tree and stand vigor. If the inoculum occurs in small discrete pockets or is limited to certain portions of the stand, the healthy portions would be thinned and the disease portions would be treated using one of the following options: 1). Remove all trees in the disease centers and those within 50′ of the center, or 2). If thinning will increase the probability that losses to windthrow will be greater than losses to disease, avoid the disease centers (Thies and Sturrock 1995). In all cases, favor the retention of disease-resistant incense cedar, pine species, and large, healthy hardwoods.

The greatest concern and impact upon individual tree and stand health is the level of intertree competition resulting from the high numbers of trees within many forest stands. Overstocked stands contain more trees than the site has resources (moisture, nutrients, and growing space) (see Figure 1). This condition leads to increased tree stress, particularly during prolonged hot summer days without any precipitation. Decreased tree vigor is magnified during periodic drought years when the cumulative effects of below average amounts of precipitation causes the interruption of basic functional processes (photosynthesis, transpiration, respiration, and translocation assimilation) over an extended period of time. In forest stands proposed for management entry, stand exams were completed to determine the "relative density." Relative density (RD) is a measure of crowding in a stand of trees. It compares the number of trees present to the number of trees the site has resources to support. Relative density levels within the units proposed for treatment range from 56 percent to 100 percent, with an average relative density of 81 percent**.** As a point of reference, crowns begin to close when the RD approaches 15 percent and suppressed trees begin to die after the RD reaches 65 percent (Perry 1994; Hann and Wang 1990). In forest stands, maintaining the RD at a level from 25 percent to 50 percent prevents excessive tree loss from competition.

Tree senescence or "aging" also plays a role in the condition and vigor of individual trees. As a tree increases in size and builds up a complex branch system, it shows a decrease in metabolism, a gradual reduction in growth of vegetative and reproductive tissues, a loss of apical dominance, an increase in dead branches, slow wound healing, heartwood formation, an increased susceptibility to injury from certain insects and diseases and from unfavorable environmental conditions, and a loss of geotrophic responses (growth of stems upward and roots downward in response to gravity). A decrease in the proportion of photosynthetic to nonphotosynthetic tissue results in less carbohydrates being produced (Kramer and Kozlowsk, 1979). Movement of food, water, and minerals becomes more difficult as the distance from the roots to the top of the tree increases. This problem is magnified when water becomes a limiting resource in tall trees. Water deficits may cause needle and stem mortality as evidenced by snag tops or dead branches and needles in the upper part of the crowns

In addition to the high numbers of trees per acre and tree aging, other factors contribute to individual tree health and vigor: understory shrub growth, soil type, precipitation, aspect, crown position in the canopy, topography, root pathogens, and insects all combine to affect tree vigor and its ability to maintain basic functional processes.

Figure A-1. Present Conditions

Forest stands are overstocked with more trees than the site has water, nutrients, and growing space to sustain. As trees increase in size, they require more growing space and a larger volume of soil to supply an increasing need for water and nutrients. Without reducing tree density levels to the carrying capacity of the site, tree and stand vigor will decline.

III. Analysis in Support of the Prescription

The target stand reflects not only what is planned for the future but also what is expected immediately after treatment. The target stand represents optimum conditions to strive for through management.

Three types of silvicultural treatments are proposed for the project area: density management, shelterwood regeneration harvest, and selection harvest. Individual operational inventory (OI) units have been grouped under one of these categories based on the proposed treatment.

1. Density Management

The O.I. units proposed for this treatment are listed in the marking guidelines.

a. Present Conditions

Stand densities are high, with the number of trees per acre above the long-term carrying capacity of the site. In the forest stands identified for this type of treatment, the average RD is 81 percent. At RD levels greater than 55 percent, the following tree and stand changes begin to occur: competition-related mortality becomes significant, sensitivity to the effects of drought increases, self-thinning starts, growth declines, volume growth per acre is offset by mortality, and susceptibility of trees to insect and disease attack increases. The tree species composition of these stands is a mixture of Douglas-fir, white fir, and minor amounts of ponderosa and sugar pine. Hardwood species include madrone and black oak.

b. Target Stand

The main objective within these stands is to improve individual tree and stand health. Harvesting within these units would be targeted toward reducing the stocking levels within those areas where overstocked conditions of sapling, pole, and mature timber exists. Density levels would be reduced by removing the suppressed crown class trees and increasing the spacing of the intermediate and dominant/codominant crown classes. Remaining trees would have crown ratios greater than 35 percent and would be the better formed trees. Ponderosa pine, sugar pine, incense-cedar, and Douglas-fir would be the preferred leave species. Large (greater than 20″ DBH) healthy ponderosa and sugar pine would be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35 percent, needles should be dark green, crown tops should be pointed (not rounded), and there should be no evidence of resin flow on the upper bole of sugar pine. The residual crown closure of these stands would range from 40 percent to 60 percent.

Large (greater than 12″ DBH) healthy hardwoods (madrone and black oak) would remain as a scattered stand component. Removal of competing trees would provide the necessary top light required for the continued growth of these trees.

Special Status species may occur within the stands. Where sites occur, sites would be buffered and protected. These buffer patches would provide additional within-stand structural diversity.

All stage 1 and 2 snags greater than 20″ DBH would remain for wildlife, future coarse woody debris, and structural diversity. To provide structural habitat and to maintain the existing microenvironment, trees immediately surrounding these stand components would be left.

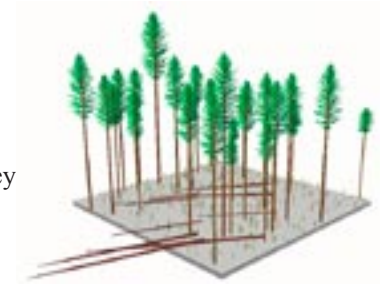

Figure A-2. Stand structure following density management
This is a visual reference only; results will vary from stand to stand (McGaughey 2004).

Table A-2. Treatments within Density Management Stands

Year	Density Management Treatment
0	Harvest • Thin from below first, removing the suppressed component of the stand. Then thin the main canopy to reduce densities and remove any insect or disease infected, or otherwise declining (based upon crown ratio and form), trees. • Residual stocking would range from an RD of 35% to 50%+ and crown closures of 40% to 60%. • Favored leave species are ponderosa pine, sugar pine, incense-cedar, and Douglas-fir. • Reserve ponderosa and sugar pine greater than 20″ DBH to maintain genetic and structural diversity. • Use existing and widely-spaced skid trails and directional falling to reduce impacts to the site and residual stands. • Reserve 2 to 4 of the largest hardwoods (12″ DBH or greater) per acre. • Hand pile heavy slash concentrations. • Slash all sprung, severely damaged, spindly-crowned, low crown ratio (less than 40%) conifers and hardwoods between 1 and 7″ DBH.
10-20	Conduct stand exam to assess stand conditions. Evaluate the health of the stand for excess tree mortality, reduced radial growth, and the condition of large ponderosa and sugar pine to assure presence in the stands. A second thinning entry would likely occur to maintain tree vigor and species diversity.
20-50	Assess the stands for current objectives. Additional partial cut entries or regeneration harvest may be necessary.

2. Shelterwood Regeneration Harvest (RH)

This silvicultural method would leave 12 to 25 trees per acre greater than 20″ DBH. These trees would provide a protective overstory cover that would reduce the loss of radiant heat and minimize frost damage to conifer seedlings. Overstory trees in excess of 6-8 green trees per acre may be harvested approximately 15 to 20 years after the initial shelterwood harvest. The OI units proposed for these treatments are listed in the marking guidelines.

a. Present Conditions

The shrub species present consists of Oregon grape (dwarf and piper's), deerbrush ceanothus, hazel, oceanspray, and vine maple. Hardwood species include madrone, chinkapin and black oak. Generally, the hardwoods are widely scattered or occur in small clumps and are a minor compositional component of the stands.

OI Unit 21-8 (Alternatives 2 and 3) has been tractor logged in the past. Partial harvesting removed large diameter trees, created canopy gaps, and resulted in the development of multiple canopy layers. The overstory tree component is declining due to high stand density levels, root pathogens, and tree senescence. Overstory tree species are primarily Douglas-fir with lesser amounts of white fir; minor species include sugar pine, incense-cedar, and ponderosa pine. Natural regeneration (seedlings and saplings) of Douglas-fir and white fir is present.

Units 12-5 and 12-6 (Alternative 2) are even-aged, 100-year-old stands that have never been logged. The 100 percent canopy closure has inhibited the development of understory layers. Laminated root rot is common throughout the stand and is causing the decline and mortality of Douglas-fir and white fir.

b. Target Stand

The minimum number of remaining large (greater than 20″ DBH), overstory green trees would be 12 to 25 trees per acre. Douglas-fir, sugar pine, ponderosa pine, incense-cedar, and hardwood species would be the preferred leave species. In areas of laminated root rot, healthy codominant and dominant ponderosa pine, sugar pine, incense cedar and hardwood species would be favored over Douglas-fir. Leave trees would be the largest and full crowned, healthy trees.

Preharvest snags would remain and additional healthy or cull green trees greater than 20″ DBH would be reserved if needed to meet the required 1 to 2 wildlife snags per acre, or to meet coarse woody debris requirements. Two to four large hardwoods (greater than 12″ DBH) per acre would be reserved for wildlife and stand diversity. Tree form (height and crown condition) would determine which hardwoods to leave.

Special status species may occur within the stands; sites would be buffered and protected. These buffer patches would provide for additional within-stand structural diversity.

To prepare nonstocked sites for tree planting, logging slash, along with severed shrubs and regeneration with poor crowns, would be piled and burned. Piling would be accomplished by hand or excavator. Excavator piling would occur where side slopes are less than 30 percent. To promote species diversity within these units where planting is required, a mixture of Douglas-fir, resistant sugar pine, ponderosa pine and incense-cedar would be planted following site preparation activities. Plant approximately 300 to 500 trees per acre. The species mix would be Douglas-fir (70 percent), sugar or ponderosa pine (20 percent), and incense-cedar (10 percent). In OI units 12-5 and 12-6, do **not** plant any Douglas-fir, instead, use a mix of ponderosa pine, sugar pine, and incense cedar. These species would provide a natural barrier to inhibit the root-to-root spread of laminated root rot.

Figure A-3: Stand structure following a shelterwood regeneration harvest.
This illustration is a visual reference only; results will vary from stand to stand.

Table A-3. Treatments within Shelterwood Regeneration Harvest Stands	
Year	**Treatment**
0	Harvest: Leave 12-25 green conifer trees/acre >20″ DBH and all vigorous ponderosa pine, incense cedar, sugar pine, and hardwoods 8-20″ DBH. • Leave a minimum of 1.8 snags/acre (stage 1 and 2) and 120 linear feet coarse woody debris (decay class 1 and 2, 16″ x 16′). • Use widely-spaced designated skid trails, directional falling, and log length skidding to reduce site impacts. Site preparation: Slash trees damaged from logging activities, 1 to 6″ DBH. Leave all healthy, unmerchantable trees. Treat brush and hardwoods by excavator removal or slashing. Excavator or hand pile brush and slash and burn. Limit piling of logging slash to pieces less than 16″ DBH. • Rip skid trails.
0-1	Plant with a mix of ponderosa pine, Douglas-fir, sugar pine, and incense-cedar. Apply appropriate maintenance (vexar tubing, mulching, shading, scalping, and baiting) treatments to insure planting success. In OI units 12-5 and 12-6 **do not plant any** Douglas-fir. Plant only trees resistant or tolerant to laminated root (ponderosa pine, incense cedar, and sugar pine).
1	Conduct 1st year survival survey; assess need for supplemental planting or additional maintenance treatment.
3	Conduct 3rd year survey; assess need for replanting and/or additional maintenance needs.
5	Conduct 5th year stocking survey. Target stand would have a minimum of 280 well-spaced trees per acre. Competing vegetation would be controlled and trees would be growing rapidly.
10	Precommercially thin the understory if more than 400 trees per acre. Favor pine species, Douglas-fir, and Incense-cedar. Favor ponderosa pine, sugar pine, and incense cedar over Douglas-fir and white fir in laminated root rot areas. Thin to approximately 300 trees per acre.
15-20	Overstory trees in excess of 6 to 8 green trees per acre may be harvested if the understory is well-established and frost damage is no longer a concern.
35	Commercial thin (average 10″ DBH) to approximately 200 trees per acre, if stand density is appropriate. Otherwise, delay until crown closure and competition reduces growth rates.
45-80	Commercial thin if appropriate; favor leaving the pines, Douglas-fir, and incense-cedar.
100+	Assess stand and watershed conditions for possible regeneration harvest.

3. Selection Harvest

The OI units proposed for this treatment are listed in the marking guidelines.

a. Present condition:

In the stands recommended for selection harvest, a large percentage of the trees have good crown ratios and vigor; a smaller percentage of the trees are showing symptoms of decline (poor crown ratios, chlorotic thinning foliage, or deteriorating crown form). Competition between trees for limited site resources is intense as stand densities are high. The average relative density for these stands is 83 percent. Past logging activities have created small, canopy gaps that have resulted in stands with a variable stand structure. The tree species composition is a mixture of predominantly Douglas-fir with lesser amounts of ponderosa pine, sugar pine, incense cedar, black oak and madrone.

b. Target stand:

Following harvest entry, these stands would be composed of healthy trees of all species and diameter classes. When available, large healthy ponderosa pines would be retained to insure their continued presence in the stand. Species composition would

be dominated by Douglas-fir, followed by smaller amounts of incense cedar and white fir, and lesser amounts of ponderosa pine, sugar pine, and large hardwoods. Vertical and biological diversity would be present through the retention of trees of all ages and size classes.

Special Status species may occur within the stands; sites of less than one acre would be buffered and protected. These patches would provide additional within-stand structural diversity.

Canopy closure would range from 40 to 60 percent. Coarse woody debris would be present and would provide conditions favorable for nutrient recycling, soil mychorrizae, and the development of nitrogen-fixing bacteria. Cull trees have been left to insure that a near-term "pulse" of coarse woody debris and snags would be available. Where available, large (greater than 12″ DBH), healthy hardwoods would remain as a scattered stand component.

Figure A-4. Stand structure following selection harvest
This is a visual reference only; results will vary from stand to stand.

Table A-4. Treatments within Selection Harvest Stands

Year	Selection Harvest Treatment
0	Initial harvest: Reduce stand densities by marking risk trees in all diameter classes; do not mark **any** trees 50″ DBH or greater. Tree vigor, as defined by crown form and crown condition, is the primary factor to be used in determining risk trees. Thin even-aged pockets, where appropriate. Use widely-spaced, designated skid trails, directional falling, and log length skidding to reduce site impacts. Treat logging slash by lopping and scattering heavy slash concentrations. Slash all sprung or severely damaged conifers and hardwoods between 1 and 6″ DBH.
10-20	Assess stand conditions by conducting stand exams to determine if any additional management treatments are needed.

IV. Monitoring

Implementation of the standard and guidelines in the NWFP and management direction contained within the Medford District RMP/FEIS requires a monitoring system to insure effective on-the-ground results. The NWFP states "Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The implementation of these standards and guidelines will be monitored to ensure that management actions are meeting the objectives of the prescribed standards and guidelines, and that they will comply with laws and management policy. Monitoring will provide information to determine if the standards and guidelines are being followed (implementation monitoring), verify if they are achieving the desired results (effectiveness monitoring), and determine if underlying assumptions are sound (validation monitoring). Some effectiveness and most validation monitoring will be accomplished by formal research."

Monitoring of the proposed actions would follow the outline in the Medford District RMP, Appendices 147-163. Monitoring would be specific to the land allocations and resources affected in the Upper North Fork Big Butte Creek and Beaver Dam Creek watersheds.

Monitoring should:

- Detect changes in ecological systems from both individual and cumulative management actions and natural events
- Provide a basis for natural resources policy decisions
- Provide standardized data

- Compile information systematically
- Link overall information management strategies for consistent implementation
- Ensure prompt analysis and application of data in the adaptive management process
- Distribute results in a timely manner

Monitoring begins with resource assessment and data collection which describes the existing conditions prior to management actions. Data collection is in the form of sampling which provides a representative description of the proposed treatment area. Stand exams were completed in the proposed sale area. Stand information was collected, using a comprehensive stand exam process. Within stands, a systematic sampling grid was used to establish plot centers. From the plot centers a variable plot and two nested fixed plots were used to record tree and site data. This information is then used in a BLM stand exam program that provides a variety of analysis reports.

These reports provide a description of stand characteristics (species composition, diameter distribution, densities, and canopy closure). Post-harvest monitoring can then be implemented, using the preharvest stand information to determine if the objectives have been met.

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Definitions

Assimilation – the conversion of food into new protoplasm and cell walls.

Codominant trees – trees with crowns forming the general level of the crown canopy and receiving full light from above but comparatively little from the sides.

Dominant trees – trees with crowns extending above the general level of the crown canopy and receiving full light from above and partly from the side.

Intermediate trees – trees shorter than dominant or codominants with crowns below or barely reaching into the main canopy.

Partial Cutting – removal of selected trees from a forest stand. Trees may be marked based upon diameter, species, or risk characteristics.

Photosynthesis – the synthesis of carbohydrates from carbon dioxide and water.

Translocation – the movement of water, minerals, foods, and hormones from place to place in trees.

Transpiration – the loss of water in the form of vapor.

Relative Density – the degree of crowding in a forest stand. When two stands result in the same relative density they can be thought of as being at the same degree of crowding, although they may differ in age, tree size, or site quality.

Respiration – the oxidation of food in living cells bringing about the release of energy.

Seral stages – the series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. The age classes for the five seral stages are early seral (0-10 years), mid-seral (10-40 years), late seral (40-80 years), mature seral (80-200 years), and old growth (>200 years).

Suppressed trees – trees with crowns entirely below the general canopy receiving no direct light from above or from the sides.

Table A-5. Camp Cur Marking Guidelines and Summary of Treatment Objectives

- To reduce density levels towards the carrying capacity of the site. In second growth stands, to thin from below to redistribute growth to vigorous dominant and codominant trees. In selection harvest stands, remove low vigor trees across all diameter classes to reduce intertree competition while maintaining or promoting the development of large healthy trees and multiple canopy layers.
- To maintain healthy ponderosa pine and sugar pine as a stand and landscape component.
- Maintain approximately 40%-60% canopy closure in all density management and selection harvest stands. This range of canopy closure will minimize canopy openings, reduce the growth of understory brush, maintain connectivity, and provide a variety of plant and animal habitat across the landscape.
- To regenerate stands with declining growth rates or deteriorating conditions and to prepare units for seedling establishment and growth by providing suitable site conditions for planting; within treatment areas retain coarse woody debris, snags, and large green conifers for long-term site productivity and biological legacies.

Density Management (DM)

1. Density reduction and the retention of approximately 40 percent-60 percent canopy closure are the primary objectives for these stands. Thin from below in second growth stands/clumps; low vigor codominant or dominant trees may be removed for density reduction and if tree vigor is lower than adjacent trees.
   - Stocking will be reduced to a relative density of 35 percent with the average residual basal area of treated stands between 120 to 150 square feet per acre. Spacing will vary dependant upon tree diameter and vigor. See Table A-5 for the target basal area for each stand.
   - Leave trees need to be dominant and codominant with the best crown ratios.
   - Favor healthy ponderosa pine, sugar pine, Douglas-fir, and incense cedar over white fir.
   - Large (greater than 20″ DBH) healthy ponderosa and sugar pine should be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35 percent, needles should be dark green, crown tops should be pointed (not rounded), and there should be no evidence of resin flow on the upper bole of sugar pine. Pine species with poor crowns characterized by a ragged appearance as well as bunchy, poor color foliage should be removed; do **not** retain.
2. Leave all snags, stages 1-5. When available, leave green trees (any diameter) immediately adjacent to snags that are greater than 20″ DBH. These trees will provide additional structural and habitat diversity.
3. Leave all coarse woody debris, decay classes 1-5. When available, leave green trees (any diameter) immediately surrounding large (>20″ DBH and 8′ in length) pieces of coarse woody debris. Retention of green trees would minimize disturbance and maintain the functional integrity of the coarse woody debris.
4. Minimize the marking of large (greater than 20″ DBH), broken, fork top, and deformed trees. Retain for plant and animal habitat, as well as future sources of coarse woody debris and snags.

Table A-6. Target Basal Area for Density Management Stands in Alternative 3								
T34S, R3E, Section/OI	Unit Number	Target Basal Area	T34S, R3E, Section/OI	Unit Number	Target Basal Area	T34S, R3E, Section/OI	Unit Number	Target Basal Area
2-001	2-2	150	13-002	13-1, 2, 3	130			
2-003	2-1	140	14-001, 14-002, 14-003, 14-004	14-1, 2, 3, 4, 5	140	21-010	21-4, 5	140
2-004	2-3	140	15-001	15-3, 5, 8	130	24-001	24-1	150
2-005	2-4	140	*15-004	15-6, 7	130	25-003	25-1, 26-1	120
12-003	12-3	150	15-006	15-1, 2, 3	130	26-001, 26-002, 26-003, 26-004	26-1	130
12-004	12-1	140	15-008	15-4, 5	130			
12-008	12-4	140	21-001	*21-1, 2	140			
12-010	12-2	140	21-003, 21-014	21-6	140			
NOTE: *OI unit is adjacent to VRM corridor; modified marking guidelines apply								

**** The stand data provided below is not absolute, rather it is an estimate based on sampling. It is intended to provide a general description/measure of stand density, composition, and structure. Dependent on the logging system used, conventional falling and skidding or Feller Buncher and whole tree yarding, the recommendations for the treatment of logging slash may change following post harvest surveys. In all units, damaged residual trees would be slashed.****

T34S, R3E, Section 2

OI: 001
Trees per acre <8″ DBH: 363
Trees per acre >8″ DBH: 100
Basal Area: 222 Square feet
Canopy Closure: 99
Aspect: Southeast
Relative Density Index: .79

The stand has greater structural diversity and variability than OI 003, with large (40″+ DBH) scattered overstory trees, a middle layer of 12-16″ DBH, and bottom layer of small (<8″ DBH) trees and brush. Large coarse woody debris is common.

Prescription: Density Management; Lop and Scatter

OI: 003

Trees/acre <8″ DBH: 148
Trees/acre >8″ DBH: 227
Basal Area: 301 Square feet
Canopy Closure: 100
Aspect: Southwest
Relative Density Index: .90

Predominately an even-aged Douglas-fir stand with high stand densities. Minor amounts of white fir, incense cedar, and pine species. Height to crown ratios is such that wind throw is not of concern, and stand density reduction would benefit the stand. Understory is generally free of large amounts of brush species.

Prescription: Density Management; Lop and Scatter

OI: 004 and 005
An irrigation canal delineates the northern boundary of OI units 004 and 005. Stand structure is even-aged with high density levels.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 12

OI: 003
Trees per acre <8″ DBH: 0
Trees per acre >8″ DBH: 214
Basal Area: 330 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .93

Prescription: Density Management; Lop and Scatter

OI: 004
Trees per acre <8″ DBH: 19
Trees per acre >8″ DBH: 169
Basal Area: 324 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .89

Prescription: Density Management; Lop and Scatter

OI: 008
Trees per acre <8″ DBH: 29
Trees per acre >8″ DBH: 168
Basal Area: 278 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .80

Prescription: Density Management; Lop and Scatter

OI: 010
Trees per acre <8″ DBH: 29
Trees per acre >8″ DBH: 254
Basal Area: 313 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .94

These even-aged stands are approximately 100 years old and range in size from 5 to 15 acres. These stands have never been commercially logged and represent the only intact islands within Section 12. Stand initiation occurred following the Merle burn of the early 1900s. Currently, stand densities are high with closed canopies and minimal understory development.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 13

OI: 002
Trees per acre <8″ DBH: 90
Trees per acre >8″ DBH: 127
Basal Area: 178 Square feet
Canopy Closure: 77
Aspect: North and South
Relative Density Index: .56

A variable, even-aged stand with some commercial thinning available in pockets in the north and southeast part of the OI. The middle of the unit adjacent to the north/south line is mainly a sub 8″ DBH class with a hardwood (madrone and chinquapin) mix in a rocky surface; precommercial thin or conifer release would benefit stand development and tree growth. A meadow is present on the east side of the OI; conifer trees have encroached from the edges and have decreased the size of the meadow over the past 40 years.

Prescription: Density Management; Lop Scatter

T34S, R3E, Section 14

All stands proposed for entry originated after the 1930 Merle burn.

OI: 001
Trees per acre <8″ DBH: 105
Trees per acre >8″ DBH: 178
Basal Area: 283 Square feet
Canopy Closure: 95
Aspect: Northwest
Relative Density Index: .75

A riparian buffer is needed on the north end of unit adjacent to a perennial creek and another buffer is needed in the drainage dividing OI 001 and 002 on the south end of the OI. Water was present in this intermittent/ephemeral drainage during July/August. Stand densities of the plots ranged between 280 and 100 square feet basal area, with a median estimated at 210 square feet basal area.

Prescription: Density Management; Lop Scatter

OI: 002
Trees per acre 8″ DBH: 258
Trees per acre >8″ DBH: 188
Basal Area: 245 Square feet
Canopy Closure: 100
Aspect: North
Relative Density Index: .85

Stand canopy closure and variability is greater than other stands within this 160 acre area. Density is also slightly less. An old road running north/south exists with some rutting occurring on the north end adjacent to private. This road connects through to the south with Section 23. Southwest boundary with OI 001 needs a buffer adjacent to drainage area.

Prescription: Density Management; Lop and Scatter

OI: 003

Trees per acre <8″ DBH: 218
Trees per acre >8″ DBH: 142
Basal Area: 263 Square feet
Canopy Closure: 100
Aspect: North and West
Relative Density Index: .86

A collector/ephemeral exists through the middle of this OI, running at approximately 120 degrees. Scattered fire remnant trees 40″+ DBH are common within this OI. Vine maple is common and is generally 10-20′ in height.

Prescription: Density Management, Lop and Scatter.

OI: 004
Trees per acre <8″ DBH: 584
Trees per acre >8″ DBH: 91
Basal Area: 201 Square feet
Canopy Closure: 98
Aspect: Level
Relative Density Index: .78

Variable stand structure, with a fire remnant pocket in the western ⅓ of the OI unit. The remainder of the OI unit contains a mix of merchantable (>8″ DBH) and submerchantable (<8″ DBH) size classes.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 15

OI: 001
Trees per acre <8″ DBH: 622
Trees per acre >8″ DBH: 166
Basal Area: 225 Square feet
Canopy Closure: 100
Aspect: South
Relative Density Index: .88

Prescription: Density Management; Lop and Scatter

OI: 004
Trees per acre <8″ DBH: 433
Trees per acre >8″ DBH: 142
Basal Area: 188 Square feet
Canopy Closure: 92
Aspect: South and East
Relative Density Index: .72

A highly variable stand with dense conifer pockets on the west side of the OI unit adjacent to the north/south section line and also on the east side of the OI unit. The center portion of the OI unit is smaller, submerchantable (<8″ DBH) size classes with moderate to heavy amounts of brush species.

Prescription: Density Management; Lop and Scatter

OI: 006

Trees per acre <8″ DBH: 129
Trees per acre >8″ DBH: 205
Basal Area: 237 Square feet
Canopy Closure: 98
Aspect: South
Relative Density Index: .78
Prescription: Density Management; Lop and Scatter

OI: 008
Trees per acre <8″ DBH: 366
Trees per acre >8″ DBH: 235
Basal Area: 284 Square feet
Canopy Closure: 100
Aspect: South
Relative Density Index: 1.0

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 21

OI: 001
Trees per acre <8″ DBH: 492
Trees per acre >8″ DBH: 131
Basal Area: 195 Square feet
Canopy Closure: 100
Aspect: South
Relative Density Index: .75

Rocky surface, multiple canopy layers, 140-200 square foot Basal Area (>8″ DBH).

Prescription: Density Management; Lop and Scatter

OI: 003
Trees per acre <8″ DBH: 57
Trees per acre >8″ DBH: 174
Basal Area: 301 Square feet
Canopy Closure: 100
Aspect: East
Relative Density Index: .88

Even-aged pocket with high stand density.

Prescription: Density Management; Lop and Scatter

OI: 010
Trees per acre <8″ DBH: 504
Trees per acre >8″ DBH: 115
Basal Area: 214 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .81

Prescription: Density Management; Lop and Scatter

OI: 014
Trees per acre <8″ DBH: 589
Trees per acre >8″ DBH: 124
Basal Area: 203 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .80

Springs are present on the northern and southern roads that serve as the OI boundaries. Buffers will need to be delineated. Stand structure is variable with varying amounts of understory brush present.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 24

OI: 001
Trees per acre <8″ DBH: 505
Trees per acre >8″ DBH: 107
Basal Area: 200 Square feet
Canopy Closure: 97
Aspect: Level
Relative Density Index: .76

An 80-90 year old stand; previous entries removed both chinquapin and conifers. Crown conditions of conifers are excellent with full dark green foliage; many were apparently established under low density conditions, with dead limbs on the bottom layer of the crown. Hardwoods and well-spaced conifers (primarily Douglas-fir) established following the 1910 fire. The fire burned very hot, as predominant trees are not common. Over time, the conifers overtopped the hardwoods and the hardwoods

began to decline and die, leaving wide spacing between conifers and subsequently the development of full crowns. On the east side of the OI unit, adjacent to private ownership, are concentrated pockets of dwarf mistletoe in the Douglas-fir. Average Basal Area is estimated at 200 square feet.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 25

OI: 003
Trees per acre <8″ DBH: 1,167
Trees per acre >8″ DBH: 108
Basal Area: 145 Square feet
Canopy Closure: 88
Aspect: Level
Relative Density Index: .68

This stand was previously logged in the 1970s. Logging opened the canopy and created a network of skid trails that were ripped for soil compaction mitigation for the Rancheria Timber Sale in 1995. The general stand condition is good with the basal area of conifers greater than 8″ DBH ranging from 60 to 280 square feet. The wide range of basal areas represents the random arrangement of dense conifer patches and more open areas across the OI unit. Most trees less than 8″ DBH are generally 1-2′ in height.

Prescription: Density Management; Lop and Scatter

T34S, R3E, Section 26

OI: 001
Trees per acre <8″ DBH: 719
Trees per acre >8″ DBH: 121
Basal Area: 221 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: .88

Prescription: Density Management; Lop and Scatter

OI: 002
Trees per acre <8″ DBH: 916
Trees per acre >8″ DBH: 109
Basal Area: 165 Square feet
Canopy Closure: 93
Aspect: Level
Relative Density Index: .73

Prescription: Density Management; Lop and Scatter

OI: 003
Trees per acre <8″ DBH: 114
Trees per acre >8″ DBH: 161
Basal Area: 248 Square feet
Canopy Closure: 98
Aspect: Level
Relative Density Index: .78

Prescription: Density Management; Lop and Scatter

OI: 004
Trees per acre <8″ DBH: 382
Trees per acre >8″ DBH: 111
Basal Area: 182 Square feet
Canopy Closure: 88

Aspect: Level
Relative Density Index: .68

The overall stand conditions are good with some individual tree risk and thinning available. OI 002 was ripped as part of the mitigation for soil compaction on the Rancheria (1995) Timber Sale. OI units 001, 002, and 004 are similar in structure, density, and species composition, with density management needed. OI 003 is an even-aged intact stand with high stand densities. Within the stand, a collector/empheral stream needs to be verified and buffered, if needed.

Prescription: Density Management; Lop and Scatter

Selective Cut (SC)

1. Reducing stand densities, removing low vigor trees, and retaining approximately 40 percent-60 percent canopy closure are the primary objectives for these stands.
   - Dependent on the spatial arrangement of low vigor trees, canopy closure would vary across the stand.
   - Tree selection criteria should be based upon the retention of the desired basal area with tree vigor (risk factors) used as the primary aid in determining individual trees to mark. Refer to the attached low vigor and high risk of mortality guidelines. Ideally, trees selected for removal should be proportional to their presence within the stand, although this will not always be possible. For example, if the size class distribution within a stand is 70 percent of the trees are 8- 20″ DBH, 20 percent of the trees are 20-32″ DBH, and 10 percent of the trees are 32″ DBH or greater, then the majority of the trees selected would be in the 8-20″ DBH size class with lesser amounts marked in the 20-32″ DBH size class and even fewer marked that are greater than 32″ DBH.
   - The average residual basal area of treated stands would range from 130 to 180 square feet per acre. See below for the approximate residual basal area for each stand.
   - Clumpiness of residual trees is okay. Meeting the target basal area is more important than meeting a spacing requirement. Spatial and structural variability is a desired stand condition.
2. Trees would be marked across all diameter classes. Minimize marking trees greater than 40″ DBH and do not mark **any** trees 50″ DBH or greater, regardless of condition.
3. Favor drought- and fire-tolerant tree species, such as ponderosa pine, incense cedar, Douglas-fir, and sugar pine.
4. Large (>20″ DBH) healthy ponderosa and sugar pine should be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35 percent, needles should be dark green, crown tops should be pointed (not rounded), and there should be no evidence of resin flow on the upper bole of sugar pine. Pine species with poor crowns characterized by a ragged appearance and bunchy, poor color foliage should be removed; do not retain.
5. Leave all snags, stages 1-5. When available, leave green trees (any diameter) immediately adjacent to snags that are greater than 20″ DBH. These trees will provide additional structural and habitat diversity.
6. Leave all coarse woody debris, decay classes 1-5. When available, leave green trees (any diameter) immediately surrounding large (>20″ DBH and 8′ in length) pieces of coarse woody debris. Retention of green trees would minimize disturbance and maintain the functional integrity of the coarse woody debris.
7. Minimize the marking of large (>20″ DBH) broken, fork top, and deformed trees. Retain for plant and animal habitat, as well as future sources of coarse woody debris and snags.

Table A-7. Target Basal Area for Selection Harvest Stands in Alternative 3

T34S, R3E Section/OI	Unit #	Target Basal Area
*21-004	*21-4 21-8	140 square feet
*21-013	*21-3	140 square feet
21-015	21-7	140 square feet

NOTE: *OI unit is adjacent to VRM corridor; modified marking guidelines apply.

T34S, R3E, Section 21

OI: 004
Trees per acre <8″ DBH: 236
Trees per acre >8″ DBH: 196
Basal Area: 270 Square feet
Canopy Closure: 95
Aspect: Level
Relative Density Index: .75

In the OI unit on the west side of the Butte Falls to Prospect Highway, a previous entry removed many of the largest trees within the stand. Stand structure is multi-layered, with individual tree risk present. Emphasize the removal of declining white fir and favor the release of vigorous incense cedar and Douglas-fir. True fir dwarf mistletoe is common on white fir. Indian paint fungus occurs on larger white fir. Leave white fir with Indian paint conks for wildlife and future coarse woody debris. Fir engraver beetles have caused the mortality of individual white fir throughout the stand; minimize logging damage to residual white fir.

On the east side of the highway, BLM road #34-3-21.6 provides access through the unit and continues to the east/west section line. From the east end back toward an opening/old landing, stand conditions are generally poor in the overstory with branch dieback common. Immediately east of the opening is a stand type change, where trees are generally smaller and have good crown and good form. Parallel and adjacent to the highway, stand conditions are more open with large trees throughout.

Prescription: Selection Harvest; Lop and Scatter

OI: 013
Trees per acre <8″ DBH: 630
Trees per acre >8″ DBH: 97
Basal Area: 169 Square feet
Canopy Closure: 89
Aspect: Level
Relative Density Index: .69

Douglas-fir is the dominant tree in the overstory with codominant and intermediate white fir. Crown vigor is variable in dominant trees.

Prescription: Selection Harvest; Lop and Scatter

OI: 015
Trees per acre <8″ DBH: 526
Trees per acre >8″ DBH: 109
Basal Area: 208 Square feet
Canopy Closure: 100
Aspect: West
Relative Density Index: .80

A meadow is adjacent to highway and the Camp Creek Road (BLM road #34-3E-26) and will need a buffer. A fence line runs adjacent to the meadow and then south/southwest to corner of a plantation. Risk (dead tops in white fir and dead upper 1/5 branches in Douglas-fir) in the overstory trees.

Prescription: Selection Harvest; Lop and Scatter

Shelterwood Regeneration Harvest

The minimum requirements are:

1. 1.8 wildlife trees/acre.
2. 120 linear feet of coarse woody debris.
3. 12-25 green conifers per acre >20″ DBH (proportionally representing the total range of tree sizes >20″ DBH). These are minimum levels; where additional healthy green trees are available they should be left. Determination of leave and take trees should be based upon tree vigor (live crown ratio and crown form) as opposed to the strict implementation of the 12-25 leave tree guideline. Let tree condition dictate where and how many trees are left. Leave trees should have the following attributes: a). Low susceptibility to wind, snow, and ice damage measured by a height to diameter ratio of 70 or

below; b). Crown ratio >35 percent with a healthy crown, dark foliage, and dense needles; c). Disease free; and d). Favor healthy seral species, ponderosa pine, sugar pine, and incense cedar, where possible.

4. **All** healthy ponderosa pine, incense cedar, sugar pine, and hardwoods, regardless of size, should be left (<1″ DBH to 20″ DBH). These trees should have the following attributes: a). crown ratios 35 percent; b). healthy foliage; and c). disease and insect free.
5. Retain all large hardwoods >12″ DBH.
6. Units do not have to be uniform in appearance; diversity and patchiness is desirable.

Table A-8. Shelterwood Regeneration Harvest Units in Alternative 3

T34S, R3E, Section/OI	Unit Number (Acres)
21-004	21-9 (15)

T34S, R3E, Section 21

OI: 004
Trees per acre <8″ DBH: 764
Trees per acre >8″ DBH: 101
Basal Area: 267 Square feet
Canopy Closure: 100
Aspect: Level
Relative Density Index: 1.0

In the eastern ⅓ of the OI unit, BLM road #34-3E-21.6 provides access through the unit and continues to the east/west section line. Overstory tree conditions within this area are generally poor with branch die-back common.

Prescription: Regeneration Harvest; Excavator Pile or Hand Pile and Burn.

SGFMA (Structural Retention) Regeneration Harvest

The minimum requirements are:

1. 1.8 wildlife trees per acre.
2. 120 linear feet of coarse woody debris.
3. Laminated root rot is common throughout these small stands. Leave the minimum of 16 green conifers/acre, >20″ DBH. Where possible, discriminate against white fir and Douglas-fir as both are susceptible to laminated root rot. Favor healthy seral species, ponderosa pine, sugar pine, and incense cedar. Many Douglas-fir trees would need to be left to meet the tree count; use visual characteristics to determine the best trees to leave. Douglas-fir trees that are left should have crown ratios >35 percent, healthy full crowns, dark green foliage, and dense needles along the entire branch.
4. **All** healthy ponderosa pine, incense cedar, and sugar pine <20″ DBH should be left. These trees should have the following attributes: a). crown ratios 35 percent; b). healthy foliage; and c). disease and insect free.
5. Retain all large hardwoods >12″ DBH.
6. Units do not have to be uniform in appearance; diversity and patchiness is desirable.

Table A-9. SGFMA Regeneration Harvest Units in Alternative 3

T34S, R3E, Section/OI	Unit Number (Acres)
12-007	12-5 (9)
13-005	12-6 (15)

These even-aged stands are approximately 100 years old and have never been commercially logged. Stand initiation occurred following the Merle burn in the early 1900s. Currently, stand densities are high with closed canopies and minimal understory development. Laminated root rot is present throughout these stands and a large amount of coarse woody debris is on the ground in OI 005. White fir is the first species to decline, followed by Douglas-fir. Where the species mix increases with chinquapin, madrone, incense cedar, and sugar pine, the impact of laminated root rot is less, as root-to-root contact is

disrupted. When available, favor species **other than** white fir or Douglas-fir. Douglas-fir left to meet the needed tree counts should be the healthiest looking. Do **not** leave **any** white fir to meet the tree count.

Visual symptoms of trees affected by laminated root rot may include:

- groups of trees affected, with trees showing variable levels of decline
- yellow foliage
- crown decline is from the top to the bottom
- distress cone crop; cones are small and numerous
- windthrow trees are common; the wood at the base of the downed trees is soft and stringy or has begun to delaminate

T34S 3E Section 12

OI: 007
Trees per acre <8″ DBH: 19
Trees per acre >8″ DBH: 153
Basal Area: 280 Square feet
Canopy Closure: 98
Aspect: Level
Relative Density Index: .78

Prescription: Regeneration Harvest; Excavator Pile or Hand Pile and Burn.

T34S 3E Section 13

OI: 005
Trees per acre <8″ DBH: 72
Trees per acre >8″ DBH: 147
Basal Area: 255 Square feet
Canopy Closure: 96
Aspect: Level
Relative Density Index: .76
Prescription: Regeneration Harvest; Excavator Pile or Hand Pile and Burn.

Relative Density

Estimate the average diameter of potential leave trees and determine the desired spacing in feet by referring to the table below. Follow the basal area and spacing table as closely as possible. Once the area has been marked, verify the leave basal area using a relaskop or prism; adjust basal area as necessary. As the average diameter changes, spacing will also change, holding stand density constant.

Table A-10. Average Leave Tree DBH, Basal Area, and Tree Spacing for a Relative Density of 35%		
Average Leave Tree DBH	**Leave Tree Basal Area**	**Leave Tree Spacing**
8"	99	12' x 12'
10"	111	15' x 15'
12"	121	17' x 17'
14"	131	19' x 19'
18"	148	23' x 23'
20"	157	25' x 25'
22"	164	26' x 26'
24"	171	28' x 28'
26"	178	30' x 30'
28"	185	32' x 32'
30"	191	33' x 33'

Table A-11. Risk Guidelines - Characteristics of Low Vigor Trees
1. Low vigor trees
a. Low vigor, ponderosa pine trees are defined as those trees meeting the following criteria: • Crowns are ragged and thin. • Foliage in parts of crown thin, bunchy, or unhealthy; needles average to shorter than average in length. • Needle color poor to fair. • Some twigs or branches lack foliage and some twigs or branches are fading or dead. • Localized weakened parts of crowns present. • Crown top is rounded, and the crown width is narrow or flat on one or more sides. b. Low vigor Douglas-fir and white fir trees are defined as: • Crown has thin appearance when viewed against the sky. • Short needle length. • Needle color very poor, yellowish. • Dead or dying twigs or branches in the crown forming holes; sparse and ragged crown appearance. • Poor crown ratio. • Mistletoe infected. c. Visual characteristics of trees affected by root rot are: • Groups of trees affected, with trees showing variable levels of decline. • Trees have reduced height growth; look at top of trees for reduced increment growth. • Yellow foliage; decline of the crown is from the top to the bottom. • Distress cone crop. • Bark beetles sometimes present because of the stressed trees. • Windthrow trees common; wood at the base of the downed trees is soft and stringy or has begun to delaminate.
2. Insect infested trees
• Douglas-fir and white fir trees undergoing attack from Douglas-fir bark beetle, as identified by red boring dust present in bark crevices or on the ground near the base of the tree. Foliage is thinning and yellowish in appearance. Borers typically begin their attack in the top of the tree, and then may spread to the lower bole. Pitch streamers may also be present on the mid to upper bole. • Ponderosa pine trees undergoing current attack from western pine beetle or red turpentine beetle. Pitch tubes should contain reddish/brown granular frass. Pitch tubes clear in color indicate the tree has been successful in expelling the beetle; these trees should not be marked if otherwise healthy.
All snags and coarse woody debris will be maintained as they presently occur; snags that are a safety hazard ***may be felled but will be left on-site.***

Table A-12. Pieces of Coarse Woody Debris by DBH	
Tree DBH	**Number of pieces per tree equal to 16″ DBH by 16′ in length**
16"	1
18"	1
20"	2
22″	3
24″	4
26″	4
28″	5
30″	5
32″	6
34″	6
36″	6
38″	6
40″	6
42″	7
44″	7

VRM Marking Guidelines for Units 15-7, 21-1, 21-2, and 21-7

The BLM managed lands along the county road from Butte Falls to Prospect is designated as VRM Class II. The objective is to manage to meet the visual quality by retaining the existing character of the landscape. Manage the lands for low levels of change to the characteristics landscape. Management activities may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

PDFs would provide for additional visual consideration. No tree over 24″ DBH would be cut within 100 feet of the Butte Falls/Prospect Highway. In all treatment areas along the highway, no new openings would be built and equipment would not enter the units from the highway. The trees would be felled away from the highway, with the stumps cut low at an angle facing away from the highway so not to be seen. Clumps of vegetation not needed for stand treatment would be retained to provide screening.

Riparian Reserve Understory Thinning Marking Guidelines

1. Release healthy, full crown conifer trees 8″ DBH and greater by slashing all trees 7″ DBH and less underneath the dripline. Healthy, full crown trees are defined as trees having crown ratios greater than 35 percent, branches on all sides, straight boles, dark green foliage, conical-shaped crowns, and no evidence of insect or disease problems (pitch tubes, boring dust, woodpecker activity, yellowish or short needles, stress cone crop).
2. Between released conifers, thin smaller and less vigorous trees between 1″ and 7″ DBH. Conifers between 1″ and 7″ DBH would be thinned to approximately 16′ by 16′ spacing. Retained conifers 7″ DBH and less should have a 35 percent crown ratio, full crown, dark green foliage, and a straight bole. White fir should be discriminated against when equally healthy conifers (ponderosa pine, sugar pine, incense cedar, or Douglas-fir) are available for retention.
3. All brush species would be slashed.
4. Unless needed to meet spacing requirements, all madrone less than 7″ DBH would be slashed.
5. Minor species, such as Pacific yew, black oak, big leaf maple and alder, would be reserved.
6. Conifers less than 2′ in height would not be treated.
7. Handpile slash 1″ to 8″ by 2′. Cover and burn piles.

Appendix B – Botany

Summary

- The Camp Cur project area is outside the ranges and does not contain suitable habitat for *Fritillaria gentneri*, *Limnanthes floccosa* ssp *grandiflora,* or *Lomatium cookii*. The proposed activities would result in **"no effect"** to these three Endangered plants.
- Activities proposed under the action alternatives would not trend toward listing Special Status Sensitive or Assessment vascular or nonvascular plants because no vascular plant sites occur in the proposed units and nonvascular sites would be protected.
- Because of their rarity, it is unlikely Sensitive fungi occur in the treatment units. Therefore, the risk is low that they would be impacted during the proposed activities.

Introduction

Special Status plants include vascular plants, lichens, bryophytes, and fungi in the following categories:
1. Federal Threatened and Endangered (T&E),
2. State Threatened and Endangered,
3. Bureau Sensitive, and
4. Bureau Assessment.

Bureau of Land Management policy is to manage, protect, and conserve T&E species and the ecosystems on which they depend and ensure actions authorized on BLM-administered lands do not contribute to the need to list Bureau Special Status species under the provisions of the Endangered Species Act. Bureau Tracking species are species that are apparently secure or for which more information is needed to determine their rarity. Protection of Tracking species is discretionary and project evaluations are not required for them (USDI 2001; USDI 2003). Tracking plant species found in the Camp Cur project area are included in this report for information purposes.

Survey and Manage (S&M) was formerly a designation for rare and uncommon vascular and nonvascular plants and fungi. The *Record of Decision for the Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines*, signed March 22, 2004 and effective April 21, 2004, removed Survey and Manage as a management category for plants and animals. Former S&M species determined as still requiring management or protection were reassigned to the Special Status species program. They are considered for analysis in this EA under their new status. Former S&M species that do not have Special Status are not analyzed or managed.

Methodology

Between 1990 and 2001, approximately 1,700 acres in the project area were surveyed for vascular plants; 600 acres were surveyed for lichens, bryophytes, and fungi prior to timber sales, silvicultural treatments, and restoration projects. Surveys were completed for Special Status vascular and nonvascular plants in all proposed Camp Cur treatment units in 2004 and 2005. Surveys are conducted by qualified botanists at the time of year when Special Status plants can be detected. Surveyors use an intuitively controlled methodology where a representative cross section of all major habitats and topographic features are covered. Efforts are concentrated in areas of probable habitat of Special Status species. Survey reports, species lists, and Special Status plant site reports are on file in the Butte Falls Resource Area.

The assumption was made in the *FEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* that predisturbance field surveys for Special Status fungi would not be conducted. "If project surveys for a species were not practical under the Survey and Manage standards and guidelines… then surveys will not be practical or expected to occur under the Special Status/Sensitive Species policies either. Instead, the other components of pre-project clearances, such as habitat examinations; habitat evaluation; evaluation of species-habitat associations and presence of suitable or potential habitat; review of existing survey records, inventories, and spatial data; or utilization of professional research, literature, and other technology transfer sources are most likely to be used" (USDA and USDI 2004, 122). All Sensitive fungi in the Medford District (see Table B-2) were formerly S&M species for which surveys were not considered practical. Surveys are considered impractical because the fungi produce ephemeral sporocarps (fruiting bodies) on an irregular basis. "Richardson

(1970) estimated that sampling every 2 weeks would fail to detect about 50 percent of macrofungi species fruiting in a season. On the average, less than 10 percent of species were detected in each of 2 consecutive years at any one of eight sites" (O'Dell, et al. 1999). "The reasons for annual and seasonal variation are not fully understood, and predicting when, or under what conditions, a species would fruit is not possible at present." (USDA, USDI 2004, p. 148)

Assumptions

- It is unknown if Sensitive fungi are present in the Camp Cur harvest units or, if present, what consequences would occur to the species if a population was impacted. The 2004 *FEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* addresses incomplete or unavailable information. "While additional information would add precision to estimates, the basic data and central relationships are sufficiently well established that any new information would be unlikely to reverse or nullify understood relationships. Though new information would be welcome, no missing information was evaluated to be essential to a reasoned choice among the alternatives…. Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitats have been surveyed. In situations where limited species-specific information is available, more reliance, by necessity, must be placed on information regarding the condition and management of the overall landscape in formulating conclusions regarding environmental consequences" (USDA and USDI 2004, 108-109). In the absence of complete information about the presence of Sensitive fungi in the Camp Cur treatment units or the consequences of the proposed activities on species viability, the best available information about the fungi, their habitats, distance from known sites to the project area, and the effects of similar activities on related species groups was used to evaluate potential effects of the action alternatives on Sensitive fungi.
- Data are not available for the abundance or extent of rare plants in the Camp Cur project area prior to BLM botanical surveys conducted over the last 10-15 years. It is unknown if rare plants or fungi have been impacted in the project area as a result of human activities or natural ecosystem processes during the last 150 years. Only observations about current environmental conditions in relation to the known habitat requirements of Special Status species can be made. Environmental changes that have occurred in the project area during the last 150 years may have caused some native plants to become rarer.
- Private timber lands are in early to mid-seral stages and do not provide habitat for late-successional associated plants and fungi. Special Status species do not receive protection on private lands, but are protected on BLM-managed lands by the Endangered Species Act and Bureau policies.

Affected Environment

The Camp Cur project is located in the northeastern part of the Butte Falls Resource Area on the western slopes of the Cascade Mountains. The project area falls within two 5th field watersheds: South Fork Rogue River and Big Butte Creek. The area analyzed in this EA for botanical resources includes a block of 20 sections in Township 34 South, Range 3 East that contains the proposed treatment units. The BLM administers 5,507 of the 12,800 acres in this area. The remaining acres are privately owned.

Elevation in the project area ranges from approximately 3,000 to 3,800 feet. Topography is mostly flat with gentle to moderate slopes. The dominant natural plant community is conifer forest, with small inclusions of meadows along the streams and in the lower flatlands. The main plant series represented are Douglas-fir-white fir and white fir-dwarf Oregon grape. Overstory trees include white fir, Douglas-fir, incense cedar, ponderosa pine, sugar pine, and western hemlock. Hardwood trees include chinquapin, dogwood, madrone, and California black oak. Typical understory shrubs are dwarf Oregon grape, tall Oregon grape, trailing snowberry, hazel, trailing blackberry, oceanspray, rose, service berry, and whipplevine.

Beaver Dam, Parsnip, and North Fork Big Butte creeks are the major perennial streams that transect the area. Open riparian areas support willow, alder, vine maple, red osier dogwood, hazel, Douglas spiraea, sedges, and rushes that grow along the streams and in the surrounding meadows. Riparian vegetation in forested areas often only lines the stream and then transitions immediately into upland tree and shrub species. Exceptions are flat terraces along streams where vine maple thickets have become established. The stewardship units proposed for thinning were planted with off-site ponderosa pine after they were harvested approximately 40 years ago. Douglas-fir, white fir, incense cedar, ponderosa pine, and sugar pine seedlings and poles, as well as vine maple, Douglas maple, madrone, Pacific dogwood, and chinquapin are established in the understory.

The landscape and plant communities in the project area have changed over time as a result of human activities and natural processes. Timber harvest on private and public lands over the last 80 years has converted mature forests with structural complexity and species diversity to single-age, early seral stands, making them less suitable as habitat for late-successional associated plants and fungi. At the 5th field watershed level, 61 percent of BLM-administered forests in the Big Butte Creek Watershed are late-successional (80+ years old) and 47 percent in the South Fork Rogue River Watershed are late-successional. Early and mid-seral stands will develop late-successional characteristics in 80+ years and would provide habitat for late-successional plant species. Private forest stands are harvested under shorter rotations and are assumed to support early to mid-seral species.

Road and railroad track construction and tractor logging have also altered the landscape and natural plant community patterns. Special Status plants that were located where roads or railroads were built, they would have been eliminated. Tractor logging disturbs and compacts soil and may have also resulted in extirpation of rare plant or fungi individuals or populations. Tractor logging and road establishment have also created avenues for the introduction and spread of noxious weeds which negatively impact native plants by competing for water, space, nutrients, and light. The Camp Cur area does not contain noxious weed species of great concern, although nonnative plants have become established along riparian areas and in meadows that were heavily grazed in the past.

Some privately owned natural meadows in the project area have been converted to pasturelands. Nonnative grasses were planted which replaced native grasses and forbs. Two active grazing allotments – Summit Prairie and Big Butte – are in the project area. Livestock graze from April to October in the Big Butte allotment and from June to September in the Summit Prairie Allotment. Because the Bureau Assessment bryophyte *Tayloria serrata* grows on cattle dung, it is likely more common in the project area because of the presence of livestock.

Plant community patterns that naturally follow topographical or soil type features have also been altered due to the checkerboard ownership of private and public lands. Treatments on both private and public lands follow property boundaries, resulting in habitat fragmentation which isolates plant populations and reduces gene flow between populations. Species with few or small populations are vulnerable to extirpation or reduced viability as a result of these altered habitat patterns.

Because historical plant data is not available for the project area, it is unknown if or to what extent Special Status plants may have been impacted by past activities and processes.

Special Status Plants

Threatened and Endangered (T&E) Plants

Three Federal Endangered vascular plants have ranges within the Butte Falls Resource Area: *Fritillaria gentneri, Limnanthes floccosa* ssp *grandiflora,* and *Lomatium cookii. Fritillaria gentneri* grows in oak woodlands, chaparral, or in the ecotone (area with characteristics from both adjacent plant communities) between oak woodlands and mixed hardwood-conifer woodlands. *Limnanthes floccosa* ssp *grandiflora* and *Lomatium cookii* populations in the Butte Falls Resource Area grow in vernal pools or vernally wet areas in the Agate Desert. The Camp Cur project area does not contain suitable habitat for them and is outside the ranges of these three species. No T&E plants have been discovered in the project area.

Bureau Special Status Vascular and Nonvascular Plants

The Camp Cur project area does not contain highly diverse plant communities or special habitats where many rare plants grow. Roughly one-half (2,800 out of 5,507 acres) of BLM-administered lands have been surveyed in this area for Special Status vascular plants during the last 14 years. No Bureau Sensitive plants and only one Bureau Assessment plant has been documented (see Table B-1). In addition to *Tayloria serrata*, the Bureau Tracking species *Carex interior* (inland sedge), *Carex leptalea* ssp. *leptalea* (flaccid sedge), *Ribes inerme* var. *klamathense* (Klamath gooseberry), and *Leptogium rivale* (streamside vinyl) have also been documented in the project area. Under BLM policy, tracking species do not receive protection.

Table B-1. Special Status Sensitive and Assessment Plants in the Camp Cur Project Area

Scientific Name	Lifeform	Status	Location	# of Sites	Proposed Treatment	Protection Measures
Tayloria serrata	Nonvascular	Assessment	T34S, R3E, Sec 5	1	None	Not Applicable
			T34S, R3E, Sec 9	2	None	Not Applicable
				3	Pine Plantation Thinning	Buffer
			T34S, R3E, Sec 21	1	Select Cut	Buffer
				1	None	Not Applicable
				1	Pine Plantation Thinning	Buffer

Tayloria serrata (broad-leaved stink moss, dung moss) grows on old dung or on soil enriched by dung, in peatlands and sometimes uplands. Its distribution is global, but it is rare throughout the Pacific Northwest. Dung mosses are ephemeral, due to their dependence on an ephemeral substrate, and can disappear from a locality in one season. Their persistence in an area depends on flies to disperse their spores to new substrates and on the presence of suitable substrate (Christy and Wagner 1996, 73-74).

Ten sites have been documented in the Medford District; one in the Glendale Resource Area and nine in the Camp Cur project area. Four *Tayloria serrata* sites discovered in the Camp Cur project area are outside the proposed treatment units. Four sites are located in pine plantations proposed for thinning to restore native species composition and one site is in a selection harvest unit. The pine plantation sites occur in small openings of mid-seral stands or in small patches or conifer trees. The site in the selective harvest unit is in a mature stand. The moss occurs along the edge of the stand, adjacent to an open meadow. Cows congregate under the canopy at these sites for shelter from sun or rain. All sites are semi-shaded with flat to gently-sloping topography.

Special Status Fungi

Ten former S&M fungi species for which surveys were not considered practical are now Bureau Sensitive (see Table B-2). Four have been documented in the Medford District and the other six are suspected here based on what is known about their habitats and ranges. None of the 10 Sensitive fungi have been found to date in the Butte Falls Resource Area, although various levels of fungi surveys have been conducted on roughly 7,700 acres over the last 7 years. Information about the habitat requirements for these 10 fungi is limited, although all are known to be ectomycorrhizal and to depend on wind or animals for spore dispersal. Few sites have been documented for these fungi in the Pacific Northwest.

The Bureau Tracking fungi *Clavariadelphus sachalinensis*, *Plectania milleri, Ramaria aurantiisiccescens*, and *Spathularia flavida* were discovered in Titanic Timber Sale units during S&M fungi surveys in 1999 and 2000. Bureau Tracking species do not receive protection under BLM policy.

Table B-2. Special Status Fungi Documented or Potentially Occurring in the Camp Cur Project Area

Scientific Name	Status	D/P/S[1]	Proximity of Known Sites to Camp Cur	# of Sites	
				Medford	NWFP[2]
Boletus pulcherrimus	Sensitive	D	25 miles (Southeast Jackson County)	4	36
Dermocybe humboldtensis	Sensitive	S	Arcata and Roseburg BLM	0	4
Gastroboletus vividus	Sensitive	S	Rogue River National Forest (South Central Jackson County)	0	4
Gymnopilus punctifolius	Tracking	P	1 site in T34S, R3E, Sec. 24 (outside Camp Cur units)	6	95
Phaeocollybia californica	Sensitive	D	Grants Pass Resource Area, Josephine County	1	34
Phaeocollybia olivacea	Sensitive	D	65+ miles (East Josephine County)	4	99
Phaeocollybia oregonensis	Sensitive	S	Eugene and Coos Bay BLM	0	11
Ramaria spinulosa var. *diminutiva*	Sensitive	S	Roseburg BLM	0	1
Rhizopogon chamalelotinus	Sensitive	S	North Central Josephine County	0	1
Rhizopogon ellipsosporus	Sensitive	D	50+ miles (West Jackson County)	1	3
Rhizopogon exiguous	Sensitive	S	North Central Josephine County	0	3

[1] D = Documented in the Medford District BLM; P = Documented in the Camp Cur Project Area; S = Suspected in the Medford District BLM
[2] Source for number of sites in the Northwest Forest Plan area is GeoBob database.

Information about the ranges, habitat associations, and number of sites are from the Geographic Biotic Observation database (GeoBob), *Management Recommendations for Survey and Manage Fungi* (Castellano, and O'Dell 1997), *Handbook to Strategy I Fungal Species in the Northwest Forest Plan* (Castellano, et al. 1999), *Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan* (Castellano, et al. 2003), and Oregon Natural Heritage Program (http://oregonstate.edu/ornhic/survey_manage_ranks.html).

Boletus pulcherrimus is a red-pored mushroom that grows solitary in humus in association with the roots of mixed conifers (grand fir and Douglas-fir) and hardwoods. It is native to the Pacific Northwest and fruits from July through December, although it does not fruit every year.

Dermocybe humboldtensis is a gilled mushroom that fruits in November and December in association with conifer roots. It has been documented only in Humboldt County on stable dunes and in Roseburg in a late-successional Douglas-fir forest in a Riparian Reserve at 1,720 feet elevation. No sites have been documented in the Medford District BLM. It is suspected here because the Medford District is located midway between the known sites and contains similar habitat to the Roseburg site.

Gastroboletus vividus is a semi-underground boletoid mushroom. It forms below ground in association with the roots of various conifers and is known only within the range of the Northern Spotted Owl. It was documented in southern Oregon in Star Ranger District/Rogue-Siskiyou National Forest in a low elevation Douglas-fir forest, although other sites across its range are at higher elevations and are associated with Shasta red fir and mountain hemlock.

Gymnopilus punctifolius is a gilled mushroom that forms sporocarps on well-decayed, large conifer stumps, logs, and snags containing brown cubical rot. Its range is the western U.S. and it fruits from August through January.

Phaeocollybia californica is a gilled mushroom that may fruit in March, May, October, or November. It is associated with the roots of silver fir, Sitka spruce, Douglas-fir, western hemlock, oak, or tanoak in later successional mixed evergreen forests. Native to the Pacific Northwest, it has been found in the Arcata, Coos Bay, Eugene, and Roseburg BLM Districts.

Phaeocollybia olivacea is a fall-fruiting gilled mushroom found scattered or in arcs in later successional, mixed evergreen forests in association with oak or tanoak roots.

Phaeocollybia oregonensis is a fall-fruiting gilled mushroom associated with the roots of silver fir, Douglas-fir, or western hemlock in moist, late-successional forests. Sites have been documented in the Coast Range in the Coos Bay BLM and in the Cascade Mountains in northern Oregon.

Ramaria spinulosa var. *diminutiva* is a coral fungi that fruits in the fall on humus or soil in association with conifers. It is known from Europe and the Pacific Northwest. The closest known site to the Camp Cur area is a late-successional Douglas-fir stand at 1,200 feet elevation in Roseburg.

Rhizopogon chamalelotinus is a truffle that grows in the duff in association with roots of Douglas-fir and sugar pine at around 3,600 feet elevation. It fruits in June and September and has been documented in Josephine County and in Idaho.

Rhizopogon ellipsosporus is a truffle that grows in the duff in association with the roots of Douglas-fir and sugar pine at around 2,800 feet elevation. It fruits in October and is nattive to the Pacific Northwest. Sites have been documented on the Medford BLM in a Douglas-fir forest in the Applegate and in Josephine County on the Rogue-Siskiyou National Forest. All three documented sites in the Pacific Northwest Forest Plan area are in Josephine and Jackson counties.

Rhizopogon exiguous is a truffle that grows in the duff in association with Douglas-fir and western hemlock at around 3,100 feet elevation. It fruits in March, August, September, and November and is known within the range of the Northern Spotted Owl. One site was documented in Josephine County in a low elevation Douglas-fir forest.

Noxious Weeds

Only one noxious weed has been documented in the Camp Cur project area. *Cirsium vulgare* (bull thistle) was observed occasionally on roads and in openings in T34S, R3E, Section 25. Bull thistle is widespread in Oregon where it occurs along roads, in waste areas, in timber clearcuts, in burned forest stands, and in pastures which are in poor condition (Hawkes, et al.1985, 83). Bull thistle is shaded out and dies in harvested or burned forest stands when trees and shrubs grow back.

Environmental Consequences

Effects Common to All Alternatives on Botany

Threatened and Endangered Plants

The Camp Cur project area is outside the ranges and does not contain suitable habitat or sites of *Fritillaria gentneri, Limnanthes floccosa* ssp *grandiflora,* or *Lomatium cookii*. The activities proposed under all three action alternatives would have **"no affect"** on these three Endangered plants.

Effects of Alternative 1 (No Action) on Botany

Direct and Indirect Effects

Special Status Vascular Plants

No direct or indirect effects would occur to Special Status Sensitive or Assessment vascular plants from not implementing timber harvest, thinning pine plantations, replacing culverts, renovating pump chances, planting riparian areas, decommissioning roads, or constructing fences along streams because there are no sites in the treatment areas.

Under the No Action Alternative, no ground-disturbing activities would occur that could result in increased noxious weeds or nonnative weedy species that compete with native plants and degrade native plant communities that provide habitat for Special Status plants. The only noxious weed reported in the project area was bull thistle which occurs in some areas harvested in the past, particularly in regeneration harvest units.

Special Status Nonvascular Plants

There would be no direct or indirect effects to Special Status nonvascular species under the No Action Alternative because no physical disturbances would occur that could impact them. Only one Special Status Assessment nonvascular species was documented in the project area (see Table B-1). No negative indirect impacts would occur to this species or its habitat from not implementing the treatments and restoration projects proposed in the action alternatives because the treatments would have no beneficial effects to them.

Special Status Fungi

It is unknown if Sensitive fungi are present in the proposed treatment units. If present, they would likely occur in late-successional forest stands. No direct or indirect impacts to fungi would occur under the No Action Alternative because there would be no loss of late-successional forest habitat and no physical disturbance would occur that could impact them. Under the No Action Alternative, pine plantations would continue to mature and develop species diversity and structural complexity that would make them suitable habitat for Special Status fungi, but at a slower rate than if thinned.

Cumulative Effects

It is anticipated logging, road building, and livestock grazing will continue on private lands in the Camp Cur project area. It is assumed privately owned forest lands are in early or mid-seral stages or will be returned to an early seral stage in the future and consequently do not provide suitable habitat for Special Status plants and fungi associated with late-successional forests. It is also assumed Special Status plants and fungi do not receive protection on privately-owned lands, but will continue to be protected and conserved on federal lands, according to BLM policies and federal regulations.

On BLM-managed lands within the Camp Cur project area, the Titanic Timber Sale will be implemented in 2005. A total of 429 acres will be tractor harvested: 252 acres commercially thinned, 105 acres selection harvested, and 72 acres regeneration harvested. Early and mid-seral stands on BLM-managed lands would continue to develop toward a late-successional stage and would eventually provide habitat for late-successional associated plants and fungi, if they remain unburned and unharvested.

Grazing would continue in the project area on both private and public lands. Under the No Action Alternative, no cattle exclosures would be built on Camp or Parsnip creeks. One exclosure is planned on Beaver Dam Creek and is covered under a separate EA. If Special Status vascular plants are present along these streams, they may be impacted by cattle trampling or browsing if not protected within fences.

As a result of harvest activities on private lands, livestock grazing, and vehicular traffic, nonnative and noxious weeds will likely continue to spread throughout the project area. On BLM-managed lands, weeds may be treated under the Medford District *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*.

No activities would occur under the No Action Alternative that would directly impact T&E, Sensitive, or Assessment plants. Not implementing the treatments and restoration projects proposed under the action alternatives would not contribute additional indirect effects to Special Status plants or trend them toward listing.

Effects Common to all Action Alternatives on Botany

The effects on Special Status plants and fungi under Alternatives 2, 3, and 4 are similar in nature and differ only in the magnitude of effects, based on the number of acres proposed for treatment and the treatment types.

Direct and Indirect Effects

Special Status Vascular Plants

No T&E, Sensitive, or Assessment vascular plants are present in the proposed treatment areas, so no direct or indirect effects would occur to them as a result of the proposed activities.

All three action alternatives would involve some level of ground disturbance, which opens areas to potential invasion by nonnative plants, noxious weeds, or both. Weeds compete with native plants for resources and degrade habitats that rare plants may occupy or colonize. The only noxious weed reported in the project area is bull thistle which occurs in some previously harvested areas, particularly in regeneration harvest units. Bull thistle is not considered a problematic weed because it disappears once trees grow and shade it out. PDFs, such as requiring equipment to be washed before entering the

project area and seeding and mulching landings and temporary spur and decommissioned roads with native seed and straw after disturbance, would reduce the possibility of introducing or spreading noxious weeds or nonnative plants during project implementation.

Because no Sensitive or Assessment vascular plants occur in the treatment areas, there would be no difference in effects to them among the three alternatives. No activities proposed under the action alternatives would contribute to a need to list Sensitive or Assessment vascular plants.

Special Status Nonvascular Plants

The only Sensitive or Assessment nonvascular species located in the treatment units is *Tayloria serrata*, a Bureau Assessment bryophyte. One population is located in a harvest unit and four are in pine plantations proposed for thinning. Four other populations were discovered during surveys but are located outside the proposed units. *Tayloria serrata* grows on dung and is ephemeral, disappearing when the substrate deteriorates, but spreading when flies carrying the spores to new substrates. Populations are located at the edge or in openings of mid- or late seral conifer stands or along old roads with some canopy cover. Several sites are located next to meadows. The locations of the populations indicate the species is a habitat generalist, rather than strictly late-successional associated. All sites have partial shade, with varying degrees of overstory canopy. Because it grows at the edge of stands, it does not appear to be as sensitive as true late-successional associated species to the effects of higher temperatures and lower relative humidity that occurs at a forest edge.

The goal for managing *Tayloria serrata* in the Camp Cur treatment units is to protect the plants from direct disturbance by logging equipment or from radiant heat during pile burning. If all surrounding shade trees were removed they could also be indirectly affected by increased light exposure which could result in decreased spore production. A population's persistence depends on sporophyte and spore production. Plants could also be damaged if cattle congregate at a site because it contains the only shade adjacent to the meadows. Although *Tayloria serrata* depends on dung for its substrate and for attracting flies for spore dispersal, it may also be destroyed by repetitive trampling (Christy and Wagner 1996, 73-74). The *Tayloria serrata* population located in the harvest unit would be protected with a 100-foot radius buffer. The buffer and the retention of 40 to 60 percent canopy cover in the surrounding unit would protect against direct impacts from harvest equipment or burn piles. Leaving scattered overstory trees in the surrounding unit would also divert livestock from the buffer and reduce the chances of them congregating at the site and potentially impacting the plants.

The four *Tayloria serrata* populations in pine plantations would be protected from potential direct or indirect impacts by establishing no entry buffers around the openings where they occur and maintaining the surrounding canopy cover. Buffer sizes would vary to include surrounding trees that provide canopy cover. Because the prescription for the plantations would retain evenly distributed trees, livestock would disperse throughout the area and not congregate at sites.

None of the proposed activities would cause *Tayloria serrata* to trend toward listing because sites would be protected against direct and indirect effects..

Special Status Fungi

No surveys have been conducted in the proposed Camp Cur treatment areas for the 10 Medford District Sensitive fungi (see Table B-2). Surveys for S&M fungi were conducted in 1999 and 2000 on approximately 600 acres for the Titanic Timber Sale, which is adjacent to the Camp Cur projects area but no Sensitive fungi were discovered. However, the focus of those surveys was on other S&M species.

Although the habitat requirements for the 10 Medford District Sensitive fungi are not well known, they are believed to be associated with late-successional forests. If present in the Camp Cur treatment units, they would most likely occur in late-successional stands proposed for timber harvest. They are unlikely to occur in the proposed mid-seral pine plantation thinning stands. Proposed restoration projects do not contain suitable habitat for fungi and would not contribute direct or indirect impacts to them.

Because of their rarity and distance from known sites (25+ miles), it is unlikely Sensitive fungi are present in the harvest units. If present, though, they could be directly or indirectly adversely impacted by harvest activities. Harvest can have varying degrees of adverse impacts to rare fungi, depending on the levels of tree removal and ground disturbance.

The main and most extensive parts of fungi consist of below-ground mycelial networks which reside in the top few inches of mineral soil. They are often connected to multiple trees through their root systems. Activities which remove, disturb,

or compact the top layer of organic material and mineral soil could negatively impact fungi that occur there. In one study, fungal mycelia networks ranged in size from 1.5-27 square meters (Dahlberg and Stenlid 1995). Mycelia networks could be disrupted by equipment during timber harvest, construction or ripping of roads or landings, or by removal of host trees that sustain the ectomycorrhizae. These impacts could result in a loss of fungal species diversity and abundance (Amaranthus, et al. 1996). Temporary spur roads would be constructed under all action alternatives to allow access to harvest units: 5.2 miles in Alternatives 2 and 3, and 3.0 miles in Alternative 4.

Tractor yarding presents more potential risk of ground disturbance and compaction and effects to fungi than cable, helicopter, or skyline yarding. Since most units in Camp Cur would be tractor logged, the difference in impacts by alternative would vary by the number of acres affected: Alternative 2 proposes 803 acres of harvest and 200 acres of pine plantation thinning by tractor, Alternative 3 proposes 782 acres of harvest and 200 acres of pine plantation thinning by tractor, and Alternative 4 proposes 517 acres of harvest and 200 acres of pine plantation thinning by tractor. Under all action alternatives, potential impacts would be localized and minimized by using existing skid roads with a minimum spacing of 150 feet (see Section 2.5, Project Design Features, Timber Harvest). This spacing limits impacts to only 12 percent of an area. Fungal mycelia could survive if they were missed or only partially damaged during harvesting, if their host trees remained, and if environmental conditions were favorable for their persistence.

Sensitive fungi could also be directly impacted from radiant heat during burning of post-harvest slash piles. Effects from pile burning include damage or death of mineral soil fungi, including the mycelia and spores; loss of litter, organic matter and large wood, resulting in reduced moisture retention capability; loss of nutrient sources; and changes in fungal species diversity and abundance.

Fungi may also be indirectly affected by changes in environmental conditions after timber harvest. Reducing canopy cover results in lower humidity, increased light, and higher air temperatures. Hotter, drier conditions inhibit sporocarp production and fungal persistence. Luoma, et al. (2004) looked at the effects of different levels and patterns of green-tree retention (basal area) on ectomycorrhizal sporocarp production. The results of the study suggest that leaving a combination of dispersed and aggregated (grouped) green-trees is desired when sporocarp production is the goal. This mix of retention patterns reduces the effects of a distinct edge between forest stands and harvested areas, particularly for temperature and moisture. In the study, total fall mushroom biomass decreased significantly in the stands where basal area retention patterns were 40 percent aggregate, 15 percent dispersed, and 15 percent aggregate compared to the 75 percent aggregate and 40 percent dispersed treatments and the control. Sporocarp production was nearly eliminated from the stands where only 15 percent of basal area was retained in an aggregate pattern. In the Camp Cur project, regeneration and shelterwood prescriptions would leave an estimated 11 to 19 percent basal area in a dispersed pattern. Density management and selection harvest prescriptions would retain an estimated 42 to 83 percent basal area in a dispersed pattern. If rare fungi are present in the Camp Cur harvest units, they might persist in the altered environmental conditions in the density management and selection harvest units, but would be less likely to persist in regeneration or shelterwood units (see Table B-3).

Table B-3. Acres of Basal Area Retention in Camp Cur Harvest Units by Alternative

Alternative	Density Management and Selection Harvest; 42-83% Retention	Regeneration and Shelterwood Cuts; 11-19% Retention
2	690	113
3	763	39
4	487	13

Converting late-successional conifer stands to an early seral stage as a result of regeneration harvest could also affect Sensitive fungi by reducing the amount of suitable habitat across the landscape for these species. Each alternative proposes some regeneration harvest (see Table B-3), but late-successional forest would be reduced by less than 1 percent under all three action alternatives. All regeneration harvest would occur in the Big Butte Watershed and 60 percent of BLM-managed late-successional forest would remain in the watershed. Late-successional forest stands would remain at 47 percent in the South Fork Rogue Watershed.

While timber harvest activities present potential direct and indirect threats to Sensitive fungi, pine plantation thinning, density management and selection harvest treatments could also benefit them by reducing the potential for stand-replacing wildfires and improving stand resiliency against drought, insects, and disease. Reducing stand densities would provide more water,

nutrients, light, and growing space for the remaining trees and improve individual tree vigor and resiliency against natural disturbances. Reducing the density of ponderosa pine in plantations would allow stands to develop more natural and diverse species composition and move them faster toward late-successional characteristics. In the long-term (40+ years), the resulting conditions in these stands would be more favorable to Special Status fungi than current conditions.

Cumulative Effects

The same past, present, and future activities would occur in the Camp Cur project area under Alternatives 2, 3, and 4 as those described under Alternative 1, with the exception that harvest and restoration projects proposed in the action alternatives would occur.

The projects proposed in Alternatives 2, 3, and 4 would provide no additional cumulative effects to T&E, Sensitive, or Assessment vascular or nonvascular plants because project areas have been or would be surveyed and Special Status plant sites would be protected from direct and indirect effects of the proposed activities. PDFs would reduce the risk of noxious weeds being introduced or spread during project implementation. Because *Tayloria serrata* is not strictly associated with late-successional habitat, the loss of 14-108 acres of late-successional forest through regeneration and shelterwood harvest would not contribute additional cumulative effects to this species.

The cumulative effect of timber harvest on Sensitive fungi would be the loss of the following amounts of late-successional forest: 108 acres in Alternative 2, 42 acres in Alternative 3, and 14 acres in Alternative 4. However, the proposed harvest would occur on Matrix lands, which are designated for timber production and harvest. Of the 8 million acres of late-successional forest in the Northwest Forest Plan area, 14 percent are designated as Matrix and available for harvest and 86 percent are in Late-Successional Reserves, congressionally reserved, administratively withdrawn areas, and Riparian Reserves. It is estimated that over the next 50 years, late-successional forest would develop at 2.5 times the rate of loss through stand replacing fires and harvest (USDA and USDI 2004, 109-111). This reserve system, spread across the landscape, is intended to provide protection and development of late seral habitat for the protection and expansion of rare plants associated with late-successional habitat. Under the Northwest Forest Plan, at least 15 percent late seral conifer forest must be maintained in each 5th field watershed (USDA and USDI 1994, C-44). Under all 3 action alternatives, 60-61 percent of late-successional forest in South Fork Rogue River Watershed and 47 percent in the Big Butte Creek Watershed would remain. It is recognized that some late-successional stands in these watersheds are 80-year-old forests which do not currently possess all the characteristics of mature and old growth stands and will not provide suitable habitat for rare fungi until some timethe future.

For 8 of the 10 former S&M fungi for which surveys are not practical (see Table B-4), the 2004 *Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* determined that habitat, including known sites, is insufficient to support stable populations in the Northwest Forest Plan area. For 7 of the 8 species, "this outcome is not due to federal actions but other factors such as: (1) limited potential habitat and few populations on federally managed lands; (2) potential for stochastic events; (3) low number of individuals; (4) limited distribution; and (5) narrow ecological amplitude" (USDA and USDI 2004, 124). Because habitat is insufficient to support stable populations and is not due to federal actions, the Camp Cur proposed timber harvest would not change the species viability condition (based on habitat) for 7 of the 10 species. For 1 of the 8 species (*Phaeocollybia californica*), the outcome of insufficient habitat is due to land management activities, such as soil disturbance and loss of host trees. Known sites of *Phaeocollybia californica* are not substantially protected by reserves and loss of even a few known sites could adversely impact persistence within the Northwest Forest Plan area (USDA and USDI 2004, 154). Because habitat is insufficient to support stable populations due to management actions, the Camp Cur proposed timber harvest treatments could adversely affect the viability of *Phaeocollybia californica* if populations were present and impacted. However, the species is rare across the Pacific Northwest Forest Plan area and it is not likely to be present in the proposed harvest units. Therefore, the risk of impacting populations is low.

For 2 of the 10 former S&M fungi for which surveys are not practical (*Phaeocollybia olivacea* and *Phaeocollybia oregonensis*) (see Table B-4), habitat, including known sites, was determined to be sufficient to support stable populations in the Northwest Forest Plan area. These species would stabilize in a pattern similar to or different from their reference distribution because a substantial number of known sites are located in reserves or are managed under the Special Status Species Programs (USDA and USDI 2004, 152). Because habitat is sufficient to support stable populations, the Camp Cur timber harvest would not change the viability condition for these 2 species.

Table B-4. Former Survey & Manage Fungi - Surveys Not Practical Species in Reserves

Scientific Name	Number of Sites in NWFP Area[1]	Number of Sites in Reserves[2]	Percent of Sites in Reserves
Habitat Not Sufficient – Not Due to Federal Action			
Boletus pulcherrimus	36	5	13.9
Dermocybe humboldtensis	4	1	25.0
Gastroboletus vividus	4	2	50.0
Ramaria spinulosa var. *diminutiva*	1	0	0
Rhizopogon chamaleontinus	1	0	0
Rhizopogon ellipsosporus	3	0	0
Rhizopogon exiguus	5	3	60.0
Habitat Not Sufficient – Due to Management			
Phaeocollybia californica	30	5	16.7
Habitat Sufficient			
Phaeocollybia olivacea	93	19	20.4
Phaeocollybia oregonensis	11	5	45.5

[1] SOURCE: Interagency Species Management System database; November 20, 2004
[2] Reserves (Land Use Allocations): Late-Successional Reserves, Owl Cores, Riparian Reserves, and Congressionally Reserved Areas

Because of their rarity across the Northwest Forest Plan area, it is unlikely Sensitive fungi are present in the Camp Cur timber harvest units and the risk is low they would be impacted. It is assumed that protecting known sites (current and future found) for these Sensitive fungi species, in addition to conducting large-scale fungi inventories throughout the Pacific Northwest, will be adequate to ensure this project and future projects would not contribute to the need to list (USDI 2004, 5-2).

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Appendix C – Cultural Resources

Methodology

The Butte Falls Resource Area is planning a timber sale northeast of Butte Falls. Preliminary to the timber sale project, the BLM must complete its obligations to protect archaeological resources, as stipulated in Section 106 of the National Preservation Act.

The State Historic Preservation Organization standards stipulate that 100 percent of the high probability lands, 20 percent of the medium probability lands, and 5percent of the low probability lands within the project area must be surveyed. Also, a minimum of 20 percent of the total project area is required to be surveyed. These standards were met or exceeded for this project through ground surveys.

In accordance with the National Historic Preservation Act of 1966, Section 106, an archaeological reconnaissance was conducted for the project area.

Assumptions

All known cultural sites in the project area will be buffered and protected during timber or fuels treatment.

Affected Environment

The following information is taken from the Lost Creek Watershed Analysis (1998), Flounce Around Project Cultural Report (2003), BF97-35 report (1997), and *Historical Cultural Inventory of the Proposed Butte Falls Park*, Jackson County, Oregon by D. Gray.

Prior to Euro-American settlement in the 19th century, the upper Rogue River drainage was likely a boundary area between the Takelma people of the Rogue River Valley and the Molala who inhabited parts of the Cascade Mountains from Mt. Hood to the upper Rogue River.

Archeological surveys in the Lost Creek area suggest a long history of human use. Beginning about 10,000 years ago (Paleo-Indian period), people migrated into the Rogue Valley. It is presumed these people lived in small mobile groups and were big game hunters. People used the Lost Creek area sporadically until about 5,000 years ago (Archaic period), after which use of the area increased. During this time, collector-village subsistence and settlement patterns are noted in the region including the first appearance of pithouses and the use of the mortar and pestle. By about 1,500 to 1,000 years ago (Archaic period), small permanent villages existed in the Lost Creek area. This is the time period during which the bow and arrow, and associated small projectile points, were introduced. From 1,000 years ago to contact (Formative and Protohistoric period), the Takelma had a settlement pattern closely related to their subsistence regime. The permanent winter villages were located in the low elevation river valleys of the region in close proximity to the predictable and significant food resources. During the warmer months of the year, the Takelma would temporarily move to their seasonal base camps in the surrounding uplands to hunt, gather crops, and procure other resources not available near their winter villages.

The staple vegetal foods of the Takelma were acorns and camas. A variety of root crops, manzanita berries, pine nuts, tarweed seeds, wild plums, and sunflowers augmented their diet. Anadromous fish (especially salmon), deer, elk, and a variety of small mammals and certain insects provided protein in the Takelma diet.

The ethnographic record for the interior southwestern Oregon is limited due to the rapid destruction of the Native American cultures in the region as a result of the “Rogue Indian Wars” of the 1850s. With the discovery of gold in northeastern Oregon, prospectors from the Rogue Valley created a route over the Cascades to the gold fields of the John Day River. Roads to the Klamath Basin that branched off the road to John Day include the Jacksonville to Fort Klamath Military Road.

Beginning in 1862 with the Homestead Act and ending in 1915, many acres of land were transferred out of federal ownership into the private sector. In the southern Oregon Cascades, these land laws were used to obtain ownership to potentially valuable, but nonarable forest lands. Additionally, the Preemption Land Law of 1841 and the Timber and Stamp Act of 1878

enabled the transfer of millions of federal timbered acres to private citizens. Many of these settlers abandoned their claims immediately after receiving patent and sold their lands to waiting timber companies.

In 1906, a small logging company built a sawmill at the falls on Big Butte Creek and laid out the town of Butte Falls on the flat above the mill. The Pacific and Eastern Railway Company reached Butte Falls in 1911 and by1925, the Owen-Oregon Lumber Company began large scale logging activities in the area. Logging initially took place east of Butte Falls where railroad lines were constructed into the forest lands. Logging companies established semi-permanent residences in logging camps. Over the next several decades, railroad logging activities moved north/northeast of Butte Falls. Railroad logging eventually ceased operation in the early 1960s when it became more efficient and less expensive to move logs to the mills via truck.

Environmental Consequences

Effects Common to All Alternatives on Cultural Resources

There will be no direct environmental consequences to cultural resources, because all sites will be buffered and protected. Indirectly, the increased activity in the project area could lead to the possibility of further looting of some of the sites.

Appendix D – Wildlife

Fishers

Fishers (*Martes pennanti)* are the largest members of the weasel family. The fisher is light brown to dark/blackish brown, often with a patch of white on the chest and/or underside. Fishers have a general body build of a stocky weasel, long and thin and set low to the ground (Powell and Zielinski 1994). They have a long bushy tail. Males range from 35-47 inches long while females may be 29-30 inches. Prey is ground squirrels, rabbits, woodrats, opossums, skunks, porcupines, pileated woodpeckers, grouse, and other birds. They also eat fruits, berries, and yellow jackets.

Fisher habitat

Fishers occur in the northern conifer and mixed conifer/hardwood forests of Canada and the Northern United States. Prior to extensive European settlement, they occupied most coniferous forest habitats in the Pacific Northwest. In general, the habitats used by fishers are forest woodland landscape mosaics that include conifer-dominated stands.

In the Pacific Northwest, fishers are associated with low and mid-elevation forests where deep snowpacks do not accumulate. Negotiating deep snow is energetically for fishers because of their body size and physical adaptations (USDA and USDI 1994b). Studies in the Pacific states were conducted between 1989 and 2000 to determine fisher occurrence. In Oregon, fishers were only detected in the Siskiyou Mountains near the California border in the southwestern corner of the state and in the southern portion of the Cascade Range. Fishers appear to have been extirpated from all other portions of their presumed historical range in Oregon. Surveys for fisher in Washington State indicate they may be extirpated in Washington (Aubry and Lewis 2002). In California, fishers were detected only in the Klamath-Siskiyou region in northwestern California and in the southernmost portion of the Sierra Nevada (Zielinski, et al. 1995).

“Fisher populations are believed to have declined on Federal lands within the range of the northern spotted owl, primarily for two reasons, both of which are related to the widespread conversion of old-growth Douglas-fir forests to young plantations: loss of habitat due to forest fragmentation resulting from clearcutting designed in a staggered-setting prescription, and removal of large, downed coarse woody debris and snags from the cutting units” (USDA USDI 1994b).

The NWFP was designed with a network of reserves of late-successional forests surrounded by younger, managed forests. Many known locations for the species are outside late-successional reserves, and it is possible that harvest of such forests may cause lower extirpation of populations (USDA and USDI 1994b).

Fishers were considered under the NWFP and given a less than 80 percent likelihood of being well-distributed across the range within the NWFP area. The assessment of the NWFP implementation effects on the fisher was that there was a 63 percent likelihood of achieving an outcome in which there is sufficient quality, distribution, and abundance of habitat to allow the fisher population to stabilize and be well-distributed over Federal lands.

Although the NWFP may provide suitable habitat that is well-distributed on federal lands, fisher populations may never respond and be well distributed because of (1) their apparently low rates of recolonization of restored habitats after local extirpation, (2) the lower amount of federal land at lower elevations, and (3) their natural rareness (USDA and USDI 1994b). The species’ range includes 34 percent nonfederal lands (USDA and USDI 1994b).

Maintaining structure in the fisher home ranges is the most important thing for forest management in areas where they are present. Snags with heartwood decay, snags and decadent trees with natural cavities, and coarse wood are the structures important to fisher. Studies in the west have consistently found fisher in association with riparian areas or near water (Buskirk and Powell 1994; Harris and Ogan 1997). It is important to note that this may be due to the fact that trees in riparian areas may have been protected in western forests and these trees may provide the closed canopies that fisher prefer (Harris and Ogan 1997). It cannot be determined if fishers chose riparian areas because they are close to water, for the riparian vegetation, or because of special microhabitat conditions (Self and Kerns 2001). However, the study within the southern Oregon Cascades with PNW and USFS did not detect a preference for using riparian areas in the study area (Raley 2004).

Researchers in the southwestern Oregon Cascades found that fishers will use recovering clear-cuts for foraging (Raley 2004). The recovering clear-cut areas that fishers use have small diameter trees and closed canopy. Residual patches of trees and riparian areas associated with the clear-cuts on private lands were used by fishers (Raley 2004).

Results from the study of fisher in the southern Oregon Cascades indicate that male breeding season activities conclude near the end of April. Females give birth to kits in late March and early April and move the kits from natal to maternal dens sometime in May. Natal dens are sites where a female gives birth and remains with the kits until weaning at about eight weeks of age. Natal dens used by adult females in the PNW study were live trees with openings that accessed hollow interiors created by heartwood decay. Most openings appeared to have been excavated by pileated woodpeckers (Aubry and Raley 2004). After weaning, the female moves the kits to the maternal den, a site used by the female and kits during the period when kits are still dependent on the female for food. This period lasts until late August or early September when the kits are about 5 months old. Maternal dens may be located in woodpecker holes; natural cavities, including those in the lower bole or butt of live and dead trees; and large hollow logs (Aubry and Raley 2002).

All habitats used disproportionately by fishers have high canopy closure. Fishers avoid areas with low canopy closure. Studies conducted in late-successional Douglas-fir forests of the Pacific Northwest are characterized by multiple layers of cover that create closed-canopy conditions. These studies concluded that fishers use late-successional forest more frequently than early to mid-successional forests with complex physical structure (Powell and Zielinski 1994). The physical structure of the forest and the prey associated with the physical structure are critical features that explain habitat use, not specific forest types. Structure includes vertical and horizontal complexity created by diversity of tree sizes and shapes, light gaps, dead and down wood, and layers of overhead cover (Powell and Zielinski 1994). Forest structures may also be important to fishers through effects on snow depth, snow compaction, and snow characteristics.

A study in Northern California on extensively managed private forest lands detected the presence of fishers. They were found to be associated with large, residual forest structures (snags, logs, and live trees). They had more fisher detections in areas with logs and hardwoods and areas where patches of larger trees were left on the landscape (Diller 2004). Fishers use harvested areas if patches of habitat with residual components are left in the landscape.

Fragmentation may affect fisher populations. The problem for fishers is not necessarily with the forest openings. Fishers evolved in forests where windthrow and fire were common. Small patch cuts, group selection harvests, and small clearcuts can superficially resemble these disturbances in form and pattern of succession that follows. Fishers have been reported to use recently clearcut areas during the summer, when the cover is formed by ground vegetation and young trees. Depending on the forest type and geographical location, the relationship between seral stage or forest age and canopy may vary. One study reported that while fisher used a variety of different seral stages, they are not detected as frequently in early successional forests as late-successional forests (Harris and Ogan 1997).

In the west, retention of hardwoods, especially older and larger trees as rest sites, den sites, and potential food sources for prey, may be important. Rest sites for fisher are important attributes of the habitat (Harris and Ogan1997). Mistletoe brooms are especially important resting sites. They also use snags, logs, and cull piles (Aubry and Raley 2002).

One study reported a negative association between detections of fisher and roads. In a well-roaded study area (an area without roads did not exist), fishers were detected more frequently at sites where the roads were closed by gates or other means (Harris and Ogan 1997). The closure of roads to public access, or severely controlled access in forests being entered for timber production, may be tools to reduce mortality.

Table D-1. Fisher Habitat Connectivity and Dispersal Habitat

Watershed Analysis Unit	Areas with Older Stand Characteristics[1]	Acres within Late-Successional Reserves	Amount in Riparian Reserves[1]	Acres within Wilderness Areas	Acres within National Parks
Forks	33,337 acres late-successional	30,441	16,705 acres	59,163	6,951
Lost Creek	10,213 acres late/ mature/ old growth stands	1,400	2,917 acres	0	0
Central Big Butte	12,143 acres large conifer stands	1,300	111 miles	0	0

[1]NOTE: Information for this table was taken from the Forks, Lost Creek, and Central Big Butte watershed analyses. The watershed analyses used different metrics so direct comparisons cannot be made. Information is provided merely to show how much habitat exists for fisher to use.

Table D-2. Assessment of General Habitat Conditions within 0.4 ha (1 acre) around Radio-telemetry Locations of Female and Male Fishers in the Southern Oregon Cascade Range 1995-2001

	Females			Males	
Habitat category	Den locations *n* = 32	Resting locations *n=489*	Active locations *n=274*	Resting Locations *n*=342	Active locations *n*=260
Unmanaged forest[1]	56%	63%	40%	25%	25%
Managed forest[2]					
1-33% overstory trees removed	13%	8%	6%	5%	8%
33-66% overstory trees removed	12%	6%	9%	7%	6%
>66% overstory trees removed	12%	8%	17%	14%	13%
Managed second-growth forest[3]					
10-25 cm dbh trees	3%	4%	5%	23%	6%
26-50 cm dbh trees	3%	10%	21%	23%	36%
51-75 cm dbh trees	0	<1%	1%	1%	0
Nonforested habitats[4]	0	1%	1%	2%	6%

SOURCE: *Ecological Characteristics of Fishers in the Southern Oregon Cascade Range Final Progress Report: June 2004*
[1] No evidence of past timber harvesting within 0.4 ha around location. Stand age varies from young to older forests.
[2] Some timber harvesting has occurred but the original forest has not yet been completely replaced.
[3] Areas that have a longer history of timber management and the original forest has been replaced
[4] Includes wet meadows and upland shrub habitat conditions

Aubry, Keith B. and Catherine Raley. 2002. *Ecological Characteristics of Fishers in the Southern Oregon Cascade Range. Final Progress Report: June 2002*. USDA Forest Service, Pacific Northwest Research Station. Olympia Forestry Sciences Lab. Olympia WA.

Special Status Species Review

Medford BLM lands are excluded from the range of the lynx, due to the absence of key lynx habitat characteristics, their southern geographic location, and lack of historic sightings (USDA and USDI 1998; Rutiger, et al. 2000). Medford BLM land is outside the range of California wolverine. Pine martins are not on the Medford District Bureau Sensitive list. Medford District BLM lands are outside the range of pygmy nuthatches.

The table contains the BLM Oregon/Washington (OR/WA) Special Status Species List. This list was updated in March 2005 based on information from the Oregon Natural Heritage Program and BLM site-specific information. Each of these Bureau Sensitive and Assessment species was considered and evaluated for this project. The method(s) used to assess and review the potential effects to these species followed the techniques described in the OR/WA Special Status Species Policy (IM OR-2003-054). Bureau Tracking species are not considered special status species for management purposes and, therefore, are not included in this assessment. Table D-3 documents the basic conclusions of this assessment by species.

Table D-3. Butte Falls Resource Area Special Status Species
Camp Cur Proposed Project Assessment, May 5, 2005

Species	Status	Range	Presence in Camp Cur Area	Conclusions
Amphibians				
Foothill yellow-legged frog	BA	Yes	Absent	Range is from sea level to about 1,800′. Camp Cur elevation of 3,000-3,500′ is above the elevation range. A check of stream survey records in the project area did not find any yellow-legged frog reported. Riparian Reserves would be one or two site-potential-tree lengths to protect streams. Thinning in 26 acres would remove brush and small understory trees, leaving 15′ no-cut buffer. No detectable impacts from proposed projects.
Oregon spotted frog	FC	No	Absent	BFRA is outside the range.
Reptiles				
Northwestern pond turtle	BS	Yes	Absent	No suitable ponds within project area. Surveys of pump chances in the watershed were negative. No detectable impacts from Camp Cur proposed projects.
Birds				
Bald eagle	FT	Yes	Present	One eagle nest is present near the proposed action. No known roost or nest trees would be removed. A seasonal restriction for activities within ¼ mile of nest would be in place. Impacts would be negligible and would not affect eagle recovery. The action is covered under BO #1-15-03-F-511, 20 October 2003.
Black-backed woodpecker	BS	No	Absent	Habitat is primarily lodgepole, ponderosa, and mixed conifer forests. They were not encountered in bird surveys and have not been reported in the watershed. Nearest confirmed location is near Crater Lake. All snags would be reserved. No impacts; outside range.
Burrowing owl	BS	No	Absent	N/A. Project area is outside the range.
Flammulated owl	BS	Yes	Present	One detection during Great Gray Owl surveys; not found on follow-up. All large snags not being felled for safety reasons would be retained. Standards and guidelines for snags and green-tree replacements for woodpeckers and other primary cavity-nesting species would provide for flammulated owls (UDA and USDI 1994, C-47). Proposed activities would have no detectable impacts to species at the watershed level.
Lewis' Woodpecker	BS, NBC	No	Absent	Present in lower elevation private lands in Sam's Valley and Table Rocks. They are associated with open woodland habitat, primarily white oak, ponderosa pine, and riparian communities (Marshall, et al). They are not found in the project area. No impacts.
Northern Goshawk	BS	Yes	Present	Surveys in suitable habitat in project area were negative for goshawk. Goshawks are present to the north and south of the proposed project area. Adequate habitat exists adjacent to project area. No nests were found; no impacts to nest. Could still forage after the action. No impacts to species viability.
Northern spotted owl	FT	Yes	Present	Nests throughout BFRA in suitable habitat. Known sites would be surveyed prior to action. Suitable habitat adjacent to known sites would be checked if NSO are not found in historic locations. Likely to adversely affect. Covered under 2003 BA/BO # 1-15-03-F-511

Table D-3. Butte Falls Resource Area Special Status Species
Camp Cur Proposed Project Assessment, May 5, 2005

Species	Status	Range	Presence in Camp Cur Area	Conclusions
Olive-sided flycatcher	NBC	Yes	Present	All snags would be retained. Olive-sided flycatchers forage from a perch on snags and large trees at the edges of clearcuts and openings. Timber harvest would likely increase foraging habitat with increased edge at regeneration harvest units. No negative impacts to species viability.
Peregrine falcon	BS, NBC	Yes	Absent	No suitable habitat within project area. No impact.
Purple martin	BS	No	Absent	N/A. Not present in BFRA.
Rufous hummingbird	NBC	Yes	Present	Nest in conifer forests, thickets, and brushy slopes, foraging in adjacent meadows. Regeneration harvest would increase forbs and brushy species, increasing foraging habitat.
Streaked horned lark	FC	No	Absent	N/A. Not present in BFRA.
Three-toed woodpecker	BS	No	Absent	BFRA is outside range. No impacts.
Tri-colored blackbird	BA	No	Absent	Project area is outside the range. No habitat present. No impacts.
White-headed woodpecker	BS, NBC	No	Absent	Occasional visitor to Dead Indian Plateau. May be vagrant in BFRA higher elevation lands on east side. All snags would be reserved. Adequate potential habitat exists within and adjacent to the project areas. Impacts would be negligible.
White-tailed kite	BA	No	Absent	Project area is outside range. No suitable habitat. No impact.
Mammals				
Fisher	FC	Yes	Present	Fishers use a variety of forested habitats. They use late-successional forests for denning and rearing young. Timber harvest would alter fisher habitat. Seasonal restriction would be in effect during the breeding period to allow successful breeding. Impacts to habitat of one or two individuals.
Fringed myotis	BA	Yes	Suspected	A mist net survey near Camp Cur in 2004 captured no fringed myotis. Fringed myotis appear adapted to live in areas with diverse vegetative substrates. All snags and CWD would be retained. Riparian Reserves would provide snag and large tree habitat. Proposed activities would not affect persistence of the species in the watershed.
Lynx	FT	No	N	N/A. Medford BLM lands are outside the range of lynx.
Pallid Bat	BA	Yes	Suspected	A mist net survey near Camp Cur in 2004 captured no pallid bats. All snags and CWD would be retained. Proposed activities are inconsequential to species and/or habitat. Proposed activities would not affect persistence of the species in the watershed.
Red tree vole	BT	No	N	Project area is outside the range of red tree voles. No impacts.
Townsend's big-eared bat	BS	Yes	Suspected	A mist net survey near Camp Cur in 2004 captured no Townsend's big-eared bats. All snags and CWD would be retained. No caves or mines in area. Proposed activities would not affect persistence of the species in the watershed.
Mollusks				

Table D-3. Butte Falls Resource Area Special Status Species
Camp Cur Proposed Project Assessment, May 5, 2005

Species	Status	Range	Presence in Camp Cur Area	Conclusions
Crater Lake tightcoil	BS	No	Absent	Mollusk surveys were conducted to protocol in proposed Camp Cur timber sale units. No Crater Lake tightcoil were found. No impacts from project. Due to the high levels of survey with negative results, BFRA is considered to be outside the range.
Oregon shoulderband (snail)	BS	Yes	Absent	Protocol mollusk surveys were conducted in the proposed Camp Cur timber sale units. No Oregon shoulderband snails were found. No impacts from project.
Insects				
Johnson's hairstreak (butterfly)	BS	No	Absent	Project is outside known range. Nearest locations are near Conde Creek and near Hyatt Lake and Oregon Gulch in the Jenny Creek (Klamath River) drainage. Identified habitat is mostly old-growth conifer forests with red firs, western hemlocks, or gray pines where parasitic mistletoe, *Arceuthobium camplopodum,* is found. The mistletoe has not been seen in the Camp Cur area, but could be present in low amounts. No records in BFRA. No known impacts.
Mardon skipper butterfly	FC	No	Absent	N/A. Project area is outside the known range.
Siskiyou short-horned grasshopper	BS	Uncertain	Uncertain	No habitat information is available. They may be associated with elderberry. There is no elderberry in the proposed action units. No known effects identified from project. They have never been documented in Medford BLM.
Vernal pool fairy shrimp	FT	No	Absent	N/A. Project is outside the range.

STATUS:
FT (USFWS Threatened) - likely to become endangered species within the foreseeable future.
FC (USFW Candidate) - proposed and being reviewed for listing as threatened or endangered.
BS [Bureau (BLM) Sensitive] - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.
BA [Bureau (BLM) Assessment] - not presently eligible for official federal or state status, but of concern which may at a minimum need protection or mitigation in BLM activities.
NBC (Neotropical Birds of Concern) - on USFWS Birds of Conservation Concern list (February 6, 2005). Not proposed for listing and no special management identified.

Bald eagle ***Haliaeetus leucocephalus*** **FT**

Five nesting pairs of bald eagles have been located within Butte Falls Resource Area (BFRA) boundaries. Three nests (Elk Creek, Big Butte Creek, and Parsnip Creek) are on BLM lands, one is on private lands (South Slough), and one is on lands managed by US Army Corps of Engineers (Lost Creek). One historic nest on private lands near the Rogue River and Lower Table Rock was lost when the tree blew down in the winter of 2002-2003. An alternate replacement nest has not been found, although the eagles were present during the mid-winter eagle count in January 2003 and adult bald eagles were reported in the area in the summer of 2003. Observations will be tracked. Nest searches will continue until the eagles are absent from the area or a new nest is located. Known nests are monitored annually.

In Oregon, the majority of nests (84%) are located within one mile of lakes, reservoirs, large rivers, and coast estuaries. Nest trees are larger, dominant or codominant trees in the stand and are usually components of old growth or older second growth forests. Prey of bald eagles is fish, waterfowl, small mammals (rabbits, etc.), and carrion.

Black-backed woodpecker ***Picoides arcticus*** **BS**

There are no records of presence in BFRA. The nearest known location is near Crater Lake National Park in the Rogue River National Forest (Barrett, personal communication). Black-backed woodpeckers have been documented in Cascade Mountains

in Jackson County and in the Siskiyou Mountains in Josephine County. They could be attracted to newly burned forests. Limited surveys of areas burned in the Timbered Rock Fire and in adjacent Morine Creek in 2003 did not detect black-backed woodpeckers. ONHP records will be checked periodically for any detection recorded on BFRA lands.

In Oregon, the black-backed woodpecker tends to occur in lower elevation forests of lodgepole pine, ponderosa pine, or mixed pine/conifer forests. Lodgepole pine forests are not present in BFRA-administered lands. Dead trees used for foraging have generally been dead three years or less.

Burrowing owl ***Athene cunicularia*** **BS**

There is no breeding population of burrowing owls in the Rogue Valley. A reintroduction attempt in the 1980s at Denman wildlife refuge failed.

At least one burrowing owl has been documented wintering near the Rogue Valley Airport. There is no suitable habitat near the airport on lands administered by BLM and they are not considered to be present on BFRA.

Chase sideband (snail) **Monadenia chaceana** **BS**

Monadenia were found in the higher elevations south of Lost Creek Lake in two locations during mollusk surveys. Another specimen was found in Clark Creek Quarry east of Big Butte Creek.

Crater Lake tightcoil (snail) ***Pristiloma arcticum crateris*** **BS**

New evidence from surveys indicates Medford BLM is outside the range of the Crater Lake tightcoil. Survey and Manage surveys did not locate this mollusk on BFRA lands. The closest location to BFRA is at a high elevation spring in Crater Lake National Park. A review of pre-disturbance surveys in suitable habitat will continue in the short-term (in the next year) to determine if they are present in BFRA. Due to the high number of acres surveyed with negative impacts, they will be recommended for removal from the list of mollusks suspected to be present in Medford BLM lands.

Crater Lake tightcoil have been found from Crater Lake to the Bull Run Watershed in northern Oregon (Burke, et al. 1999). They may be found in perennial wet situations in mature conifer forests; among rushes, mosses, and other surface vegetation; or under rocks and woody debris within 10 meters of open water in wetlands, springs, seeps, and riparian areas. They are generally found in areas which remain under snow for long periods in the winter. Riparian habitats in Eastern Oregon may be limited to the extent of permanent surface moisture, which is often much less than 10 meters from open water. Crater Lake tightcoil are found in moderate to high elevations, roughly 2,000 to 7,000 feet.

Ferruginous hawk ***Buteo regalis*** **BS**

This hawk inhabits the most open country of the state's Buteos. They may be a rare winter visitor in the winter, but have not been observed on BLM lands.

Ferruginous hawks have not been documented on BFRA-administered lands.

Fisher ***Martes pennanti pacifica*** **FC**

Two fisher detections on BFRA lands occurred during the Rogue River National Forest Fisher Study conducted from 1995 to 2001 by the Wildlife Ecology Team, USDA Forest Service Pacific Northwest Research Station (Aubrey and Raley 2002a). These sightings occurred near Red Rock Canyon above Lost Creek Lake, and between North Fork of Big Butte Creek and Cur Creek. Near Cur Creek, an adult female fisher was found using a pileated woodpecker nest for a natal den on BFRA-administered land.

A third detection occurred a few miles east of BFRA on USFS Prospect Ranger District lands in the Bitterlick Creek Drainage, a tributary of Elk Creek. The USFS study was completed in 2002. The final report is not available at this time. Fishers are present in the eastern part of BFRA and could occur across the resource area in limited numbers. Currently, there are no management requirements or recommendations in place for fisher, and surveys are not planned. New regulations will be incorporated into management decisions as it becomes available.

Fisher habitat is mature and old growth forests. They appear to be closely associated with riparian areas in these forests. They seem to prefer 40 to 70% canopy cover. They mainly use large living trees, snags, and fallen logs for denning. In live trees, both female and male fishers used mistletoe brooms as resting platforms (Raley 2002). Little information is available about

the distribution and density of fishers in southwestern Oregon. Preliminary information from the RRNF fisher study indicates that fisher home range for females was approximately 25 square kilometers. Male home range size was approximately 147 square kilometers during the breeding season (Aubrey and Raley 2002).

Flammulated owl ***Otus flammeolus*** **BS**

There are no known flammulated owl nests on BFRA administered lands. Individual responses have been reported by field surveyors during other owl surveys, but no nests have ever been found. There are reports of their presence in Elk Creek from surveys on private timberlands. Surveys have been conducted in BFRA, with negative results.

Habitat is coniferous woodlands and forest edges, especially oak and pine ecosystems. They nest in abandoned woodpecker holes, especially those of flickers (Erlich et al).

Foothill yellow-legged frog **Rana boylii**

Foothill yellow-legged frogs are present in various creeks throughout BFRA. They have been documented in Maple Gulch and Elk Creek. They are often observed by fish survey crews during surveys. No surveys have been done, but incidental sightings are reported. No surveys are planned. Expected impacts will be assessed in preproject planning.

These frogs are closely associated with water. Their habitat is permanent streams with rocky, gravelly bottoms. Their distribution is west of the Cascade crest from sea level to 1,800 feet (Leonard et al 1993).

Fringed myotis (bat) ***Myotis thysanodes*** **BA**

A fringed myotis was captured in a mist net at Fredenberg pond. This is the only confirmed location of this species in BFRA. Since 1993, 11 ponds have been mist netted in BFRA. Some sampling of ponds will continue as time and money allows, but there are no plans for annual surveys. Expected impacts will be assessed in preproject planning.

Fringed myotis is a crevice dweller which may be found in caves, mines, buildings, rock crevices, and large old growth trees. They have been captured in openings and in mid-seral forest habitats. Food consists of beetles, butterflies, and moths.

Johnson's hairstreak ***Mitoura johnsoni*** **BS**

Nearest locations are near Conde Creek, and at Hyatt Lake and Oregon Gulch in the Jenny Creek (Klamath River) drainage. Identified habitat is mostly old-growth conifer forests with red firs, western hemlocks, or gray pines on which a parasitic mistletoe, *Arceuthobium camplopodum*, is found. The mistletoe has not been seen in the Camp Cur area, but could be present in low amounts. No records in BFRA.

Lewis' woodpecker ***Melanerpes lewis*** **BS**

Lewis' woodpeckers are present in some locations in BFRA during the spring and summer but have not been documented nesting on BLM lands. They have been observed during the summer on private, low elevation fields and oak woodlands in Sam's Valley. Lewis' woodpeckers migrate out of the Rogue Valley in winter. Flocks of Lewis' woodpeckers have been observed wintering near Copco and Irongate lakes in northern California, just south of the Oregon border (Hale, personal observation). ONHP records will be checked periodically for detections recorded on BFRA land.

Lewis' woodpeckers breed sparingly in the foothill areas of the Rogue and Umpqua River valleys in Douglas, Jackson, and Josephine counties. Habitat preference is hardwood oak stands with scattered pine near grassland shrub communities. Breeding areas in the Rogue valley are uncertain. In some locales, the woodpeckers breed in riparian areas having large cottonwoods and in oak conifer woodlands. They usually do not excavate nest cavities, but most often use cavities excavated by other woodpecker species. They winter in low elevation oak woodlands.

Lynx ***Lynx canadensis*** **FT**

Medford BLM was excluded from the known range due to the absence of lynx habitat characteristics (elevation and snow depth) and lack of historic sightings. Although lynx have been taken in Oregon, "available evidence suggests that the lynx has never been a part of the resident fauna of Oregon" (Bull, et al. 2001). Lynx are known to disperse exceptionally long distances (as far as 300 km south of the known breeding range) as prey populations decline. Verts and Carraway found that collection dates of most lynxes in Oregon closely follow peaks in populations further north. The conclusion is that "self-maintaining populations of lynxes likely have not existed in historic times in Oregon, but records of their occurrence here

likely are of dispersers from within currently occupied areas farther north that immigrate and persist for a short time" (Verts and Carraway 1998).

Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. In North America the distribution of lynx is nearly coincident with that of snowshoe hares (Ruediger et al 2000). Snowshoe hares are the primary prey of lynx, comprising 35 to 97% of the diet throughout the range of the lynx. Snowshoe hares are not found on BFRA-administered lands.

Mardon skipper butterfly ***Polites mardon*** **FC**

Mardon skipper butterflies are present in the Ashland Resource Area near Hyatt Lake and near Soda Mountain. They have not been found in the BFRA. There are no plans currently to survey for butterflies in the BFRA.

Habitat in Southern Cascades is small, open grassland sites within the Ponderosa pine savanna/woodland, at elevations ranging from 1,900′ to 5,100′. Site conditions range from dry, open ridgetops to areas associated with wetlands or riparian habitats (Potter 1999).

Northern Goshawk ***Accipiter gentiis*** **BS**

Goshawk nest in suitable older forests in the BFRA. Approximately 15 known nest territories have been identified. The majority of the nest sites are in the east part of the BFRA, on the west slopes of the Cascade Mountains. The western-most known nest site is north of Elderberry Flat near White Rock. Known goshawk nest sites are checked for presence and, as time allows, annually for reproductive status. Active nest sites are protected with a 30-acre buffer and a seasonal restriction. Surveys prior to habitat disturbing actions that could affect nesting goshawks, where they are suspected to be present, are planned.

Goshawks are found in a variety of mature forest types, including both deciduous and conifer types. Dense overhead foliage or high canopy cover is typical of goshawk nesting habitat. Perches where they pluck their prey, known as plucking posts, are provided by stumps, rocks, or large horizontal limbs below the canopy.

Northern spotted owl ***Strix occidentalis caurina*** **FT**

Approximately 200 northern spotted owl activity centers, 100 acres of the best habitat around known sites (as of 1/1/94), have been designated and mapped as late-successional reserves (LSR) in the Medford BLM District. Critical habitat has been designated on Medford BLM lands. Critical habitat for spotted owl on BFRA-administered lands is present south of Lost Creek Lake in the A and B road area. Critical habitat is also located near Elk Creek LSR 224 north of Lost Creek Lake and Trail Creek.

In 2002, approximately 70 known (presumed active) northern spotted owl sites were present in the BFRA. Approximately 2/3 of the known nests in the BFRA are monitored annually. Activity centers are maintained around sites known as of 1/1/94. Currently, surveys are completed prior to habitat disturbing actions near a known site or activity center and/or a seasonal restriction established when a project is planned near a known nest site.

Old growth coniferous forest is preferred nesting, roosting, and foraging habitat. Spotted owls also use areas with some old growth characteristics; multi-layered, closed canopies with large diameter trees with abundant dead and down woody material. Northern spotted owls commonly nest in cavities 50 feet or more above the ground in large decadent old growth trees. Other nest sites include large mistletoe clumps, abandoned raptor nests, and platforms formed by whorls of large branches Prey is primarily small arboreal mammals, such as flying squirrels, woodrats, voles, and occasionally small birds.

Northwestern pond turtle ***Clemmys marmorata marmorata*** **BS**

Northwestern pond turtles are present in the BFRA in Elk, Big Butte, East and West Evans, and main stem Evans creeks. They have not been found during surveys of the small pump chances on BFRA-administered lands. Most of these ponds are small and may not be large enough to provide the needed structures (aquatic vegetation and basking spots). The pump chances are small pools constructed for fire suppression use in headwater streams and springs. Two larger ponds on Boise Corporation lands, which are surrounded by BFRA-administered lands, have northwestern pond turtles. Pump chances are usually checked at least once very one to five years for presence of sensitive frogs and turtles.

Northwestern pond turtles live in most types of freshwater environments with abundant aquatic vegetation, basking spots, and terrestrial surroundings for nesting and over-wintering. Some northwestern pond turtles leave water in late October to mid-

November to over-winter on land. They may travel up to 1/4 mile from water, bury themselves in duff and remain dormant throughout winter. Turtles have been found to generally stay in one place in areas with heavy snow pack, but may move up to 5 or 6 times in a winter in areas with little or no snow. General habitat characteristics of over wintering areas appear to be broad. There may be specific microhabitat requirements, which are poorly understood at this time.

Northwestern pond turtles are the only native turtle endemic to southern Oregon. They appear to be declining in number in the northernmost part of the range. They are more common in large river basins in southern Oregon. Major threat to native turtles is predation on young turtles by exotic bullfrogs and fish.

Olive-sided flycatcher ***Contopus cooperi*** **NBC**

Olive-sided flycatchers are found throughout the BFRA. They are fairly common in coniferous woodlands, burns, and clearings. They are associated with forest openings and forest edge and are more abundant in landscapes containing highly fragmented late-seral forests with high-contrast edges and less frequently in less fragmented landscapes. They hunt insects from a high branch of a conifer.

Oregon shoulderband (snail) ***Helminthoglypta hertleini*** **BS**

In the BFRA, Oregon shoulderbands were commonly encountered during surveys in oak woodlands, open dry conifer forests with grass and forbs, and in open grassland in rocky areas along streams. In the Glendale Resource Area, it has also been found at the edges of roads in roadside ditches where rocks have raveled off cut-banks. Oregon shoulderband was removed from S&M requirements in 2002 because it is not an old-growth obligate. Currently, no predisturbance surveys are planned prior to habitat disturbing actions. Expected impacts will be assessed in preproject planning.

This species is found in rocky areas including talus deposits, but not necessarily restricted to these areas. It is suspected to be found within its range wherever permanent ground cover and/or moisture is available. This may include rock fissures or large woody debris sites. They are adapted to somewhat xeric conditions during a part of the year.

Oregon spotted frog ***Rana pretiosa*** **FC**

Oregon spotted frogs are not present in the BFRA. The closest known location for Oregon spotted frog is the Wood River in Klamath County. A breeding population of spotted frogs was found in the Cascade-Siskiyou National Monument (Parker, personal communication). Historical records of spotted frogs in Jackson County have been subsequently determined not to be spotted frogs (Arnold, personal communication).

Oregon vesper sparrow ***Pooecetes gramineus affinis*** **BS**

There are no records of presence in lands administered by the BFRA. They are most likely to be present on private lands in the low elevations of the Rogue Valley. They are considered sensitive in Oregon BLM for the Willamette Valley and Klamath Mountain Provinces. They are not known to be present on lands administered by the BFRA. ONHP records will be checked periodically for any detection recorded on BFRA lands.

Abundance of the Oregon vesper sparrow is greatest in dry, grassy foothills of the Rogue valley, where it is an uncommon to locally common breeding species (Marshall 2003). There may be a breeding population near Howard Prairie. Occasional birds are reported to winter in the Rogue Valley. In the Rogue River basin, vesper sparrow were reported in open habitats of the mixed-conifer forest zone in the breeding season and throughout the valley during migration. No other data from southwestern Oregon are available.

Diet of the vesper sparrow consists of a mix of invertebrates and seeds, although it is primarily insectivorous during breeding season. During the winter months, it feeds mostly on arthropods and seeds. They nest on the ground, often with a nest placed against a clump of vegetation, crop residue, clod of dirt, or at the base of shrub or small tree. In eastern Oregon, they nest in dry, open woodlands and openings in forested habitat, such as clear-cuts.

Pallid bat ***Antrozous pallidus*** **BA**

Pallid bats were captured at 2 of 11 ponds mist-netted in the BFRA between 1993 and 2003. They were found in ponds near Rancheria Road and Doubleday Road in the eastern part of the resource area near Rogue River National Forest lands. They do not appear to be common in BFRA. Some sampling of ponds will continue as time and money allows, but there are no plans for annual surveys.

West of the Cascade Range, pallid bats are restricted to the drier interior valleys of the southern portion of the state. This bat is a crevice dweller. Rock crevices and human structures are used as day roosting sites. Recent radio telemetry studies indicate that these bats also use interstitial spaces in the bark of large conifer trees as a roost site. One colony of pallid bats was observed roosting in a hollow tree. The species feeds mostly on beetles and moths, mostly by gleaning them from the ground.

Peregrine falcon ***Falco peregrinus*** **BS**

Three peregrine falcon nesting territories are known to be present within BFRA boundaries. Only one nesting cliff is on BFRA-administered lands. The other two are on private timber company lands; (Superior-Swanson Group and Boise Corporation). These nests are monitored annually. Peregrine falcons are reported near the Medford sewage treatment plant and near Table Rocks in the winter months. Other sightings are occasionally reported during the winter months, but these are thought to be migrating/wintering individuals. Other sightings and possible nesting locations have been reported, but no nests have been located on follow-up. Peregrine falcon nest sites are present on USFS lands in at least four known sites to the north of the BFRA boundary. Nests will be protected according to current management guidance. Suitable cliffs near any proposed disturbance action will be checked for peregrine falcon presence.

Primary nest habitat is tall cliffs. Forest lands provide habitat for prey species for peregrine falcons. Prey is mostly birds, especially doves and pigeons. Peregrines also prey on shorebirds, waterfowl, and passerine birds.

Purple martin ***Progne subis*** **BS**

Purple martins are not present in lands administered by the BFRA. Historically, a colony was present in the Hyatt Lake and Howard Prairie region of the Medford District BLM, but they are considered to be extirpated from these areas and are not considered to be present in Medford BLM-administered lands. No surveys are planned.

Rufous hummingbird ***Selasphorus rufus*** **NBC**

Rufous hummingbirds are the most common and widespread of Oregon hummingbirds. They are found in a wide variety of habitats, although it shows a breeding preference for wooded areas with fairly high canopy and well developed understory. They feed on flowering currant, salmonberry, and pacific madrone. Preference is shown for tubular flowers, including paintbrush, columbine, and penstemons. They may also glean insects from willow catkins and beneath leaves early in the spring.

Siskiyou Mountains salamander ***Plethodon stormi*** **BA**

Lands administered by the BFRA are outside the range of the Siskiyou Mountains salamander. They occur in Oregon in the Applegate River drainage.

Siskiyou short-horned grasshopper ***Chloealtis aspasma*** **BS**

These grasshoppers are associated with elderberry. They lay their eggs in elderberry. Little is known about habitat needs.

At least one specimen was found on the Rogue River National Forest. No other information is available.

Streaked horned lark ***Eremophila alpestris strigata*** **BS**

The streaked horned lard is a sub-species of the horned larks. They are not present in the Rogue Valley.

Three-toed woodpecker ***Picoides tridactylus*** **BS**

There are no records of three-toed woodpeckers on BFRA-administered land. The BFRA is outside the range and does not have spruce or lodgepole pine forests. Limited surveys of burned areas in the Timbered Rock Fire and in adjacent Morine Creek in 2003 were negative for three-toed woodpeckers. ONHP records will be checked periodically for any detection recorded on BFRA lands.

The range of the species overlaps the range of spruce trees (Marshall 2003). In eastern Oregon, three-toed woodpeckers nest and forage in lodgepole pine forests. Bark beetle larvae are primary food source.
Their range is along the crest of the Cascade Range and eastward. They are generally found in higher elevation forests, above 4,000 feet. In Oregon, they are rare and local. There have been two reports from southwest Oregon, one near Roxy Anne Peak and one near Mt. Ashland.

Townsend's big-eared bat ***Corynorhinus (=Plecotus) townsendii*** **BS**

Two maternity colonies are known on BFRA-administered lands. One is located in a natural cave near Poverty Flat and another is located in an adit at Cinnabar Mines north of Meadows Road. Townsend's big-eared bats have been found roosting and hibernating in adits and caves throughout BFRA. These bats are also known to use cavities in trees and attics of buildings. One big-eared bat was captured in a mist net in the Salt Creek area on the east side of the BFRA. Current management is establishment of a 250-foot buffer around sites known to contain bats. Mine adits, shafts, and caves where human disturbance is determined to be impacting the bats or which are unsafe will be identified and closed using current guidelines and procedures, as funding allows. Mines will be assumed to contain bats if they cannot be inventoried due to safety concerns.

Townsend's big-eared bats have low tolerance to changes in temperature and humidity and removal of trees around sites where they are present may change airflow patterns to make the area less desirable as a hibernaculum, maternity, or roosting site. Food consists primarily of moths, and other arthropods.

Tri-colored blackbird ***Agelaius tricolor*** **BA**

The breeding population of tri-colored blackbird is BS in the Klamath Mountain Province.

Although tri-colored blackbirds are present near the Rogue River and along the marshes on Denman Wildlife Refuge as well as in Sam's Valley, they are not known to be nesting on lands administered by the BFRA. There is no suitable marsh habitat on BFRA-administered lands in the low elevations along the Rogue River. While most tri-colored blackbirds retreat south to California in winter, some remain in Oregon, mainly in the Rogue Valley (Marshall 2003). ONHP records will be checked periodically for any detection recorded on BFRA lands.

Tri-colored blackbirds are found in the lowland interior valleys of southern Oregon, near freshwater marshes and crop lands. Oregon breeding colonies occur in hardstem bulrush, cattail, nettles, willows, and Himalayan blackberry.

Vernal pool fairy shrimp ***Branchinecta lynchi*** **FT**

Vernal pool fairy shrimp have been found in two places on lands administered by the BFRA: a vernal pool on Upper Table Rock and one on Lower Table Rock. Critical habitat, designated in 2003, is primarily on private and Jackson County lands in the Agate Desert just north of Medford near White City and Eagle Point. The BFRA administers 344 acres of Critical Habitat on the flat terrain on the top of both Table Rocks. In the short-term, recreation use will be monitored to determine if there are negative impacts to the vernal pools. A management plan for the Table Rock ACEC will be written. The timeframe for the management plan has not been determined.

Habitat for vernal pool fairy shrimp is vernal pools, small shallow pools that fill with water during the wet winter and early spring months and are dry during the remainder of the year. These pools are present in various locations where flat topography and soil types allow the development of the pools during the wet season. Most vernal pools occur on private or state/county owned lands in the Agate Desert. Some vernal pools may develop in a few isolated areas in the BFRA near Poverty Flat. A sampling of the vernal pools at Poverty Flat and near the settlement of Lincoln in the Ashland Resource Area was negative for vernal pool fairy shrimp.

White-headed woodpecker ***Picoides albolarvatus*** **BS**

White-headed woodpeckers may be rare migrants through the BFRA. A single bird was reported in the eastern part of the BFRA near the Rogue River National Forest boundary. This was likely a wandering or vagrant bird as preferred habitat is not present in the BFRA. The bird was not seen in subsequent visits to the area. They have not been documented nesting or present during in the breeding season in the BFRA. ONHP records will be checked periodically for any detection recorded on BFRA lands.

White-headed woodpeckers occur in open ponderosa pine and mixed conifer forests dominated by ponderosa pine. They are present on the east side of the Cascades, but suitable habitat is restricted. A small population of white-headed woodpeckers is present in true firs in the Siskiyou Mountains southwest of Ashland (Marshall 2003). They forage mainly on trunks of living conifers for insects. Nest cavities are within 15 feet of ground in dead trees which have heart rot. Standing and leaning snags and stumps are used.

White-tailed kite ***Elanus caeruleus*** **BA**

White-tailed kites are present in the farmlands and uncultivated open woodlands in the low elevation lands in the Rogue Valley. They are frequently seen during the mid-winter eagle counts along Kirtland Road. They may nest in the Rogue Valley, although no known nest sites have been identified. They have not been sighted on BFRA-administered lands.

They are not known to be present on BFRA-administered lands, but could hunt in the small isolated patches of BLM ground in the low elevations.

Appendix E – Fire and Fuels

Affected Environment

Fire History

Wildland fires within the Camp Cur project area were first recorded in the 1960s. A total of 24 fires have been recorded in the project area since 1960 (see Table E-1). Of these, 3 were less than ¼ acre, 3 were greater than 10 acres, and 1 burned to 55 acres.

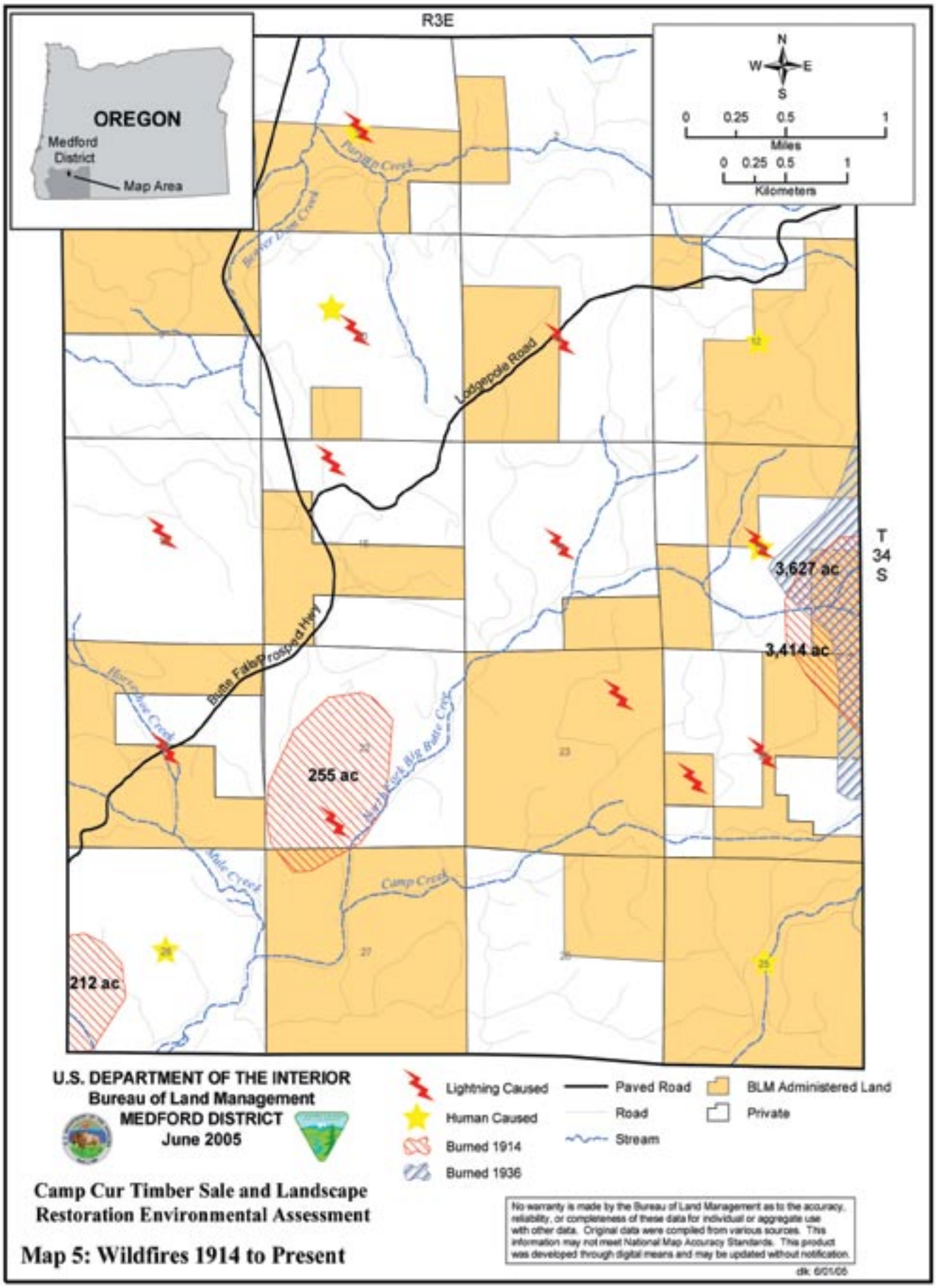
Table E-1. Natural and Human-caused Fires in the Camp Cur Project Area

	Natural		Human-caused		Total Fires	
Decade	Number	Acres	Number	Acres	Number	Acres
1960	2	.2	0	0	2	.2
1970	8	1.5	4	.04	12	1.54
1980	3	55.2	1	.1	4	55.3
1990	4	.9	0	0	4	.9
2000	1	.1	1	.1	2	.2
Total	**18**	**57.9**	**6**	**.24**	**24**	**58.14**

Three large fires burned within the project area prior to 1960. In 1914, two fires began outside the project area and burned into it. One fire began within the project area and burned approximately 255 acres. Another larger fire burned into the area in 1936 (see Map 5).

Fire Risk

Fire risk is the probability of an ignition, whether the source is human or lightning within a given area. Historically, lightning played a much larger role in the project area as an ignition source than humans. Information from the Oregon Department of Forestry wildfire data base shows a total of 25 fires occurred from 1967 to 2003 within the project area. Lightning accounted for 18 (75 percent) of the total fires; 6 (25 percent) were human-caused. Of the 6 human-caused fires, 4 were started on BLM-administered land within 100 feet of the road system (see Table E-1).


R3E
OREGON
Medford District
Map Area
N
W
E
S
0 0.25 0.5 1
Miles
0 0.25 0.5 1
Kilometers
Lodgepole Road
Butte Falls-Prospect Hwy
T 34 S
3,627 ac
3,414 ac
255 ac
212 ac
Camp Creek
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
June 2005
Lightning Caused
Human Caused
Burned 1914
Burned 1936
Paved Road
Road
Stream
BLM Administered Land
Private
Camp Cur Timber Sale and Landscape Restoration Environmental Assessment
Map 5: Wildfires 1914 to Present
No warranty is made by the Bureau of Land Management 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.
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Fire Regimes

Historical conditions or processes are most often characterized in terms of the regimes, which are defined by fire frequency (fire return intervals), severity, seasonality, duration, and extent of fire occurring in an area (Agee 1990; Agee 1993). Fire regime is a generalized description of fire's role within an ecosystem. Five natural (historic) fire regime groups were developed based on the average number of years between fires (fire frequency) combine with the severity of the fire on the dominant, overstory vegetation (Hardy, et al. 2001; Schmitdt, et al. 2002). Fire severity is the degree in which vegetation and site conditions have been altered by fire. Table E-2 summarizes the five natural (historic) fire regime groups. These fire regimes represent historic fire regimes prior to the era of fire suppression.

Table E-2. Fire Regime Groups

Fire Regime Group	Fire Frequency	Fire Severity
I	0-35 years	• Low to Mixed Severity • Surface Fires • <75 % dominant, overstory vegetation replaced
II	0-35 years	• High Severity • Stand Replacement Fires • >75% dominant overstory vegetation replaced
III	35-100+ years	• Mixed Severity • Surface to Stand Replacement Fires • <75% dominant, overstory vegetation replaced
IV	35-100+ years	• High Severity • Stand Replacement • >75% dominant overstory vegetation replaced
V	200+ years	• High Severity • Stand Replacement • >75% dominant overstory vegetation replaced

Fire Regime IV, and in some cases V, best represents the natural (historic) fire regime of the Douglas-fir series found throughout the project area. Where fires are less frequent (up to 200 years or more apart) due to differences in moisture, terrain, lightning, or other practices, more of a variety of tree species could be present, producing mixed-conifer forests that experienced a high severity fire regime. Often, these forests have not yet missed a full fire return interval and the historic stand structure of generally high fuel loadings and a fire regime characterized by weather-dominated, lethal fuels has not changed significantly (Agee 1996a; Agee 1998a). Historically, fires in the Douglas-fir series varied from light surface fires to partial stand-replacement fires to heavily damage overstory and, in some instances, patches of stand-replacement. Thinning for restoration does not appear to be appropriate in higher elevation, cold, moist forests (Agee and Huff 1986).

Environmental Consequences

Effects of Alternative 1 (No Action) on Fuels

No new management is proposed under Alternative 1. The effects described would reflect current condition and trends shaped by events unrelated to forest management and possible natural disturbance events. The No Action Alternative would continue the current trend of a mixed severity fire throughout the project area. Fire suppression activities would continue to contain and control all fires as small and as rapidly as possible.

Direct and Indirect Effects

In many cases, historic fire-return intervals for this type of forests are longer than the period of time in which the current fire exclusion practices have been in effect. Fire exclusion due to wildfire-suppression activities has not yet measurably altered the structure and composition of the forests since they have not missed a sizable fire cycle like the dry forests have (Smith and Fisher 1997). It can be assumed, though, that historic fire suppression practices have resulted in some loss of mosaic patterning and diversity of age classes, which has allowed larger, more continuous areas which can carry a stand replacement fire.

Cumulative Effects

Stands in the early to mid-seral stages would continue to experience high intensities fires throughout the majority of the fire season. Past forest management practices on private and BLM-administered lands have shifted the mostly continuous late-successional forest to a patchy mosaic of young stands. Private lands in the project area are dominated by early to mid-seral stands less than 40 years old. The BLM-administered lands exhibit a range of seral age classes. In the No Action Alternative, untreated young stands would continue to burn with increased fire intensities and severities and potentially increase fire intensities in neighboring managed and unmanaged stands. This trend would continue until they develop the characteristics of healthy mature and old growth stands.

Effects Common to All Alternatives on Fuels

Direct and Indirect Effects

Slash generated from harvest activities would increase fire behavior intensities with increasing rates of spread and flame lengths. The reduction of the canopy would decrease the potential for crown fires to burn through the treatment area. However, in a wildfire event, the remaining vegetation and down woody debris would burn as though the stand was in early seral stage with increasing probability of active crown fire initiation in adjacent managed and unmanaged stands. The large overstory trees retained would suffer damage to the boles of the trees. The fire regime would remain the same throughout the project area.

Treatments designed to reduce canopy fuels through density management and selection harvest, increase and decrease fire activity simultaneously. Slash generated from the thinning of timber stands, if not treated, would created surface fuels loading greater than current levels. This increase in surface fuels would increase fire behavior intensities, with higher flame lengths and greater rates of spread in the event of a wildfire. Despite the temporary increase in ground fuels, recent research indicated a reduction in crown fuels out weighs any increase in surface fire hazard (Omi and Martinson 2002).

Fuels assessment would be conducted within each unit following harvest activity. This assessment would determine the fuels hazard and fire risk based on aspect, slope, surface fuels loading (tons per acre), access, and location of each unit. Treatment recommendations would be based on post harvest fuels assessment of the amount of slash created during harvest activities. To determine tons per acre, the Photo Series for Quantifying Forest Residues in the Douglas-fir-stand types will be used (Maxwell and Ward 1976). Post-harvest slash treatments could consist of lop and scatter; and excavator piling or hand piling, and burning of the piles created. During the post harvest assessments, if the tons per acre are low (less than 30 tons), the possible recommended treatment could be to lop and scatter. If the tons per acre are moderate to high (greater that 31 tons) the recommended treatment could be to pile the unit (see Figures E-1, E-2,and E-3 for example of tons per acre). Piling would consist of either excavator (machine), or by hand. The piling method used would be based on the number of trees per acre left, and slope percentage in the unit. If the slopes in the unit are greater than 35%, the recommended treatment would be hand pile. If the slopes in the unit are less than 35%, the recommended treatment would be to excavator pile (machine pile) the unit.

Harvest treatments that target canopy bulk density (the foliage mass contained per unit crown volume), canopy base height, and canopy closure have the potential to reduce the development of all types of crown fires (Cruz, et al. 2002; Rothermel 1991; Scott and Reinhardt 2001). Canopy base heights would increase in regeneration harvest units. The slash generated from harvest activities would increase fire behavior intensities with increasing rates of spread and flame lengths. Slash treatments would reduce the fuel loadings created. However, in a wildfire event, the remaining vegetation and down woody debris would burn as though the stand was in early seral stage with increasing probability of active crown fire initiating in adjacent managed and unmanaged stands. The large overstory trees retained would suffer damage to boles of the trees.

Treatments designed to reduce canopy fuels through density management and selection harvest, increase and decrease fire activity simultaneously. Slash generated from the thinning of timber stands, if not treated, would create surface fuel loading greater than current levels. Therefore, these stands are assessed post treatment, and the decision is made based on tons per acre which treatment would best be used to treat these units. This increase in surface fuels would increase fire behavior intensities, with higher flame lengths and greater rates of spread in the event of a wildfire. Despite the temporary increase in ground fuels, recent research indicates a reduction in crown fuels out weighs any increase in surface fire hazard (Omi and Martinson 2002). Reducing the canopy by 40 to 60 percent would decrease the canopy bulk density in density management and selection harvest units. Additional thinning of brush and conifers less that 7″ DBH would raise the canopy base height so transition from a surface fire to a crown fire would only occur in very extreme condition. Understory thinning in combination with a reduction to 40 to 60 percent canopies in late seral stands would provide the greatest benefit to reduced crown fire activity.

Cumulative Effects

Fire suppression efforts would continue, and stands would continue to have increased patches of continuous fuels to carry larger areas of stand replacement fires. These stands have not missed a sizable fire cycle like the dry forests have (Smith and Fisher 1997).

A wildfire occurrence would result in less severe effects due to the reduction in fuels amounts from proposed treatments. Silvicultural treatments can also modify vegetation dynamics in the short and long terms. Opening forest canopies increases light on the forest floor with the potential for increased grass and shrub fuel structure and, in some cases, successional pathways for vegetation (Peterson 2005). The removal of ladder fuels reduces the amount of vertical continuity and lowers the propagation and spread of crown fire activity. Wildfires would burn with less intensity, duration, and severity. Reduction in fire intensities would be localized within or immediately adjacent to the treated areas. Crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels (Omi and Martinson 2002). Small changes in the fire environment can transition a surface fire to activate crown fire abruptly with no period of passive crowing to act as a warning. Once a crown fire is initiated, it maybe possible for a crowning fire to spread through adjacent stands that have been treated and could not initiate crown fire on their own (Scott and Reinhardt 2001).

Figure E-1. Lop and Scatter

DATA SHEET Residue descriptive code 2-DF-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	1.9	124
1.1-3.0	3.6	289
3.1-9.0	6.3	483
9.1-20.0	8.1	547
20.1+	0	0
Total	19.9	1,443

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.5
Ground area covered by residue 1/4-inch diameter and larger		(percent)	76
Average duff and litter depth		(inches)	1.4
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent)	54
	western hemlock	(percent)	21
	other	(percent)	21
Rotted residue 3.1-inch diameter and larger		(percent)	4

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	26
Net volume cruised (M fbm/acre)	21
Average stems/acre cut	52
Average d.b.h. of stems cut (inches)	22
Stand age (years)	170+
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<6

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING
U.S. Forest Service Region 6 fuel type identification: HN
REMARKS

Figure E-2. Thin, Pile and Burn

DATA SHEET Residue descriptive code 7-DF-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.6	240
1.1-3.0	9.5	759
3.1-9.0	14.6	1,128
9.1-20.0	2.5	192
20.1+	31.6	2,463
Total	61.8	4,782

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.7
Ground area covered by residue 1/4-inch diameter and larger		(percent)	96
Average duff and litter depth		(inches)	5.2
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent)	56
	western redcedar	(percent)	35
	other	(percent)	3
Rotted residue 3.1-inch diameter and larger		(percent)	6

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	44
Net volume cruised (M fbm/acre)	28
Average stems/acre cut	15
Average d.b.h. of stems cut (inches)	38
Stand age (years)	250
Cutting prescription	Overstory removal
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	8

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HE
REMARKS	

Figure E-3. Pile and Burn

DATA SHEET Residue descriptive code 6-DFHD-4-CC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	5.6	371
1.1-3.0	10.4	833
3.1-9.0	51.6	2,847
9.1-20.0	13.8	793
20.1+	0	0
Total	81.4	4,844

OTHER MEASUREMENTS		
Average residue depth		(feet) 2.1
Ground area covered by residue 1/4-inch diameter and larger		(percent) 97
Average duff and litter depth		(inches) 0
Sound residue 3.1-inch diameter and larger	tanoak	(percent) 75
	Douglas-fir	(percent) 12
	other	(percent) 11
Rotted residue 3.1-inch diameter and larger		(percent) 2

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	41.5
Net volume cruised (M fbm/acre)	38.2
Average stems/acre cut	34
Average d.b.h. of stems cut (inches)	34
Stand age (years)	200
Cutting prescription	Clearcut
Yarding method	Slackline
Slash treatment	None
Period since cut or treatment (months)	12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING

U.S. Forest Service Region 6 fuel type identification: EE

REMARKS

Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where:

1 = <5 ft in height
2 = 5-15 ft in height
3 = >15 ft in height
and
A = 0-33% understory crown space occupied
B = 34-66% " " " "
C = 67-100% " " " "

was rated by District Foresters as 3C.

Appendix F
Camp Stew Stewardship Project

Stewardship Unit 2-A

T34S, R3E, Sec 2, OI 002

History:

- Area was clearcut tractor logged in 1958.
- Post-harvest slash was machine piled and burned.
- Planted with Douglas-fir and ponderosa pine seedlings in 1959.
- Residual conifers scattered throughout unit.
- Ponderosa pine was precommercially thinned in 1990.
- Large number of natural seedlings (Douglas-fir, white fir, incense cedar) regenerated.

Existing Stand:

- 100 to 170 ponderosa pine per acre; 6-16″ DBH.
- Average of 450 understory conifers per acre, primarily Douglas fir, with white fir and incense cedar.
- Understory size classes range from seedling to 10 -15 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Scattered pockets of residual mature conifers throughout stand.

Recommended Treatment

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent desirable Douglas-fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material as special forest products, e.g., poles, posts, Christmas trees, bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Reconstruct existing minimal standard road. This road would also service the Camp Cur Timber Sale. Road would be reconstructed before first use and decommissioned after last use.
- Following use, subsoil rip road grade and seed with native grass.
- Block road to prevent vehicle access.

Stewardship Unit 9-A

T34S, R3E, Sec 9, OI 002, 004, and 005

History:

OI 002

- Area was first tractor logged in 1940, salvage logged in 1953, and clearcut in 1960.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Residual conifers remained scattered throughout the unit.
- Pine stand was underplanted with Douglas-fir in 1981 and 1983.
- Pine precommercially thinned in 1983.
- Large number of natural seedlings (Douglas-fir, white fir, incense cedar) regenerated.

OI 004

- Small area below BLM road #34-3E-9.3 was selective cut in 1940 and 1960.

OI 005

- Natural residual stand was selective cut in 1940 and 1960.

Existing Stand:

- 100 to 170 ponderosa pine per acre; 6-18″ DBH.
- 600 to 900 understory conifers per acre, primarily Douglas fir, with white fir and incense cedar.
- Understory size classes range from seedling to 20 feet.
- Extensive old skid road network resulting in widespread compaction.
- Scattered large old growth Douglas-fir and sugar pine.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent desirable Douglas-fir or cedar sapling.
- Leave more pine per acre in VRM Class II seen zone near Butte Falls/Prospect Highway.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing. Leave more understory.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material as special forest products, e.g., poles, posts, Christmas trees, bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.
- In order to release scattered old growth Douglas-fir and sugar pine, remove all trees and shrubs from the bole of the tree to the dripline.

Road Use:

- Construct approximately 2,200 feet of minimal standard road.
- Following use, scarify road grade and seed with native grass.
- Block road to prevent vehicle access.

Other work to be completed in and adjacent to cutting unit:

- Protect and develop spring in southeast corner of unit for water source.

Figure F-1. Unit 9-A from Butte Falls/Prospect Highway

Stewardship Unit 9-B

T34S, R3E, Sec 9, Ol 302, 402, and 502

History:

- Area was first tractor logged in 1940, salvage logged in 1953, and clearcut in 1958.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1960.
- Residual conifers remained scattered throughout unit.
- Pine stand underplanted with Douglas-fir 1984, 1985, 1987, and 1988.
- Pine precommercially thinned in 1984.
- Large number of natural seedlings (Douglas-fir, white fir, incense cedar) regenerated.

Existing Stand:

- 100 to 170 ponderosa pine per acre; 6-18″ DBH.
- Average of 450understory conifers per acre, primarily Douglas fir with white fir and incense cedar.
- Understory size classes range from seedling to 20 feet.
- Extensive old skid road network resulting in widespread compaction.
- Scattered pockets of residual mature and old growth conifers throughout stand.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent desirable Douglas-fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material as special forest products, e.g., poles, posts, Christmas trees, bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.
- In order to release scattered old growth Douglas-fir and sugar pine, remove all trees and shrubs from the bole of the tree to the dripline.
- Harvest merchantable plantation pine growing on shoulders of BLM road #34-3E-9.2.

Road Use:

- Construct approximately 1,000 feet of new minimal standard road.
- Following use, scarify road grade and seed with native grass.
- Block road to prevent vehicle access.
- Decommission BLM road #34-3E-9.2 following use. Remove all 18″ culverts (3) and replace with rolling waterdips; construct additional waterdips; scarify and seed entire road length to Vine Maple Creek block (1.64 miles). Reblock at road beginning.

Stewardship Unit 9-C

T34S, R3E, Sec 9, OI 008

History:

- Area was first tractor logged in 1940 and clear-cut in 1958.
- Post harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1960.
- Residual conifers remained scattered throughout unit.
- Pine stand underplanted with Douglas-fir in 1984, 1985, 1987, and 1988.
- Pine precommercially thinned in 1992.
- Large number of natural seedlings (Douglas-fir, white fir, incense cedar) regenerated.

Existing Stand:

- 170 to 220 ponderosa pine per acre; 6-18″ DBH.
- Average of 450 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 20 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Scattered pockets of residual mature and old growth conifers throughout stand.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent, desirable Douglas-fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.
- In order to release scattered old growth Douglas-fir and sugar pine, remove all trees and shrubs from the bole of the tree to the dripline.

Road Use:

- Use existing road.

Other work to be completed in and adjacent to cutting unit:

- Fence spring source for the perennial stream that traverses BLM road #34-3E-9.3.

Figure F-2. Spring source in Section 9 to be fenced.

Stewardship Unit 15-A

T34S, R3E, Sec 15, OI 005

History:

- Area was select tractor logged in 1940 and clear-cut in 1958.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in1960.
- Pockets and individual residual conifers remained scattered through and on edge of unit.
- Douglas-fir seedlings planted in 1978.
- No record of precommercial thinning.

Existing Stand:

- 300 to 400 ponderosa pine per acre; 4-18″ DBH.
- 300 to 600 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 20 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature conifers scattered throughout and on edge of unit.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent, desirable Douglas-fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Use existing BLM road #34-3E-15.1 and existing landings off road.
- No improvements to this road.

Stewardship Unit 15-B
T34S, R3E, Sec 15, OI 003

History:

- Area was selection harvest tractor logged in 1940 and clear-cut in 1958.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1960.
- Pockets of residual conifers remained scattered through and on edge of unit.
- Douglas-fir and ponderosa pine seedlings planted in 1981.
- Precommercial thinned in 2001.

Existing Stand:

- 100 ponderosa pine per acre; 4-18″ DBH.
- Very light understory component of planted and natural conifers, primarily Douglas-fir with white fir and incense cedar.
- Extensive old skid road network resulting in widespread compaction.
- Wet area developed by undefined watercourse from private spring development; degraded from harvest activity and grazing.

Recommended Treatment:

- Thin this poorly developed pine stand to 50-70 trees per acre; approximately 25′ x 25′ spacing.
- Favor other (natural or planted) conifers when possible for development of species diversity.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.

Road Use:

- Use existing BLM road #34-3E-15.1.
- No improvements to this road.

Other work to be completed in and adjacent to cutting unit:

- Fence wet area to protect watercourse from trampling damage.
- Develop water trough to accommodate grazing permittees. Work with local rancher to assess cattle needs in the area.
- Assure protection of stream course that supplies spring water to irrigation ditch.
- Locate and protect underground domestic water pipe if on BLM.

Stewardship Unit 15-C

T34S, R3E, Sec 15, OI 005

History:

- Area was tractor logged in 1940 and clear-cut in 1958.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1960.
- Pockets and individual residual conifers remained scattered through and on edge of unit.
- Douglas-fir and ponderosa pine seedlings planted in 1981.
- Precommercial thinned in 2001.

Existing Stand:

- 250 ponderosa pine and other conifers per acre; 6-16″ DBH.
- Very light understory component of planted and natural conifers, primarily Douglas-fir with white fir and incense cedar.
- Extensive old skid road network resulting in widespread compaction.
- Area between OI 003 and north of BLM road #34-3E-15.1 to eastern property line is young dense stand of planted pine and natural mixed conifer, unlike either OI 003 or OI 005.
- Area is designated as VRM Class II.

Recommended Treatment:

- Thin this largely natural stand to an average of 100 trees per acre; variable spacing of 15′ x 15′ to 25′ x 25′.
- Favor species in this order: Douglas-fir, incense cedar, ponderosa pine.
- Harvest conifers with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be removed from VRM seen area.
- Harvesting equipment should not operate within 50 feet of highway.
- In addition to variable spacing of conifer thinning, leave small clumps of unthinned conifers.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Reserve all hardwoods and roadside brush species.

Road Use:

- Use existing BLM road #34-3E-15.1.
- No improvements to this road.

Other work to be completed in and adjacent to cutting unit:

- Protect corral and irrigation ditch.

Stewardship Unit 15-D

T34S, R3E, Sec 15, OI 007

History:

- Area was selection harvest tractor logged in 1940, 1960, 1975, and 1987.

Existing Stand:

- A natural mixed-conifer stand residual from past logging entries.
- Highly variable stand includes large old growth Douglas-fir and ponderosa pine interspersed with young mixed conifers.
- Open meadow type in between old railroad grade and road along eastern OI boundary.
- Area designated as VRM Class II.

Recommended Treatment:

- Harvest conifers with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be removed from VRM seen zone.
- Thin this largely natural stand to a variable spacing of 15′ x 15′ to 25′ x 25′.
- Favor species in this order: Douglas-fir, incense cedar, ponderosa pine.
- Harvesting equipment should not operate within 50 feet of highway.
- In addition to variable spacing of conifer thinning, leave small clumps of unthinned conifers.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Reserve all hardwoods and roadside brush species.

Road Use:

- Use existing railroad grade beds.
- All slash in unit would be removed or chipped upon completion of operations.
- Following use, road grade culverts would be removed, a natural slope would be established in drainage-way, and roadbed would be ripped and native grass seeded.
- Block road to prevent vehicle access.

Figure F-3. Entering unit northbound on Butte Falls/Prospect Highway.

Figure F-4. Back of unit through meadow

Stewardship Unit 21-A

T34S, R3E, Sec 21, OI 005

History:

- Area was first tractor logged in 1950, relogged 1955, and clear-cut in 1960.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Pockets and individual residual conifers remained scattered throughout and on edge of unit.
- Precommercially thinned in 1976.
- Fertilized in 1978.
- Planted Douglas-fir in 1979, 1980, and 1981.
- Ripped and scarified in 1984.
- Interplant with Douglas-fir and mulched in 1984.
- Precommercially thinned in 1990.

Existing Stand:

- 250 ponderosa pine per acre; 4-18″ DBH.
- 600 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 20 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature conifers scattered throughout and on edge of unit.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10-20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent, desirable fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Construct 580 feet of minimal standard roads; 2 roads (395′ and 185′).
- Following use, scarify road grades and native grass seed.
- Block roads to prevent vehicle access.

Other work to be done in and adjacent to cutting unit:

- Collect water coming from springs along BLM road #34-3E-21.1 and 21.3 ditches. Specific design from contractor proposals. Remove water from ditch in order to maintain ditch in dry condition. Pipe water across roadway to free-flow across ground. Fence wet areas. Pipe spring water from junction to a trough to install approximately 800 feet downslope to opening.

Figure F-5. Meadow below unit 21-A (construct pipeline from springbox to trough in center of opening)

Stewardship Unit 21-B

T34S, R3E, Sec 21, OI 005

History:

- Area was first tractor logged in 1950, relogged in 1955, and clear-cut in 1960.
- Post-harvest slash was machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Pockets and individual residual conifers remained scattered throughout and on edge of unit.
- Precommercially thinned in 1976.
- Fertilized in 1978.
- Planted with Douglas-fir in 1979, 1980, and 1981.
- Ripped and scarified in 1984.
- Interplanted with Douglas-fir and mulched in 1984.
- Precommercially thinned in 1990.

Existing Stand:

- 100 ponderosa pine per acre; 4-16″ DBH.
- Less than 100 understory conifers per acre, primarily Douglas-fir and incense cedar.
- Understory size classes range from seedling to 15 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature conifers scattered on edge of unit.

Recommended Treatment:

- Thin ponderosa pines to all but the largest 40 to 70 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of a vigorous adjacent, desirable fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Construct approximately 580 feet of minimal standard roads; 2 roads (395′ and 185′).
- Following use, scarify road grade and seed with native grass.
- Block road to prevent vehicle access.

Other work to be done in and adjacent to cutting unit:

- Collect water coming from springs along BLM roads #34-3E-21.1 and 21.3 ditches. Specific design from contractor proposals. Remove water from ditch in order to maintain ditch in dry condition. Pipe water across roadway to free-flow across ground. Fence wet areas. Pipe spring water from junction to a trough to install approximately 800 feet downslope to opening.

Figure F-5. Meadow below unit 21-B (construct pipeline from springbox to trough in center of opening)

Stewardship Unit 21-C

T34S, R3E, Sec 21, OI 006

History:

- Area was first tractor logged in 1950, relogged in 1955, and clear-cut in 1960.
- Post-harvest slash machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Pockets and individual residual conifers remained scattered through and on edge of unit.
- Precommercially thinned in 1977.
- Fertilized in 1978.
- Douglas-fir seedlings planted in 1978, ‘79, ’80, ‘81

Existing Stand:

- 90 to 300 ponderosa pine per acre; 4-18″ DBH.
- 200 to 800 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 15 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature conifers scattered throughout and on edge of unit.

Recommended Treatment:

- Cut and remove all but the largest ponderosa pines; leave 10 to 20 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent, desirable fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Following pine harvest, precommercially thin the understory conifers to 200 trees per acre, approximately 15′ x 15′ spacing.
- When possible, within the time frame of the Stewardship contract, cut and remove precommercial material for use as special forest products, such as poles, posts, Christmas trees, and bird perch material.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Construct approximately 3,640 feet of minimal standard road.
- Following use, scarify road grade and seed with native grass.
- Block road to prevent vehicle access.

Other work to be done in and adjacent to cutting unit:

- Aggrade degraded stream bed by various methods proposed by contractor.
- Fence channel to prevent cattle access.
- Protect or develop spring in ash grove for water source.
- Remove approximately 2.5 miles of old grazing study fence, including 3 troughs, for reuse on other projects in stewardship contract.
- Fully decommission BLM road #34-3E-21.4. Remove large culvert in Horseshoe Creek; stabilize banks; and rip, scarify, and seed roadbed. Consider using chipped slash to mulch roadbed. Block at highway.

Figure F-6. Typical overstory ponderosa pine with understory mixed conifers

Figure F-7. Meadow on north end of unit 21-C with degraded stream channel

Stewardship Unit 21-D

T34S, R3E, Sec 21, OI 006

History:

- Area was first tractor logged in 1950, relogged in 1955, and clear-cut in 1960.
- Post-harvest slash machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Pockets and individual residual conifers remained scattered through and on edge of unit.
- Precommercially thinned in 1977.
- Fertilized in 1978.
- Douglas-fir seedlings planted in 1978, ‘79, ’80, ‘81

Existing Stand:

- 100 to 1500 ponderosa pine per acre; 4-18″ DBH.
- 50 to 100 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 15 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature conifers scattered throughout and on edge of unit.

Recommended Treatment:

- Thin all but the largest ponderosa pine; leave 40 to 70 pines per acre.
- Pines to remain should have good crown form and crown ratio.
- Pines to remain should not impede the development of an immediately adjacent, desirable fir or cedar sapling.
- Harvest pine with low-ground pressure Feller-Buncher. This would require whole tree harvesting with slash to be consumed at landing.
- Pockets and edges of mature timber within area of old pine plantation would be commercially thinned and/or submerchantable material density thinned.

Road Use:

- Use existing BLM road #34-3E-21.4. Decommission after logging and fence removal.

Other work to be done in and adjacent to cutting unit:

- Protect or develop spring below end of BLM road #34-3E-21.4 for water source.
- Remove approximately 2.5 miles of old grazing study fence, including 3 troughs, for reuse on other projects in stewardship contract.
- Fully decommission BLM road #34-3E-21.4. Remove large culvert in Horseshoe Creek; stabilize banks; and rip, scarify, and seed roadbed. Consider using chipped slash to mulch roadbed. Block at highway.

Figure F-8. Spring below BLM road #34-3E-21.4 to be protected and developed for water supply.

Stewardship Unit 21-E

T34S, R3E, Sec 21, OI 006

History:

- Area was first tractor logged in 1950, relogged in 1955, and clearcut in 1960.
- Post-harvest slash machine piled and burned.
- Planted with ponderosa pine seedlings of unknown origin in 1963.
- Pockets and individual residual conifers remained scattered through and on edge of unit.
- Precommercially thinned in 1977.
- Fertilized in 1978.
- Douglas-fir seedlings planted in 1978, 1979, 1980, and 1981

Existing Stand:

- 100 to 150 ponderosa pine per acre; 4-16″ DBH.
- 50 to 100 understory conifers per acre, primarily Douglas-fir with white fir and incense cedar.
- Understory size classes range from seedling to 15 feet tall.
- Extensive old skid road network resulting in widespread compaction.
- Pockets and individual mature fir trees scattered throughout unit.

Recommended Treatment:

- Unit is adjacent to mature Douglas-fir stand with well-established laminated root rot.
- Objective is to create a “fir-free” zone around OI Unit 007.
- Reserve all but the smallest and poorest-crowned ponderosa pines.
- Cut and remove all merchantable fir trees.
- Lop and scatter all submerchantable fir trees.
- Plant incense cedar and sugar pine seedlings the year following harvest; 8′ x 8′ spacing. Mulch seedlings.

Road Use:

- Use existing BLM road #34-3E-21.4. Decommission road after logging and fence removal.